Factors of Coronavirus—Implications

Richard Pais

The world has seen many epidemics but the Corona virus disease (COVID-19), which started in the end of 2019, is still with us. Although COVID-19 started in China in December 2019, it spread to other countries at a great speed. As we peruse the list of COVID-19 cases, it is found to be more in Europe and America and less in Asian countries and still less in Africa. Major epidemics too were predominant in Europe and America. This article tries to examine the factors of COVID-19 such as care taken during the epidemics, racial features, immunity, and type and amount of food consumed. It also highlights the implications arising from the factors. While some factors such as ethnicity, climate, and extent of urbanization cannot be changed, factors such as increasing immunity, and type and amount of food taken could be changed.

Keywords**:** *COVID-19, epidemics, immunity, atmospheric temperature, urbanization, migration*

Introduction

The world has seen many epidemics but Corona virus disease (COVID-19), which started in the end of 2019, is still with us. In spite of the best efforts such as lockdowns, precautions, thermal screening, vaccinations, etc., the epidemic still lingers on. Hence, a proper study of the epidemic is necessary not only by medical microbiologists, physicians, epidemiologists, and immunologists but also by social scientists. Writing on the ordeal of social sciences, Brij Mohan (2012,

Richard Pais retired as Associate Professor and Head, Department of Sociology, St Aloysius College (Autonomous), Mangaluru, Karnataka, India. He is the managing editor of Samaja Shodhana (Mangaluru, India) and Social Science Gazetteer (Agra, India), and editor of Sulabh Journal of Action Sociology (New Delhi, India). He can be contacted at richardpais123@gmail.com

pp. 208–209) premised on the following three formulations: (1) The sciences of social phenomenon have a role in shaping our future; (2) our past and present approaches have been pretentious at best; and (3) social scientists for the future should conscientiously look into their professional selves for achieving a society that is conducive to human existence. In this paper, an effort is made to study the factors of COVID-19 and understand their implications on the society, that is, to achieve a society that is conducive to human existence in the realm of health.

Major Epidemics in the World

Although COVID-19 is new to us, the world has seen many epidemics, both minor and major. However, major epidemics have ravaged humanity throughout its existence, often changing the course of history and, at times, signalling the end of entire civilizations. The first recorded epidemic took place in China in 3000 BC where an entire village was wiped out. The archeological site is now called *Hamin Mangha* and is one of the best preserved prehistoric sites in northeastern China, and the site was never inhabited again. Another epidemic in the form of plague took place in Athens in 430 BC which lasted for 5 years. It also spread to Libya, Egypt, and Ethiopia. The death toll was as high as 100,000 people. The Greek historian Thucydides (460–400 BC) wrote that "people in good health were all of a sudden attacked by violent heats in the head, and redness and inflammation in the eyes, the inward parts, such as the throat or tongue, becoming bloody and emitting an unnatural and fetid breath" (as quoted by Jarus, 2020).

The Antonine Plague, which may have been smallpox, started in 165 AD in the Roman Empire and killed over 5 million people. The epidemic was said to have been brought into the Roman Empire by soldiers returning home after a war with Parthia. The epidemic lasted for 15 years and ended in 180 AD, after which there began instability in the Roman Empire. However, Christianity became increasingly popular after the plague. With the plague of Cyprian (251–271 AD), people thought that end of the world had come. This plague was so severe that it was estimated to have killed 5,000 people a day in Rome alone. The plague of Justinian was active in Europe and West Asia and lasted from 541 to 549 AD. It is estimated that 30–50 million people died as a result of this epidemic which was 10% of the world's populations and 40–50% of Europe's population. After this, recurring incidents of plague had taken place in Europe and West Asia.

Another terrible pandemic was Black Death, which lasted for 8 years (1346–1353) in Europe, Asia, and North Africa; estimated 75–200 million people perished due to this plague. In fact, it wiped out over half of Europe's population. As a result, the course of Europe's history was changed. With so many deaths, labor became scarce, bringing about better salary for workers and the end of Europe's system of serfdom. Another epidemic, cocoliztli epidemic, was a type of viral hemorrhagic fever that killed 15 million inhabitants of Mexico and Central America between 1545 and 1548. In the 16th century, there were many American plagues which are a cluster of Eurasian diseases brought to the Americas by European

explorers. As a result, around 90% of the indigenous population perished in the Western Hemisphere. The diseases helped Spanish forces to conquer the Aztec (Mexico) capital of Tenochtitlán in 1519 and Incas (Columbia) in 1532.

The Great Plague of London started in 1665, causing a mass exodus from London. By the time the plague ended in 1666, about 100,000 people, including 15% of London's population, had died. Adding to the misery of London, on September 2, 1666, the Great Fire of London, which lasted for 4 days, burned down a large portion of the city. In the Great Plague of Marseille (1720–1723), as many as 100,000 people died in Marseille and surrounding areas. It's estimated that up to 30% of the population of Marseille might have perished.

In the Russian plague of 1970–1972, the terror of quarantined citizens erupted into violence. Riots spread through the city and culminated in the murder of Archbishop Ambrosius, who was encouraging crowds not to gather for worship. By the time the plague ended, as many as 100,000 people had died. Yet restoration of law and order was a big problem. In 1889, the flu pandemic which started in Russia killed about a million people around the globe. In the Spanish Flu, an estimated 500 million people from the South Seas to the North Pole fell victim this disease; one-fifth of the dead belonged to some indigenous communities pushed to the brink of extinction. Asian flu (1957–1958) started in China and claimed more than 1.1 million lives worldwide, with 116,000 deaths occurring in the United States.

Acquired Immuno Deficiency Syndrome (AIDS), the recent pandemic which started in 1981, is still with us. It has claimed an estimated 35 million lives since it was first identified. Human Immunodeficiency Virus (HIV) is the virus that causes AIDS. Now, about 64% of the estimated 40 million having HIV live in sub-Saharan Africa. H1N1 Swine Flu pandemic (2009–2010) is the most recent pandemic that originated in Mexico, and in 1 year the virus infected as many as 1.4 billion people across the globe and had killed between 151,700 and 575,400 people (Pais 2020, pp. 5–7).

COVID-19 Pandemic

COVID-19, which emerged in Wuhan, a city in the Hubei province of China in December 2019, has spread around the world. It is said that COVID-19 started with the bats being sold in Wuhan market and got transferred to humans. Further, it spread rapidly due to human to human contact. However, it remains unclear how the virus first spread to humans. Corona viruses are common in certain species of animals such as cattle and camels. In fact, the transmission of corona viruses from animals to humans is rare. Corona (in Latin word "corona" refers to crown) virus represents crown-like spikes on the outer surface, thus it was named as a corona virus.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spreads from person to person in close communities. When people infected with COVID-19 exhale or cough, they expel tiny droplets containing this virus. These droplets

enter the normal healthy human body through mouth or nose, thus causing infection. The disease becomes contagious when infected person's symptoms are at their peak. Droplets containing the virus can also land on nearby surfaces or objects. Normal healthy persons can acquire the virus by touching these surfaces or objects, and is infected through their nose, eyes, or mouth.

Common symptoms of COVID-19 include fever, breathlessness, cough, sore throat, headache, muscle pain, chills, and loss of taste or smell. These symptoms are likely to occur within 2–14 days of virus exposure. Hence, 14-day quarantine is recommended when one travels from one place to another. Older adults are at maximum risk of severe illness, as are people with chronic health conditions such as serious heart conditions, including heart failure, coronary artery disease, or cardiomyopathies, kidney disease, chronic obstructive pulmonary disease (COPD), obesity, which occurs in people with a body mass index (BMI) of 30 or higher, sickle cell disease, weakened immune system because of organ transplant, and type 2 diabetes. COVID-19 symptoms are similar to that of SARS-like symptoms.

On December 31, 2019, Chinese authorities alerted the World Health Organization (WHO) about the outbreak of a novel strain of corona virus causing severe illness, which was subsequently named SARS-CoV-2. Several of those infected with this virus worked at the city's Huanan Seafood Wholesale Market, which was shut down on January 1, 2019. Soon China's aggressive action of shutting down transportation in some cities and suspending public gatherings started out. Officials isolated sick people and aggressively tracked their contacts, and had a dedicated network of hospitals to test for the virus. On January 11, 2020, China announced its first death from the virus—a 61-year-old man who had purchased goods from the Huanan seafood market. People travelling from China have spread the disease to Thailand, the United States, Nepal, France, Australia, Malaysia, Singapore, South Korea, Vietnam, and Taiwan.

On January 30, 2020, the WHO declared the corona virus a global emergency as the death toll in China jumped to 170, with 7,711 cases reported in the country, where the virus had spread to all 31 provinces. On February 7, 2020, Li Wenliang, a doctor who was among the first to sound alarm over the corona virus in China, died. By the end of February 2020, countries such as Kuwait, Bahrain, Iraq, Oman, Qatar, Norway, Romania, Greece, Georgia, Pakistan, Afghanistan, North Macedonia, Brazil, Estonia, Denmark, Northern Ireland, and the Netherlands confirmed their first corona cases. On March 11, 2020, the WHO declared COVID-19 a pandemic. On March 20 2020, the corona virus-related deaths surged past 10,000 globally. During this time, Europe remained the epicenter of the pandemic, with Italy reporting 4,825 fatalities and 53,578 patients. On March 31, 2020, the number of corona deaths in the United States surpassed those reported by China and reported more than 4,000 fatalities with more than 300,000 patients.

On April 21, 2020, President Donald Trump announced on Twitter that he "will be signing an Executive Order to temporarily suspend immigration into the United States"! On May 5, 2020, the United Kingdom recorded the highest official COVID-19

death toll in Europe, with more than 30,000 people dead. On May 27, 2020, the United States became the first country to reach a six-figure death toll, as the number of corona fatalities surpassed 100,000. On August 2, 2020, the death toll in Latin America from the novel corona virus had surpassed 200,000. The United States on August 9, 2020 surpassed 5 million corona virus cases, the highest in the world.

On November 7, 2020, the world saw 50 million cases, and on November 12, 2020, there were 661,612 patients, the highest number of daily cases. On November 6, 2020, the United States reached the 10 million mark, and on November 13, 2020, there were the highest daily cases of 190,428. Till September 9, 2020, Brazil was at the second position after the United States with 4.11 million cases and the third position was taken up by India. On March 12, 2021, India attained the second position in the world. After the middle of August 2021, the United States and the major countries of Europe, such as the United Kingdom, France, Spain, Italy, Germany, Poland, and Belgium, saw the second wave of corona virus. With the US elections, there was a surge of corona virus cases not only in the United States but the world as a whole. Some countries had already invented vaccine and were administering to their people. The highest number of daily cases and the highest number of daily deaths in ten countries of the world as on March 1, 2021 are given in Table 1.

As shown in Table 1, the highest number of daily cases in the world on January 8, 2021 was 859,126, and the highest number of daily deaths on January 20, 2021 was 19,390. The United States surpassed all the countries in the highest number of daily cases and the highest number of daily deaths. For this study, 21 countries were selected which had crossed 1 million cases as given in Table 2.

As seen in Table 2, the United States lead with 29 million cases, followed by India and Brazil. The United States with 24% of India's population lead the table. Although India was at the second position, the number of cases in Brazil was increasing, with the result that on March 12, 2021, it had overtaken India. Real indicator of the extent of the pandemic is not the total number of cases and deaths

Table 1 The highest number of daily cases and deaths in the world and in some important countries.

	Country	Dates	Cases	Dates	Deaths
	World	08-01-21	859,126	20-01-20	19,390
1.	USA	08-01-21	324,857	04-02-21	5,392
2.	India	17-09-20	97,859	16-09-20	1,283
3.	Brazil	07-01-21	87,134	03-03-21	1,840
4.	Russia	24-12-20	32,935	11-11-20	613
5.	UK	08-01-21	68,053	20-01-21	1,820
6.	France	07-11-20	86,852	08-04-20	1,417
7.	Spain	02-11-20	48,570	04-11-20	1,623
8.	Italy	07-11-20	39,811	03-12-20	993
9.	Turkey	08-12-20	33,198	28-12-20	257
10.	Germany	18-12-20	31,553	06-01-21	1,689

Table 2 Total number of cases and deaths as on March 1, 2021

	Country	Total cases	Deaths	Total cases 1 M population	Total deaths 1 M population	Total population
1.	USA	29,314,254	527,226	88,218	1,587	332,293,850
2.	India	11,123,619	157,275	8,008	113	1,389,012,340
3.	Brazil	10,589,608	255,836	49,585	1,198	213,563,946
4.	Russia	4,257,650	86,455	29,167	592	145,976,195
5.	UK	4,182,009	122,953	61,389	1,805	68,123,305
6.	France	3,760,671	86,803	57,529	1,328	65,369,759
7.	Spain	3,204,531	69,609	68,521	1,488	46,766,856
8.	Italy	2,938,371	97,945	48,647	1,622	60,402,483
9.	Turkey	2,711,479	28,638	31,922	337	84,941,319
10.	Germany	2,455,569	70,924	29,246	845	83,962,383
11.	Colombia	2,255,260	59,866	44,011	1,168	51,242,817
12.	Argentina	2,112,023	52,077	46,447	1,145	45,471,214
13.	Mexico	2,089,281	186,152	16,092	1,434	129,831,819
14.	Poland	1,711,772	43,793	45,262	1,158	37,818,948
15.	Iran	1,639,679	60,181	19,357	710	84,705,636
16.	South Africa	1,513,959	50,077	25,315	837	59,804,451
17.	Ukraine	1,352,134	26,050	31,042	598	43,558,040
18.	Indonesia	1,341,314	36,325	4,870	132	275,443,201
19.	Peru	1,332,939	46,685	40,057	1,403	33,276,156
20.	Czechia	1,240,051	20,469	115,652	1,909	10,722,222
21.	The Netherlands	1,092,452	15,584	63,662	908	17,160,136

Source: https://www.worldometers.info/coronavirus/

but the number of cases and deaths per 1 million population. The same is given in Tables 3 and 4 respectively. As we see in Tables 3 and 4, Czechia, a small country in Europe with a population of 10 million lead in the total number of cases and deaths per 1 million population. India, the second most populous country in the world, is at the bottom of Tables 3 and 4.

As we peruse Tables 3 and 4, we find that the COVID-19 pandemic is concentrated in Europe and America. It is also clear that most of the past pandemics have started in either Europe or America. Further, prevalence of COVID-19 is less in the Third world, underdeveloped Asian and African countries. Although Europe and America consisted of developed countries with good sanitation and health facilities, spread of the COVID-19 pandemic was wide. We made an attempt to study the factors affecting the wide spread of COVID-19.

(1) Care Taken

Countries such as China and India, although the two most populous countries in the world, took good care during the epidemic. Although the epidemic started in China, the early response and measures adopted, such as early reporting and situation monitoring, large-scale surveillance, and preparation of medical facilities and supplies, were successful in reducing the epidemic. Similarly, a series of

Table 3 Total number of cases per 1 M population as on March 1, 2021

	Country	Continent	Total Cases	Total Deaths	Total cases/ 1-M population	Total deaths/ 1-M population	Total population
1.	Czechia	Europe	1,240,051	20,469	**115,652**	1,909	10,722,222
2.	USA	North America	29,314,254	527,226	**88,218**	1,587	332,293,850
3.	Spain	Europe	3,204,531	69,609	**68,521**	1,488	46,766,856
4.	The Netherlands	Europe	1,092,452	15,584	**63,662**	908	17,160,136
5.	UK	Europe	4,182,009	122,953	**61,389**	1,805	68,123,305
6.	France	Europe	3,760,671	86,803	**57,529**	1,328	65,369,759
7.	Brazil	South America	10,589,608	255,836	**49,585**	1,198	213,563,946
8.	Italy	Europe	2,938,371	97,945	**48,647**	1,622	60,402,483
9.	Argentina	South America	2,112,023	52,077	**46,447**	1,145	45,471,214
10.	Poland	Europe	1,711,772	43,793	**45,262**	1,158	37,818,948
11.	Colombia	South America	2,255,260	59,866	**44,011**	1,168	51,242,817
12.	Peru	South America	1,332,939	46,685	**40,057**	1,403	33,276,156
13.	Turkey	Asia	2,711,479	28,638	**31,922**	337	84,941,319
14.	Ukraine	Europe	1,352,134	26,050	**31,042**	598	43,558,040
15.	Germany	Europe	2,455,569	70,924	**29,246**	845	83,962,383
16.	Russia	Europe	4,257,650	86,455	**29,167**	592	145,976,195
17.	South Africa	Africa	1,513,959	50,077	**25,315**	837	59,804,451
18.	Iran	Asia	1,639,679	60,181	**19,357**	710	84,705,636
19.	Mexico	North America	2,089,281	186,152	**16,092**	1,434	129,831,819
20.	India	Asia	11,123,619	157,275	**8,008**	113	1,389,012,340
21.	Indonesia	Asia	1,341,314	36,325	**4,870**	132	275,443,201

Source: Modified Table 2.

Table 4 Total number of deaths per 1 M population as on March 1, 2021

	Country	Continent	Total Cases	Total Deaths	Total cases/ 1-M population	Deaths/ 1 M population	Total Population
1.	Czechia	Europe	1,240,051	20,469	115,652	**1,909**	10,722,222
2.	UK	Europe	4,182,009	122,953	61,389	**1,805**	68,123,305
3.	Italy	Europe	2,938,371	97,945	48,647	**1,622**	60,402,483
4.	USA	North America	29,314,254	527,226	88,218	**1,587**	332,293,850
5.	Spain	Europe	3,204,531	69,609	68,521	**1,488**	46,766,856
6.	Mexico	North America	2,089,281	186,152	16,092	**1,434**	129,831,819
7.	Peru	South America	1,332,939	46,685	40,057	**1,403**	33,276,156
8.	France	Europe	3,760,671	86,803	57,529	**1,328**	65,369,759
9.	Brazil	South America	10,589,608	255,836	49,585	**1,198**	213,563,946
10.	Colombia	South America	2,255,260	59,866	44,011	**1,168**	51,242,817
11.	Poland	Europe	1,711,772	43,793	45,262	**1,158**	37,818,948
12.	Argentina	South America	2,112,023	52,077	46,447	**1,145**	45,471,214
13.	The Netherlands	Europe	1,092,452	15,584	63,662	**908**	17,160,136
14.	Germany	Europe	2,455,569	70,924	29,246	**845**	83,962,383
15.	South Africa	Africa	1,513,959	50,077	25,315	**837**	59,804,451
16.	Iran	Asia	1,639,679	60,181	19,357	**710**	84,705,636
17.	Ukraine	Europe	1,352,134	26,050	31,042	**598**	43,558,040
18.	Russia	Europe	4,257,650	86,455	29,167	**592**	145,976,195
19.	Turkey	Asia	2,711,479	28,638	31,922	**337**	84,941,319
20.	Indonesia	Asia	1,341,314	36,325	4,870	**132**	275,443,201
21.	India	Asia	11,123,619	157,275	8,008	**113**	1,389,012,340

Source: Modified Table 2.

announcements, including lockdowns and other surveillance measures made by Indian Prime Minister Modi, such as contact tracing, thermal screening, hospitalization of patients, quarantining the visitors, etc., reduced spread of the pandemic. Although there were attacks on medical personnel, Prime Minister Modi was firm. In terms of total numbers, the United States was the most affected country in the world. At the time of writing this article, there were 30 million cases and 547,000 COVID-19 deaths in the United States. Varying reasons are provided for this. First of all, people did not cooperate, there were instances of revolts. Second, then President of the United States, Donald Trump, did not take much care, also refused to wear mask, and tested positive for COVID-19. Now, with Joe Biden at the helm of affairs, the number of daily cases and deaths has come down. Although different countries have taken various steps, such as restrictions on travel, transportation, reduction in mass mobility, especially of senior citizens, protection of working life, improvement in healthcare system, evacuation of citizens stranded abroad, economic measures, and social assistance, COVID-19 has spread fast.

(2) Racial and Cultural Factors

COVID-19 has further exposed a strong association between race, ethnicity, and culture. Anthropologists on the basis of anthropometric traits have classified the world population into three main ethnic groups: Caucasoid, Mongoloids, and Negroid. They have further classified these three larger ethnic groups into many subgroups. As we discover in Table 3, most of the cases of COVID-19 are found in Europe and North America, including good number of cases in South America. South America is home to 400 million people, of which 180 million are Whites with different European extractions and other lineages. (Wikipedia). We observe in Table 3 that only one country in Africa, that is, South Africa has just 10% Whites. Hence, COVID-19 is mostly found among Caucasoids, moderately among Mongoloids, and the least among Negroids. Paradoxically, although Caucasoids have good physical environment, housing, occupation, education, healthcare, and economic stability, morbidity of COVID-19 has been maximum among them. Within a country, the case could be different. Evelyn (2020) in her article, "It's a Racial Justice Issue," asserts that Black Americans are dying in greater numbers from COVID-19. It may be due to discrimination, healthcare access and utilization, type of occupation, education, income and wealth disparities, and housing.

Cultural factors too play an important role in preventing COVID-19. In Thailand and India, where virus-affected numbers are relatively low, people greet each other from a distance, with palms joined together, as dine in prayer. In Japan and South Korea, people bow to greet one another, and long before the arrival of COVID-19, they started wearing face masks if feeling unwell. People from most of the Asian countries take care of the elderly at home, which naturally prevents the spread of COVID-19, unlike the developed countries of Europe and America, where they are taken care in the senior citizens' homes.

(3) Development Perspective

Countries are labeled as either developed or developing countries. A number of criteria exist for defining whether a country is considered a developing country or not. The United Nations Development Programme's (UNDP) country classification system is calculated from the Human Development Index (HDI), which aims to take into account the multifaceted nature of development. The HDI is a composite index of three indices measuring countries' achievements in longevity, education, and income. It also recognizes other aspects of development such as political freedom and personal security. As we see in Tables 3 and 4, the developed countries had a greater number of COVID-19 patients and deaths compared to the developing countries, because they were ill-prepared for the pandemic. When we compare developed with developing countries, the sophisticated parameters that we use do not necessarily address the weaknesses of healthcare systems of developed countries that make them susceptible to crises such as the present pandemic. We strongly suggest that better preparation for such events is necessary for a country to be considered developed (Freed et al., 2020).

(4) Immunity

Racial factors could also be correlated with immunity factor. The immune system protects against viruses and diseases and produces antibodies to kill pathogens. The immune systems of any two individuals and groups of individuals can respond differently. Researchers ponder why COVID-19 appeared deadlier in the United States and Europe than in Asia and Africa. It is observed that Africans, Asians, and Europeans have genetically different immune systems. Although the epidemics are supposed to hit harder the urban areas with denser populations and poor socioeconomic conditions, that is, slums, it has not happened in Dharavi in Mumbai, India (the biggest slums in Asia). Immunity exhibited by Indians against COVID-19 has to be explored, because the three main killer diseases of tuberculosis, human immunodeficiency virus (HIV), and malaria have plagued India, Africa, and several countries of the Southern hemisphere with much more intensity than European and North American nations. Further, the persistent provision of BCG vaccination in India since the late 1940s could have provided a boost to develop robust innate and adaptive immunity against infectious vectors, which could include the COVID-19 virus.

(5) Atmospheric Temperature

The impact of COVID-19 is more evident in the countries of Northern hemisphere than those in the Southern hemisphere and those positioned adjacent to the Equator. With few exceptions, the infection rate, severity, and mortality are significantly overrepresented in the countries like Italy, Spain, the United States, the United Kingdom and several others. Temperatures vary from the north of

Northern hemisphere compared to the tropical countries which are near the Equator. Since most respiratory viruses are known to show a seasonal pattern of infection, it has been hypothesized that COVID-19 may also be a seasonally dependent virus. The study conducted by Rouen et al. (2020) suggests that high temperature may dampen propagation of COVID-19, while lower temperature could increase its transmission. Similar conclusions were drawn in the study done by Roy (2020). Based on March–April temperatures, various degrees of vulnerability could be identified and countries were specified. The maximum reported cases, as well as deaths, were observed when the temperature was in the range of around 2–17°C. Countries such as the United States, the United Kingdom, Italy, and Spain belonged to this category. The vulnerability was moderate when the temperature was less than around 2°C, for instance, Russia, parts of Canada, and a few Scandinavian countries. A significantly lesser degree of vulnerability was noted for temperatures of 27°C and above. Countries from South Asian Association for Regional Cooperation (SAARC), southeast Asia, the African continent, and Australia belonged to this category (Roy, 2020).

(6) Food Habits

The type and amount of food consumed is an important factor of resistance to infection. Much of literature in Ayurveda and other Indian systems of medicine maintains definitive beneficial effects of Indian spices in augmenting immunity. Spices such as capsicum, cardamom, cinnamon, clove, coriander, cumin, garlic, ginger, kokum, nutmeg, pepper, saffron, tamarind, turmeric, etc. are the most common food ingredients of an Indian kitchen that are instrumental in developing immunity. A study conducted by Elsayed and Khan (xxxx) showed that there was a clear prevalence of an interrelationship between the total number of COVID-19 cases per million population tested and a gram of spice supplied per capita per day. Countries with lower consumption of spices per capita showed greater number of COVID-19 cases per million population. Obesity, which is the hallmark of developed countries, is the result of consuming more food than what is required by the body. Since the beginning of pandemic, dozens of studies have reported that many of the sickest COVID-19 patients had obesity (Wadman, 2020).

(7) Urbanization

Urbanization is a crucial factor in the spread of COVID-19. Cities are home to more than half of the world's population. Deep inequalities and poverty mark cities in both developed and developing countries. After spreading in China, COVID-19 quickly emerged in urban centers around the world. Given the high concentration of population and economic activities in cities, they became hotspots of the COVID-19 infection. Countries such as the United States (82.7%), the United Kingdom (83.9%), Italy (71%), Germany (77.5%), and France (81%) have higher urbanization rate and have higher morbidity of COVID-19 per million population

whereas Indonesia (56.6%) and India (34.5%) have lesser percentage of urbanization and have lower morbidity of COVID-19. Hence, COVID-19 is directly related to the rate of urbanization. Greater the rate of urbanization, greater is the mixing of people, whereas in rural areas, people live far away from each other and mixing with one another is often less than in urban areas. Geographers and urbanites will thus need to explore these emerging relationships between extended patterns of urbanization and outbreak of infectious disease through an interdisciplinary approach to prevent and mitigate the future disease outbreaks.

(8) Migration and Travelling

Migrants are considered vulnerable to the spread of COVID-19. In most of the countries, COVID-19 started with migrants. As of March 1, 2021, emigrants from 20 countries with the highest number of COVID-19 cases accounted for 31% of the total international migrant stock. Further, available international data show that at least seven countries—the United States, the United Kingdom, France, Spain, Italy, Germany, and Czechia—depend on foreign-born workers in the critical sector of healthcare services. Living conditions in crowded housings pose a particular risk to the spread of COVID-19 among migrant workers. People travel for different purposes such as employment, education, business, leisure, adventure, etc. People from developed countries travel more than people from underdeveloped countries, with the result that the extent of COVID-19 is more among migrants from developed countries. Now, various countries have imposed restrictions on travel.

Implications

COVID-19 is one of the major epidemics of our times. So far, we had just heard of major epidemics, but now we have experienced the same. It has impacted people's livelihoods and health. As on March 15, 2021, 120 million people have been affected and 2.67 million have perished by COVID-19. The pandemic is far from over, with daily cases of around 400,000 and nearly 10,000 deaths. Taking basic precautions, such as wearing of masks, sanitizing of hands (and legs), and keeping social distance, are very important to prevent spread of the virus. The governments too have to be extra careful in protecting their citizens. Neglect by the Trump administration has cost the United States more than 500,000 lives, but now things are improving because of Joe Biden's efforts to contain the virus.

Mere economic development is not sufficient to control the virus. The so-called developed countries have suffered more than the developing countries. Social development is the answer. It is achieved when economic equality, social justice, health and education, and cultural equality are provided to people. Marulasiddaiah (1912, p. 195) has devised the following five-faceted development path to tackle viruses and the problems caused by them simultaneously: Education, health, *kayaka* (means of earning one's livelihood), harmony, and the people's power.

Caucasoids, people inhabiting in cold climates, and people living in urban areas cannot help themselves because of the conditions they are living in, but they can increase their immunity by having proper physical exercise (yoga could be a good option) and consuming proper food with spices. Overeating should be avoided because obesity could be an invitation not only for COVID-19 but also for other sicknesses such as high blood pressure, diabetes, etc. Excessive travelling should be avoided. Science and technology have come to the rescue to people. Modern technology has accelerated the use of machines and devices at the time of COVID-19. Modern technology has helped us in ameliorating our troubles by helping us through health management, education, entertainment, changed business practices, and making people gadget savvy (Kamath 2020, p. 119). Vaccination would to a great extent prevent people from the epidemic.

Conclusion

COVID-19, epidemic of our times, has created havoc in the lives of people in multiple ways as loss of employment, free movement, fear, insecurity, etc. This article has analyzed the direct and indirect factors of the epidemic. Since the epidemic is far from over, we have to be vigilant. Since we are helpless with indirect factors, we can prevent the epidemic by taking precautions and increase our immunity through proper physical exercise and diet. Let us hope that the COVID-19 epidemic will vanish with the administration of vaccine.

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