

## ORIGINAL ARTICLE

# An Observational Study on the Early Stages of the Covid-19 Pandemic in Pakistan

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## ABSTRACT

**Background:** The coronavirus disease 2019 (COVID-19) pandemic, which started on February 26, 2020 in city of karachi, spread quickly throughout Pakistan.**Material and Method:** The design of this study was a observational study design and this study was conducted at king Edward medical University Lahore. More than 6,200 persons were afflicted by the illness in the first seven weeks, and there were more than 111 documented fatalities. Many problems arise if we contrast the COVID-19 tragedies in Pakistan with those in nations like China, Iran, and the European Union. The geography of the nation, poverty, poor literacy rates, environmental circumstances, sanitary conditions, and dietary habits are only a few of the difficulties we face in containing this epidemic. Although there are terrible circumstances in each of these areas, Pakistan's COVID-19 epidemic was slower than that of other developing nations.**Results:** The impact of COVID-19 appears to be lessened by Pakistan's humid hot temperature, early reaction to COVID-19, population immune system, BCG vaccination, and the proportion of young individuals. In this essay, we explore the COVID-19 pandemic outbreak in China, Iran, and Pakistan and present its day-to-day changes. We outline the COVID-19 structure and how it compares to SARS-CoV and SARS-CoV2. The use of Remdesivir (an adenosine analogue used against RNA viruses), Chloroquine (a widely used anti-malarial drug), convalescent plasma, neutralising antibodies targeting the ACE-2 receptor, and an ACE-2-like molecule that might bind to the S protein of the coronavirus are also covered in terms of treatment options and their drawbacks. Also covered are the effects of COVID-19 on Pakistan's economy and government relief measures.**Conclusion:** In conclusion, it may be said that the support systems in place may not be sufficient to stop the spread of the virus. Even with the meagre assistance offered, it is weaker for rural places where the virus's effects may be severe than in the nation's cities. Further research is required as the epidemic develops to better understand governmental efforts to contain the virus and its effects across the nation.**Keywords:** Coronavirus COVID-19 Pakistan Pandemic Outbreak

## INTRODUCTION

The coronavirusidae family includes corona viruses. Wuhan, a developing commercial hub in China, witnessed a coronavirus outbreak towards the end of the year that claimed the lives of more than 1,800 individuals and infected more than 70,000 others in the first five days of the epidemic (1). Chinese researchers have dubbed this coronavirus the new coronavirus illness 2019 (2019-nCoV). The illness COVID-19 and the virus SARS-CoV-2 were both given such names by the International Committee on Taxonomy of Viruses (ICTV). The nucleic material of the coronavirus is a single-stranded RNA with a size range of 26 to 32 kbs. Coronavirus is tiny (65125 nm in diameter) (Figure1) (2).

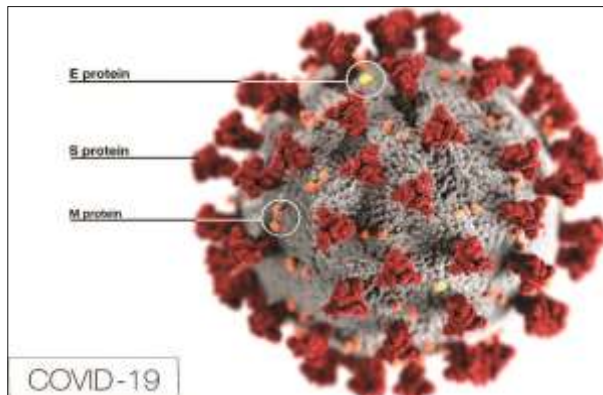


Figure 1: Structure of SARS-CoV-2 (Source: CDC)

The fundamental processes, infections, and replications of COVID-19 are the same as those of a conventional respiratory

coronavirus. However, certain modifications enable it to connect to the host receptor more firmly and raise its transmissibility, both of which are considered to boost its infectivity. SARS-CoV-2 is detectable in aerosols for up to three hours, on copper for up to four hours, on cardboard for up to 24 hours, and on plastic and stainless steel for up to two to three days, according to research (3). These findings show that SARS-CoV-2, which causes COVID-19 illness, is stable and that humans may get the virus by breathing it in or touching contaminated surfaces.

We are currently dealing with a pandemic more than a century after the 1918 influenza epidemic broke out. We will likely have to live with the COVID-19 virus for a very long period due to the global spread of the sickness. The intricate pathophysiology and presentation of COVID-19 have continued to be explained to experts in science. For instance, not all COVID-19 exposed individuals experience symptoms, and not all infected individuals get a severe respiratory illness (4). As a result, the COVID-19 infection can be roughly divided into three phases: phase I, an asymptomatic incubation period with or without noticeable virus; phase II, a non-severe symptomatic phase with the occurrence of virus; and phase III, a severe respiratory symptomatic phase with a high viral load. According to reports, SARS-CoV 2002 was responsible for the first severe acute respiratory syndrome (SARS) epidemic in Guangdong, China. The S-protein in the current virus's receptor-binding domain (RBD) region may have contributed to the faster transmission rate of SARS-CoV-2 than the original SARS-CoV (5).

**Outbreak of Covid-19 Pandemic in China:** The Chinese government contacted the World Health Organization (WHO) in December 2019 about a large number of pneumonia cases with an unknown origin. More than 50 people were affected within a short period of time after the outbreak started at the Hunan seafood market in Wuhan. Live animals including frogs, bats, birds,

bunnies, and marmots were sold at the Hunan seafood market. The National Health Commission of China said it was viral pneumonia on January 10, 2010, although this virus was subsequently determined to be a new coronavirus (6). At first, it was believed that the fish market had diseased animals and that everybody who entered the market would become ill. Further research revealed that some people had the virus even though they had no history of going to the market. Later observations therefore showed the virus's capacity to infect humans. Close contact with an infected person or exposure to aerosols carrying the virus when sneezing, coughing, or breathing causes the infection to spread. Through inhalation through the mouth or the nose, these aerosols might reach the lungs. The early phases of the COVID-19 epidemic are depicted in Table 1 (7).

**Comparison of Covid-19 with the previous Coronaviruses:** In the case of the original SARS-CoV, initial studies focused on palm civets and raccoon dogs as a significant reservoir of infections. Positive results, however, were only obtained from samples separated from the meals sold to civets at the market. This shows that additional palm civets or other sick animals may have infected the palm civets at the market. After being exposed to the virus in the past, anti-SARS-CoV antibodies were later discovered in Rhinolophus bats, indicating that bats are a source of viral infections. In 2012, the Middle East Respiratory Syndrome (MERS) coronavirus epidemic affected Saudi Arabia. According to a recent study, the MERS-Coronavirus was also found in bats, who served as the virus' primary hosts and carriers. The main hosts of SARS-CoV-2 are listed in Table 2, along with a comparison to SARS-CoV (8,9).

**Outbreak of Covid-19 in Iran:** On February 19, 2020, in Qom, Iran revealed its first confirmed instances of SARS-CoV-2 infections. Iran's Ministry of Health and Medical Education (MOHME) announced that both patients had passed away on the same day. According to the MOHME, there has been 2,898 COVID-19 fatalities in the nation as of March 31, 2020, with 44,605 verified cases. Following Italy, China (10), Spain, and the United States, and France Iran has the sixth-highest number of COVID-19 fatalities and coronavirus-infected patients as of March 31, 2020,

It was believed that a trader from Qom who had been to China may have brought the virus into the nation. By February 28, more than ten nations were able to trace their cases of the virus back to Iran, making Iran the hub of the disease in the Middle East. Friday prayers and public events were suspended by the Iranian government, and shopping malls, schools, colleges, and holy

temples were all closed. Festival festivities were also prohibited. In order to assist families and companies, economic measures were also presented (5). Despite its objective to restrict travel, the government was unwilling to quarantine entire towns and regions, and substantial mobility between cities persisted before the Nowruz celebrations. A travel ban between cities was subsequently put in place by the government as a result of an increase in the number of new cases.

**Outbreak of Covid-19 in Pakistan:** Table 3 gives the COVID-19 outbreak report on a daily basis in Pakistan.

Table 1: Timeline of early stages of COVID-19.

Dates	Events
December 30, 2019	Cluster of cases of pneumonia of unknown origin reported to China National Health Commission.
January 1, 2020	Hunan seafood market closed.
January 7, 2020	Novel coronavirus isolated.
January 11, 2020	First fatal case reported.
January 12, 2020	Named as 2019-nCoV; whole genome sequence shared with WHO.
January 13, 2020	First case in Thailand reported.
January 16, 2020	First case in Japan reported.
January 19, 2020	First case in Korea reported; 2 cases in Beijing and 1 in Guangdong province reported.
January 20, 2020	Infection in healthcare workers caring for 2019-nCoV patients reported.
January 24, 2020	853 cases reported in China (549 from Hubei province, 286 from other 31 provinces, municipalities, or special administrative regions) reported.

Table 2: Biological Features of SARS-CoV and SARS-CoV-2

Feature	SARS-CoV	SARS-CoV-2 (COVID-19)
Emergence date	November 2002	December 2019
City of emergence	Guangdong, China	Wuhan, China.
Date of full-control	July 2003	Not controlled yet.
Key hosts	Bat, palm civets and Raccoon dogs	Bats
Number of countries affected	26	Worldwide
Entry receptors in human	ACE-2 receptor	ACE-2 receptor
Symptoms	Fever, malaise, myalgia, headache, diarrhea, shivering, cough and shortness of breath SARS	Cough, fever and shortness of breath
Disease caused	SARS, ARDS	SARS, COVID
Total infected people	8,098	1,089,479
Total recovered patients	7,322	22,8005
Total deaths	776 (9.6% mortality rate)	58,476 (3.4 % mortality rate)

Table 3: COVID-19 Daily update in Pakistan till March 31, 2020

February 26	In a tweet, the special aide to the prime minister for health says that two people have been diagnosed with COVID19, both of whom are known to have been to Iran. The first patient was from Karachi, Pakistan's federal territory, while the second patient was from Karachi, Sindh province. Pakistan acknowledged three further incidents at the end of February.
March 2	A 45-year-old woman from Gilgit-Baltistan who had come from Iran was the fifth case, and she was found in the federal region of the nation.
March 6	According to the chief minister of Sindh's advisor, the first COVID-19 patient in Karachi has recovered and been released from the hospital after testing negative.
March 8	Seventh case tested positive of COVID-19 in Karachi.
March 9	There have been 9 additional instances reported by authorities in Karachi, bringing the total number of COVID-19 cases throughout Pakistan to 16, with 13 cases occurring in Sindh Province. A number of the new patients had recently returned from London, and five of them had travelled to Syria.
March 10	On March 10, three more cases were verified, the first of which originated in Quetta, Baluchistan, and the second in Hyderabad.
March 11	76 suspected cases have been reported in the Punjab province's Lahore, Gujranwala, Sargodha, Hafizabad, and Lodhran districts. The Healthcare Department authorities claimed that 55 patients were cleared after testing negative, while 10 patients were quickly cleared of any suspected infections. Skardu verified a second Gilgit-Baltistan case, raising the total to 20.
March 12	A third case has been confirmed in Gilgit-Shigar Baltistan's area; the patient had been to Iran previously and was said to be receiving care at the Skardu hospital. According to the chief minister of Sindh's advisor, the second sick patient has made a full recovery.
March 13	Due to the patient's journey from Islamabad, the 52-year-old patient who tested positive for the disease was the first instance of local disease transmission, according to the Sindh Health Department. On same day, 24 of the 27 presumptive cases in Khyber Pakhtunkhwa were also resolved. 28 cases have been reported overall, including 6 new cases in Taftan and 1 in Sindh.
March 14	The total cases were 31, with 2 new patients in Karachi testing positive and 1 in Islamabad.
March 15	The coronavirus was locally transmitted twice in Sindh, resulting in 5 more patients, 3 of which had been to Saudi Arabia before, and 1 of which had visited Baluchistan. Additionally, there was a new case in Islamabad. The first coronavirus case in Punjab has been confirmed by the Lahore Health Secretary. The contaminated patient was brought to Mayo Hospital Lahore, Pakistan, in an isolation unit after arriving from England on March 10. The Pakistan National Institute of Health reported 53 instances overall, with 11 new cases in Sindh, 6 new cases discovered during a mobile laboratory at the Taftan border area, and the first case in Punjab.
March 16	116 of the 134 newly reported positive cases were in Sindh. The first 15 instances were reported from Khyber Pakhtunkhwa, while three were discovered in Baluchistan. The rise was the biggest one thus far. In addition to the province in which over 100 cases were recorded in a single day, 187 illnesses were reported nationwide.
March 17	The total cases had risen to 237 with 25 new cases in Punjab, 12 in Sindh and 4 in Islamabad.
March 18	The first COVID-19 case has been reported by Azad Kashmir. The number of cases increased by 36 and 10 respectively in the provinces of Sindh and Gilgit-Baltistan. Other provinces also reported new instances. After recovering in Sindh province, a patient from Hyderabad was also released, bringing the total number of recovered cases to 5. On March 18, Pakistan verified a total of 302 positive cases. On this day, it was also determined that the two initial virus-related fatalities in the nation had occurred. The first victim, a 50-year-old male who had just returned from Saudi Arabia to Mardan District after doing the Umrah in Mecca, and the second victim, a 36-year-old woman from Hangu District, were both reported from the province of Khyber Pakhtunkhwa. In Peshawar both had undergone hospitalisation.

March 19	In Punjab, the cases quadruple from 33 to 80, while in Baluchistan, they increase from 23 to 81. The Baluchistan province administration declared a health emergency and halted all transportation due to the rise in cases. The provincial administration said that employees of transportation businesses would get assistance packages. The overall number of confirmed cases increased to 461 with a total of 159 additional cases.
March 20	Sindh announces the first COVID-19 death. The 77-year-old patient contracted the virus through regional transmission. In addition to being a cancer survivor, the patient also suffered from diabetes and hypertension. While in other provinces, there were 34 more new cases than the previous several days, bringing the total up to 495.
March 22	Khyber Pakhtunkhwa reports the third virus-related fatality. The first death in Baluchistan and Gilgit-Baltistan was also reported, bringing the total to six. With 138 additional cases, the total number of cases had also grown to 784. A medical professional who died at Gilgit's DHQ (District Headquarters) Hospital caught the virus while screening Iranian pilgrims returning from the country. An extended period of lockdown was imposed on Gilgit-Baltistan. At Mirpur, 13 fresh pilgrims who had travelled from Taftan through Dera Ghazi Khan were quarantined. Hospitals in Punjab received 10,000 hand sanitizers from Descon, a global engineering business from Pakistan. 26 drivers who drove the positive COVID-19 cases to hospitals in Baluchistan were placed under quarantine.
March 23	The lack of appropriate tools to combat the infection is criticised by many doctors across the country. The Ministry of Health of Foreign Affairs made arrangements on that day to return 72 Pakistanis who were stuck at Doha International Airport. Upon arrival, the passengers went through a thorough screening process. 150 Pakistanis who were stuck at Dubai and Abu Dhabi International Airports were transported on another flight that was organised. The Sindh Education Minister submits to a virus test and imposes a 14-day self-quarantine. Lockdown was announced by the governments of Baluchistan and Sindh till April 7. Lockdown was declared in Azad Kashmir till April 13.
March 24	Lockdown is in effect in Punjab till April 6. 640 pilgrims quarantined in Sukkur were permitted to return home by the provincial administration of Sindh after testing negative for the virus.
March 25	Islamabad's capital city was subject to a number of restrictions, including the closure of hospital outpatient clinics and a total prohibition on social gatherings as well as transportation inside the city, across districts, and between provinces. There were three fresh recoveries reported. With an additional fatality, Pakistan now has 1,057 confirmed cases.
March 26	In Pakistan, 140 additional cases were found to be positive. The number of verified deaths in Punjab now stands at nine. The number of cases rose to 1,197. There were two recoveries.
March 27	A record 211 new cases were discovered in Pakistan in a single day. With 490 instances, Punjab has surpassed Sindh as the province with the most cases. In Punjab, two fatalities were recorded. N95 masks were given by the Pakistan National Institute of Health (NIH) throughout Sindh, and screening teams were stationed at district entry and departure points in Khyber Pakhtunkhwa to check visitors for the virus. The administration of Gilgit-Baltistan determined that visitors from the Taftan border would be subjected to a virus test. Pakistan had 1,408 confirmed cases, while 3 patients were cleared, placing the recovered cases in 26th place with two deaths, bringing the total number of fatalities to 11.
March 28	175 Pakistanis who were left stranded in Bangkok, Thailand, can return home as Pakistan permits Thai Airways to restart international aircraft service to Islamabad
March 29	1,526 cases are now reported from Pakistan, an increase of 118 cases. Thirteen fatalities have been reported, including one death each in Sindh and Khyber Pakhtunkhwa. Khyber Pakhtunkhwa created and sent instructions for ending quarantine. The same day, five Pakistani individuals with medical visas who had been stuck in India owing to the country's 21-day statewide lockdown came home across the Wagah border. On March 31, two of them revealed positive viral tests.
March 30	Locally made ventilators and testing supplies will be available soon, according to the federal minister of science and technology.
March 31	Authorities report a total of 82 recoveries and the death of 26 people. The discovery of 174 more cases brought the overall number of confirmed cases to 2,039 patients.

Table 4: Confirmed COVID-19 Cases in Pakistan According to Daily Reports.

Province/Territory	Cases	Death	Recoveries	Active Case	Fatality Rate (%)	Recovery Rate (%)
Punjab	3,410	37	672	2,701	1.09	19.71
Sindh	2,355	48	581	1,726	2.04	24.67
Khyber Pakhtunkhwa	1,077	50	216	811	4.64	20.06
Baluchistan	335	5	142	188	4.49	42.39
Gilgit-Baltistan	250	3	192	55	1.20	76.80
Azad Kashmir	48	0	9	39	0.00	18.75
Islamabad	163	1	20	142	1.61	12.27
Total	7,638	144	1,832	5,662		

**Comparison of Pakistan with the other countries of the world:**

According to Table 4 statistics, Gilgit Baltistan and Sindh had the highest death rates, followed by Khyber-Pakhtunkhwa (KPK). The biggest number of infection cases were in Sindh, then Punjab. The highest rate of recovery was in Baluchistan. Due to their high temperatures, nations like Malaysia, Indonesia, and Thailand don't appear to have favourable climatic conditions for the virus to survive for an extended period of time (11). The impact of temperature and relative humidity on COVID-19 is being studied by scientists. The relationship between the virus and weather is yet unknown, however the majority of experts think that COVID-19 is not affected by temperature and humidity. Similarly, it is yet unknown how the immune system influences infection, mortality, and recovery from COVID-19. Using information from Worldometer, available at <https://www.worldometers.info/coronavirus/> (8),

we compared the number of cases reported, the number of deaths and the fatality rate in Pakistan with selected countries across the world (Table 5).

Although COVID-19 began in Iran almost simultaneously with Pakistan, Table 5 demonstrates that Iran has more infected patients and fatalities than Pakistan. Compared to 40,000 deaths in Italy and Spain combined, the United States of America had 26,000 registered deaths in March. According to some experts, the number of COVID-19 cases recorded in the EU/EEA and the UK is rising quickly. The pandemic appears to be spreading equally quickly in all countries, according to recorded patterns in the cumulative incidence of COVID-19, however the trend in Pakistan may not have been as rapid as in other nations up to this point (12). This is true despite the fact that different nations are at different phases, distinct national public health responses, perhaps different case definitions, and various patient selection processes, including catchup testing, for COVID-19 illness confirmation

testing. According to Table 5, Pakistan appears to have a lower mortality rate than other nations, particularly those in the EU, the USA, Iran, and Indonesia (Table 5).

**Control of COVID-19 in Pakistan: Potential Views and Prevalent Opinions Weather Conditions:**

There are some anecdotal claims about the connection between meteorological conditions and coronavirus propagation, but there isn't any study to back them up yet. It is well known that during chilly days, the air outside is chilly (13). Absolute humidity has been found to have a significant impact on influenza transmission, with drier circumstances being more conducive to the spread of the flu than colder ones. Analysts claim that SARS-Cov-2 transmission patterns are comparable to those of influenza based on research from Vietnam and the USA. It is noteworthy that the Vietnam investigation found influenza-like diseases without differentiating between influenza and other kinds of infections. Although it has been suggested that coronavirus transmission may follow similar patterns to those of influenza, there are no particular research addressing the impact of humidity on coronaviruses or other respiratory viruses outside influenza. Countries with dry, chilly air offer good conditions for influenza transmission (14,9), but it's unclear how important this element is for coronaviruses. According to a research, transmission may occur in a variety of hot, humid conditions. citing the large coronavirus transmission in Singapore, for instance, which is almost on the equator. However, there are distinctions between a temperate region in the summer and Singapore in February. Different day lengths, UV radiation, and other unidentified variables, for instance, may have a role in the transmission of the coronavirus. If warmer climates like those in Pakistan and Saudi Arabia have less viral propagation of transmission, further research is needed to confirm this (15).

**Indoor/Outdoor Living:** In many climates, individuals spend more time indoors during the winter with less ventilation and privacy than



they do during the summer. There may be more chances for the spread of infectious diseases in schools. School breaks have been firmly linked to greater rates of respiratory virus transmission, including those that cause the flu, chicken pox, and measles (16). During the summer, the 2009 pandemic flu in the United States was greatly diminished, but it quickly returned in September.

Table 5: Confirmed COVID-19 cases, deaths and fatality rate according to daily report in the countries with more than 100 COVID-19 Deaths.

Country	Total Cases	Total Deaths	Total Recovered	Fatality Rate (%)
Algeria	2,070	326	691	15.75
Argentina	2,443	109	596	4.46
Austria	14,325	393	8,098	2.74
Belgium	33,573	4,440	7,107	13.22
Brazil	25,758	1,557	14,026	6.04
Canada	27,063	903	8,235	3.34
China	82,295	3,342	77,816	4.06
Colombia	2,979	127	354	4.26
Czechia	6,151	163	676	2.65
Denmark	6,681	309	2,515	4.63
Dominican Republic	3,286	183	162	5.57
Ecuador	7,603	369	696	4.85
Egypt	2,350	178	589	7.57
France	143,303	15,729	28,805	10.98
Germany	132,500	3,521	72,600	2.66
Greece	2,170	101	269	4.65
Hungary	1,579	134	192	8.49
India	11,555	396	1,362	3.43
Indonesia	5,136	469	446	9.13
Iran	76,389	4,777	49,933	6.25
Ireland	11,479	406	77	3.54
Israel	12,200	126	2,309	1.03
Italy	162,488	21,067	37,130	12.97
Japan	8,100	146	853	1.80
Mexico	5,399	406	2,125	7.52
Morocco	1,988	127	218	6.39
Norway	6,740	145	32	2.15
Pakistan	5,988	107	1,446	1.79
Peru	10,303	230	2,869	2.23
Philippines	5,453	349	353	6.40
Poland	7,408	268	668	3.62
Portugal	18,091	599	383	3.31
Romania	7,216	362	1,217	5.02
Russia	24,490	198	1,986	0.81
South Korea	10,591	225	7,616	2.12
Spain	177,633	18,579	70,853	10.46
Sweden	11,927	1,203	381	10.09
Switzerland	26,336	1,221	14,700	4.64
Turkey	65,111	1,403	4,799	2.15
UK	98,476	12,868	N/A	13.07
Ukraine	3,764	108	143	2.87
USA	615,406	26,164	38,879	4.25
World	2,024,622	128,965	492,482	6.37

Source:

Worldometer,

<https://www.worldometers.info/coronavirus/>

**Schools Closures:** However, the importance of academic words for the SARS-CoV-2 is significant but unclear. There were few occurrences of the pandemic among children at first. This was thought to indicate that they were resistant to infection and did not considerably spread the virus. Children were thought to be less prone than their older peers to experience severe symptoms when they did contract the infection (17). However, more recent research had shown that younger age groups, including youngsters, were being infected. On February 26, 2020, Pakistan's first case was reported; soon after, the government of Sindh stated that all schools would be closed. Understanding how the virus affects children is crucial to determining if closing schools would help curb the spread of COVID-19 and how much summer vacation might potentially assist (18).

**Immune Levels:** The population of Pakistan has sunny weather for almost the whole year, and the average person's immune

system is often stronger in the summer than the winter. The cold weather only lasts for a relatively brief period of time. One theory has centered on the function of the hormone melatonin, which has certain immunological effects and is controlled by the photoperiod, which changes seasonally. Another theory relates to vitamin D levels, which partly depend on exposure to UV radiation. One study found that taking vitamin D supplements lowers the risk of developing an acute respiratory infection (19). Many people believe that the pandemic peaks when the fraction of susceptible contacts decreases, then drops, as Lipsitch contends in his work. Regarding the seasonality of COVID-19 and if warmer weather will make the virus less contagious, Lipsitch makes a strong case. The unresolved question is whether children spread the virus as easily as adults do, despite a recent study suggesting that youngsters may be infected and shed detectable virus at roughly the same rate as adults (17). The government of Pakistan quickly closed schools when the first case was confirmed, which assisted the nation in containing the spread.

According to John Hopkins' most recent statistics on COVID-19 deaths, of the 132,276 instances that were reported globally, the majority were from Spain, Italy, and the United States combined. Just 515 people have passed away in India and Pakistan since then, whilst 20 fatalities have been reported in Nigeria and Kenya. As of April 15, Pakistan had documented 107 fatalities and around 6,300 cases since the country's first COVID-19 case was announced on February 26. According to some studies, countries like the European Union and the United States that did not need the effective anti-tuberculosis vaccine Bacille Calmette Guerin (BCG) are significantly harmed by COVID-19. Some studies claim that fewer people have died from COVID-19 in Iran (18), where extensive BCG immunisation was adopted in 1984. The countries that did not implement the BCG vaccination, which are primarily western countries, had higher rates of coronavirus infections per capita and mortality. 36 For newborn newborns in Pakistan, the BCG immunisation is required. Since 1949, all newborns in Pakistan have received a single dose of the BCG vaccination (19). Figure 2 depicts COVID-19 fatalities in Pakistan and the European Union.

**Treatment Plans and Developments in Vaccine:** There were more than 80 clinical trials evaluating a variety of possible SARS-CoV-2 therapies at the time this publication was submitted (20). Utilizing serum from individuals who have recovered from the virus to treat new patients is one straightforward yet very efficient therapeutic technique. those with recovered viral

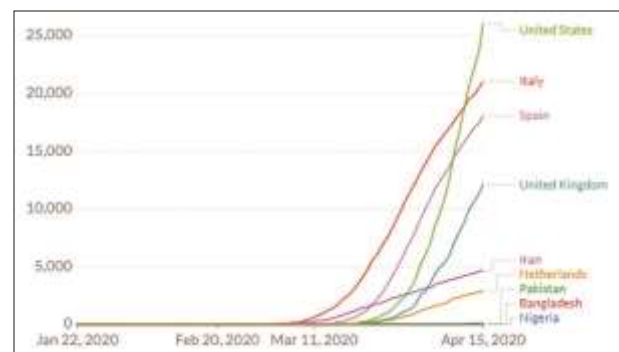


Figure 2: Shows the comparison of COVID-19 deaths with European countries with Pakistan.

Viruses can be neutralised in newly infected people if particular antibodies to the infection are produced. In the past, this therapy was used with great effectiveness. The blood of recovered COVID-19 victims can be used to stop the spread of the deadly virus, which has infected and killed thousands of people globally, according to an announcement made on March 20 by Pakistan's leading haematologist and transplant surgeon in the state of

Shamsi. According to reports, a COVID-19 patient's body produces antibodies against the virus (21).

Pakistan's National Institute of Blood Disease (NIBD) was getting ready to provide its first plasma treatment on April 10. On April 9, the Drug Regulatory Agency of Pakistan (DRAP) approved a plasma therapy-based passive immunisation. In Pakistan's Dow University of Health Sciences (DUHS), medical professionals announced on April 13 that they have developed a medication to treat COVID-19 sufferers. Intravenous immunoglobulin, according to medical experts at the DUHS, was a significant advancement in the fight against new coronaviruses. The DUHS research team revealed that the globulin was produced using purified antibodies that were taken from the COVID-19 patients who had recovered, and they described it as a glimmer of hope (22).

World widely, creating an effective vaccination to generate neutralising antibodies is the long-term goal of COVID-19 research. The National Institutes of Health in the United States and Baylor University in Waco, Texas, are developing a vaccine based on what is known about the coronavirus in general and utilising data from the SARS outbreak. Additionally, the new identification of the COVID-19 spike protein may pave the road for a particular vaccination to advance more quickly (5). Particularly noteworthy is the application of RNA vaccines, a relatively new vaccine technology that can trigger robust immune responses against infectious illnesses and certain malignancies. Traditional vaccines work by either employing entire cells or studies with pathogen proteins that have been isolated to induce the formation of antibodies (live, attenuated vaccines) (23,10). The development of new vaccinations might take years despite being incredibly successful. RNA-based vaccines, on the other hand, employ mRNA, which, when it enters cells, is converted into antigenic molecules that then activate the immune system. Clinical studies are currently being conducted for a number of additional malignancies, and this method has been employed successfully against other tumours. Additionally, RNA-based vaccinations may be produced more quickly and cheaply than conventional vaccines, which can be a huge benefit in pandemic conditions (24). An mRNA-based SARS-CoV-2 vaccine is now undergoing clinical testing. Participants in the study will get the mRNA vaccine twice, 28 days apart, with safety and immunogenicity being taken into account. On April 18, Pakistan's Federal Minister of Science and Technology announced that the country would begin the COVID-19 vaccine's first phase of clinical trials and would contribute fully to the global studies on three different approaches being carried out, including the use of repurposed medications, antibodies, and vaccines (25,26).

**Economic impact:** In research by the Asian Development Bank (ADB), the COVID-19 outbreak might cause Pakistan's economy to lose between \$16.387 million and \$4.95 billion, or between 0.01% and 1.57% of its GDP (27). This GDP decline would reduce Pakistan's GDP by at least 1.57% and result in the loss of 946,000 jobs. 50 The majority of Pakistan's capital goods inputs for the textile industry come from other nations. The epidemic forced several international textile factories to collapse, which would undoubtedly have an impact on Pakistan's textile industry (28,29). Due to the pandemic, Pakistan Stock Exchange (PSX) is suffering a severe decline. The PSX reached its lowest level in more than five years on March 19. Several trading halts have occurred recently on the Karachi Stock Exchange 100 index (KSE-100) in order to safeguard investors from unrest and instability.

## CONCLUSION

A developing epidemic is COVID-19. The rate of COVID-19 transmission in Pakistan appears to be low in compared to other nations, according to the data that are now available, but it is uncertain how this will alter over the upcoming months and years. It has been suggested that a variety of factors, including humid climate, hot temperatures, tropical circumstances, widespread BCG vaccines, and government preventive measures, may be responsible for the low prevalence of infection. Due to the

epidemic, both the lives and livelihoods of Pakistani people and those of the rest of the globe are in danger. If the virus reemerges, there are still a lot of questions regarding how the pandemic would be contained in Pakistan. In conclusion, it may be said that the support systems in place may not be sufficient to stop the spread of the virus. Even with the meagre assistance offered, it is weaker for rural places where the virus's effects may be severe than in the nation's cities. Further research is required as the epidemic develops to better understand governmental efforts to contain the virus and its effects across the nation.

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