

## Covid-19 pandemic profile difference between africa and europe: An early viral exposition issue?

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The ongoing coronavirus disease-2019 (COVID-19) crisis represents a health challenge that led to a health system saturation. Not only it represents a huge pressure on the healthcare capacity but also leads to the delay of the regular care given to patients suffering from other different health conditions. In addition, the measures applied to limit the diseases spread such as confinement and the economic shutdown can impact the development of other diseases such as obesity [1] and mental health problems [2] and also impacts the immunity [3]. In addition, the post COVID-19 would also have a severe multi-level health crisis [4]. The combination of the applied measures and the vaccination were expected to end this pandemic. However, with the new variants some experts start to doubt that this health crisis will end soon.

One of the current key questions is why the COVID-19 is both spreading faster and with heavier consequences on the COVID-19-related hospitalizations in many western countries compared to Africa. To answer the question of the why behind such patterns, this short piece of writing provides hypothetical explanations for the specific pandemic profile seen in countries like some those in Africa. First, based on the hygiene hypothesis [5] in countries with low hygienic conditions, as well as the genetics and the physiology, could explain the better immunity the residents of such countries enjoy.

The second point is related to how seriously the preventive measures have been respected at the beginning of the pandemics when the virus started to spread (around the beginning of 2020) and reached most countries. At that time, there were no available vaccines [6] or efficient treatments. Thus, governments and health officials implemented measures to limit the spread of the virus by attempting to reduce the chances individuals have to get COVID-19. In the developing countries, for numerous reasons and circumstances, the implemented measures were not strictly followed. Therefore, COVID-19 virus spread among the population. However, since at that time (beginning of the pandemic) the virus did not have the mutations it has now, that spread allowed the population to be in

contact with the virus but without a heavy consequences in terms of infections severity. Such exposition would have consequences similar to vaccination (immunization) but without severe infections. Afterwards, when the virus mutated, those populations already had a certain immunization after the exposure to the virus when it did not have mutations and was less harmful which can be considered as the first-exposure immunization. Therefore, when they were exposed to the virus they it had lower impacts on the public health compared to Europe (and western countries).

In the western countries, on the other hand, the measures (face masks wearing, hands sanitizer usages, physical distancing, etc.) were more respected. Thus, at the beginning of the crisis (when the virus did not have mutations and was less harmful) the populations were less exposed which led to the non-development of the immunization (no exposure to the virus). Afterwards, when the virus mutated towards a faster spreading with a more severe forms of infections, those populations did have the first-exposure immunization. This led to the heavy impacts on the health public health in those countries. These theories could explain the differences in the current impacts of COVID-19 between Europe (and western countries) and Africa (among other developing countries). To that, we can add other reasons such as the younger population in Africa versus the important elderly population in Europe (more susceptible to the virus infection) in spite of the advanced vaccinations campaign in Europe. Elucidating these immunological patterns could allow a better understanding of how COVID-19-related immunology evolves depending on factors such as early exposition and/or vaccinations and might be the resistance to vaccines.

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