

Coronavirus Pandemic: Clear and Present Danger

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Abstract: Scientists, clinicians, health care personnel and policy makers were all taken aback with a sudden spurt of Coronavirus pandemic that had impacted every nation raising many issues related to the life of a common man. Now, the impact of the pandemic has subsided and people have resumed their routine. However, the present situation should not be taken to be the reason for complacency. Instead, we must be prepared to face this or similar challenges in future. A wrong decision taken in one country has its far-reaching consequences world over. One has seen the ever-mounting death toll in some countries for their delayed or incorrect decisions. Clearly, we need to understand the virulency of the Coronavirus and its biology in the context of herd immunity, symptomatic and asymptomatic cases, resistant and susceptible genomes and human immune system. In addition, comorbidity has its own impact on the human genome which not only makes a person more susceptible but less responsive to the medications. The electronic media has now become a double edge sword, not knowing its own limit, disregarding the effect of unedited or poorly edited news focusing only on its target rating point (TRP). Thus, along with relevant information, several wrong ones are also propagated. Too much in/correct news does not allow us to use our judicious prerogative. Further, the blame game makes the job of caregivers a lot more complicated. The other dimension of the present peril is that several African countries, though have modest amounts of money to buy medicine, masks, and protective gear, were not allowed to do so because of the International Sanctions. The circumstances dictated us to use all our resources to contain this pandemic and be on the same page. Promulgation of lockdown was an attractive option but not without its severe consequences. Taiwan had managed this pandemic very well without a lockdown, as did Sweden and New Zealand. However, timely lockdowns in the UK and USA would have saved many lives. These instances are contradictory and call for due deliberation. Thus, each country has to evolve its own strategy keeping in view the local dynamics and long-term perspectives. Present overview is aimed to provide a judicious mix of critical information in a semi-scientific manner highlighting the ground realities faced by the common people including the logistics used by the government machinery to contain this pandemic. This article also covers social, financial, emotional aspects and problems

faced by the caregivers and law enforcement agencies. During the COVID-19 pandemic, civility of the highest order and greed of the worst kind both were witnessed. We need to fine-tune our civility and act as responsible global citizens avoiding superstition and complacency, not blaming anyone for anything, and extending our helping hand to others as much as possible. Even now, we must be prepared to face the aftermath of this pandemic and to undertake an uphill task of rebuilding the society, nations and the world.

Keywords: Corona conundrum, Doomsday, Global citizen, Infectious disease, Information influx, Pandemic aftermath, Unsafe world.

I. INTRODUCTION

Much debate has gone to ascertain the origin of the coronavirus. It is largely believed that it is a zoonotic disease and has originated from animals [1]. However, which animals the disease has originated from is not yet fully established. Some pathogens share symbiotic relations with their animal hosts and survive without encroaching upon other living systems. When these pathogens sense their own survival at stake, they look for another host. Darwin's theory of survival of the fittest remains operative all the time. If the new found host of such a pathogen happens to be the human, that pathogen invariably proves to be virulent. Alternatively, it becomes an integral part of the human genome. If this relationship is favored by the evolutionary forces, the virus becomes a permanent guest without causing any harm to the human host. Whether the Coronavirus has originated from pangolin, civet, bat, elephant or any other mammal is immaterial now since it has affected humans on an unprecedented scale across the globe. Scientists with some of the best brains, aware of the principles of vaccine development, concept of herd immunity are busy searching for the likely cure of this contagion. It is indeed unfortunate that more than 90,000 people have died in the USA alone and several thousands in Europe. This article should have seen the light of the day, long ago. However, the publication was deferred for some unavoidable circumstances. Now we know the extent of damages that were done world over by this pandemic and the measures that were taken to contain the same. We have a slightly better understanding of this pandemic and its aftermath.

We also know that a large number of medicines that were originally developed against cancer have been found to be very effective to deal with the Coronavirus pandemic. Thus, this has restored the faith of drug repurposing making it more prevalent world over. We need to work together to defeat this uninvited guest exemplifying our tenacity and magnanimity shunning all the differences across the continents.

II. BIOLOGY OF CORONAVIRUS, VIRULENCY AND MODE OF INFECTION

Coronavirus disease 2019 un/lovingly known (COVID-19) is caused by severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) of the family Coronaviridae belonging order Nidovirales [2]. At the outset, SARS-CoV-2 behaved more like SARS (2003) and MERS (2012) [3]. Subsequently, SARS-CoV-2 assumed a pandemic proportion causing huge mortality across the world. The World Health Organization (WHO) declared COVID-19 a pandemic on 11th March 2020 [4]. COVID-19 spreads among people via the respiratory droplets of the infected individual's cough or sneeze [5]. The COVID-19 patients show respiratory symptoms, fever, cough, shortness of breath and other breathing related difficulties but the lungs are the most affected organ [6]. In some cases, infection caused pneumonia, severe acute respiratory syndrome, and multi-organ failure resulting in death. This virus has a 30 kb RNA specific genome, though sequenced fully but the virulent part of the genome is not yet identified nor the mechanism of its virulency. This raises a question: where was the virus earlier, does it not still enjoy the hospitality of its original animal host? How come it has developed such a strong liking for humans? What is there that it finds in the human host so very alluring? How does it evade the human's immunological surveillance systems? How often does it mutate and does it have mutational hot spots more than other RNA specific viruses? Is it the high rate of mutation that enhances its virulency? Has mutation rate increased or decreased after it took over the human host? How come it is not responding to the drug molecules effective for other RNA specific viruses? How many different strains/types of this virus are floating around? Since the virus enters through the receptors, do we have human-like receptors in animal hosts? Are there several receptors, if so, which is the preferred one used for infection purposes of this virus? How does the Coronavirus decide in favor of a particular receptor? How many receptors are engaged with one virus particle? Are there sufficient receptors readily available on the cell surface of the host or they are produced upon infection? Do we know the sequences of these receptors and their genomic location in the human? Do they also mutate and cripple the virus binding, thus conferring the resistance to the host genome. Finally, assuming that humans are able to develop a vaccine, what is the guarantee that this vaccine would be effective for all the humans' world over? How far this would be true? The Lyme disease vaccine developed in Germany works in the USA but does not work in the German population. Perhaps this can better be understood

if we take information on the human genetic make-up available in the published form.

The gradation in infection and rate of recovery tend to alter the dynamics of epidemiology. Thus, a large population free from infection and fast rate of recovery of those infected earlier reflect resistance and robustness of the human genome. However, epidemiological data would be skewed owing to the occurrence of a large number of asymptomatic cases floating round in the population. Do these asymptomatic cases represent resistance and robustness of the human genome? If yes, how to access incisive information from such cases?

Does it mean that virulency and mode of infection is altered by the human host, at least in some cases at the outset of infection? Does it also mean that some human host will remain resistant even under the most promiscuous infectious condition? With the development of vaccines, new knowledge will emerge highlighting if a single dose is enough or booster dose would also be required. If booster dose is not needed that means, the immune system does not have short term memory for this virus and a single dose would suffice. This in turn will lessen a huge burden on the production front of the vaccine facilitating its distribution across the globe. We would need close to about 7 billion doses of vaccine for a single shot to cover the entire global population. However, after the first shot, one time booster means more than 14 billion doses will be required to cover the entire globe. When and wherever the vaccine is developed, it must be free from the booster dose of politics, economic greed and political polarization and must not be used as a weapon against a country. Indeed, in several countries those who have had access to vaccines used it for three doses meaning two times booster doses. Facing depression, disease and death is challenging and we need to remain patient, positive and purposeful and more than that maintain calm keeping our hopes alive. Along with the medical miracles, we also need to have faith in God, in others (caregivers) and in ourselves. In light of the recent coronavirus infection, we need to revisit the human immune system and focus on the epidemiology and genetics for deeper understanding. We also need to emphasize on the nuances of our civility at the global level for the sake of humanity, and human civilization.

III. SUSCEPTIBLE AND RESISTANT HUMAN GENOMES

What makes coronavirus so very infectious is still not very well understood. Since it is highly contagious, that makes the war against this virus more challenging. Despite the fact that there is only one human species *Homo sapiens* alive today, we do have variations at several levels but broadly, we can divide the humans into susceptible and resistant groups in the context of this virus. This is because not every individual is affected by Coronavirus with similar severity. Similarly, not every individual dies due to this infection. More than 80% recover and of the remaining 20%, 5% die but rest also tend to recover slowly [7]. The gradation in infection and rate of recovery is

not only related to epidemiology but also associated with our immune system.

The brain and immune system are intricately connected, and perturbations in one system have direct effects on the other. The immune system is designed to detect and protect the body from infection, injury, and damage. The immune system has two arms: innate and adaptive. The innate immune system responds quickly to a wide range of pathogens (disease-causing microorganisms such as viruses and bacteria) and danger signals, whereas the adaptive immune system responds more slowly and is targeted to a particular pathogen.

Depression is common among COVID survivors. Early studies with hospitalized COVID patients in Italy suggest that inflammation may contribute to post-COVID depressive symptoms; inflammation during hospitalization for COVID predicted depressive symptoms one month [8] and three months after discharge [9], [10] with corresponding alterations in brain structure and connectivity [11].

Research in several countries shows that levels of anxiety and depression during the pandemic increased compared to the time before the pandemic. Many people experience negative emotions, such as fear, anxiety, and depression, during the COVID-19 pandemic.

When the stress level is controlled, the body's resistance increases and causes a defense mechanism, but when the stress level is out of control, it will have a negative effect on the autonomic nervous system and the cerebral cortex. This can cause psychosomatic and somatic symptoms, which can eventually lead to psychological disorders and mental illness.

Psychosomatic disorder is a psychological condition that leads to physical symptoms, often without any medical explanation. Mind and body have a single identity. Therefore, the interaction between body and mind disease is natural. The relationship between mind and body depends on the relationship between the central nervous system and the rest of the body, the relationship between emotions, the mind and the physical organs, and the relationship between the conscious and subconscious and the body. The etiology of psychosomatic symptoms is not yet clear. However, there are several explanations, molecularly, that there is a role for genetic modification and epigenetics, childhood trauma and other traumatic life events, the aging process, and the existence of situations of uncertainty. A pandemic is a traumatic event. It is proven that there is an increase in stress levels during the pandemic [12] [13].

Susceptibility and resistance both are genetic traits and faithfully inherited across the generations. However, the immune system fluctuates like Sensex and may be augmented by medications, food and a healthy lifestyle. We can uncover the molecular signature in the resistant genome across the individuals that would provide a much-needed flip to the overall screening program run by the government. This way, the susceptible lots so delineated may be taken up for screening on the priority

basis lessening the burden from our caregivers. Further, if the resistance is heritable and faithfully passed on to the next generation and remains unchanged, that would prove to be a game changer. However, this may or may not be true because our body remains dynamic for its entire physical, physiological, emotional, sexual and psychosomatic requirements. Accordingly, a person may seem to be susceptible but actually may be resistant. This would be akin to symptomatic and asymptomatic infections of coronavirus leading to false positive and false negative cases. Present pandemic has opened up several newer avenues for additional interdisciplinary research in basic sciences.

IV. HUMAN BODY CHEMISTRY AND HOMEOSTASIS

There are 102 elements present in the earth and these are also present in the human body but not in the same proportion. Of these, 20 elements are most crucial to maintain homeostasis. Four of these elements are present in large quantities that include Oxygen, Carbon, Hydrogen and Nitrogen. Eight elements are present in small quantities which include Magnesium, Sodium, Potassium, Calcium, Phosphorous, Sulphur, Iron and Chlorine. Other eight elements are present in minute quantities which are Molybdenum, Cobalt, Manganese, Copper, Zinc, Fluorine, Silicon and Iodine. These elements are present in the plants and animal systems though in different proportions. Animals and plants both are interdependent and use each other in different ways. These non-human systems have huge roles to play for our survival and sustenance.

René Descartes was a French philosopher, mathematician, and scientist who supported these facts independently. What is there that regulates the fine balance of these elements? Thus, we still need to understand the composition of the human body with respect to these elements. Besides the Indian Ayush system, we have an equally rich traditional Chinese medicinal (TCM) system [14]. Perhaps we may explore these medicinal systems to broaden our health care canvass and see if it correlates our immune system. Is this balance of elements (BE) related to our physiology, emotions, thoughts, faith, beliefs, habits, environment, pollution level and genetic makeup? Do we need all these 102 elements or can we do away with some? What is the relationship of these elements with ageing, neurological disorders, depression, autism, diabetes, cardiovascular diseases, or with COVID-19 contagion? Is a child born with the right proportion of these elements or acquire diseases because he has inborn deficiency?

A healthy body maintains the optimal functioning with respect to its different systems. This condition "homeostasis" is the key to good health and resultant happiness. To be able to have a healthy and happy life, it would be ideal to know the missing or extra elements in the body. Thus, searching for precision food with balanced elements would prove to be an ideal condition. In this context, Metabolomics and Metagenomics and data from human microbiome may be useful to assess the body's

elemental requirement. This would also help correlate the data with the presence/absence of any of the above mentioned 102 elements of the body. Traditional knowledge and ancient wisdom may also be useful to establish a scientific correlation between an ailing and failing body. Clearly, this needs additional research involving human physiology, reproductive biology, metabolism, endocrinology, molecular human genetics and immunology. How much is the human microbiome involved in conferring resistance against coronavirus infection? If we uncover a consensus on the quantum of all crucial elements in a healthy body, that would prove to be an important baseline data adding additional dimension to disease diagnosis. It would also lend support to the concept of personalized medicine.

V. PLANTS AND ENVIRONMENTAL DEGRADATION

Plants on the earth are 400 million years old, whereas humans, only 100 million years old. Nature created plants for us to survive, sustain and fulfill our food, medicine and household requirements. The humans have played havoc with the ecology disregarding the fact that nature maintains a very delicate balance to support and sustain the life processes. If this natural balance is disturbed, it would endanger all the living beings on earth. Like humans, other species also depend on one another for their survival and remain parts of the ecological chain. The sordid saga is that during 1990-2016, humans have cut down 46% of the trees on earth, clearing 1.3 million square kilometers of the forest. Despite this gloomy scenario, we can still restore one trillion trees which will protect this planet from the perils of global warming and climatic change. Trees can reduce particulate matter (PM) from 7-20% and a single tree can produce 250 pounds of pure oxygen per year [15]. Trees are wonderful filters for dust, smoke and harmful gases. Tree leaves cool the atmosphere through evapotranspiration providing moisture which in turn protects the forest from fire. A single tree can provide shelter to about 80 different species of birds. Also, a single tree stores away up to 800 pounds of carbon dioxide (CO₂) per year through carbon sequestration. A single oak tree can transpire up 40,000 gallons of water into the atmosphere in one year. These are a few examples signifying the relevance of the trees in our lives. Trees offer medicine, rubber, food, flowers, wood, perfumes, spices and shelter that are useful to a large number of species. This includes microbes, algae, fungi, insects, reptiles, amphibians and many small and large mammals.

Our four main Vedas- Rig, Sama, Yajur and Atharva teach us Vedic lifestyle for our sustenance. Air, water plants permeate the universe and are essential for the existence of life on earth, says the Atharva Veda. Also, plants and herbs help destroy the poison. Yajur Veda says none should kill the animals useful for humans and protect the ocean as they are treasure troves. The tradition of harmony has been maintained since the time of Puranas. In essence, Vedic civilization was rooted in judicious

use of natural resources. Despite the availability of this valuable information, we remain largely ignorant or knowingly arrogant.

VI. ATROCITIES ON NATURE

Humans have destroyed the forests, green land, many valuable herbs and plants including the precious medicinal ones. They have polluted the environment and killed a large number of animals without any remorse. No species has caused environmental damages as much as humans. Massive environmental degradation and large-scale atrocities on nature committed by humans have resulted in serious consequences. Global warming, food shortage, depletion of germplasm, extinction of species, outbreak of newer unknown disease and loss of forests are a few examples. Similarly, rampant use of polythene and plastics and their unscientific disposal allowing them to reach the water bodies have choked the entire system. Micro plastics have reached to the veins and arteries and to the human heart. Like humans, other life forms too have been affected but then they have no way to complain. If the environment is heavily polluted and has become radioactive due to continuous bombardment in several parts of the world, it has no way to protest against our follies. Nature remained silent spectator, tolerating the highhandedness of the humans for much too long. But when this hegemony and highhandedness reached to the brim, nature cannot take it anymore and start giving us back paying in the same coin. Some animals are used as food in a civilized manner. However, humans started experimenting with those animals that are the natural reservoir of microbes, bacteria and viruses of which many are pathogens. The recent Coronavirus infection that had gained gigantic proportions, has now called off the day is one such example. This pandemic must be seen as a wakeup call in a larger perspective. We have had contagions earlier also but not to this unprecedented scale and not with such severity. In Western countries, the apparent environmental filth may be much less but the rampant use of plastic and packing materials have choked the water bodies and sizable part of land masses as mentioned above. Also much has gone to the ocean affecting marine lives in a big way. Because of our arrogance, we have not only committed the atrocities on nature but have also depleted the earth resources by mining lands for minerals, coal, metals and heavy earth materials. Thus, we brought many perils to the environment, little realizing that we cannot ever defeat nature. This is a clear and present danger warranting us to protect nature for the sake of humanity and future generations. If we agree that we have borrowed this planet earth from our children, then we better behave and become civic of the highest order.

Respecting nature, treasuring its bounties, not killing animals indiscriminately and keeping the environment clean does not require rocket technology. It only needs honesty, planning, willpower and a sense of responsibility. We have the best of technologies but the worst human beings. We have well

developed countries but under-developed citizens and bad policies. A country should not be evaluated just by its technologies or GDP but by the characters of its people. In the end, our worth depends upon our values and our greatness depends upon our goodness. We must learn the art of protecting these green bounties of nature and use it judiciously for the benefit of mankind. The current coronavirus pandemic is the result of the atrocities we committed on nature.

VII. FOOD HABITS AND LIFESTYLE

We are what we eat but often we eat what we should not eat or do not eat what we should eat. The choice of food and availability coupled with belief changes the entire dynamics. Seemingly, food habits are related to culture and culture itself is influenced by the food habits. Both tend to affect human health. The culture again is linked with the region and religion which in turn affect habits. Further, religious rituals that are an integral part of the society, also affect lifestyle. What one believes may not always be true. Likewise, what is true is not always believed. Thus, at times, it becomes difficult to delineate between the two. Belief is largely based on the conditioning of the human mind, body and peer pressure of the society. Thus, food nourishes us and sustains our body constitution but every one may not have access to the food in the desired quantity.

This wakeup call must be taken seriously and respecting earth resources taking only as much as bare minimum required. When we learn the art of following minimalistic lifestyles, we would automatically be taken to the much-needed realm of sustenance. This would ensure availability of earth resources to the deprived ones. Coronavirus infection has proved that we can live with a bare minimal and still survive comfortably. This pandemic has many positive effects on the ecology; water bodies, social systems, human behaviours, cleaning everything that we failed to do earlier. It has also taught us to become less dependent and reach out to others who need help. With our right actions, reoriented thoughts and positive attitude, we can surely metamorphose into an Aryaman.

VIII. GENETICS AND THE HUMAN IMMUNE SYSTEM

The human genome has close to about 3.5 billion haploid sequences and 20-22,000 genes [16]. Each gene is prone to mutation and thus is likely to cause genetic anomalies. Some chromosomes are gene rich whereas others are gene poor. Similarly, some chromosomes harbor more number of diseased genes compared to others. A human body replaces all its cells (about 30 trillions) with new ones in two years' time. A large number of genetic diseases have been reported. What would be the scenario if a person is already suffering from some known diseases and he is also infected with coronavirus? Current level of our understanding in that direction is not sufficient. Several physiological and genetic disorders add to the list of human diseases overburdening the population. When a person with

diseases is infected by the coronavirus, how does his body cope up with the infection? Logically, a sick person is a sitting duck for this contagion though this may not be true for everyone because a strong immune system may protect a person from the perils of coronavirus infection. While Corona is expected to do maximal damage, it would also compel us to reorient our thoughts and approaches towards augmenting our health care system all at the personal, social and governmental levels.

By far, humans have the most advanced immune system controlled by MHC loci and genes that have close to about six thousand variants. However, the immune system alone is not sufficient because viral load at the time of infection also plays a critical role. Surprisingly, of the 3.5 billion human haploid sequences, about 10% are contributed by the viruses that have invaded our body long ago and have now become an integral part of our genomes. Thus, protecting an individual from the onslaught of the viral load may be the smart way to protect from the infection. In this context, physical distance makes more sense than relying on herd immunity. This is because herd immunity will first kill many and then protect some at a later stage whereas physical distancing will protect many and kill some, later on, largely to those who violate rules of the game. Immune system of humans is affected by the environment he lives. Thus, polluted environment, unhealthy lifestyle, metabolic disorder, genetic and infectious diseases, food habits, culture, poor nutrition, lack of hygiene, belief, faith and practice, superstition, complacency and other personal ills and social evils would weaken the immune system. A happy person has a more robust immune system than that of an unhappy one. Happiness is directly related to the healthy and positive attitudes coupled with a healthy lifestyle and sense of overall security or total lack of insecurity.

IX. MANAGEMENT OF CORONAVIRUS PANDEMIC

The management of coronavirus pandemic has put enormous strain both on the civilians and government machineries world over. It calls for large-scale testing of the infected people, providing them medical and moral support and ensuring that after their recovery, they are able to adjust with society. However, it is not always feasible because infrastructures and hospital setup in many countries are not at par with the desired level. Further, the sagging economy has added additional woe to this scenario. In India, the virus infection came along with those who returned from abroad. The government failed to realize the gravity of the situation and made several mistakes. The government arranged a special flight to bring them back. All such people could have been religiously quarantined for a month after they reached India. However, this did not happen and several of them were allowed to join their family. This initial failure started getting amplified, spreading the infection across the country. The entire situation seems to be aggravated further because close to about 140 million laborers are on the road trying to return back home disregarding the social distancing. In the entire spectrum of the

management of this pandemic, mistakes were made one after the other in the absence of coordination between the central and state governments. However, no one or no organization is to be blamed. This is because this pandemic was new to everyone not knowing how to handle it.

There are several countries in Africa where no protective gear and mask was available. Social distancing was almost impossible because poor people have to fend for themselves for basic things like clean water, food and shelter. Since governments in those countries have been running the show on an ad-hoc basis, they could never ever develop Roads, Hospitals, Schools, Colleges and Universities and trained manpower. Logically, affluent countries should have been better off to deal with this pandemic. However, the overall death rate belies this fact and shows that they were no better. The way to go was to ensure large scale testing, provide healthcare to the affected individual and support poor citizens so that the wheel of economy keeps moving. In that situation, the government had to be innovative, sensitive and generous doling out cash and kind to the masses.

X. FUNDING FOR CORONAVIRUS VACCINE

Availability of a robust all round research paraphernalia spread across the country and generous financial support are mandatory for high tech research. Such infrastructure and liberal funding would be a great asset during a pandemic or any other similar disaster. Fortunately, India had reasonably good paraphernalia and a skilled pool of scientists to take the bull by horn. The vaccine was indeed developed indigenously and used successfully across the country. An active vaccine program for infectious disease started long ago could have been more rewarding. Now since we have been exposed to pandemic and data from across the globe is available, we can plan accordingly for the future. For several infectious diseases, special research facilities are required. Funding may be based on merit and track records of the researchers, not on the basis of the name and fame of the Institutes. Many scientists who have made substantial research contributions during their active career have been asked to move out in the name of superannuation. With the passage of time, a person becomes more seasoned, knowledgeable and mature and may prove to be an asset to the organization and to the country. The institute must act more generously to accommodate such persons taking the advantages of their experiences. Of course, this superannuation rule is also broken frequently for several privileged ones. The researchers who joined the National Institutes prior to 2004 on a regular basis have been denied their pension. Now poor souls have been fighting litigation in the court of law for more than decade. This is unethical and highly deplorable, more so because these scientists and faculty members paid their income tax regularly, religiously on time, every time.

In India, research can partly be supplemented by the contribution of the corporate houses. The liberal fellowship awarded to the students, research support in the form of grants, on a regular

basis will go a long way to augment the scientific caliber of the country. The other important issue is the production of scientific equipment. China is self-sufficient and ahead of many countries as it has indulged in fabricating equipment needed also by other countries. There is nothing conceivable that China does not make. Time is up for us to join head and hand to fulfill this much awaited requirement lest it becomes too late and we remain followers and do not become leaders in this field. During the present pandemic, some research students were not paid their scholarship money in several organizations. It is very difficult to sustain without financial support in such a situation. Such organizations must be sensitive to the needs of researchers ensuring their regular financial reimbursement.

XI. CURRENT STATUS OF DRUG MOLECULES AGAINST THE CORONA INFECTION

The antiviral drugs may inhibit the binding of virus with the host cell receptor or inhibit its assembly by acting on structural protein after infection or by preventing viral replication inside the host cells. Several natural compounds and plant derivatives show antiviral properties with less or minimal toxicity as compared to known antiviral drug molecules in the market. Therefore, identification of the potential inhibitors or natural plant derived compounds against spike, helicase and RdRp proteins of SARS-CoV-2 may prove to be a promising proposition [17].

In this context, crystal/ modeled structure analysis followed by docking with 100 approved antiviral drugs and natural compounds have been a very useful approach. The ligands EK1 and CID_23631927 were found to interact with all the proteins [18]. The CID_23631927 is a potential entry inhibitor as it showed affinity with the immunogenic receptor binding domain (RBD) of spike protein [18]. This RBD interacts with the ACE2 receptor facilitating the entry of virion in the host cells. Here comes the philosophy of science. If instead of the ACE2, some other receptors are employed by the virus that would change the dynamics of infection. Lopinavir, Nelfinavir, Setrobuvir, Indinavir and Tipranavir are FDA approved inhibitors of HCoV and HIV have shown interactions with the target proteins [19]. However, these molecules have not given desired respite from the pandemic. Several natural compounds including Tannin, Rutin and Amentoflavone have shown inhibitory properties against these proteins [20]. These compounds are safe and known to have anti-SARS activities against the HCoVs. A popular herb Tulasi is known to help during respiratory stress. It has anti-microbial, anti-inflammatory and expectorant properties providing much desired optimum respiratory support during cough and cold. Ashwagandha, Meshashringi and Chandraprabha, Arjuna and Giloy are safe and known immune-modulators. Surprisingly, not many people seem to be aware of their Immuno-modulator potentials. Tulasi, available in the market as caplet, may safely be used in Corona infected symptomatic and asymptomatic cases as this does not have any

side effects. It is not a cure for coronavirus but would surely help augment the sagging immune system of a person which in turn may provide resistance to the infection. It was speculated that only lung cells are the target of the virus but now it is seen that other organs are also affected since they too have ACE2 receptors. Thus, several cell lines may be used for in vitro assay experiments. Further, it would be prudent to explore different nanomaterials to selectively eliminate the infected cells with these Nano-bullets.

XII. BURDEN ON CORONA WARRIORS

World over, caregivers, ambulance drivers and police forces have not received the care they deserve. Several such persons died and many were infected and quarantined. Many caregivers worked continuously even without food and water owing to logistic constraints. They lack basic protective gear, gloves, masks, sanitized transportation and mandated hassles free access to food in a safe, secure and a well-kept environment. Thanks to the print and electronic media, every villain in any hue in the society was fully exposed. What else can be more sordid than to put a pregnant female doctor on duty to care for a coronavirus infected patient? Even if this statistic is miniscule, it still questions our moral turpitude. Other Corona warriors include school, college and university teachers taking continuous online classes and scientists busy with their experiments for the development of vaccine and therapeutic agents against this infection. Similarly, many scientists are still pursuing computational approaches to map the evolutionary trajectories of this virus to identify possible drug targets. Coronavirus has apparently gone but its occasional resurgence continues to remind us that we should remain alert and active. It is going to be a long-drawn battle and thus we must live with it and be prepared to face the forthcoming unexpected challenges.

XIII. LAWS, POLICIES, IMPLEMENTATION AND ENFORCEMENT

Management of this pandemic calls for streamlining the logistics leaving no room for any exigencies. Any law that is enacted must be in tune with the ground realities. If reform is needed, it must be done at every level including that at the level of law enforcement agencies. Besides, police and judiciary, several other bodies are also involved in the intricate fabric of law enforcement. They all perform within the realm of well-defined rules and by-laws. At the micro-levels, laws may be formulated for smooth conduct of an event, or a gathering. Any breach and communication gap amongst different agencies would prove to be a recipe for disaster. A glaring example of communication gap amongst different agencies has resulted in the influx of migration from Delhi to UP, Bihar and West Bengal showing huge congregations at Anand Vihar Departure terminal. Further, in the absence of transportation, lakhs of migrant workers were forced to walk to reach home

barefoot without food, shelter and water. Lack of coordination and advanced planning of multiple civic and administrative agencies culminated in the colossal loss of lives. More than forty persons died for no fault of their own due to hunger and lack of transportation. Several road accidents resulting in death and destruction are all too well known to us. In addition, atrocities were committed by the police on daily wagers. This is not because they are beasts but because they lack training, education, exposure, proper grooming and human sensitivities and empathy. Police in India must be given better salaries, educational facilities for their children and accommodation for families. Their duty hours must not be more than 10 hr. During their initial training, they must spend at least three months in a hospital set up, orphanage or old age home so that they are brought closer to the ground realities of human life. If such sensitivities are inculcated in them during the training, they would be an asset to the society commanding more respect. This would also enable them to make better decisions under the most challenging conditions. On many occasions, police personnel have played roles of angels looking after the distressed, old and helpless people providing them food, medicine and moral support, all free of cost. In the context of Police reform, it is high time that the Bureau of Police Research and Development (BPR&D) headed by the Ministry of Home Affairs takes the initiative and addresses this issue on war footing. Current overall infrastructure in every sector must also be augmented only to ensure that we remain fighting fit on all fronts all the time. Similarly, citizens too have to act in a more responsible manner, sacrificing their own comforts and maintain harmony in the society.

Government world over must take stock of the situation now and in retrospect assess both its achievement and failures. Fix and reorient the judiciaries, reform police and criminal justice system, upgrade medical facilities, spend money on masses, particularly focusing on poor and elderly people, allow only those industries which show respect for the environment and make tough laws against environmental pollution. Invest large heartedly on infrastructural facilities. Create a congenial atmosphere and encourage use, reuse, recycle, replace mantra to arrest environmental degradation. Make sure to arrest wastage of man, material and mind, food spoilage and instill a sense of safety in the society. This will culminate in the much-desired social reforms. But first and foremost, the country has to chalk out the priority in order of merit and then to go for its ruthless implementation so that citizens take pride in connecting with government and in turn with nature. When we are connected with nature, we show due respect. When we respect nature, we do not destroy it, when we do not destroy nature; other species thrive maintaining the ecological balance. Needless to mention, nature includes plants, animals, mountains, ocean, rivers, ponds, lakes, deserts, insects, birds and marine organisms and humans. Therefore, conservation of biodiversity is more important now than ever before. This would arrest the spread of future zoonotic diseases.

XIV. SOCIAL HARMONY AND SOCIETAL REFORMS

Social harmony is possible only when we have efficient, judicial, medical, industrial and environmental systems. The fact that a large number of cases are lying in the court and people are waiting to be heard is obvious to all of us. If a person is not guilty and put behind the bar, he cannot come out unless his case is decided. In the process, if he spends twenty to thirty years in jail, who is responsible for the loss of time in his life? Is this not an injustice? *Let a hundred guilty go scot free but no innocent be punished.* On the face of it, this looks to be too civil, full of empathy but in actual case scenario, it is just the opposite. An overcrowded jail is an ideal recipe for coronavirus infection. Many, who have committed the crime, are freely roaming around. On the other hand, a large number of innocent people are behind the bar. The system of judiciary is either overburdened or pathetically inefficient or both. In any case, the system calls for an all-out revamping and reform.

Even before the present pandemic, our health care system was not in very good shape. We have far too few physicians for the population of our country. In a village setting, this becomes even more abysmal. Medical education is outrageously expensive, and has assumed a well-organized business (corporate) structure. Barring government medical colleges, the private ones demand hefty donations in addition to regular fees. This is known to all of us but we take it lightly or ignore it. Adding insult to injury, the smart medical graduates move out to seek their fortune elsewhere. Law alone cannot change these anomalies, revamping of the system and making it better, will. Perhaps this pandemic will enlighten the policy makers to address this issue in greater detail. The other important aspect is the manufacturing and fabrication of medical/research equipment and accessories. Depending upon other countries is not a crime but developing and fabricating medical devices indigenously will provide a much-needed flip to our medical ecology besides instilling a sense of pride in health workers and caregivers. It would not be inappropriate if DRDO becomes the leader paving the path for others to follow. Current scenario demands revamping of the health care system and hospitals in terms of infrastructures and medical equipment including lifesaving ventilators. A country is never made strong and happy only on the basis of false promises, living in fool's paradise ignoring the basic requirements of the citizens. This may be a smart ploy to divert their attention from the main issues. Country needs a strengthening support system second to none to be able to become self-sufficient. The development of the healthcare system is an absolute necessity and this must be established even in the far-flung areas of the country managed by well-trained physicians. What people are experiencing world over now is just one dimension of the gigantic problem largely created by us. Perhaps many would realize that being self-sufficient is the right way to lead the country but its implementation remains an issue.

India is a sovereign country but we still operate under the outdated colonial laws. Since many of these laws do not conform to our present-day situation and have outlived them, they have become redundant. The excess use of force mixed with a generous dose of brutality all around in the recent past before and during lockdown period has shaken the citizens across the country and maximum brunt was faced by the poor. This highhandedness has generated large scale trust deficits against the system. It must be noted that social harmony is the key parallel to social justice. Social justice automatically brings a sense of security. This sense of security results in a sense of assurance which in turn culminates in happiness. Thus, the government of the country must pay attention to ensure trust building and social harmony so that unrest of any kind may be nipped before it becomes poison ivy. Unfortunately, several rules themselves act as poison ivy with total political and administrative immunity. This trend is seen in many countries and with the result, protests and demonstrations against the government have become norms of the society.

We need urgent salvaging to build up a clean society if not a utopian one. In several countries, the government has failed, but society too is to be blamed by not electing the worthy person as its representative. In the Parliament of several countries, more than 50% elected members are hard core criminals. Some of them control, judiciary, business empires, government policies and even faith and religion. The gullible masses remain unaware or afraid of their nefarious design. The very deep nexus between politics and crime, church and politics has spoiled the entire social ecology resulting in large scale mistrust and dissatisfaction. The mantra to fix is to elect good, honest, clean and educated persons with personal and professional integrity. If this is followed ignoring all the other considerations such as cast, creed, region, religion, political affiliation, personal and professional gains, things would start moving in the right direction.

Social norms are built around the philosophy that those who are less fortunate will also be able to live a modest but a decent life. Thus, care and sharing should be the hallmarks of society world over. However, often this is not seen. During the lockdown period in India, a pregnant female was refused admission to three private hospitals; by the time she reached the fourth one, the baby was delivered but the mother expired. There are several such examples of the ordeals faced by the people during the lockdown. Globally, we have more than 40 million refugees' spread across the world. Many in the process of migrating have died; others have lost their meager belongings, kith and kin and all of them lost their homes. No one has a right to decide the world order at his whim and fancy just because he is not questioned. This ever-growing pathetic social contagion is not only seen in developing countries but also in very well-developed countries who aspire to be the champion of human civilization. Reducing the funding of the WHO on some plea is one such glaring example. Perpetual

sanctions and never-ending economic embargo against other countries has now become rules of the game. This is because those who promulgate sanctions think that subjugating others is the only way to remain powerful. In this context, coronavirus is not only proving to be a game changer but also a social leveler. For a just, healthy and happy world, corona will disarm many of them of their arrogance.

Post pandemic, we expected a new world order. Whether or not, only time will resolve this issue. However, one thing is clear, this pandemic would change the way we work, interact and depend on others. During post contagion, some people may shun the desire to amass illegal wealth in the society at least by some people. Similarly, the frequent international sanctions and economic embargo have to go away once for all bringing much needed civility and harmony in the system.

XV. SOCIAL JUSTICE AND EMPOWERMENT

We do have social justice and empowerment columns in India and in other countries as well but that needs a revisit. If we practice zero tolerance against abduction, kidnapping, drug trade, rampant environmental pollution, poisonous speeches by the people, large scale bigotry and hatred coupled with exclusion policies, that would resolve many burnings hitherto unaddressed issues in the society. We should also create an atmosphere that each state remains sovereign and independent with respect to the implementation of their need-based programs meant for social uplifting and poverty elimination. When India gained freedom in 1947, it remained non-aligned. That indirectly allowed India to remain focused on the more pressing issues like development. This way, we had more friends and a lot less enemies. India has indeed progressed, thus, ignoring the progress made during the last seventy years or blaming the earlier ruler reflects the insipid thinking of some people. With our agro based economy, cheap labor and four seasons climate, we surely could have done much better on all fronts. But not doing better earlier should not stop us now to fix it, move on and excel.

In order to take the country into a higher orbit and make it competitive at the global level, we must dislodge our preconceived notion about a person, community, region, religion, faith, belief and caste. When it comes to offering a job, merit alone should be taken into consideration. We must remember, if we are biased against someone, others too will be biased against us. Thus, we must deal with honesty and enjoy the sweet fruits of the same, in return. Indeed, honesty is the best policy.

We see large scale moral debasing in the society as if we have forgotten the art of being polite and science of good conduct in our routine dealing. Although, the majority of the people still practice decency on a regular basis, nonetheless, we must stop manipulating the system, get rid of our biases and ill doing to make our society a better one. Many countries have prospered

in a big way because these ills are not there. Thus, let us come out of this moral debasing to make our country prosperous and strong simply by indulging in community development.

XVI. LESSONS LEARNT FROM THE PANDEMIC

Many of us never learn anything from any situation owing to our myopic vision, greed and arrogance. However, many of us have realized that this infection has affected the entire globe. Perhaps this has never happened earlier in the annals of human history. Let us ask where and how things went wrong and who is responsible for this scenario? How often the world leaders have indulged in wrong doing with respect to other countries in the name of politics? How many positive steps have they taken individually and collectively to streamline the global order to stop wars? Who is responsible for such a large-scale destruction of the building, infrastructures, schools, colleges, hospitals and Universities in several countries? Who is responsible for much avoidable food shortage, human diseases caused because of famine or war? Who is responsible for such a large-scale migration of the poor, helpless people from one part of the world to another? What kind of future are we going to pass on to our next generation? Who is responsible for the environmental pollution and biodegradation and rampant habitat encroachment and loss of enormous numbers of species? Who is responsible for loss of species, extinction and their habitat destruction? How much wealth does a person need to live a luxurious life? What is the satisfaction and happiness index across the globe? These may be ordinary questions for ordinary people but have extraordinary consequences and thus must be deliberated. It is now seen that without having domain knowledge some government officials suggest outrageous treatment to coronavirus patients in connivance with some companies. This is sheer arrogance and height of dictatorship. Some herbal companies claimed to offer a cure for coronavirus far more than they understand the nuances of this contagion.

Our civility would have been in order if only we would have not allowed corruption and moral debasing to flourish in our social system. Dereliction of duty, highhandedness, appointment of incompetent persons to a higher position, election rigging, bribes, undue favors, ignoring merits, and even after doing all these, no sense of moral compunction is seen anywhere. A diseased person cannot be treated by a diseased system. We fail to acknowledge a large number of anomalies in society. The Corona pandemic is warranting us to show our civility not only once in a while but all the time on every occasion.

If we think a corrupt person gains a lot of wealth and lives a happy life, one should think again and analyze their life in minute details. As you sow, so you reap, if this is true (I believe, it is true), then all those people one way or the other end up paying a very heavy price for their wrong doing. If one is not scared of heavenly ire (wrath), good for him/her but surely not good for the next generation. Wrong doers, first and foremost

lose their peace of mind. Of course they would not lose the peace of mind if they have no mind.

XVII. INFRASTRUCTURE AND DEVELOPMENT

We have a lot less Medical Colleges than our country needs. We have equally smaller number of hospitals and doctors that our society needs. This is true also for other sectors such as Schools, Colleges and Universities. When the British came to India, the Indian population was 16 crores. When they left India, we were 37 crores but now we are 1367 crores. Proportionately, we did not augment our infrastructures.

Development of robust infrastructure speeds up the processes of the overall development in any country. The same very infrastructure also acts as a shield during an emergency. I wonder if the policy makers ever found time to visit far flung areas of the country to assess the implementation of their policies. The ground realities are very different as people live pathetic lives, without clean drinking water, housing, sanitation facilities, or electricity. 160 million people are poor living below the poverty line. They are poor because they have been fed hopes and live on false promises. Someone has to be responsible for the lack of implementation of the policies at the gross root level. Global warming, environmental pollution, rampant food adulteration and lack of medical facilities do not spare anyone; but the poor people are the worst sufferers. No one talks about the enormous food wastages world over. It is an open secret that every year, a sizable part of grain is wasted in FCI warehouses in India. Hunger on one side, food wastages on the other side is all much too common and must be stopped. We may have great ideas and wonderful programs for the sake of teaming millions in our country. However, lack of determination and casual attitude for its implementation become gigantic impediments for stalling any movement small or big in forward direction. Reality is bitter but the present pandemic is indeed a blessing in disguise. It has exposed the entire chink in the armor perhaps only to make us more resilient, tolerant, sensitive, and respectful to others especially to the women, street children and poor people.

XVIII. POST PANDEMIC SCENARIOS

We expected more hell post pandemic due to rampant job loss, skewed health care system, stalled economy, heightened mistrust, burden of feeding the teaming millions, finding a way to engage the daily wagers and numerous other unforeseen problems. Schools, Colleges, teaching of the students, their examination, and timely result declaration were some of the issues that needed attention and solutions. Development of manpower corresponding to different areas of human activities may be another challenge. Agriculture work cannot be done online; similarly, a surgeon cannot be trained online. Despite apprehension during post pandemic, India did well on almost all fronts. Now, if we iron out our angularities at every level,

work honestly, practice the philosophy of care and share and art of being frugal and minimalist, we can leave post pandemic blues far behind establishing our resilience.

People who have very little or no faith in Government Machinery may not be blamed. This is because the lockdown was announced all of a sudden. A few days gap and planning for mass transportation coupled with availability of food and shelter facilities should have made a huge difference. This could have checked mingling of the asymptomatic cases with others and avoided the infection. Providing dedicated trains to UP, Bihar and Bengal and other places coupled with Bus services on war footing would have saved many lives and numerous heart burns. Those who flooded the departure terminals of trains/buses were also the carriers of coronavirus. Many recovered but some did not and those who did not would continue to infect others. While physical distancing is a globally acknowledged way to contain the coronavirus infection, the modalities are equally important to fight this menace. It was not a system failure and placing the blame squarely on the government is also not justified. This is because the government works on the basis of advice given by the in/competent experts. Large scale education, honest inclusive policy, uniform treatment of the government to all sections of the society would have surely resulted in a lot less confusion avoiding even the Tablighi incident in Delhi. Let us move on with the lesson that we have learned to become more innovative, imaginative and responsible and civilized persons.

XIX. WAR LIKE SUFFERING AND COLOSSAL LOSS OF LIFE

In a full-fledged war, man, materials and infrastructures are destroyed and the wheel of economy is brought to a standstill. However, in the present pandemic, humans and economy have become the causality. But in the absence of humans, wealth and materials would lose their relevance. The current scenario suggests that even without the third world war, coronavirus will kill many people including a large number of caregivers. What would have been the scenario had there been a full-fledged world war? Perhaps a lot more death and destruction and ecological disaster would have occurred owing to the dissipation of large-scale radiation from the smart bombs. Still, if we are not awake, then we surely deserve to sleep un/peacefully forever due to our follies and arrogance.

Every country needs defense forces and weapons for its security. However, the world has gone much too far to develop weapons of mass destruction. Even for self-defense, production of such weapons is not justified in such staggering quantities. The large-scale nuclear weapons made available to those who enjoy killing and maiming others has not only destroyed the sizable part of the human population, mostly those of helpless ones but also released a dangerous level of radiation in the environment. This aspect is never talked about on any forum. The so-called superpowers believe that it would not affect them because of their myopic views. Radiation does not recognize the Nation's

boundaries nor does it discriminate between humans and non-human species. In the process, we contaminate everything. Inadvertent Chernobyl accident, Bhopal gas tragedy and Japan's nuclear accident were unavoidable. But indiscriminate large scale use of nuclear weapons in Syria, Iraq, Iran, Afghanistan, Pakistan, Libya or other parts of the world is abhorring and unjust and is avoidable. No power (country) has the right to create inhuman living conditions for humans in the name of policies, politics and priorities. This must be stopped henceforth without any rhyme and reason. Let us not forget, if we try to be smart by being anti-human, nature is going to terminate and erase us without any siren or warning. Nature has decided not to tolerate our arrogance anymore and the coronavirus pandemic was the reaction along this line.

XX. IMPACT ON FUTURE GENERATION

The present scenario would leave an everlasting impression on the next generation. Hopefully, following this pandemic, the earth's resources should only be used and not abused. Perhaps, greed will find a break so also the whims and fancies of the ruthless rulers. If the rulers do not mend their ways, the ruled ones will start playing the same coins that the rulers are now using. We must remember that everything has a limit. Only the human imagination and ingeniousness have no limit. Frail was the phenotype of Gandhi but with his firm conviction and unlimited power of Ahimsa, he rocked the bottom of the British Empire and made them nosedive. Gandhi succeeded because he believed in himself. Of course, for some people, even Gandhi has lost his relevance as his killer, Nathuram Godse is still admired.

XXI. DOOMSDAY AND END OF HUMAN CIVILIZATION

We progressed, prospered and then became greedy and then greed impelled us to become a super power. Not every country can become a superpower. This dictum has created a situation that a sizable quantum of taxpayer money is diverted to create weapons and weaponries. Life is dependent on many people, factors, facilities, products, procedures and places. Thus, we will not survive by eliminating other Nations. Let us not forget that the human race has survived and flourished because of social interactions. The simple lockdown has driven people mad and many are depressed world over. This little lockdown trailer proves the point that we must live and let live which is the only policy we should follow. And now, this phrase may be slightly readjusted as *Live, love and Let live*. Therefore, one should dislodge the idea of becoming a superpower once for all. The enormous quantum of money saved from the weaponries may be used to convert today's hell into everlasting heaven fulfilling our dream of a utopian society.

Undoubtedly, human civilization will come to an end one day even if we live in harmony. However, we shall only be speeding

up the process of getting closer to the doomsday, if we continue living with our highhandedness and arrogance. None of us can say that we live in a safe, secure and a just world today. Thus, it is up to us to decide if we want our end swiftly, or gracefully with the passage of time. Rulers come and go but our value system stays in the society. We have to hold on to our social norms and values and protect them from any kind of onslaught to pass on to the next generation.

XXII. CONCLUSION

The earth has survived two world wars. However, we cannot be sure that the earth will survive again if third and perhaps last world war takes place. The only way that we can survive is to reduce the size of our ego, get rid of the never-ending greed to concur the world and desire to be the ultimate superpower. We must accept that everyone born on this planet has a right to live his/her life in the dignified manner. Society delineates mankind into different class, cast, region and religion but we humans (*Homo sapiens*) are same with similar requirement for our sustenance. Let us love, live and let live.

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