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Editorial Board

Editorial Brief

We have in the second volume of IJMGS articles that were peer reviewed by scholars in the field. All, but one, were presented at various times on virtual weekly webinar organized by the Centre. They were then revised and independently reviewed as part of intellectual rigour the Journal editorial is noted for. The coverage is multidisciplinary in contents, and trans-global in analyses. The current world discourse is predicated on three main issues: health and development in the midst of ravaging COVID-19 pandemic; climate change; and food security. The commonality with the three challenges, and scholar's interrogation, is the phenomenal transdisciplinary Migration and its global context. The articles in this volume are rich in contents, informative in analyses; and refreshing in evidence. They are useful in all parameters and will add value to finding solutions to some of the issues raised on all topics.

Hakeem I. Tijani
Editor

Syndemicity of COVID-19: Implications for Global Studies on the Pandemic

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Abstract

The syndemic model exemplifies the effect of the clustering of health conditions which are intensified by socioecological factors that result in worse outcomes among vulnerable populations. The ongoing COVID-19 pandemic has demonstrated varying health outcomes against a backdrop of distinctive structural contexts. A holistic view of the factors responsible for the wavering health outcomes at the individual, family and community levels point to the interplay between biological and socioecological factors.

Studies have shown the role the biological interactions of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with existing communicable and non-communicable diseases play

in increasing vulnerability to worse health outcomes. A similar dynamic has been demonstrated by the biological interactions of the virus with social determinants of health and political factors. Together, these factors synergistically create a spectrum of possible outcomes, making some individuals and populations more vulnerable to worse outcomes than others.

Though several COVID-19 studies have been conducted, there are relatively few studies which explore the disease from a syndemic model. This leaves a research gap in the study of the effects of the disease on existing diseases in the host system, as well as social, environmental, and political factors that may increase the risk of individuals and populations to clustered disease effects. Researchers are urged to view the COVID-19 pandemic through a syndemic lens, and design and implement studies based on this perspective. In addition, we recommend the development and implementation of a global syndemic framework by international bodies, which will be adaptable at national and subnational levels for the conduct COVID-19 related studies. These could provide better understanding of the virus and the factors that lead to the clustering effects which have both direct and indirect impact on health outcomes.

Keywords: COVID-19, pandemics, syndemics, global studies

Background

The synergistic interaction between biological and socioecological factors resulting in varying health outcomes is a "syndemic". This concept was defined by Merrill Singer in the 1990s as "a set of closely intertwined and mutual enhancing health problems that significantly affect the overall health status of a population within the context of a perpetuating configuration of noxious social conditions".[1] The clustering effect of biological factors and socioecological factors, working together to create distinctions could make some individuals or communities more vulnerable to a particular disease than others.

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory coronavirus 2 (SARS-CoV-2). Being a novel virus, significant body of knowledge around this virus is still being generated. The pandemic is arguably one of the biggest threats to global health security in the 21st century and its effects have been profound across the world.[2] However, the pandemic has had varying effects across different contexts, including the individual, community, and national levels. This may not be unrelated to the interconnectedness of COVID-19 vulnerabilities and outcomes with the biological, social, environmental, and political factors in these contexts. A significant proportion of studies conducted on COVID-19 may have failed to holistically consider the role socioecological factors play in the pandemic. This gap in research limits the evidence-based information on structural and deep-

[1] Merrill Singer, "A Dose of Drugs, a Touch of Violence, a Case of AIDS: Conceptualizing the SAVA Syndemic," *Free Lnqwry - Speoal Issue: Gangs. Drugs & Violence* 24, no. 2 (1996): 99, https://ojs.library.okstate.edu/osu/index.php/FICS/article/view/1346.

[2] Oluwatosin Wuraola Akande and Tanimola Makanjuola Akande, "COVID-19 Pandemic: A Global Health Burden," *Nigerian Postgraduate Medical Journal, Nigeria* 27 (July 2020): 144–55, https://doi.org/10.4103/npmj.npmj_157_20.

rooted implications and potential interventions for the pandemic. This paper aims to describe the syndemicity of COVID-19 and its implications on global studies on the pandemic.

The Syndemicity of COVID-19

Bio-bio interactions

Biological interactions of the SAR-CoV-2 virus with existing pathogens in the host system could result in adverse health outcomes. These biological interactions can be demonstrated with communicable diseases which could be bacterial, parasitic or viral, antimicrobial resistance, and non-communicable diseases.[3] For instance, malaria, a parasitic infection caused by Plasmodium spp. triggers inflammatory reactions which result in clinical symptoms of the disease.[4] Similarly, COVID-19 triggers a lot of inflammatory reactions through the cytokine pathway.[5] SARS-CoV-2 and Plasmodium spp. coinfection is associated with severe COVID-19 as a result of excessive proinflammatory cytokine-mediated responses and hypercoagulable state.[6] These responses

[3] Uday Narayan Yadav et al., "A Syndemic Perspective on the Management of Non-Communicable Diseases Amid the COVID-19 Pandemic in Low- and Middle-Income Countries," *Frontiers in Public Health* 8 (2020): 508, https://doi.org/10.3389/fpubh.2020.00508.

[4] Temitope W. Ademolue et al., "Patterns of Inflammatory Responses and Parasite Tolerance Vary with Malaria Transmission Intensity," *Malaria Journal* 16, no. 1 (April 11, 2017): 145, https://doi.org/10.1186/s12936-017-1796-x.

[5] Yujun Tang et al., "Cytokine Storm in COVID-19: The Current Evidence and Treatment Strategies," *Frontiers in Immunology* 11 (2020): 1708, https://doi.org/10.3389/fimmu.2020.01708.

[6] Mogahed Ismail Hassan Hussein et al., "Malaria and COVID-19: Unmasking Their Ties," *Malaria Journal* 19, no. 1 (December 23, 2020): 457, https://doi.org/10.1186/s12936-020-03541-w.

may manifest in form of acute respiratory distress syndrome (ARDS) and thrombocytopenia, both of which are associated with poor prognosis.

HIV infection has been linked with increased vulnerability to SARS-CoV-2 infection and worse health outcomes. In a systematic review and meta-analysis conducted by Ssentongo et al, there was an 80% excess risk of mortality from COVID-19 among HIV/AIDS patients compared with those without HIV/AIDS.[7] Studies have shown SARS-CoV-2 and Hepatitis B co-infected patients have been found to have increased risk of hepatic dysfunction, altered albumin production and lipid metabolism, and manifestation of symptoms such as severe monocytopenia and thrombocytopenia.[8]

A study of the trend in the use of antibiotics among patients with severe SARS-CoV-2 infection found antibiotic use to be higher than the incidence of bacterial infections.[9] Coupled with the de-prioritization of antimicrobial resistance surveillance and antimicrobial stewardship programmes as a result of the diversion of resources to COVID-19 response, COVID-19 has been

[7] Paddy Ssentongo et al., "Epidemiology and Outcomes of COVID-19 in HIV-Infected Individuals: A Systematic Review and Meta-Analysis," *Scientific Reports* 11, no. 1 (March 18, 2021): 6283, https://doi.org/10.1038/s41598-021-85359-3.

[8] Yong Lin et al., "Patients with SARS-CoV-2 and HBV Co-Infection Are at Risk of Greater Liver Injury," *Genes & Diseases* 8, no. 4 (July 2021): 484–92, https://doi.org/10.1016/j.gendis.2020.11.005; Rui Liu et al., "Clinical Characteristics of COVID-19 Patients with Hepatitis B Virus Infection — a Retrospective Study," *Liver International* 41, no. 4 (2021): 720–30, https://doi.org/10.1111/liv.14774.

[9] Jesús Rodríguez-Baño et al., "Key Considerations on the Potential Impacts of the COVID-19 Pandemic on Antimicrobial Resistance Research and Surveillance," *Transactions of The Royal Society of Tropical Medicine and Hygiene*, no. trab048 (March 27, 2021), https://doi.org/10.1093/trstmh/trab048.

associated with inappropriate antibiotic use and may contribute to antimicrobial resistance in the long term.[10]

Studies have also found patients with non-communicable diseases to have worsened health outcomes when co-infected with COVID-19. A systematic review conducted by Nikoloski et al has shown people living with diabetes, cardiovascular diseases, chronic respiratory diseases, chronic liver and kidney diseases to be more vulnerable to COVID-19.[11] The interaction between COVID-19 and these NCDs have direct and indirect effects on the individual which increase their risk of dying. For instance, patients with hyperglycaemia have more severe COVID-19 health outcomes as a result of modulatory immune and inflammatory responses.[12]

Bio-social interactions

Social determinants of health have a significant effect on the outcome of COVID-19.[13] These social determinants may be grouped into five key domains: health and health care, social and community context, physical environment, education, and economic stability.[14] These factors are also interconnected, as one factor can be linked to the other.

[10] Rodríguez-Baño et al.

[11] Zlatko Nikoloski et al., "Covid-19 and Non-Communicable Diseases: Evidence from a Systematic Literature Review," *BMC Public Health* 21, no. 1 (June 5, 2021): 1068, https://doi.org/10.1186/s12889-021-11116-w.

[12] Soo Lim et al., "COVID-19 and Diabetes Mellitus: From Pathophysiology to Clinical Management," *Nature Reviews Endocrinology* 17, no. 1 (January 2021): 11–30, https://doi.org/10.1038/s41574-020-00435-4.

[13] Sravani Singu et al., "Impact of Social Determinants of Health on the Emerging COVID-19 Pandemic in the United States," *Frontiers in Public Health* 8 (2020): 406, https://doi.org/10.3389/fpubh.2020.00406; Elissa M. Abrams and Stanley J. Szefler, "COVID-19 and the Impact of Social Determinants of Health," *The Lancet Respiratory Medicine* 8, no. 7 (July 1, 2020): 659–61, https://doi.org/10.1016/S2213-2600(20)30234-4.

[14] Michael Marmot and Richard Wilkinson, *Social Determinants of Health* (OUP Oxford, 2005).

Access to healthcare services is key to preventing severe health outcomes from COVID-19 and non COVID-19 cases. Ironically, the COVID-19 pandemic has led to a disruption in access to healthcare services.[15] For example, disruption in routine health services such as immunisation and maternal health services could increase a community's risk to an outbreak of a vaccine preventable disease and worsen maternal health outcomes. An interplay of these factors could result in an increase in a community's vulnerability to the high burden of the disease in terms of morbidity and mortality rates.

Closely linked to education is its impact on health literacy. People who are not educated are likely to have low health literacy.[16] Adherence to public health and social measures is important in the prevention of COVID-19 transmission. Those with low health literacy may not understand need to adhere to this measure and the responsibility they have to others in order to curb the transmission of the virus.[17] In addition, those in fragile communities may be disadvantaged, as they may be underserved in the dissemination of risk communication messages that could reduce transmission of the virus.

Economic stability and social class distinctions have a noteworthy role to play in the outcome of COVID-19. Daily wage earners whose businesses cannot be

[15] Alicia Núñez, S. D. Sreeganga, and Arkalgud Ramaprasad, "Access to Healthcare during COVID-19," *International Journal of Environmental Research and Public Health* 18, no. 6 (March 14, 2021): 2980, https://doi.org/10.3390/ijerph18062980.

[16] Tahereh Bayati et al., "Investigating the Effect of Education on Health Literacy and Its Relation to Health-Promoting Behaviors in Health Center," *Journal of Education and Health Promotion* 7 (October 29, 2018): 127, https://doi.org/10.4103/jehp.jehp_65_18.

[17] Singu et al., "Impact of Social Determinants of Health on the Emerging COVID-19 Pandemic in the United States."

done remotely have to go out to earn a living.[18] Social interventions such as the imposition of lockdowns and closure of businesses in response to the pandemic decreased income for many families during the pandemic.[19] Low socioeconomic status may also be associated with unwillingness to seek healthcare services.[20] These have implications on the individual level and community levels. In addition to putting the individuals and families at increased risk of contracting the virus, those who are asymptomatic or have mild symptoms but must continue to go to work to earn a living serve as a source of infection that could drive community transmission. Conversely, the pandemic provided an increase in demand for high skilled workers, including frontline workers and those in the Information, Communication and Technology (ICT) sector, with an increased likelihood of more income.[21] These factors may suggest that individuals in the lower wealth quintiles are more vulnerable to COVID-19 infection and may have worse outcomes compared with those in higher wealth quintiles.

Physical distancing is one of the public health social measures that contributes towards decreasing transmission of the virus. However, the feasibility of this intervention is variable in different contexts. This is particularly concerning

[18] Centre for the the Study of the Economies of Africa, "COVID 19 and the Informal Sector in Nigeria: The Socio-Economic Cost Implications," April 2020, http://cseaafrica.org/covid-19-and-the-informal-sector-in-nigeria-the-socio-economic-cost-implications/.

[19] Gbemisola Oseni et al., "Tracking the Socioeconomic Impacts of the Pandemic in Nigeria: Results from the First Three Rounds of the Nigeria COVID-19 National Longitudinal Phone Survey," September 2020, https://blogs.worldbank.org/opendata/tracking-socioeconomic-impacts-pandemic-nigeria-results-first-three-rounds-nigeria-covid.

[20] Singu et al., "Impact of Social Determinants of Health on the Emerging COVID-19 Pandemic in the United States."

[21] OECD, "An Assessment of the Impact of COVID-19 on Job and Skills Demand Using Online Job Vacancy Data," April 2021, https://www.oecd.org/coronavirus/policy-responses/an-assessment-of-the-impact-of-covid-19-on-job-and-skills-demand-using-online-job-vacancy-data-20fff09e/.

among those who live in urban slums where overcrowding is a norm. Physical distancing may be close to impossible in this setting, thus increasing their vulnerability to the infection.

Bio-political interactions

Governments are expected to take decisive actions during health emergencies such as the COVID-19 pandemic. However, the response of governments may be politicised for certain political gains. There are reports that some governments might have misused their power and for political gains, declared a state of emergency as a response to the pandemic.[22] Some governments have been implicated in the use of the pandemic as a pretext to crack down on free expression and public access to information.[23] Others have remained adamant in their denial of the existence of the virus and used political power to limit testing for the virus in their constituencies. There are also political costs for (mis)managing the pandemic. Herrera et al found a negative relationship between the number of COVID-19 cases and political approval across countries and time. Governments that placed more emphasis on health outcomes as opposed to short-term economic outcomes gained more political support.[24]

Conversely, mistrust in the government may also influence people's willingness to have confidence in the government guidelines and

[22] The Economist, "Would-Be Autocrats Are Using Covid-19 as an Excuse to Grab More Power | The Economist," April 2020, https://www.economist.com/international/2020/04/23/would-be-autocrats-are-using-covid-19-as-an-excuse-to-grab-more-power.

[23] Freedom House, "Information Isolation: Censoring the COVID-19 Outbreak," 2020, https://freedomhouse.org/report/report-sub-page/2020/information-isolation-censoring-covid-19-outbreak.

[24] Helios Herrera et al., "The Political Consequences of the Covid Pandemic: Lessons from Cross-Country Polling Data," *VoxEU.Org* (blog), November 6, 2020, https://voxeu.org/article/political-consequences-covid-pandemic.

recommendations aimed at responding to the outbreak. In Nigeria, Ezeibe et al found that corruption motivates wide-ranging political distrust which undercuts compliance to government protocols. This undermines the outcomes of government responses to COVID-19 and facilitates the transmission of the virus in the country.[25] The use of the top-down policy approach, without community involvement and participation may also down-play the effect of government protocols, as communities may not be motivated and willing to adhere to such protocols.[26]

Implications for Global Studies on the Pandemic

The consequences of the social determinants on social gaps and health disparities even after the pandemic cannot be overemphasized. The syndemic impacts of COVID-19 could pose a greater public health burden than the pandemic itself. This syndemicity implies that solitary studies of COVID-19 may undermine the complex nature of the disease and prolong the deleterious societal effects beyond the pandemic.

The research roadmap being coordinated by the World Health Organisation (WHO) on COVID-19 is quite comprehensive.[27] However, it may not effectively address the complexity of biological and socioecological interactions as an entity that has led and may continue to lead to structured vulnerabilities in various contexts. Poor interdisciplinary inclusiveness in implementation of

[25] Christian C. Ezeibe et al., "Political Distrust and the Spread of COVID-19 in Nigeria," *Global Public Health* 15, no. 12 (December 1, 2020): 1753–66, https://doi.org/10.1080/17441692.2020.1828987.

[26] Chinwe Lucia Ochu et al., "Responding to a Pandemic through Social and Behavior Change Communication: Nigeria's Experience," *Health Security*, December 18, 2020, hs.2020.0151, https://doi.org/10.1089/hs.2020.0151.

[27] World Health Organisation, "Global Research on Coronavirus Disease (COVID-19)," 2020, https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov.

research agendas mean complex syndemic interactions may not be adequately appraised by current studies. Though skewed research that have focused on the sole effect of COVID-19 have provided quick and useful interventions that have been used to inform the implementation of response strategies (in form of vaccinations, therapeutics, diagnostics and behavioural interventions), there is a gap in more in-depth studies that address the broader and deeper bio-ecological and socioeconomic vulnerabilities that could predispose to worse pandemics in the future.

While it may appear that we may be winning the COVID-19 war, the world is experiencing a trend in emerging and re-emerging threats. This may imply that the COVID-19 pandemic may not be the last pandemic and countries and health systems need to build resilience, particularly during peacetime. Little investment in integrated biomedico-ethnographic studies on COVID-19 keeps the root that feeds pandemics underneath the earth of scientific obscurity. Failure to address the syndemicity of COVID-19 in public health research could result in the global health community remaining on the defensive rather than on the attack line, dealing with periodic “surprises” from biological threats.

The implementation of an integrated multi-disciplinary approach to research will provide a better understanding of the COVID-19 syndemic and generate holistic data that will be more relevant to policymakers, health practitioners, and the public. The amplification and integration of biomedical and ethnographic studies in the global research roadmap would aid the generation of robust scientific evidence which could reduce the negative impact of the COVID-19 syndemic. To ensure community participation and involvement, end-users and target population should be involved in the development and

implementation of research agenda on COVID-19. Similarly, there should be a deliberate consideration of structured vulnerabilities in the design of global and local studies.

Owing to the significant role NCDs play in the pathophysiology and eventual health outcomes of COVID-19, these should be reconsidered as a component of the pathogenetic pathway of COVID-19 outbreak and not just as "pre-existing conditions" or superficially as "co-morbidities". Global research policies should be underpinned by the understanding of COVID-19 as a syndemic, not just a pandemic. As WHO convenes experts to review the current research roadmap, the complexity of COVID-19 that exceeds biomedical boundaries should be more extensively explored.

Conclusion

COVID-19 is not just a pandemic; it is a syndemic. Critical to the understanding of the factors that drive disease clustering effects is the recognition of the role of varying contextual realities. The interplay of biological and socioecological factors has a significant role to play in varying health outcomes in terms of predisposition or vulnerability and severity of the disease. However, this interplay is often undermined. This extends to research studies being conducted, as many studies do not holistically consider the critical role social, environmental and political factors play in COVID-19 outcomes.

To bridge this research gap, we urge researchers to holistically consider the syndemicity of the COVID-19 while designing and implementing research. In addition, there is a need to develop a global syndemic research framework for

holistic studies on the pandemic. This initiative could be led and coordinated by international bodies such as the WHO. This framework should be flexible and adaptable by researchers at the national and subnational levels, to ensure relevance in local contexts. These recommendations could foster broader and deeper understanding of the syndemicity of COVID-19 and potentially lead to the development of evidence-based strategies that address not only the virus, but the structural socioecological factors that could result in disease clustering effects.

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