Research Article

Covid-19: Africa Versus the World

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Abstract

Africa is the largest and most populous continent after Asia but with highest number of countries. Africa represents about 1/6 of the world population but Africa is the least represented in the world Genomic population. During the outbreak of COVID-19 there was much concern about Africa due to numerous inadequate health facilities. Data was gotten from the official World Health Organization (WHO) website and was cleaned and arranged in Microsoft Excel version 2019. The data was then visualized using Tableau Public version 10.4. Africa was compared to other regions in two categories: New cases and Deaths. In the number of new cases and deaths, Africa and Western Pacific regions were lower than other regions with the number in Africa being slightly higher than that of Western Pacific from 23rd May and 30th May respectively. The results showed that Africa performs better when compared with the rest of the world in new cases and deaths rate as a result of COVID-19. There is need for equal representation of Africa populace in the genomic world data.

Keywords: COVID-19; Corona-Virus; African; Healthcare

Introduction

A range of human diseases with little or no known pathology, etiology and treatment still exist and could be pandemic if it is an infectious disease, in cases like the Spanish flu, Middle East Respiratory Syndrome, Chicken pox among others. The spread of the 2019 novel coronavirus diseases (COVID-19) or the severe acute respiratory syndrome originated from Wuhan city of Hubei Province of China before spreading to the rest of the world with the exception of Antarctica [1].

Coronaviruses are seen under electron microscope as enveloped positive sense RNA viruses with sizes ranging from 60 nm - 140 nm in diameter with spike like projections on its surface giving it the crown like appearance where the name coronavirus was deduced [2]. Four corona viruses have being identified namely HKU1,

NL63, 229E and OC43 which have been in circulation in humans, and generally cause mild respiratory disease.

There are two reported events of crossover of animal beta coronaviruses in the past two decades; wherein crossover of animal beta coronaviruses to humans has resulted in severe disease. In 2002 - 2003 which was the first instance, coronavirus of the beta genera with its origin from bats crossed over to humans via an intermediary host of palm civet in the Guangdong province of China. About 8400 people were affected, mostly in Hong Kong and China and caused about 900 deaths (mortality 11%) before being contained [3].

About ten (10) years later in 2012, the Middle East Respiratory syndrome coronavirus (MERS-CoV), which also originated from bat, started in Saudi Arabia through dromedary camel as the in-

termediate host and affected about 2500 people and caused about 900 deaths (fatality rate 34%) [4].

The spread of the novel coronavirus disease (COVID-19) to Africa was officially said to have been on 14 February 2020 with the first reported confirmed case being in Egypt (WHO, 2020) and the first confirmed case in sub-Saharan Africa in Nigeria (WHO, 2020). Most of the known imported cases to Africa arrived from the United States and Europe instead from China where the virus was first confirmed [5]. It is believed to be widespread of under-reporting especially in African countries with less developed healthcare systems [6].

There were worries about the spread of COVID-19 in Africa because of the numerous inadequate healthcare systems in Africa, problems related to lack of equipment and funding, insufficiently trained healthcare workers and inefficient data transmission. Uncontrollable widespread of the pandemic in Africa and the huge economic problems arising from it were cause for fear [5].

Two (2) months after the index case of COVID-19 in Africa, there were insufficient supply of ventilators: 41 countries had only 2,000 ventilators among them, and ten countries had no ventilators at all. Basic materials like sanitizer and water were subject to shortage supply in some parts of the continent [7]. The Regional Director of WHO Africa stated that physical distancing and hand washing might be a challenge in some places in Africa due to cultural and religious practice. Also lockdown maybe difficult to achieve, and challenges might be exacerbated due to the incidence of diseases such as AIDS, malaria, cholera, and tuberculosis [7].

Speculation like Testing Based Strategy was proposed by expert to allow African countries reduce lockdowns that might impose huge hardship on those who are day to day income earners to be able to feed themselves and their families. There is increased threat of food crisis in several African countries. The United Nations proposed that about 74 million test kits and 30,000 ventilators will be considered necessary by the continent's 1.3 billion people in 2020 in the best circumstances [8] and WHO have helped many countries in Africa to set up COVID-19 testing centers.

Coronavirus has spread to all the African countries with Lesotho being the last African nation to report a case of COVID-19 (WHO, 2020), there were no reported cases in French Southern Territories, Saint Helena and British Indian Ocean Territory as of May 13, 2020. Regardless of a steady climb in the number of confirmed cases, Africa continues to lag behind the global curve for infections and

deaths rate. The continent witnessed a grave economic impact as a result of the pandemic, which damaged the continent's growing middle class and threatened to add to the rates of deficiency and extreme poverty [9].

Materials and Methods

Data was gotten from the official World Health Organization (WHO) website. The period in view in this work is from February 2020 to July 2020. From the period being studied, Saturdays were picked and the statistics for every Saturday of every month in this period was collected. The data was cleaned and arranged in Microsoft Excel version 2019. The data was then visualized using Tableau Public version 10.4.
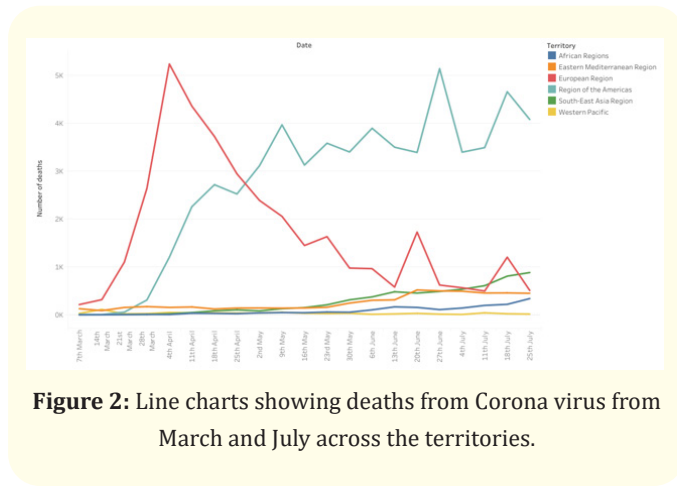
Results

The data was obtained from the WHO website and was analyzed using Excel and visualized using Tableau Public. The values show new cases and deaths for every Saturday in the period between March and July.
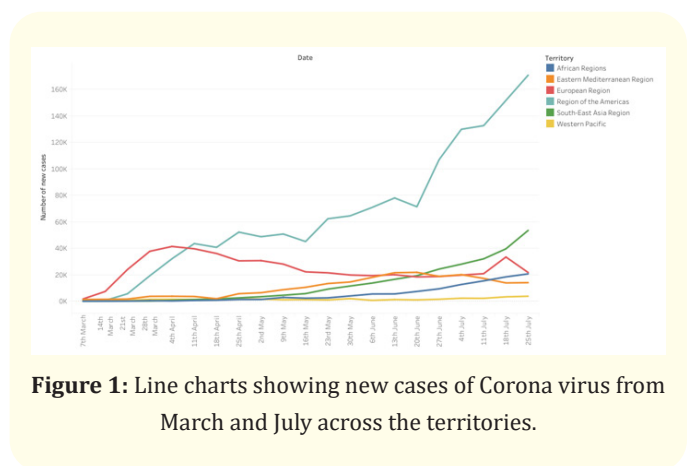

Figure 1: Line charts showing new cases of Corona virus from March and July across the territories.

From the line chart, the European region is showed an increase in the new cases of Corona virus from 14th March and gradually reduced from 25th April till the spike in 18th July. The American region kept increasing from 21st March till the 25th July. The Eastern Mediterranean, South-East Asia, African and Western Pacific regions were relatively low when compared to the European and American regions, the Eastern Mediterranean region increased gradually 25th April and kept increasing till 27th June from which there was a gradual decrease while South- East Asian region started to increase from 2nd May and has kept increasing. African regions show a spike in 9thMay after which it gradually increases from 30th May while the Western Pacific have the lowest new cases in this period with periodic spikes.

Figure 2: Line charts showing deaths from Corona virus from March and July across the territories.

From the chart above, the number of deaths from Corona virus in the European region showed spikes throughout the period being researched which the highest and longest spike being the one that began on 21st March and ended on 16th May while in the American region there was a gradual increase in the number with spikes from 28th March. The Eastern Mediterranean region experienced a plateau up till 30th May where it increased gradually till the end of the period in view which is the same for South-East Asia and African regions which experienced increase from 18th April and 6th June respectively. The Western Pacific region experienced a plateau with negligible spikes.

Figure 3: Heat map showing new cases of Corona virus from March and July across the territories.
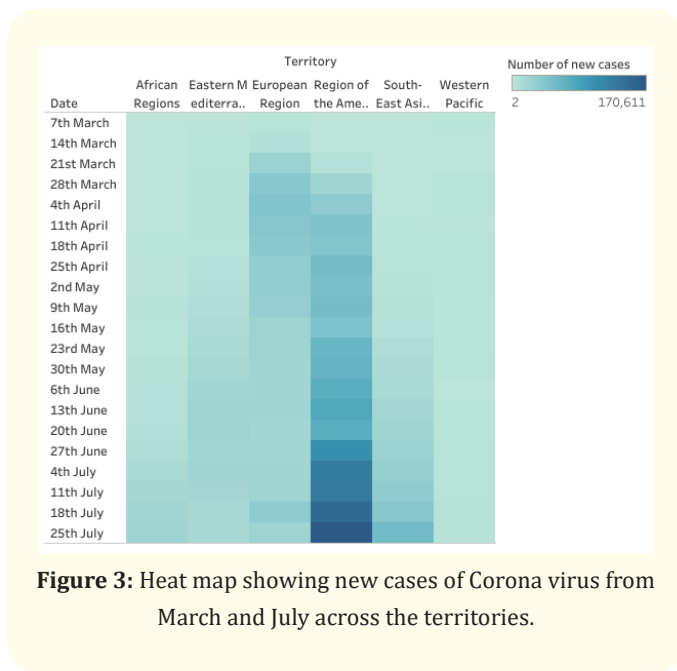
The heat map shows intensity of new cases of Corona virus and its distribution across the date and territories. The dark colors show the areas with the high range of new cases while the light colors show the areas with the low range of new cases.

Figure 4: Heat map showing deaths from Corona virus from March and July across the territories.
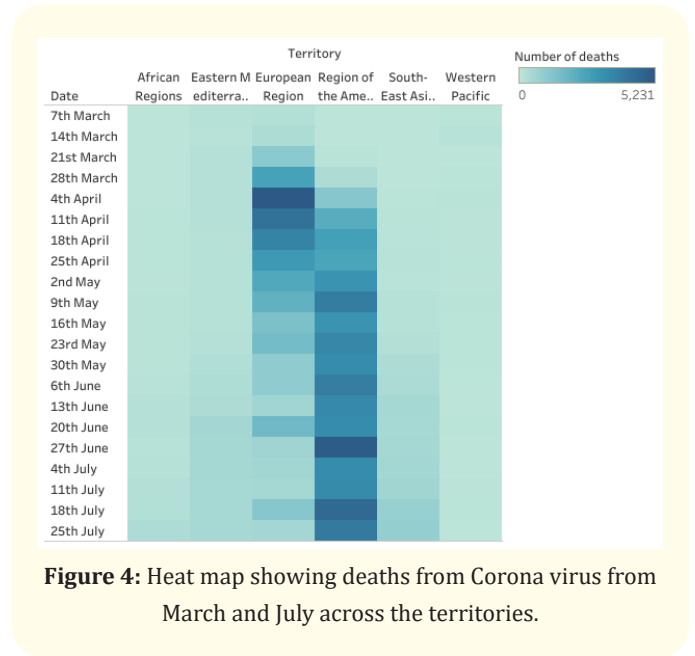
The heat map shows intensity of deaths from Corona virus and its distribution across the date and territories. The dark colors show the areas with the high range of deaths while the light colors show the areas with the low range of deaths.

Discussion and Conclusion

Even with cases of under-reporting and un-reporting case of COVID-19 in some African countries, the impact of COVID-19 on the African continent do not seems to have occurred as predicted by health experts with no news on over-burden morgue or health facilities. Some of the theories that has postulated to explain this phenomenon include the continent climatic condition, Africa youthful population with a median age of 19.4 years and that 60% of the population is under 25, indirect protection from other treatments that were intended to treat other infectious diseases like malaria or tuberculosis and also Africans are exposed to a lot of diseases, so it's possible that there is natural genetic immunity [10].

Research has shown that people from different parts of the world differ in their susceptibility to developing infectious diseases

[11]. The burden of infectious diseases is probably the most important factor shaping immune responses throughout human history, given that natural selection driven by pathogens is crucial for influencing the patterns of variability of genes involved in host defense [12]. Interspecies and intraspecies studies have shown that both purifying and positive selection are crucial processes that influence and modulate the functionality of genes related to immunity and host defense [13].

Effective host defense against pathogenic microorganisms is a crucial condition for the survival of any multicellular organism, and a complex immune system has evolved to fulfill this task. During the evolutionary history of our species, infections shaped the genetics and function of the immune system, leading to variation of host defense responses in human populations as a result of local infectious pressures and migration events [14].

Natural selection contributed to the differences in immune responses observed between populations by providing genome-wide support that regulatory variants associated with different responsiveness to immune challenges have been targeted by positive selection. Selection appears to have increased the frequency of the African -specific reQTL (mapped expression quantitative trait loci) leading to stronger CCR1 downregulation following TLR1/2 (Toll-like Receptor) activation, which suggest that CCR1 downregulation conferred a selective advantage in Africans, likely to favour diminished inflammation [15].

A study observed stronger reaction to infection induced in macrophages from those of African descent, mainly among inflammatory response genes [16]. Other studies have shown that European-Americans have lower frequencies of alleles associated with pro-inflammatory response, levels of circulating C-reactive protein and a much lower rate of inflammatory diseases than African-American individuals [17-19].

Evolutionary pressure could explain these differences, after out of Africa human migration they were exposed to lower pathogen levels [27], which reduced the want for strong, costly pro-inflammatory signals. Change in this way may have been privileged due to the disadvantageous consequences of acute or chronic inflammation, which are major contributors to the development of autoinflammatory and autoimmune diseases [20].

Evidence shows that older populations are hardest hit by the coronavirus. There are many younger population in Sub-Saharan

Africa when compared with the population of the United States, China, the European Union, and other areas experiencing widespread infection. The median age of China and the United States is 38 while it is 43 in the European Union, but it is 19 in sub-Saharan Africa [21]. In Italy, which has had one of the highest COVID-19 mortality rates in the world, 23% of the population is over age 65, while only 3% of Africa population is over 65. Nigeria, which is Africa's most populous country, about half of the population is under age 15 [22].

Advance in age causes the immune system to undergo intense remodeling and decline, with main impact on wellbeing and survival [23,24]. Immune senescence predisposes older adults to a higher risk of acute viral and bacterial infections. Infectious diseases are one of the most common causes of death among the aged in the developed countries. The ageing immune system fails to maintain full tolerance to self-antigens, with an increased incidence of autoimmune disease [25]. This is probably due to lymphopaenia occurring with age, leading to excess homeostatic lymphocyte proliferation [26] as well as a decrease in regulatory T-cell function and decreased clearance of apoptotic cells by macrophages [23].

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