

## Research Article

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## Spreading of Coronavirus Globally and Pandemic Crisis

Nagendra Nath Mondal

Department of Physics

### ABSTRACT

**Objectives:** There is a lot of speculation, debate, and hypothesis about the new coronavirus disease 2019 (COVID-19) severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Also the world famous media British Broadcasting Corporation (BBC), National Center for Biotechnology Information (NCBI), and World Health Organization (WHO) are informing their emergency concern for the public attention. But we are far behind yet to say the origin of COVID-19 and its outbreak. The main purpose of this study is to put an end to all speculations, fantasies, theories and debates.

**Methodology:** Every Coronavirus infected country updates their records of number of infected people and deaths to the WHO on daily basis. Those data are collected and studied according to the country's population density, number of infection, death rates, GDP, physical position in the globe and temperature and formulate into spectra.

**Results:** Spectra are analyzed in a systematic way and apprehend that the origin of Coronavirus is in the Laboratory of Wuhan Institute of Virology (WIV), China where scientists and researchers had been studying virus from the body of Bats. The first infected patient was found in December 2019. From interviews with individual scientists familiar with WIV and these analyses it appears today that the worldwide Corona-domination is the result of lab-leaked virus SARS-CoV-2 of the family Coronaviridae.

**Conclusions:** Based on the data analysis, and statements of many interviews, magazines and media it can be concluded that the origin of the coronavirus is the lab of WIV, China and outbreaks over the world before taking major precautions.

### \*Corresponding author

Nagendra Nath Mondal, Department of Physics, Techno International Batanagar B-7/360 New ward, Maheshtala, Kolkata 700141, West Bengal, India E-mail: nn.mondal2011@gmail.com

**Received:** December 23, 2021; **Accepted:** December 29, 2021; **Published:** January 07, 2022

**Keywords:** Bacteria; Coronavirus; Lab-leak theory; Outbreak, millions of people [4].  
Pandemic; Vaccine

### Introduction

Human beings are in grave danger since the official outbreak of Coronavirus, a highly communicable respiratory viral infection, which is originated in Wuhan, China, officially categorized as a contagion by the World Health Organization (WHO) worldwide in January 2020 [1]. Its effects are not the same in all countries and deadly attacks in developed countries have killed millions of people. The International Committee on Taxonomy of Viruses termed it as the SARS-CoV-2 virus [2]. The size of this virus is approximately 60–140 nm. The coronavirus was named so because it contained crown-like spikes on the outer surface. Coronaviruses are members of the Coronaviridae family. Up to now five species of coronavirus: alpha ( $\alpha$ -), beta ( $\beta$ -), gamma ( $\gamma$ -) and delta ( $\delta$ -) are found [3]. Towards the end of December, 2019, Wuhan, a cosmopolitan city of China, perceived the dragged of the novel coronavirus, with more than eighteen hundred individuals killed and more than seventy thousand people infected within the initial fifty days of the epidemic. The infection was named as Wuhan coronavirus or 2019 novel coronavirus, in short COVID-19 by the Chinese specialists. Since then coronavirus outbreaks occurred through the travelling people from here and there and killing

Now people are disoriented. The global market has been hit hard by the house arrests in response to the virus. As a result, people in many countries are facing economic hurdle in parallel with pandemic crisis, especially in underdeveloped and developing countries. Many workers have lost their jobs as most of the small and medium enterprises closed down. They line up every day at ration shops for food, hospitals for medicine and treatment, and anchorages for accommodation. Thousands of people are dying every day due to lack of daily necessities. Surviving family members have lost their morale also. Unable to withstand the onslaught of the pandemic, many are committing suicide. Especially in the net of anarchy, many people are living a miserable life. So many questions in the minds of millions of people today: What is this Corona virus? Is it natural, or manmade? Epidemics are caused by natural viruses that do not change their form time to time and do not last forever. As a result, its global impact is not far behind. It is regional based. But Corona is an exceptional virus. Due to the tremendous advances in modern science and technology, the natural virus is now in the possession of scientists. But Corona is not going to be subdued at all. Its character is changing over the periods. Short of distinguishing between space, time, and vessel, Corona is forcing nature to become a cemetery

by embodying its invincible image of destruction and forced many people to die and homeless. Without a prophylactic antibody and successful treatment, general well-being estimates, for example, social distancing, quarantine, contact tracing and hand cleanliness are the best way to prevent the local transmission of SARS-CoV-2 [5]. Many scientists are using the Susceptible-Exposed-Infectious-Recovered (SEIR) model, which is an established and appropriate approach in many countries to ascertain the spread of the COVID-19. It is an ideal protocol comprised essential steps that help Saudi Arabia decelerate the spreading of COVID-19 [6]. The following sections are dedicated to describe various issues of the bacteria, viruses, outbreaks globally, results and discussions.

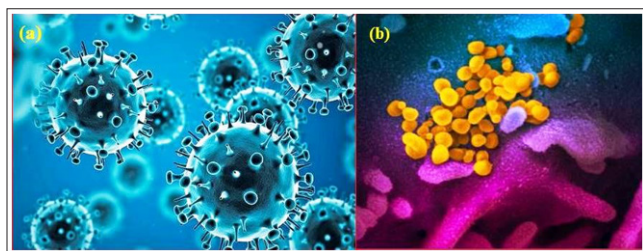
### Virus and Bacteria

Before we get to know the global coronavirus response, let's take a look at what viruses and bacteria are and how they affect human beings. Bacteria and viruses differ in their structure and response to medications. Bacteria are single-celled, living organisms, called prokaryotes. They have a cell wall and all the components necessary to survive and reproduce. They are simple and DNA is contained within a certain area of the cell called the nucleoid, but not enclosed. Bacteria are one of the oldest living microscopic germs on earth, having been in existence for at least 3.5 billion years. Although some bacteria can cause disease, less than one percent makes us sick. Many beneficial species are essential for our good health and the overall health of most of Earth's ecosystems. Inside our bodies, we have tens of trillions of bacteria making up our gut microbiome, and trillions more living, usually harmlessly, on our skin. Many chronic diseases are, such as cancer and heart disease. Infections caused by bacteria include strep throat, tuberculosis, and urinary tract infections (UTI).

Viruses are not considered to be living because they require a host cell to survive for energy and to reproduce. Viruses consist of only one piece of genetic material and a protein shell called a capsid. They survive and reproduce by hijacking a host cell, and using its ribosomes to make new viral proteins. Viruses consist of a piece of genetic material, such as DNA or RNA (but not both). Sometimes this shell is surrounded by an envelope of fat and protein molecules, and out of this envelope may project glycoprotein protrusions, which can be triangular, spiked, or shaped like a mushroom. These protrusions bind only to certain receptors on a host cell and determine what type of hosts or host cell a virus will infect and how infectious that virus will be. Microscopic viruses are 10 to 100 times smaller than the smallest bacteria.

### Image and Structure of the coronavirus

The Middle East respiratory syndrome coronavirus comprises primarily of four protein structures, namely spike or S protein, envelope or E protein, membrane or M protein and nucleocapsid or N protein. In general, E proteins are made up of 76 – 109 amino acids [7]. Recent image of COVID-19 is shown in Figure. 1(a, b).



**Figure 1:** (a) Image of Coronavirus, (b) Structure of Corona. (Curtsey: WHO)

Viruses are essentially like a parasite, and instead of protein being made they produce viral proteins. The virus also takes advantage of other components within the host cell, such as ATP (adenosine triphosphate) for energy, and amino acids and fats to make new capsids and assemble new viruses. Once enough new viruses have been made, they burst out of the new cell division, which kills the host cell. This is called viral replication and it is the way viruses reproduce. Most viruses cause disease, and they are usually quite specific about the area of the body that they attack, for example, the liver, the respiratory tract, or the blood. Common viruses include herpes, zoster, HIV, influenza, the common cold and the rabies virus.

**Symptoms of COVID-19:** Its symptoms come out through various infections: e.g., it may occur through the mucous films, particularly oral mucosa and nasal mucosa, and then, it penetrates through the respiratory tract into the lungs [8]. People with deadly virus symptoms typically have a fever and respiratory tract indication, and the approximate incubation period of COVID-19 is 14 days [9]. Coronavirus infection usually ranges from mild to severe on the basis of the immune system. The propagation of SARS-CoV-2 occurs through the replication of RNA may appear within 2 to 14 days after contracting the disease. Furthermore, the ailments can be felt for the next 27 days. Under such a circumstance, clinical testing for COVID-19 is an absolute requirement. It spreads mostly by direct and indirect contacts and droplets. The clinical tests are antibody and antigen tests. The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads. To protect ourselves and others from infection by staying at least 1 meter apart from others, wearing a properly fitted mask, and washing hands or using an alcohol-based rubbing frequently. Get vaccinated in timely manner by the following of local guidance. It is important to practice respiratory protocol, for example by coughing into a flexed elbow, and to stay home in self-isolation until recover. COVID-19 affects different people in different ways. Once COVID-19 is tested positive, essential drugs are used in India: (a) protocol drugs: Remdesivir, Enoxaparin, MethylPrednisolone, Dexamethasone, Tocilizumab and Ivermectin. (b) non-protocol drugs: Favipiravir, Amphotericin and Apixabin. It is said that "Prevention is better than Cure". In order to protect her people India has discovered vaccines and have started vaccination since March 2021.

### Vaccine and vaccination

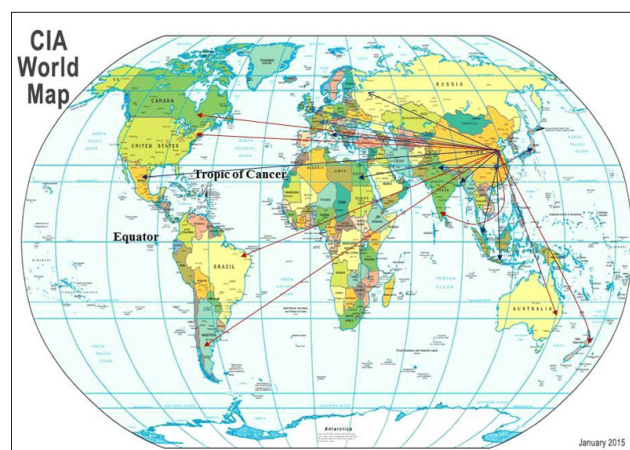
**COVAXIN®:** India's indigenous COVID-19 vaccine by **Bharat Biotech** is developed in collaboration with the Indian Council of Medical Research (**ICMR**) - National Institute of Virology (**NIV**) [10]. The indigenous, inactivated vaccine is developed and manufactured in Bharat Biotech's BSL-3 (Bio-Safety Level 3) high containment facility. The vaccine is developed using Whole-Virion Inactivated Vero Cell derived platform technology. Inactivated vaccines do not replicate and are therefore unlikely to revert and cause pathological effects. They contain dead virus, incapable of infecting people but still able to instruct the immune system to mount a defensive reaction against an infection. Conventionally, inactivated vaccines have been around for decades. Numerous vaccines for diseases such as Seasonal Influenza, Polio, Pertussis, Rabies, and Japanese Encephalitis use the same technology to develop inactivated vaccines with a safe track record of more than 300 million doses of supplies to date. It is the well-established and time-tested platform in the world of vaccine technology. It is a 2-dose vaccination regimen given 28 days apart. It is a vaccine with no sub-zero storage, no reconstitution requirement, and ready to use liquid presentation in multi-dose vials, stable at 2 – 8 °C. Vaccine-induced neutralizing antibody titers were observed with

two divergent SARS-CoV-2 strains. COVAXIN® led to tolerable safety outcomes and enhanced humoral and cell-mediated immune responses. Zeta was first isolated in Brazil, B.1.617 (Kappa) first isolated in India, B.1.351 & B.1.617.2 (Beta & Delta) first isolated in RSA & India. Efficacy data demonstrates 65.2% protection against the SARS-CoV-2, B.1.617.2 Delta variant.

**COVISHIELDTM:** The Serum Institute of India (SII) and ICMR are jointly conducting a Phase II/III, Observer-Blind, Randomized, Controlled study to determine the safety and immunogenicity of Covishield (COVID-19 Vaccine) [11]. It is a recombinant, replication-deficient chimpanzee adenovirus vector encoding the SARS-CoV-2 Spike (S) glycoprotein. Following administration, the genetic material of part of corona virus is expressed which stimulates an immune response. Vaccine contains the following excipients: L-Histidine, L-Histidine hydrochloride monohydrate, Magnesium chloride hexahydrate, Polysorbate 80, Ethanol, Sucrose, Sodium chloride, Disodium edentate dihydrate. It consists of two doses of 0.5 ml each. There is no difference between the 1<sup>st</sup> and 2<sup>nd</sup> dose. Each dose has the same content of viral particles. The Indian government has recommended that the time interval between the 1<sup>st</sup> and 2<sup>nd</sup> dose should be between 12-16 weeks. Severe allergic reaction after a previous dose of this vaccine can be seen. If your treating physician considered this event as a severe allergic reaction to the vaccine, then you should not take second dose of vaccine. If you experience any other adverse event (known or unknown) after first dose, you can take the second dose. This vaccine has been administered in people with or without comorbid conditions in clinical trials and now it works successfully without side effects. Recently, Ministry of Health & Family Welfare, Govt. of India said that, 'a pregnant woman, who opts for vaccination, could be vaccinated at any time of the pregnancy. To help pregnant women make an informed decision to be vaccinated, they should be provided with information about the risks of COVID-19 infection in pregnancy, the benefits of vaccination, along with the likely side effects of vaccination'. The Ministry of Health and Family Welfare, Government of India declared that about 1,34,61,14,483 vaccinations has been completed till December 15, 2021.

### Spreading Of Coronavirus

Each country infected with the COVID-19 updates to the WHO on a daily basis, the number of confirmed cases and the number of deaths and number of vaccinations. Based on that information up to the 28<sup>th</sup> October 2021, it can be said that COVID-19 is not a natural virus, it is manmade. A study of the virus in a laboratory of Wuhan Institute of Virology (WIV), China, revealed that the virus was leaked and infected lab workers for which they were not prepared. As a result, it continues to gain momentum. Realizing the seriousness of the state, they closed the lab and declared a state of emergency, isolating the entire city from other cities. They took control of the situation by keeping the common people under house arrest. By then, it had spread from Wuhan to Beijing by air, land and sea, to local and foreign businessmen, students, and professionals, neighboring countries all over the world, especially in India, Japan, USA and European countries as demonstrated in Figure: 2



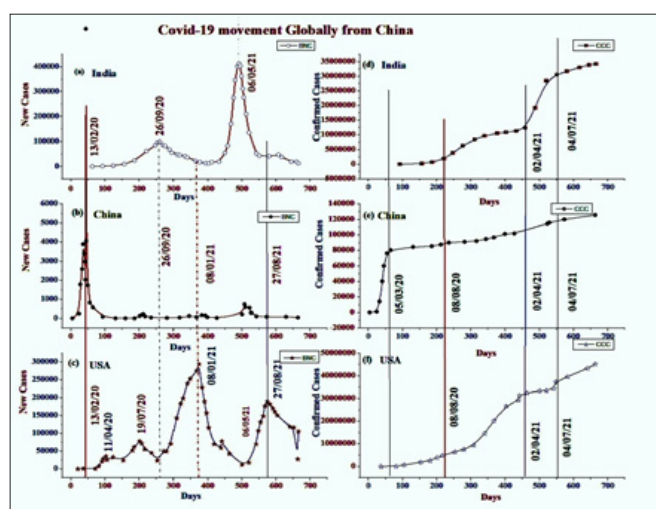
**Figure 2:** Movement of COVID-19

The virus spreads through carriers. When the scientists and staffs at the laboratory became infected, they left the lab and spread to cities and abroad. Its impact on different parts of the country is lesser than its impact on neighboring countries, since the Chinese have a lot to come and go with them. An analysis of the data provided to the WHO shows that the first symptoms of the disease were found in the city of Wuhan on December 2019. Journal *Nature* also examines arguments that the coronavirus SARS-CoV-2 escaped from a lab in China, and the science behind them after a prolong discussion on it among officials from nearly 200 countries. Most scientists say it has a natural origin, however lab-leak theory has not been ruled out, and many are calling for deeper investigation into the hypothesis that the virus emerged from the WIV, located in the Chinese city where the first COVID-19 cases were reported [12]. The virus was tested and named COVID-19, and since the first week of January 2020, the number of infections in Wuhan has been steadily rising, with many students, researchers and business men from abroad. As the incidence increased day by day, they could not understand which type of virus had leaked. They identified one possible virus and gave it a chance to spread in the second week of February. As a result, the number of victims jumped up to 15,000 the next day. That strain of the virus is SARS-2 [13] i.e., COVID-19. As a result, they are forced to shut down the lab and took appropriate action by identifying the risks involved in dealing with the virus. Considering the number of infections in the urban areas, the government declared a red zone and placed people under house arrest. A special hospital was set up immediately for the victims and they were treated by specialist trained doctors and nurses. As a result, Corona was able to cope with the first wave in March 2020. The Chinese have a strong political consciousness and patriotism. Despite being the world's most populous country, they managed to keep the economy afloat by checking the corona virus by March.

### Results and Discussions

Who does not know that the Chinese are a nomadic and trading nation? There is no country perhaps in the world where the Chinese have not setup food-courts and have no business. Chinatown and restaurants are available in major cities around the world. Most of the foreign students in the USA come from China. India is in the second highest. India, on the other hand, is a huge market for Chinese goods, so every day many Chinese used to come to India by air, water and land, and are recognized by Indian businessmen and students there too. Especially in the city of Wuhan, there are a lot of medical students from India. As a result, 1 – 2 of them were identified in the USA and Japan in early February and seen in India in the first half of March.

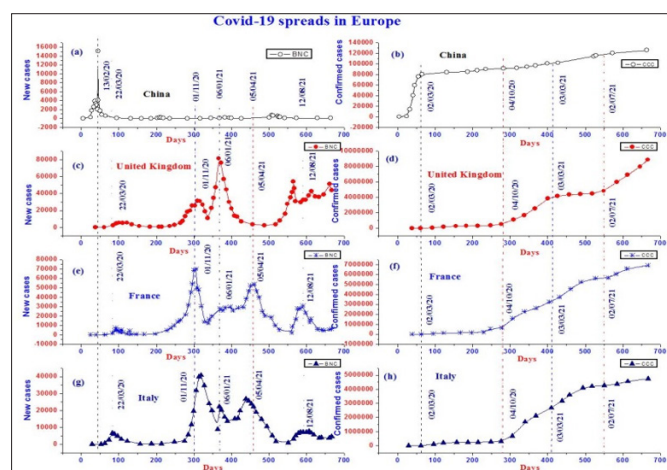
**India:** Seeing the horrors of Corona infection in different countries of the world, lockdown was started from April 2020 by closing markets, all kinds of transport, educational institutions. Corona infiltrates India through Kerala and the major affected cities are Delhi, Mumbai, Kolkata and Bangalore. The first wave of corona is seen towards the end of September is shown in Figure. 3(a). The lockdown was relaxed in the late October when the effects subsided, and from March 2021, the Indian-made **Covaxin** and **Covishield** were vaccinated to the elderly people. But after the second wave of Corona hit in May 2021 due to the negligence and recklessness of the middle-aged and the young people, it was a nightmare. As a result, the number of confirmed cases increased from 10 million to 30 million within three months (Fig. 3(d)). The government urgently provides double-dose vaccines to all citizens over the age of 18. As a result, it becomes possible to block the second wave in the month of August 2021. September-October are the months of Indian Festivals. The third and fourth waves could not overthrow the Indians as the people's vaccination was successful.



**Figure 3:** Situation of Corona pandemic in populated countries after China

**USA:** In view of the economic catastrophe, the lockdown was not strictly followed here, so they faced the first wave on April 2020, the second on July 2020, the third on January 2021 and the fourth on August 2021 (see Figure. 3(c)). The USA has the highest number of infections and deaths in the world. While the country is running a limited size lockdown, people observed ceremonies as before, e.g., huge sea- and sun-bath in Miami. Many people voluntarily reject the vaccine. As a result number of confirmed corona cases increase from 350 million to 400 million within three months (Figure. 3(f)).

**China:** The first wave of the Corona was first seen on February 2020 as depicted in Figure. 3(b). Due to all sorts of preparations, the second, third and fourth waves could not be seen promptly in China as that of the USA. Since they knew the character of Corona and the technique of how to subdue it due to their research, no wave could rise in. As a result, it took 15 months for the number of confirmed infections to increase from 8,000 to 130,000 (Figure. 3(e)). In a country with the highest population, only a small number of people are affected in compared to other developed countries, maybe it's a wonder or miracle. If they had not done the research in the lab, they too could have been affected countries like USA, India or UK.



**Figure 4:** Spreading of COVID-19 in Europe after China

**Europe:** Every country in Europe is small in size and number of population too. But everyday a huge number of people move from one country to another because of the easy borders among the countries. Especially, mixings are among the people of countries like Italy, France, Germany, Great Britain and Holland. Although countries saw corona outbreaks in February, the first wave was observed in March 20, the second in June 20, the third in January 21, the fourth in April 21 and the fifth in August 21 (Figure 4 (c,e,g)). The second and third waves are more severe and the number of confirmed cases has risen sharply from the third wave. Europeans are not accustomed to a mattress life. They are busy in enjoying lives. As a result, the so-called lockdown and vaccination did not bring much benefit to them. The number of their confirmed cases is increasing (Figure 4(d,f,h)) day by day as compared to the underdeveloped and least developed countries of the world.

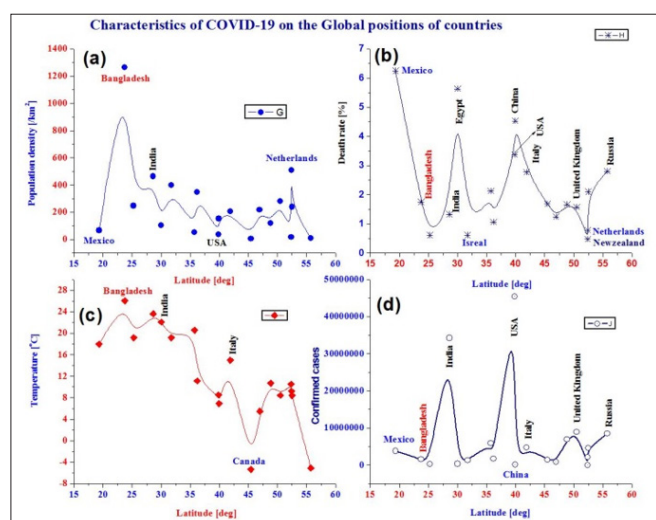
A closer look at the Corona situation in Israel and Brazil shows that they have seen sharp waves from the first to the fifth, and that Brazil has seen smaller and larger waves too. Both countries have been able to check the next attack as the people have been brought under vaccination.

**Japan:** Similar analysis shows that they are limited in size - first wave (April 20) second wave (July 20), third wave (January 21), fourth wave (May 21) and the fifth wave (August 21) with maximum infections have seen. In a span of three months, the number of confirmed infections has increased from 0.8 million to 1.5 million. The reason for this rapid transition is that the Japanese economy has ebbed due to keep the lockdown down for a long time and to lift the lockdown to get rid of it. As a result, they have to face this outbreak suddenly.

**New Zealand:** Like Japan, New Zealand has been able to isolate their landlocked country quickly. As a result, they did not see any significant wave of corona attacks from February 20 to August 21. The lifting of the lockdown has increased the number of infections and has been continuing its upward trend.

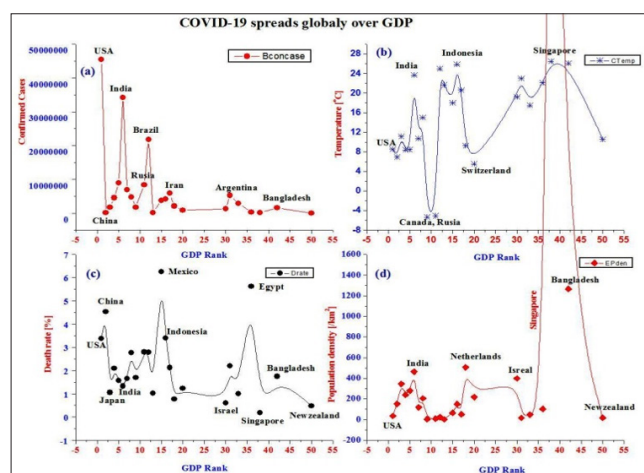
Figure 5 shows the Corona situation with the geographical location (latitude) of different countries of the world where (a) shows population density, (b) mortality rate, (c) temperature and (d) number of confirmed Corona cases. Bangladesh and Singapore have maximum population densities in Asiatic countries of 1200 / km<sup>2</sup> and 8500 /km<sup>2</sup> respectively. But their mortality rates of corona patients are 1.35% and 0.1% respectively. Singapore is a well-developed country with a small population with 100% educated,

the mortality rate is negligible due to having advanced medical system. Mexico, on the other hand, has the highest mortality rate in South America, despite being a low-density developing country. It happens due to the arbitrariness of the people or the indifference of the people of that country. On the other hand, in Egypt, Italy, China, Russia the population density is 50 – 400 / km<sup>2</sup> but the death rates are noticeable. Countries such as Israel, India, the Netherlands and New Zealand have been able to reduce mortality rates by adhering to their respective protocols. Judging by the temperature, it is seen that the countries with less latitudes have higher temperatures and the mortality rate is higher than the countries with lower temperatures (there are exceptions). In the most populous countries, the number of confirmed cases is higher, with the exception of China, who can regulate the nature of its spread.



**Figure 5:** Corona spreads over latitudes. (Death rate calculated from number of deaths with number of confirmed cases)

Figure 6 displays the Corona situation with the country's GDP ranking. Those at the top of the GDP rankings have (a) the highest number of Corona infections, such as USA, India, Brazil, Iran, Argentina and Bangladesh. China, on the other hand, is the second most populous country in the world in terms of GDP, but has managed to limit the number of confirmed cases because they are overly conscious. (c) USA, China, Indonesia, Egypt, Mexico, Bangladesh have higher death rates. Japan, India, Israel, New Zealand and Singapore have the lowest.



**Figure 6:** CoVID-19 situation over GDP of several countries

With the exception of Singapore, which has a lower GDP ranking but highest population density, the country has been able to use the maximum share of its GDP for education, health and development which helped them to eradicate COVID-19 through improved medical care, while China has failed. Interestingly GDP ranking of low temperature countries are far better than that of high temperature. Immunity levels of people in the Indian subcontinent are good enough to reduce mortality by spending a nominal GDP on health care system. In Europe and the West, the GDP rankings are within 10, have not been able to reduce the death rate despite having improved health care because of the lack of large number of nurses and doctors, especially in those countries due to lack of diet, immunity and lifestyle. Most of the people in the Indian subcontinent live in rural areas in the heart of nature and in urban areas. Corona's influence is not there. In the big cities, on the other hand, there are a lot of slum dwellers, living the lowest standard of living. Older people who have afflicted with various diseases have been killed by Corona infections. As a result, the victims of this prolong global epidemic will remember this pandemic crisis forever.

## Conclusion

Data analyses of the WHO finds that the COVID-19 starts spreading from China. When this article was being written a heart breaking message from a close friend in Bangladesh came regarding his father and sweetheart died due to Corona infections within a span of one month leaving his 18 years old daughter. His daughter also was infected by Corona and could resist it. She has been living with unbearable mourning and crying. Who will count her endless drops of tear? What's the difference between the Corona Pandemic and the Atom bombs blast in Hiroshima and Nagasaki? I've no answer.

**Acknowledgement:** Author is pleased to acknowledge the Vice Chairman of the Institute for giving the opportunity of doing this research.

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