

Pneumonia amidst the COVID-19 pandemic in Africa

Uwishema, Olivier; Onyeaka, Helen; Alshareif, Baha Aldeen Abdalaziz; Omer, Mohammed Eltahier Abdalla; Sablay, Alfredo Lorenzo Recio; Tariq, Rabeet; Mohamed, Rayan Ibrahim Hamid; Zahabioun, Amirsaman; Yousif, Mohamed Yousif Elamin; Chalhoub, Elie; Tovani-Palone, Marcos Roberto

DOI:

[10.1002/hsr2.493](https://doi.org/10.1002/hsr2.493)

License:

Creative Commons: Attribution (CC BY)

Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Uwishema, O, Onyeaka, H, Alshareif, BAA, Omer, MEA, Sablay, ALR, Tariq, R, Mohamed, RIH, Zahabioun, A, Yousif, MYE, Chalhoub, E & Tovani-Palone, MR 2022, 'Pneumonia amidst the COVID-19 pandemic in Africa: Challenges and possible solutions', *Health Science Reports*, vol. 5, no. 1, e493. <https://doi.org/10.1002/hsr2.493>

[Link to publication on Research at Birmingham portal](#)

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

CORRESPONDENCE

Pneumonia amidst the COVID-19 pandemic in Africa: Challenges and possible solutions

Africa has been significantly affected by the ongoing coronavirus disease 2019 (COVID-19) pandemic. It is noteworthy in this context that this is the continent with the poorest and most vulnerable populations to infectious diseases.¹ Since the emergence of the pandemic, scientific journals have published much literature on the topic; however, among the research articles published from June to December 2020, only 1.5% mentioned Africa in their titles or abstracts. Moreover, data from Sub-Saharan Africa underestimates the pandemic due to several factors, such as the overall low testing capacity and lack of laboratories, limited access to and weakness of health services, and political constraints, all of which suggest an imperative need for better reporting and further research on COVID-19 in Africa.²

Pneumonia is the leading global cause of mortality in children under 5 years old. However, this disease still occurs frequently in working-age immunocompromised individuals and older adults (>70 y/o) with prior chronic conditions.³⁻⁵ For decades, pneumonia has been the second-leading cause of admission to adult medical wards in Africa, behind only malaria.⁶ Recently, although improved conjugate vaccines, such as the pneumococcal conjugate vaccine (PCV) and Haemophilus influenzae type b (HiB), have contributed to a decrease in the incidence and severity of pneumonia in infants and adults,⁷ the occurrence of secondary bacterial pneumonia, and fungal and viral pulmonary co-infections on top of COVID-19 pneumonia has worsened the situation.^{8,9}

Co-infection with viral pneumonia is not rare¹⁰ and often results in hypoxia, acute respiratory distress syndrome, and multiple organ failure, with significant morbidity and mortality rates.^{11,12} Despite this, no prevalence studies of pneumonia as a comorbidity of COVID-19 or non-COVID pneumonia have been conducted in Africa during the pandemic. Co-infection with bacteria or fungi may complicate existing viral pneumonia, especially in critically ill patients.¹³ These infections may vary according to the local endemic/epidemic infections, suggesting that results may differ in Africa. Therefore, the continent's response to the pandemic should always consider the epidemiology of comorbidities and co-infections.¹⁴ Currently, there is also a need for prevalence studies to define the significance of different types of pneumonia as a comorbidity of COVID-19 or as individual infections apart from COVID-19, followed by their respective morbidity and mortality status. Defining the significance of the problem would be only the first step in taking significant steps moving forward for its solution.

In addition to pneumonia, some African countries have faced other infectious diseases outbreaks.⁹ In light of this, new strategies to

address risk factors for pneumonia and severe COVID-19, such as child, maternal, environmental, pathogen, and health system factors, with a focus on strengthening opportunities for health promotion and infection prevention and control should primarily be explored.⁴ This can be initiated through supported community-based healthcare strategies in health education and health promotion campaigns concerning hygiene, pneumonia, and COVID-19. Moreover, assessing the knowledge, attitude, and perceptions of local households and communities towards pneumonia and COVID-19, including other pertinent endemic infectious diseases, and especially tackling misinformation and vague practices can assist in developing specific and targeted measures for health promotion and education. This is because health measures must only be effective if the population would agree, cooperate, and be fully involved in their planning and implementation.¹⁵

Another critical point is that Pneumococcal conjugate vaccine (PCV) and Haemophilus influenzae type b (HiB) vaccination were shown to significantly decrease the incidence and severity of pneumonia-related mortality in children.^{4,16} With PCV vaccination specifically, it was estimated that pneumonia mortality was reduced by 23% to 33% in children less than 19 years old, preventing approximately 18 000 deaths between 2009 and 2016 in South Africa.¹⁶ Moreover, a significant decrease in pneumococcal pneumonia in adults has been achieved by the process of immunizing children, given that it interrupts the transmission of disease-causing serotypes from the pediatric nasopharynx to susceptible adult populations.⁴ In this connection, it is beneficial to countries with high incidence and mortality of pneumonia to strengthen immunization programs for HiB, PCV, diphtheria, pertussis, measles, as well as Influenza, in line with the World Health Organization's Expanded Program on Immunization (EPI) programs, and thus to prevent pneumonia in relation to the capacity of each country.

Along with immunization, the inclusion of nutritional rehabilitation, zinc supplementation, exclusive breastfeeding, availability of drinking water and basic sanitation, and hygiene strategies will strengthen public health intervention for pneumonia prevention, especially amidst the COVID-19 pandemic.¹⁷⁻¹⁹ In the settings that bear an additional burden of the pandemic, there must be availability and access to necessary antimicrobials and other medications in health care centers and hospitals, while simultaneously increasing the capacity and knowledge of community health workers and medical professionals.⁷ Intervention for respiratory care of severe COVID-19 pneumonia patients as well as post-intensive care programs must also be considered in this context.²⁰

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2022 The Authors. *Health Science Reports* published by Wiley Periodicals LLC.

Africa is plagued by a weak health care system associated with a significant immunocompromised population.¹ Harsh living conditions coupled with large families confined in limited living spaces should warrant a review of current containment, lockdown, and curfew implementations.¹⁵ To secure and sustain reduced morbidity and mortality of pneumonia, opportunities to improve the socioeconomic and living conditions of African communities must be explored.⁴ In addition, guidance and support from authorities and health agencies, transparent consultation and information dissemination regarding the COVID-19 pandemic, as well as on other health concerns, would allow the population to make informed decisions to protect their health and those of their families.¹⁵

Finally, it is also worthwhile to promote community engagement through cultural and religious leaders and enable risk communication in local languages to rapidly identify red flag symptoms of COVID-19 pneumonia, especially in local communities. Furthermore, telemedicine may be applied to reach patients in rural settings, where healthcare may be scarce, improving infectious disease surveillance.

FUNDING

We did not receive any funding for this project.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Olivier Uwishema.

Data Curation: Olivier Uwishema, Helen Onyeaka, Baha Aldeen Abdalaziz Alshareif, Mohammed Eltahier Abdalla Omer, Alfredo Lorenzo Recio Sablay, Rabeet Tariq, Rayan Ibrahim Hamid Mohamed, Amirsaman Zahabioun, Mohamed Yousif Elamin Yousif, Elie Chalhoub, Marcos Roberto Tovani-Palone.

Formal Analysis: Olivier Uwishema, Helen Onyeaka, Baha Aldeen Abdalaziz Alshareif, Mohammed Eltahier Abdalla Omer, Alfredo Lorenzo Recio Sablay, Rabeet Tariq, Rayan Ibrahim Hamid Mohamed, Amirsaman Zahabioun, Mohamed Yousif Elamin Yousif, Elie Chalhoub, Marcos Roberto Tovani-Palone.

Methodology: Olivier Uwishema.

Project Administration: Olivier Uwishema.

Supervision: Marcos Roberto Tovani-Palone.

Writing – Original Draft Preparation: Olivier Uwishema, Helen Onyeaka, Baha Aldeen Abdalaziz Alshareif, Mohammed Eltahier Abdalla Omer, Alfredo Lorenzo Recio Sablay, Rabeet Tariq, Rayan Ibrahim Hamid Mohamed, Amirsaman Zahabioun, Mohamed Yousif Elamin Yousif, Elie Chalhoub, Marcos Roberto Tovani-Palone.

Writing – Review & Editing: Marcos Roberto Tovani-Palone, Helen Onyeaka.

All authors have read and approved the final version of the manuscript.


TRANSPARENCY STATEMENT

The authors affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects

of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Olivier Uwishema^{1,2,3} 

Helen Onyeaka⁴

Baha Aldeen Abdalaziz Alshareif⁵ 

Mohammed Eltahier Abdalla Omer⁶ 

Alfredo Lorenzo Recio Sablay⁷

Rabeet Tariq⁸

Rayan Ibrahim Hamid Mohamed⁹

Amirsaman Zahabioun^{2,10}

Mohamed Yousif Elamin Yousif⁹ 

Elie Chalhoub^{1,11}

Marcos Roberto Tovani-Palone¹² 

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

⁴School of Chemical Engineering, University of Birmingham, Edgbaston, UK

⁵Faculty of Medicine and Surgery, Al-Zaiem Al-Azhari University, Khartoum, Sudan

⁶Gadarrif University, Faculty of Medicine and Health Sciences, Khartoum, Sudan

⁷Faculty of Medicine and Surgery, University of Santo Tomas, Manila, Philippines

⁸Liaquat National Hospital and Medical College, Karachi, Pakistan

⁹Faculty of Medicine, University of Khartoum, Khartoum, Sudan

¹⁰College of Arts and Sciences: Department of Biology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

¹¹Faculty of Medicine, University of Saint Joseph of Beirut, Beirut, Lebanon

¹²Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brazil

Correspondence

Marcos Roberto Tovani-Palone, Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brazil.

Email: marcos_palone@hotmail.com

ORCID

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

Baha Aldeen Abdalaziz Alshareif  <https://orcid.org/0000-0002-7353-2038>

Mohammed Eltahier Abdalla Omer  <https://orcid.org/0000-0002-7131-423X>

Mohamed Yousif Elamin Yousif  <https://orcid.org/0000-0002-9781-5200>

Marcos Roberto Tovani-Palone  <https://orcid.org/0000-0003-1149-2437>

REFERENCES

- Lone SA, Ahmad A. COVID-19 pandemic - an African perspective. *Emerg Microbes Infect.* 2020;9(1):1300-1308. doi:10.1080/22221751.2020.1775132
- Colombo S, Scuccato R, Fadda A, Cumbi AJ. COVID-19 in Africa: the little we know and the lot we ignore. *Epidemiol Prev.* 2020;44(5-6 Suppl 2):408-422. doi:10.19191/EP20.5-6.S2.146 PMID: 33412836.
- Torres A, Cilloniz C, Niederman MS, et al. Pneumonia. *Nat Rev Dis Primers.* 2021;7(1):25-28. doi:10.1038/s41572-021-00259-0
- Marangu D, Zar H. Childhood pneumonia in sub-Saharan Africa: still a challenge. *J Pan Afr Thorac Soc.* 2021;2(1):1-3. doi:10.25259/JPATS_29_2020
- McAllister DA, Liu L, Shi T, et al. Global, regional, and national estimates of pneumonia morbidity and mortality in children younger than 5 years between 2000 and 2015: a systematic analysis. *Lancet Glob Health.* 2019;7(1):e47-e57. doi:10.1016/S2214-109X(18)30408-X
- Mabey D, Gill G, Perry SE, Weber MW, Whitty SJM. *Principles of Medicine in Africa.* Fourth ed. Cape Town, South Africa: Cambridge University Press; 2013.
- Druetz T, Siekmans K, Goossens S, Ridde V, Haddad S. The community case management of pneumonia in Africa: a review of the evidence. *Health Policy Plan.* 2015;30(2):253-266. doi:10.1093/heapol/czt104
- Cox MJ, Loman N, Bogaert D, O'Grady J. Co-infections: potentially lethal and unexplored in COVID-19. *Lancet Microbe.* 2020;1(1):e11. doi:10.1016/S2666-5247(20)30009-4
- Uwishema O, Onyeaka H, Alshareif BAA, et al. Current context of pneumonia amidst the COVID-19 pandemic in Africa. *J Contemp Stud Epidemiol Public Health.* 2021;2:ep21007. doi:10.30935/jconsep/11281
- Kim D, Quinn J, Pinsky B, Shah NH, Brown I. Rates of co-infection between SARS-CoV-2 and other respiratory pathogens. *JAMA.* 2020;323(20):2085-2086. doi:10.1001/jama.2020.6266
- Nowak MD, Sordillo EM, Gitman MR, Paniz Mondolfi AE. Coinfection in SARS-CoV-2 infected patients: where are influenza virus and rhinovirus/enterovirus? *J Med Virol.* 2020;92(10):1699-1700. doi:10.1002/jmv.25953
- Wu C, Chen X, Cai Y, et al. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China. *JAMA Intern Med.* 2020;180(7):934-943. doi:10.1001/jamainternmed.2020.0994. Erratum in: *JAMA Intern Med.* 2020 Jul 1;180(7):1031.
- Lansbury L, Lim B, Baskaran V, Lim WS. Co-infections in people with COVID-19: a systematic review and meta-analysis. *J Infect.* 2020;81(2):266-275. doi:10.1016/j.jinf.2020.05.046
- Anjorin AA, Abioye AI, Asowata OE, et al. Comorbidities and the COVID-19 pandemic dynamics in Africa. *Tropical Med Int Health.* 2021;26(1):2-13. doi:10.1111/tmi.13504
- Mennechet FJD, Dzomo GRT. Coping with COVID-19 in sub-Saharan Africa: what might the future hold? *Virolog Sin.* 2020;35(6):875-884. doi:10.1007/s12250-020-00279-2
- Kleynhans J, Tempia S, Shioda K, von Gottberg A, Weinberger DM, Cohen C. Estimated impact of the pneumococcal conjugate vaccine on pneumonia mortality in South Africa, 1999 through 2016: an ecological modelling study. *PLoS Med.* 2021;18(2):e1003537. doi:10.1371/journal.pmed.1003537
- Leung DT, Chisti MJ, Pavia AT. Prevention and control of childhood pneumonia and diarrhea. *Pediatr Clin N Am.* 2016;63(1):67-79. doi:10.1016/j.pcl.2015.08.003
- World Health Organization (WHO). Essential nutrition actions: improving maternal, newborn, infant and young child health and nutrition. Geneva: WHO; 2013 [cited June 2, 2021]. <https://apps.who.int/iris/handle/10665/84409>
- GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the global burden of disease study 2019. *Lancet.* 2020;396(10258):1204-1222. doi:10.1016/S0140-6736(20)30925-9. Erratum in: *Lancet.* 2020 Nov 14;396(10262):1562.
- Attaway AH, Scheraga RG, Bhimraj A, Biehl M, Hatipoğlu U. Severe covid-19 pneumonia: pathogenesis and clinical management. *BMJ.* 2021;372:n436. doi:10.1136/bmj.n436