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Short Communication

Covid-19 Outbreak-An Ecological Perspective

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Abstract
The cause of the Covid-19 outbreak as pandemic and to explore the ecological perspectives, the study takes under consideration of hypothesis 1; the wild emerging theory. This paper also enlightens the human activities beyond the natures will and suggests that there should be a certain boundaries to each ecosystem which is to be respected for well-being of the ecological balance. This study also proposes a model ecological line for the co survival of all niches that ceases pandemics in near future.
Keywords: Ecology, Bats, Covid-19, Zoonotic Viruses.

Hypotheses of the origin of the COVID-19 virus:
H1: The wild emerging theory
H2: The lab leak theory

The wild emerging theory
To support the theory that the virus emerged in the wild, there were three outbreaks since two decades in China like SARS, H7N9 and COVID-19 in 2003, 2013 and 2019 where Covid-19 is more serious than SARS and H7N9 in terms of spread, speed and scope. Scientists suspected that corona virus SARS-CoV-2 originated in a bat and then hopped to another animal which is possibly the pangolin and then passed to humans (Bryner, 2020). The disease has then been spreading between people without any intermediate animal. Wet markets put people and live/dead animals e.g. dogs, chickens, pigs, snakes, civets and more where close contact of human and animal exist (Ali *et al.,* 2020). That makes it easy for zoonotic diseases to jump from animals to humans. According to virologists the bats and birds are considered reservoir species for viruses with pandemic potential (Woodward, 2020).

Intervention with wild life and bizarre food habits
As the human population expands and societal changes occur, human contact with wildlife will continue to increase. This increases the risk that emerging zoonotic viruses, including CoVs, pose to human and animal health. Surveillance combined with scientific studies to better understand zoonotic CoVs and spill over will enable us to stay a step ahead of the next epidemic. Bats are nocturnal and not human friendly or co existing animals, if man and bats come in contact, due to the transgenesis of virus from animal to the intermediate host or to the human there might take a severe turn in the genes (mutation) this is the main cause for the outbreaks of endemics or pandemics.

Chinese People have more intervention with wildlife since ages compared to any other countries. The special dietary habits of some Chinese people, Especially South China, China has a long history of food culture, prevalence of eating wild animals in ancient times. But nowadays it became a wild dietary status symbol, because of the rarity and high price of the wild animals. Most of the Zoonotic infection has associated with eating and trading of wild animals, which proved a significant threat many times earlier and a future to the wild health. Regulating wildlife conservation and food safety to prevent human exposure to novel zoonotic viruses through dietary habits is significant for the global health. Huanan seafood market in Wuhan is the only place where a large number of people infected as the start of the outbreak, which typically sells live

animals. There are stalls selling wild animals either wild or farmed. Some wild animals like rabbit and ferret-badgers are susceptible to SARS-CoV-2 or the related virus that causes severe acute respiratory syndrome (SARS). According to Daszak, there were carcasses skinned at the market, not just cubes of meat in a plastic packet, Could have just as easily been brought in by infected people who handled wild animals (Mallapaty, 2020). The explosive way in which the outbreak took off in Wuhan suggests that the virus was probably introduced through the wildlife trade (Mallapaty, 2020).

Initial studies investigating animal sources of the virus from "wet markets" in the Guangdong province of China suggested that Himalayan palm civets and raccoon dogs were the most likely hosts responsible for human transmission. Although bats are known to harbor a wide variety of corona viruses, the mechanisms for virus spill over into humans or livestock are widely unknown. However, the inter connectedness of virus replication rates and virus spill over have not been explored for bats (Bramanti *et al.,* 2019; Lau *et al.,* 2010; Wang *et al.,* 2016).

Previous pandemic outbreaks

The Plague has a long history in the European continent where evidence of the disease date back to Stone Age. Plague epidemics in Europe during the first (sixth to eighth centuries) and second pandemics (fourteen to nineteenth centuries) including the Black Death (1346–1353) are infamous for their widespread mortality and lasting social and economic impact. The third plague pandemic originated in the Yunnan region of southwest China where plague caused multiple outbreaks since 1772. In the nineteenth century third pandemic spread globally and affected the Europe (Bramanti *et al.,* 2019).

The Spanish influenza pandemic also labelled as mother of all pandemic and an estimated one third of the world's population (or =500 million persons) were infected during 1918–1919 influenza pandemic. The disease was exceptionally severe and case fatality rates were >2.5% compared to <0.1% in other influenza pandemics. Total deaths were estimated at =50 million and were arguably as high as 100 million (Taubenberger and Morens, 2006).

On 31st December 2019 WHO has been first informed by the Chinese authorities that "a pneumonia of unknown cause" had been detected in Wuhan which is the largest city in Hubei province in central China. The COVID-19 is most recently discovered of corona viruses which have caused respiratory infections such as MERS and SARS (Ali *et al.,* 2020).

In the last 3 decades, the globe has experienced 6 major outbreaks caused by zoonotic viruses of bat origin. These include Hendra virus in Australia in 1994, Nipah virus in 1998/99, SARS-CoV-2 in 2002/03, Marburg in 2005, MERS-CoV in 2012, COVID-19 in 2019 out of which 3 are from China and recent 2 decades. Bats are unique animals having long lifespan, decreased susceptibility to cancer and ability to host various viruses without suffering virus induced or age-related inflammation.

Encroachment of other ecosystem causing Zoonotic viruses' spill outs

The outbreak of Novel corona virus (Covid-19), reported from Wuhan is the first report of Covid-19 from China on the last day of the year (i.e., 31st December, 2019) (Huang *et al.,* 2020). Epidemiological investigation suggested that this outbreak was associated with Wuhan seafood market and COVID-19 has been identified a probable bat origin (Wu *et al.,* 2020; Zhou *et al.,* 2020). Earlier, in Guangdong, China, at the end of 2002, the other outbreak, Severe Acute Respiratory Syndrome (SARS) also identified bat as the natural reservoir host of SARS corona virus 15 years later (Hu *et al.,* 2017). Another infectious disease caused by avian influenza A (H7N9) virus, that was found in March 2013 in China showed human exposure to live poultry, especially where live birds were sold. Hence SARS in 2003, influenza (H7N9) in 2013 and COVID-19 in 2019 showed zoonotic sources of virus that cross species to infect humans (Li *et al.,* 2005; Chan *et al.,* 2020). The recurrent outbreak of corona virus in china with zoonotic origin clearly indicates the wild emerging theory.

Ecological delicate balance and Non-maintaining of ecological distance

The Gaia hypothesis postulates that the organisms, and their surroundings, within it, form an integrated, single and self-regulating system, in which conditions necessary for life to exist obtain. According to this theory what required is to maintain ecological balance within the biosphere which involves the relations, and interdependencies, between the life forms and the environment. This balance, unfortunately, has, from times immemorial, been impacted adversely upon, the unfortunate phenomenon of man-animal conflict. The lack of a well maintained buffer zone between the forests and the outside is also resulting in people

travelling deeper into the forest area, in search of fuel wood and water earlier and for food now a day's in this case it is the bat, bringing them into a confrontational situation with the animals in the wild. Which is the main cause of the Non-maintaining of ecological distance between the wild and the domestic, which caused the outbreak of the novel zoonotic viruses (Mohan Kandha the Hans India, 2021).

Conclusion

Wildlife harvest, transport, buying, selling, or other exchange of wild animals and their products in both its legal and illegal forms might be the cause for the pandemic. Wildlife trade brings animals into direct and indirect contact with humans, domestic animals and other species outside of their normal interactions in the wild are responsible for the virus outbreak and spillover. This study also opens up a new avenue of investigation of the main cause of the pandemic out break through ecological and epidemiological relationship of human practices that could enable a corona virus to spill over from bats. As the human population expands and societal changes occur, human contact with wildlife continues to increase. This increases the risk that emerging zoonotic viruses, including CoVs, pose to human and animal health. Surveillance combined with scientific studies to better understand zoonotic CoVs and spill over will enable us to stay a step ahead of the next epidemic. Finally, the study suggest to educate the people about the adverse effects in eating and trading of the rare and endangered wild animals which are natural reservoirs of Zoonotic Viruses.

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