

Mini Review

Does classical immunity acquired by the subcontinent population become advantageous to manage COVID-19 due to the low rate of mortality?

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Received: 12 June, 2020

Accepted: 22 June, 2020

Published: 23 June, 2020

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Abstract

The global pandemic due to the COVID-19 has severely affected the entire world risking human life and economy. Every possible attempt becomes inadequate in controlling the disease as the number rising each passing day. Indeed, a highly populated country like India has so far successful in mitigating the outbreak within the country. Meanwhile, the strategy based on a preliminary model of assumption with massive awareness program on social (physical) distancing, compulsory wearing of a mask and nationwide lockdown might have contributed immensely to controlling such an emergency. However, the influence of the immune-competent genetic architecture of the Indian racing population and comparatively a dominant young age group population cannot be ruled out completely. Moreover, a suitable environment for viral propagation and characteristics of viral strain are other such factors that simultaneously could add a real scientific justification. However, the current global scenario indicating the countries with higher median age are severely affected compared to the Indian and African subcontinent thereby survived an outbreak with a low mortality rate. At the same time, we never claimed for complete immunity for the COVID-19 depending on age or immunity. The increased incidence of positive cases might slowly also increase the death rate within India, but so far recorded low compared to other parts of the globe.

Introduction

Coronaviruses are a group of RNA virus usually causes respiratory disease in human [1]. The term 'corona' has been derived from the crown-like structural morphology observed on the surface of the virus [2]. This virus was identified in numerous hosts of avian and mammalian origin including humans. The possible animal reservoir of the viral strain of the beta-corona virus in recent times has transmitted to humans via intermediated host as a source of zoonotic infection. The

novel coronavirus SARS-CoV-2 is highly infectious and found to be the seventh member of its family that infect humans [3]. The previously identified coronaviruses were 229E, NL63, OC43, HKU1, SARS-CoV and MERS-CoV. These identified coronaviruses are sub-grouped into two genera namely alpha-corona virus and beta-corona virus. Indeed, the novel coronavirus disease (COVID-19) ensured to be settled with a lower mortality rate than previous SARS and MERS coronavirus diseases [4]. The whole-genome sequence of SARS-CoV-2 is closely related (88% identity) to bat-SL-CoVZC45 and bat-



SL- CoVZXC21 than SARS-CoV and MERS-CoV which is about 79% and 50% respectively. Notably, the initial investigation also revealed 99.98% sequence similarity among the novel SARS-CoV-2 virus with the largest nucleotide difference of four mutations among a few initial samples tested, indicates the recent evolution of the virus in humans [5]. The evolutionary attributes of the viruses were strongly emphasized on the genetic exchange or prominence of recombination. A positive-strand RNA virus (like coronavirus) often demonstrate a copy-paste mechanism where a nascent RNA strand can dissociate from its original point and can continue synthesis elsewhere in the genome [6]. Thereby prompt to enhance the recombination possibility when attached to a similar sequence, which more often observed in coronavirus [7]. Due to the larger genome size of this virus, it is more likely to have recombination frequently and anonymously increases the chances of evolving new mutants [7]. As a result, this virus can escape host immunity and create an outbreak at a significant interval. Here, we briefly summarize a possible role of few dominant aspects in the Indian subcontinent, subsequently helps in the management of emergency outbreak due to COVID-19.

COVID-19 infection prospect in indian subcontinent

Recently, India ended up a phase-wise nationwide lockdown since March 25, 2020. Even, the incidence of positive cases of COVID-19 was eventually low initially; the rapid rise of positive cases after lockdown has put a tremendous burden on the healthcare system. However, a huge cluster of asymptomatic cases and low mortality rates compared to Europe and America open up diverse panoramas for the scientific community for intervention. The prediction about India's infectivity scenario of COVID-19 has been robust. Initially, India too adopted the same policy regarding the outbreak based on a preliminary investigation of the epidemiological and mathematical model of assumption. While time to time scientists and epidemiologists from across the globe have put forward different hypotheses depicting India's future of pandemic. The delayed sustainability towards community transmission and the low mortality rate of COVID-19 gained scientific attention. India also has not been witnessed any region-specific outbreak to date with a country with the second largest population in the world. Several classical factors might have hindered the fast propagation of the virus in the Indian environment. Any viral infectivity depends upon few factors *i.e.* virulence or harmfulness of the virus, host immune system status, a suitable environment to propagate the virus and lastly availability of the drug to mitigate the severity caused by the virus [8,9]. If all these factors favour the virus to infect, pandemic like emergency occurs. A lockdown like situation can minimize the severity of pandemic but cannot stop the viral infectivity.

An unfavorable climatic condition of tropical temperature and high humidity might be advantageous to restrict the fast propagation of the virus in the Indian environment. Moreover, the role of a discrete immune profile acquired by the population in suppressing the exponential propagation of the virus cannot be diminished completely. Past research revealed that Indians acquired more and diverse KIR (killer cell

immunoglobulin-like receptor) genes due to natural selection for survival [2], whereas another finding observed that Indian population possesses more number of NK (Natural killer) cells compared to Americans that can influence innate immunity [10]. Thereby, we can have a more proactive innate immune system. While the prediction of Chinese researcher Wang, Xu [11] about the low severity of COVID-19 for malaria-infected regions in the world somehow supporting the current global scenario. Moreover, a vivid social distinction of the Indian subcontinent and genomic admixture helps to inherit extensive MHC diversity within the population. Indeed, a variant of HLA has been found to associate with the various risk factor of autoimmune and infectious disease [12,13]. One of the most common HLA haplotypes, HLA-A2-B50-DR3 is predominant in the Indian population but not reported in the rest of the world [14]. Whereas, prevalent of subtype A*0211 of HLA-A2 allele in the distinct Indian population also reported in the past study [15]. The association of dominant HLA allele with the pathogen clearance has also been reported for HIV, HCV and HBV previously [16,17]. Such a finding supports the notion of mutation or selection of the genes acquired in response to environmental agents in due course of time within the region [18]. All these assumptions and clinical findings turned out to be a little advantageous blessing in the context of an outbreak and might be a cause of low mortality in India. Additionally, the demographic dividend of India seems to be eventually added further advantages in slowing pandemic like situation in India. It has also been seen that high median age countries are highly affected than low median age group countries. Italy, Spain has a population with a median age of 45 and 45 years respectively whereas the USA and China both have 38 years. However, India's population median age is 28 years and interestingly that number for the African continent is 18 years correlating with the low mortality rate [19,20]. Figure 1 depicts some of the classical data of top nations from different continents. The mortality rate of COVID19 in India is so far recorded nearly 2.8% where 2,67,064 infection reported (till 8th June 2020). Although South Africa, Russia and Saudi Arabia recorded low rate of mortality but their population density is far below; which is 25, 9 and 16 respectively. Whereas, according to 2020 census data India's population density is recorded 464 per square kilometer [20,21].

Thus, in regards to the current trend of pandemic across the world, India's resilience in diminishing the effect has been outstanding. Though, it is hard to predict the future course of progression. But such heterogeneity ensures better management of this disease within the country. Effective and quick response from the government side also needs to acknowledge. However, we never the less advocate for any severity of infections in the future from COVID-19 in India. Precaution is the best policy to deal with such novel microbial entities and highly contagious diseases [22].

Conclusion

India almost witnessed having positive cases of COVID-19 from every corner of the county. From the public health standpoint, the only hint of optimism prevailing is due to the

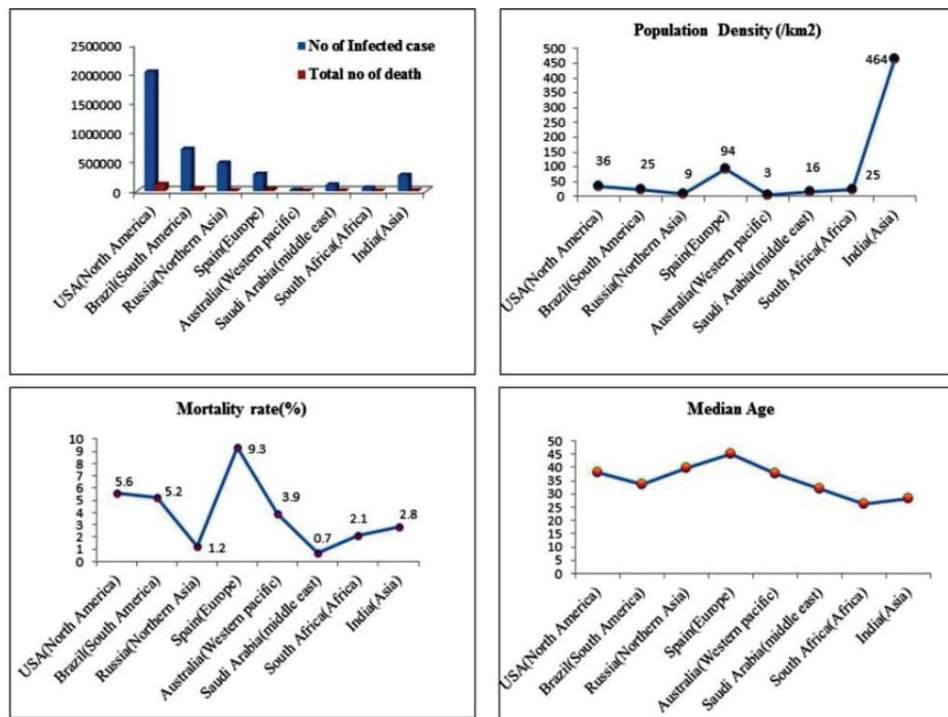


Figure 1: Showing statistical data from seven top covid19 infected countries from different regions of the world along with India [21] (Data collected till 8th June 2020). Top left: Showing the number of COVID19 infected and death recorded due to COVID19. Top right: Population density of the eight nations. Bottom left: Mortality rate due to COVID19 in the eight nations. Bottom right: Median age of the eight nations (source: <https://www.worldometers.info>).

low rate of mortality. Despite the diversity in population in the country, the infectivity rate of SARS-CoV-2 may remain persistent. However, further work can elucidate the precise role of immunogenic profile in resisting viral pathogenicity for morbidity and mortality in various ways. The accumulation of knowledge with the unanswered question regarding the disease outbreak should be the top priority in the current time.

Acknowledgment

We thank Gauhati University, Department of Bioengineering & Technology and Department of Medicine, Gauhati Medical College & Hospital for infrastructure support.

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Citation: Das PP, Medhi S, Dutta S, Das PJ (2020) Does classical immunity acquired by the subcontinent population become advantageous to manage COVID-19 due to the low rate of mortality? *Open J Biol Sci* 5(1): 034-037. DOI: <https://dx.doi.org/10.17352/ojbs.000022>