
COVID-19 Pandemics: Emerging Theories for Africa's Low Death Rates

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Initial Apprehension About Africa

At the onset of the COVID-19 pandemic towards the ending of the year 2019, there was anxiety and uneasiness in several quarters about the consequences as it reached Africa. The greatest worry is that our healthcare services in Africa are overburdened by multiple factors including i) overstretched fatigue, ii) underfunding iii) the existing load of infectious and non-infectious diseases. These are somewhat being expressed in the catastrophic terms [1,2].

Surprisingly, the development took a different dimension from the expected. The one million reported COVID-19 related death mark was exceeded on September 30, 2020. However, the accurate figure is presumed, of course, to be higher. The total estimate figure for Africa was 35,954 deaths. This development rattled researchers because Africa constitutes about 17% of the global population, but recorded an estimated 3.5% of the reported global COVID-19 deaths [1-4]. There are concerns that the figures could be presumably low due to variable quality covering a wide range of such African countries, mostly because it is far from the predicted [1-4]. However, many African countries' obtained statistics depict an emerging higher figure, but the severity and mortality much lower than expected initially based on China and Europe's experience. Some opined that this scenario might be related to Africa's much younger population, thus giving the apparent difference. Other authors queried that it could probably be due to the underreporting of events [1-4].

Objective of the Study

This editorial focuses on highlighting emerging hypotheses to substantiate the possible rationales for Africa's low death rates in the face of ravaging COVID-19 pandemic.

Emerging Theories for Africa's Low Death Rates

Younger African Populations

The most interesting observation about the lower rates of COVID-19 cases is that Africa has a relatively younger population than other western countries. Therefore, researchers theorized that the African continent with the younger people could withstand an outbreak of COVID-19 compared with different continents [1,2,5-8]. A total estimate of COVID-19 cases stands at 1 201 111, with 35,954 deaths for Africa on September 30, 2020, among about 1.3 billion people based on the WHO updates [1,2]. Beech *et al.* submitted that, on the contrary, Italy, with a median age of 45, was among the worst-hit countries by COVID-19, [1,2,5-8]. Nonetheless, Robert Bollinger, a professor of infectious diseases at the John Hopkins School of Medicine, submitted that like diabetes and hypertension, which could contribute to fatal complications in COVID-19, are not commonly found in the younger patients [1,2,5-8]. Interestingly, Beech and colleagues suggest that there are exceptions to this rule. For instance, a country like Japan, with the relatively oldest average population globally, recorded 89,400 total cases but has only 1,628 COVID-19-related deaths so far [1,2,5-8].

Cultural Distance Hypothesis

Beech *et al.* theorize that the habit of being socially distant by some nations than others could significantly impact the prevention of the new coronavirus's spread. For instance, greeting in India and Thailand is conducted by putting ones' palms together from a distance, which inherently does not require people to touch others; therefore, there have been low COVID-19 cases in such settings [1,2,5-8].

Similarly, Japan and South Korea reported relatively low COVID-19 cases because typically the residents bow to greet each other and tend to wear face-masks in public regularly, Beech and colleagues write [1, 2,5-8]. Nonetheless, there appear to be exceptions to the hypothesis. The reason is that Beech *et al.* wonder why countries like Iraq and others in the Persian Gulf allow men to embrace or shake hands-on meeting, yet have a relatively low incidence of COVID-19 cases [1, 2, 5-8].

Environmental Contributors Hypothesis

Researchers have wondered if low temperatures support the spread of COVID-19, mainly because countries such as the United States in the temperate region have higher incidences of COVID-19 cases. The question in the mind of researchers is whether the new coronavirus is heat-labile [1,2,5-8].

Surprisingly, a study submitted that ultraviolet rays could inhibit the new coronavirus. Subsequently, it is not unexpected that surfaces in sunny places may be less likely to remain contaminated [1,2,5-8].

Improved Respiratory Clearance Hypothesis

Multicenter studies suggest a lower incidence of COVID-19 cases in warmer weather and higher humidity. The hypothesis supports the improved clearance of the virus by the respiratory tracts in warmer and more humid weather [1,2,5-8].

Further, Africa is characterized by considerable variation in weather conditions in most settings. Therefore, there is a need for a comprehensive research study to substantiate these findings [1,2,5-8].

Improved Governments' Response

Social distancing was crucial to survival during the Ebola pandemics that ravaged Africa. The principle is now being applied to the COVID-19 plague. Therefore, most African countries have adopted the lessons learned from the experience in HIV and Ebola. This development has impacted significantly on the COVID-19 pandemic in such countries like Sierra Leone and Uganda etc.

Interestingly, several West African countries like Nigeria, Liberia, Sierra Leone, etc. also re-enacted the guidelines on social distancing, hand-hygiene, and wearing face-masks utilized during the Ebola outbreak in 2014. For instance, Sierra Leone has only 2 300 confirmed cases of COVID-19 with overall 72 deaths so far [1,2,5-8].

The benefits of 'lockdown' and 'social distancing' policies in such countries cannot be over-emphasized, with resultant fewer cases of COVID-19. For instance, Jordan and Thailand reported significantly lower COVID-19 cases after such policies were implemented, like the closure of schools, businesses, and their national borders [1,2,5-8]. Researchers say these policies (theories) are the most probable explanations for the differences in countries' COVID-19 outbreaks. But the implementations vary significantly from countries to countries, Beech and colleagues write [1,2,5-8].

Genetic and Immune Factors Hypothesis

Some authors suggest that *Bacillus Calmette-Guérin* (BCG) vaccination; - a vaccine against tuberculosis provided at birth in most African countries, could offer some immunological protection against the new coronavirus infection. A further research study on the extent of this protective response in such cases is yet to be executed [1,2,5-8].

In a related development, the role of genetic factors as protective contributors cannot be excluded. A recent study submitted that haplotype (the group of genes- DNA or carrier of a Neanderthal gene, on chromosome 3) associated with increased risk of severity and present in 30% of south Asian genomes and 8% of Europeans is almost absent in Africa [1,2,5-8]; even though the presence and role of such genes remain controversial and is a subject of the ongoing investigation.

Altered Systemic Inflammatory Response Hypothesis

As the new coronavirus mediated pathophysiology begins and potentially leads to pneumonia, the type-2 pneumocytes gets ruptured, and subsequently attract macrophages. Interestingly, the activated macrophages then secrete specific cytokines, including interleukin 1 (IL1), interleukin 6 (IL6), and tumor necrosis factor-alpha (TNF- α). Once these cytokines are released into the bloodstream, they provoke **systemic inflammatory response syndrome (SIRS)** [9-11]. With the progression and severity of the COVID-19, **Cytokine Storm** arises from an exaggerated immune response to the presence of the new coronavirus. Researchers submitted that the resultant overwhelming severe acute inflammation resulting is the most critical negative prognostic marker in COVID-19 cases [9,12-14].

The hypothesis suggests the endemicity of water-borne gastrointestinal pathogens, including poliomyelitis, hepatitis viruses, shigellosis, cholera, typhoid enteritis, giardiasis, and amoebiasis with prevalent infections in the typical African settings [15].

Some authors rationalized that these pathogens tampered with the overall immune response of the patients resulting in a depressed immune response that failed to progress to the severity [15], even in the face of overwhelming severe acute inflammation seen in COVID-19 patients.

Delayed Wave Hypothesis

There are speculations that the current down-turn of incidence and severity of COVID-19 cases in Africa could resemble a similar peak in the 1918 Spanish flu outbreak as a basis for the delayed wave hypothesis. This development suggests that a second and even a third wave of the COVID-19 cases are being expected. Researchers said that the Spanish outbreak explosion didn't hit areas like Alaska and the South Pacific until its third wave occurred in 1919 [1,2,5-8].

Conclusion

The most crucial emerging need at this time is to consider African COVID-19 research agendas. This situation could allow for the establishment of evidence in favor of the above research questions. The salient picture is also a robust public health policy in most African nations supporting social distancing, lockdown, hand hygiene, and wearing of face masks as necessary measures to be continued. At the same time, such measures are required to be enforced and sustained whenever there is any new level of COVID-19 transmission. Finally, another urgent need is the government's unwavering position to tackle economic and political conditions, food security, infrastructure, over-population, infective and non-infective diseases, and make the continent a better place.

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