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DOI:

[10.1016/j.cegh.2022.101073](https://doi.org/10.1016/j.cegh.2022.101073)

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Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Uwishema, O, Elebesunu, EE, Bouaddi, O, Kapoor, A, Akhtar, S, Effiong, FB, Chaudhary, A & Onyeaka, H 2022, 'Poliomyelitis amidst the COVID-19 pandemic in Africa: Efforts, challenges and recommendations', *Clinical Epidemiology and Global Health*, vol. 16, 101073. <https://doi.org/10.1016/j.cegh.2022.101073>

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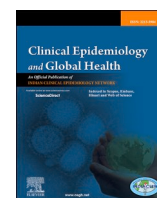
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Poliomyelitis amidst the COVID-19 pandemic in Africa: Efforts, challenges and recommendations

Olivier Uwishema^{a,b,c,*}, Emmanuel Ebuka Elebesunu^{a,d}, Oumnia Bouaddi^{a,e}, Arushi Kapoor^{a,f}, Samaa Akhtar^{a,g}, Fortune Benjamin Effiong^{a,h}, Adhiraj Chaudhary^{a,i}, Helen Onyeaka^j

^a Oli Health Magazine Organization, Research and Education, Kigali, Rwanda

^b Clinton Global Initiative University, New York, USA

^c Faculty of Medicine, Karadeniz Technical University, Trabzon, Turkey

^d Department of Medical Laboratory Sciences, University of Nigeria, Enugu Campus, Enugu, Nigeria

^e Faculty of Dentistry, Mohammed V University, Rabat, Morocco

^f Amity Institute of Biotechnology, Amity University, Delhi, India

^g University of London, London, England, UK

^h Department of Clinical Chemistry and Immunology, Faculty of Medical Laboratory Science, University of Calabar, Calabar, Nigeria

ⁱ Vardhaman Mahavir Medical College and Safdarjung Hospital, New Delhi, India

^j School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham, B152TT, UK

ARTICLE INFO

Keywords

Poliovirus
Vaccine
Polio
Africa
Poliomyelitis
COVID-19

ABSTRACT

Poliomyelitis is the leading infectious cause of acute flaccid paralysis among children under five years of age, caused by the Wild Poliovirus, with no medical cure other than prevention through vaccination. The advent of mass vaccination campaigns against polio disease worldwide has greatly decreased the number of global cases and limited the rate of transmission. However, the emergence of Vaccine-derived Poliovirus due to genetic reversions in the live attenuated oral polio vaccine has posed a significant impediment to global polio eradication efforts. Therefore, There is a need to modify the vaccination regimen by utilizing more doses of inactivated poliovirus vaccine or adopting the bivalent oral polio vaccine in order to eliminate the transmission of Vaccine-derived Poliovirus. In addition, collective efforts from governments, health policymakers, vaccination groups and health-related bodies are required to improve vaccine coverage and suppress the circulation of Vaccine-derived Poliovirus.

1. Impact

- Poliomyelitis is the leading infectious cause of acute flaccid paralysis among children under five years of age.
- Poliomyelitis is caused by the Wild Poliovirus, with no medical cure other than prevention through vaccination.
- The advent of mass vaccination campaigns against polio disease worldwide has greatly decreased the number of global cases and limited the rate of transmission.

2. Introduction

The Coronavirus Disease – 2019 (COVID-19) pandemic has resulted in a public health crisis worldwide, causing significant disruptions in global health economies and systems. However, a global health milestone was achieved in Africa amidst this crisis. On August 25, 2020, the continent was declared free of Wild Poliovirus (WPV).¹ Until 2012, polio in Africa accounted for most cases worldwide.¹ Poliomyelitis is an infectious disease caused by the Poliovirus, which causes paralysis in children under five years of age and has no cure. However, it can be

Abbreviations: WPV, Wild Poliovirus; COVID-19, Coronavirus Disease – 2019; VDPV, Vaccine-derived Poliovirus; GPEI, Global Polio Eradication Initiative; WHO, World Health Organization; cVDPV, Circulating Vaccine-derived Poliovirus; OPV, Oral Polio Vaccine; IPV, Inactivated Poliovirus Vaccine; SIAs, Supplementary Immunization Activities.

* Corresponding author. Oli Health Magazine Organization, Research and Education, Kigali, Rwanda.

E-mail addresses: uwolivier1@ktu.edu.tr (O. Uwishema), elebesunumichael@gmail.com (E.E. Elebesunu), oumnia.bouaddi@um5s.net.ma (O. Bouaddi), kapoorarushi31@gmail.com (A. Kapoor), samaa.akhtar@gmail.com (S. Akhtar), effiongfortuneb@gmail.com (F.B. Effiong), adhirajmanila@gmail.com (A. Chaudhary), h.onyeaka@bham.ac.uk (H. Onyeaka).

<https://doi.org/10.1016/j.cegh.2022.101073>

Received 10 March 2022; Received in revised form 18 May 2022; Accepted 22 May 2022

Available online 29 May 2022

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prevented through vaccination. The polio eradication programme in the African region has successfully vaccinated over 220 million children since its discovery¹ which is highly commendable, but sustaining its success has been met with challenges such as the emergence of Vaccine-derived Poliovirus (VDPV) in several African countries and the global prioritization of COVID-19 response and control efforts.¹ The African countries which are at high risk for polio are Senegal, Mali, Niger, Chad, Egypt, Mauritania, The Gambia, Guinea Bissau, Kenya, Uganda, Sudan, Guinea, Burkina Faso, Sierra Leone, Liberia, Côte d'Ivoire, Benin, Nigeria, Cameroon, Central African Republic, South Sudan, Ethiopia, Somalia, Republic of the Congo, Democratic Republic of the Congo, Madagascar.² (see Figs. 1 and 2)

3. The situation of poliomyelitis in Africa prior to COVID-19

Back in 1988, when the peak number of polio cases was attained, the Global Polio Eradication Initiative (GPEI) was established to combat the spread of the virus, and since then, there has been a significant drop in the worldwide case count, with very few countries still endemic to the disease.³ Between 2008 and 2009, the transmission of type 1 and 3 WPV cases occurred in 12 African countries, including Nigeria, the Republic of Senegal, Niger, Liberia, Chad and Mali.³ In 2012 and 2013, there were about 122 and 53 WPV cases, respectively, signifying a 58% decrease in African cases. This was followed by an 88% drop in WPV cases by 2014.³ The rapid decrease in African polio cases continued until 2016, when the last WPV case was recorded in Nigeria. This prompted the World Health Organization (WHO) to declare Africa free of Wild Poliovirus in 2020, leaving only the South Asian countries Afghanistan and Pakistan endemic to the disease.³

This gave the world optimistic hope regarding total polio eradication in Africa. However, this hope was quickly diminished by the emergence of the circulating Vaccine-derived Poliovirus (cVDPV) in a number of African countries. The Oral Polio Vaccine (OPV) contains the live poliovirus in its attenuated form, and upon vaccination, the virus may regain viability on rare occasions and begin to replicate rapidly in the intestines before spreading to other organs, thereby causing paralytic symptoms similar to those caused by the WPV.⁴ This usually happens in

POLIO ERADICATION: THE ULTIMATE GOAL

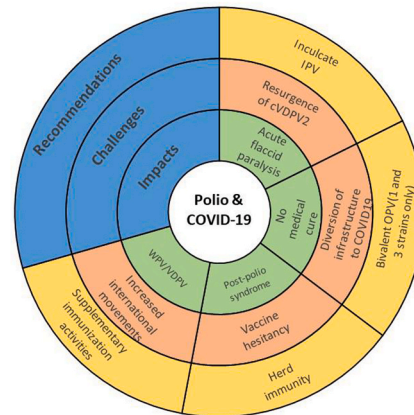


Fig. 2. Polio eradication: The ultimate goal.

populations with very low immunity due to low vaccination coverage. Currently, there are over 600 cases of cVDPV worldwide, of which 515 are cases of cVDPV2 in Africa, while 90 are cases of cVDPV1 in Madagascar, Yemen and Tajikistan, and 1 case of cVDPV3 in Israel. In addition, Afghanistan and Pakistan remain endemic to WPV1, with 4 and 2 cases in the two countries, respectively, as of May 2022).⁵ Unfortunately, the WHO was recently notified about the detection of one case of WPV1 in Malawi on 17th February 2022.

4. Current efforts and challenges facing polio eradication in Africa

The COVID-19 pandemic has caused disruptions in global polio eradication efforts and vaccination campaigns in Africa,⁶ threatening to reverse years of progress in the eradication. There is an increased likelihood of polio resurgence in Africa due to continuous international movements between Africa and polio-endemic South Asian countries

Poliomyelitis Amidst the COVID-19 Pandemic in Africa-Efforts, Challenges and Recommendations

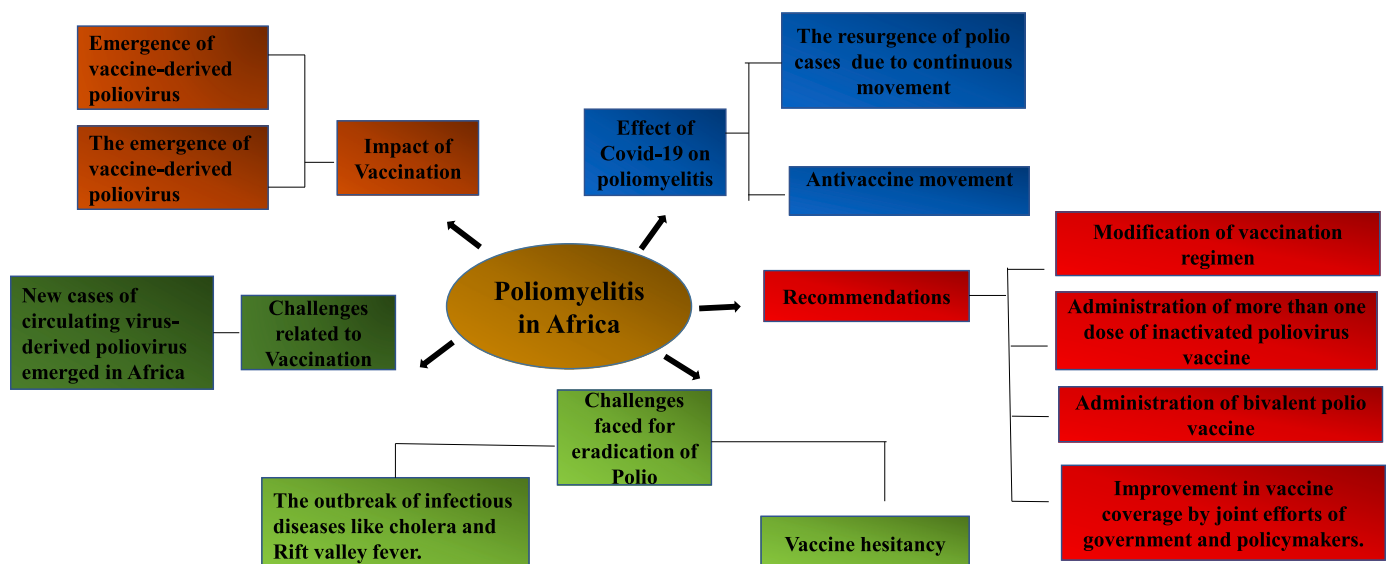


Fig. 1. Poliomyelitis amidst the COVID-19 pandemic in Africa: Efforts, challenges and recommendations.

like Pakistan and Afghanistan.⁶ Polio vaccination coverage in Africa has also been affected by the ongoing fragility, terrorism and anti-vaccine movements in some regions.⁷ Amidst the pandemic, various African countries diverted their infrastructure and expertise in polio outbreak response towards limiting the rate of COVID-19 transmission. Currently, the polio eradication laboratory network in Africa has dedicated 50% of its diagnostic capacity to carrying out COVID-19 testing in 15 African countries, and a quarter of the World Health Organization (WHO) polio staff have dedicated more than 80% of their time towards the COVID-19 response.⁸ While bringing these resources to the COVID-19 frontlines is commendable, the circulating Vaccine-Derived Poliovirus (cVDPV) is still a major issue, and the polio assets are still needed to accelerate vaccine coverage and halt cVDPV transmission.

Another daunting challenge in the African region is the problem of vaccine hesitancy due to immunization misconceptions, which have impeded vaccine coverage. However, thanks to an extensive network of polio personnel in hard-to-reach communities, there have been successful dissemination of public health messages to dispel misinformation while also leveraging polio success stories to encourage parents and caregivers to allow their children to get vaccinated against the disease.⁹ In addition to the polio outbreak, some African countries were simultaneously facing other infectious diseases and viral outbreaks such as Lassa fever, HIV/AIDS, cholera, Dengue fever, Rift Valley fever, pneumonia, African Swine fever and Crimean-Congo haemorrhagic fever¹⁰⁻¹⁹

5. Recommendations for tackling poliomyelitis in Africa

To tackle the trend of VDPV emergence in Africa, modifying the vaccination regimen is necessary. Countries making use of only the Oral Polio Vaccine (OPV) should inculcate at least one or more doses of Inactivated Poliovirus Vaccine (IPV) in their vaccination schedule, as IPV shots are less likely to revert to the virulent form, and most cases of circulating vaccine-derived poliovirus (cVDPV) occur in areas where only OPV is used, or immunization coverage is low.²⁰ It is also important to limit the use of trivalent OPV containing types 1, 2 and 3 strains of the poliovirus, and make more use of bivalent OPV (types 1 and 3 only), as the presence of the type 2 strain has a higher likelihood of causing cVDPV type 2 (cVDPV2), which is the prevalent form of vaccine-derived poliovirus.²¹ Achieving these vaccination strategies involves mobilization of volunteer community groups and establishing public-private health partnerships to maintain continuous administration of the recommended polio vaccines through supplementary immunization activities (SIAs). This will help improve vaccine coverage, maintain herd immunity, and suppress the emergence of cVDPV in various African countries.

6. Conclusion

COVID-19 and its spillover effects have threatened to reverse the milestones achieved in managing long-standing disease threats on the African continent, one of which is poliomyelitis. Furthermore, the resurgence of cVDPV has also exerted additional pressure on fragile African public health systems. Altering the vaccination regimen by inculcating doses of IPV and making use of OPV types 1 and 3 are means of curtailing the spread of prevalent VDPV. Concurrently, addressing the determinants of vaccine hesitancy is of paramount importance to restore confidence in the effectiveness of immunization, which was deflated due to the misinformation surrounding the COVID-19 vaccine.

Funding

We have not received any financial support for this manuscript.

Data availability statement

Not Applicable.

Ethics approval

Not Applicable.

Authors' contributions

Olivier Uwishema – Conceptualization, Project administration, Writing-review and Designing, **Emmanuel Elebesunu** – Literature search, Writing-review, Draft editing, **Helen Onyeaka** – Reviewed and edited the first draft, Supervisor, **Helen Onyeaka, Olivier Uwishema** – Reviewed and edited the second draft, Supervisor.

Declaration of competing interest

None.

Acknowledgment

None.

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