An Overview on COVID-19 Outbreaks Scenario in South Asia

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ABSTRACT: The global emergence of the recently discovered COVID-19 (Coronavirus disease 2019; SARS-CoV-2) has already shown its devastating effects on almost the entire world by causing huge numbers of death cases and rupturing the whole economy as well as social communication. South Asia, a region that comprises mostly of least developed and developing countries (Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka) with overpopulation, illiteracy, poverty, lack of awareness, lack of hygiene, inadequate health care facilities, is still struggling to fight against this virus and facing the consequences with over 8.5 million confirmed cases including 130,636 deaths till the 20th October. Prompt and proper protective measures, good health care systems, and conscious people are the keys to reducing the severe impacts of this pandemic situation, and most of the countries in this region lack all of this. Considering this, it will not be a surprise if the pandemic takes its full shape in these countries and recent evidence also suggest that the situation is already on its way to reach the peak. However, the pandemic nature in South Asia also demonstrates that strict measures by the government and co-operation from the people can protect a country from the impacts of the virus, whereas lack of these can lead to the next heat point. This review demonstrates and compares the impact of COVID-19 in the mass population of South Asia which could support the government and scientific community to take proper protective measures against this global pandemic and better prepare the community for future challenges. Moreover, good health care systems, public health infrastructure, and up to date information on COVID-19 outbreaks in this region will help to combat this pandemic and create more sustainable and resilient healthy societies in South Asia.

KEYWORDS: *COVID-19, SARS-CoV-2, Pandemic, Combat COVID-19, World Health Organization, South Asia, Second Wave of Transmission, Herd Immunity*.

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Introduction

Humans have a long history of coming in contact with diseases like plague, influenza, smallpox, tuberculosis, etc. which often turns out to be a pandemic, costing a huge number of lives. Pandemic was defined by the World Health Organization (WHO) as, "a worldwide spread of a new disease" (Cvetnić *et al.*, 2019; Scalera and Mossad, 2009). The most destructive pandemic ever reported in human history was the 14th century's Plague (also called The Black Death) causing 75-200 million deaths, followed by 1918s the Spanish Flu (H1N1 influenza virus) causing around 50 million deaths worldwide (Scalera and Mossad, 2009). Recently, on March 12, 2020, WHO announced the COVID-19 novel coronavirus outbreak a global pandemic (WHO, 2020).

The COVID-19 is a highly infectious and pathogenic viral infection caused by severe acute respiratory syndrome coronavirus (SARS-CoV-2) which was first spotted in December 2019 at the Wuhan, Hubei province, China (Jiang *et al.*, 2020; WHO, 2020). It has been hypothesized that the bat is the primary reservoir of the COVID-19 virus, emerging from a live animal market of Wuhan first (Guo *et al.*, 2020). The secondary source of this virus is yet to be discovered. It has been reported that SARS-CoV-2 is more transmissible than its ancestors and that might be due to genetic recombination in its spike protein (Riou and Althaus, 2020). COVID-19 attacks the lung's enzyme angiotensin-converting enzyme 2 (ACE2) found mostly in type II alveolar cells (Letko *et al.*, 2020). The common symptoms of novel COVID-19 include fever, cough, shortness of breathing, loss of smell, etc. and transmitted via droplets of sneezing and coughing from the affected person (Huang *et al.*, 2020).

The COVID-19 virus started to show its catastrophic impact on 2020 by emerging globally. In total 41,024,998 confirmed cases were recorded worldwide including 1,128,848 deaths (2.75% of total infected cases) by WHO till 20th October 2020 (WHO, 2020; Worldometer, 2020). According to WHO, COVID-19 becomes severe to those with a compromised immune system and have other health complications like cardiac disease, diabetes, liver, and kidney diseases. The year 2020 was shattered by the global emergence of the COVID-19 virus. Countrywide lockdown, avoiding social gathering, closing airports, borders, and academic institutions are the only non-therapeutic measurements recommended by WHO to minimize the case number as there are no possible vaccines available to date (WHO, 2020).

South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) are said to be least developed amongst the other continent of the world where overpopulation, low literacy rate, poor hygiene, scarcity of pure drinking water, misinformation, and panic is very common. Moreover, five countries of South Asia (Afghanistan, Bhutan, India, Nepal, and Pakistan) share a combined 4,000 miles of border territory with China, where the virus was blazed. Besides, South Asia is ranked one of the worst around the globe in healthcare issues (Fullman *et al.*, 2018). Therefore, these conditions have drawn much concern of WHO as well as the rest of the world about how these countries will deal with the outbreak of the COVID-19.

In total 8,561,719 cases including 130,636 deaths were recorded in South Asia till the 20th of October. Among the positive cases, a total of 7,552,102 patients were recovered completely leaving 878,981 active cases (WHO, 2020; Worldometer, 2020). Additionally, densely populated countries like India, Pakistan, and Bangladesh were recorded with the maximum number of cases among other countries of South Asia due to community transmission. In short, with a slow diagnosis rate as well as insignificant preparation for the fast-mutating and rapid spreading of SARS-CoV-2 South Asia is said to be highly vulnerable to combat COVID-19.

Initial identification of COVID-19 in South Asia

South Asian countries were vulnerable to combat COVID-19 pandemic from the beginning due to dense population, illiteracy, indigence, ignorance, lack of hygiene practice, and overall poor healthcare sectors. Bangladesh was in threat of COVID-19 emergence from late February, as a massive number of travelers were coming from Europe and the Middle East. During the late half of February and early half of March, thousands of Bangladeshis came back from Italy, Spain, and Germany. The first case in Bangladesh was detected on March 8 of 2020, three patients were infected with coronavirus and two of them came back from Italy and the other person was a family member of an infected patient coming from Italy (Anwar *et al.*, 2020). The first documented case of coronavirus in Afghanistan was confirmed on February 24 of 2020, in the western province of Herat, a 35-year-old man who had recently returned from Iran (Shah *et al.*, 2020). The first case recorded in Bhutan was on the 6th of March 2020, a 76-year-old male who traveled to Bhutan from the USA via India (LeVine *et al.*, 2020).

Figure-1. COVID-19 cases in South Asia according to the Worldometer as of 20th October, 2020 at 11.59PM (GMT +6)

India is one of the most densely populated countries in the world with more than 1.3 billion population. With this massive number of populations, it is no wonder that in South Asia, India is leading the dashboard of COVID-19 in terms of highest cases and death (Figure 1). The first COVID-19 case in India was detected on January 30, 2020. The Maldives, tropical heaven of white sands and palm-fringed atolls is a popular destination among tourists, especially from China, India, and Europe. The Maldives confirmed its first two cases of COVID-19 on March 7, 2020, when two foreign employees of an island resort tested positive. The virus spread there from an Italian tourist who had returned to Italy after spending holidays and tested positive there (Hussain *et al.*, 2020). The first case recorded in Nepal was on the 23rd of January 2020; a 31-year-old student at Wuhan University who returned home on 5th January. This was the first case in the South Asian continent as well (MOHP, 2020; WHO, 2020). Pakistan announced its first positive case on 26th January, a student at the University of Karachi who traveled from Iran recently (Abid *et al.*, 2020). The number of positive cases started to rise gradually then with most of them having a travel history to Iran (Abid *et al.*, 2020). In Sri Lanka, a tourist from the Hubei, China was identified as the first positive case at late January of 2020 (Wickramaarachchi *et al.*, 2020).

Preliminary preventive strategies of the governments

The government of South Asian countries intended to take preventive measures to fight with COVID-19 more or less from the beginning. The Bangladesh government arranged the screening procedure for passengers coming from abroad from 7th February 2020 in all the airports and borders. A total number of one million passengers were screened until the first detection period of Bangladesh. After the first detection of COVID-19 patients on March 16, 2020, the Government emphasized more on home and organizational quarantine for 14 days. Moreover, the Government closed all the educational institutions to control the infection. From March 25, the country went on a general holiday for the implementation of lockdown and to cut off the transmission line. In addition to this, Bangladesh closed all the international flights from March 21, and it is extended onwards till May 30, 2020. Meanwhile to reduce the rate of transmission government ensured quarantine of more than 0.2 million people around the country. The lockdown was extended several times to contain the outbreak (Anwar *et al.*, 2020).

Despite taking strict decisions the Afghan government initially rejected complete shutdown and announced publicly to maintain social distance only (Shah *et al.*, 2020; TOLOnews, 2020). By the end of March, the authorities of different provinces gradually imposed restriction measurement to limit the spread of this pandemic. Kabul, the capital of Afghanistan undergo lockdown for at least three weeks from 28 March and later which was extended by the Afghan cabinet (TOLOnews, 2020). In late March 2020, about 500 masjids in Heart were closed for worships (Ansar, 2020). The closure of all educational institutions was announced on the 14th of March and the Ministry of Education had launched a distance learning website for school students on the 7th of May to continue their academic activities (Shah *et al.*, 2020).

The Indian government screened travelers in the airports and other land borders from the 1st of February. Millions of

travelers were brought under surveillance and monitoring. In response to the COVID-19 outbreak in India, the Government closed all the schools from March 17, 2020 (Sanyal, 2020). Following the transmission of COVID-19 during the mid-March the Government imposed restrictions on international flights and domestic flights in compliance with their decision of not issuing any new visa in early March. The Indian government also has taken state-wise measurements to combat COVID-19. Following such initiative, they divided the country into three categories of Red Zone (hot spot), Orange Zone (non-hot spot), and Green Zone, which was eventually a significant step (Kumar *et al.*, 2020, PTI, 2020). They also sealed borders with Bangladesh, Nepal, Pakistan, and Myanmar in between the second and third weeks of March (WHO, 2020). On March 26, they imposed a countrywide lockdown which was extended multiple times later.

Similarly, the travel restriction, countrywide lockdown, schools closure, banned tourist spots were also implemented by the government of Afghanistan, Maldives, Nepal, Pakistan, and Sri Lanka to control the community transmission of the virus in a few time interval (Ansar, 2020; Shah *et al.*; Wickramaarachchi *et al.*, 2020; Abid *et al.*, 2020; MOH, 2020a; MOHP, 2020; TOLOnews, 2020; WHO, 2020). Bhutan, on the other hand, did not impose a nationwide lockdown till the date. However, Bhutan immediately restricted the entry of foreign tourists into the country and closed the schools as well (LeVine *et al.*, 2020).

Vulnerable health system facility of South Asia

One of the poorest and populous regions in the world is South Asia. These regions are badly recognized for their very weak health care facilities. The lowest number of physicians per capita was found in each of South Asia's eight countries. Unfortunately, it ranging between 0.3 physicians per 1,000 people (Afghanistan) to just one physician per 1,000 people (Maldives, Pakistan, and Sri Lanka) (The World Bank, 2020). Thus, there are too few healthcare workers and public health facilities with negligible resources. As such limitations are very common in this region, peoples are always much more vulnerable to a severe outbreak of COVID-19.

All the South Asian countries adapted to real-time PCR based detection system for COVID-19 detection from the beginning. Although the infrastructure for real-time PCR testing was insufficient to compare to their population and subsequent community transmission. The medical and health care system has worsened in several countries initially due to the panic to COVID-19 and many people with general health problems remain out of treatment. Subsequently, many Governments of South Asia started to increase health system facilities and build temporary hospital infrastructure to tackle such a deadly outbreak.

Access to COVID-19 testing is the key to find out about how the virus is spreading. South Asian countries are far behind on COVID-19 testing from the beginning. In Bangladesh, new laboratories for tests, isolation beds, and flu corners in the hospitals were established with the progress of time. With the purchase of medical supplies and protective equipment, more health care workers were engaged in combating this pandemic. One of the exceptional and key measures taken by the Government was the immediate recruitment of more than 2000 doctors and 5000 nurses to treatCOVID-19 patients (Bdnewes24, 2020). Besides, the private organization also came up with voluntary support to combat the virus, for example, the Bashundhara group temporarily established a hospital of 2000 bed to treat COVID-19 patients (The Daily Star, 2020a). The government in coordination with BRAC (Bangladesh Rural Advancement Committee) also trying to establish temporary sample collection booths.

The daily test per million populations is highest in the Maldives, compared to other South Asian countries. As of October 18, daily test per million population in the Maldives was 2494, and confirmed cases per million was 98.05 (Our World in Data, 2020). At the same time, Bangladesh performed only 80 tests per million population, and confirmed cases were 8.94 per million population (Our World in Data, 2020). The daily test performed by a particular country could represent the ability of public health facilities to fight against the COVID-19 outbreaks. The recent daily test and daily confirmed case per million populations in South Asian countries are represented in Table 1.

Country-wise demographic data indicating that population density, literacy rate have a strong correlation with the number of COVID-19 cases. Besides, the doctor-nurse ratio among these countries was also insignificant according to the WHO guideline of 23 doctors per ten thousand populations (Table 1). The high population density in Afghanistan, Bangladesh, India might play a key role in community transmission of these countries whereas high literacy rates played a key role for the Maldives and Sri Lanka with a low number of COVID-19 cases.

Table-1. Country-wise demographic data of South Asia and the daily tests per million people. The data were collected from UNESCO, WHO, World Population Review and ourworldindatata.org

Countries	Total Population (in Million)	Population Density (per km^2)	Doctor and Nurse per 10,000 People	Literacy Rate	Population Density where Infection Rate is Predominant	Daily test of Oct 18, 2020	
						Tests per Million	Confirmed Cases per Million
Afghanistan	38.93	154	Doctors 1.9 nurse 3.02	31.74%	Kabul (4,127 per km^2)	Not available	1.47
Bangladesh	170	1116	Doctor 5.26 Nurse 6.74	72.89%	Dhaka (23,234 per km^2)	80	8.94
Bhutan	0.77	18	Doctor 3.7 Nurse 15.09	59.5%	N/A	Not available	2.22
India	1380	464	Doctor 1:1 Nurse 1:483	74.04%	Mumbai (73,000 per km^2)	789	48.07
Maldives	0.54	1802	Doctors 26 Nurse 78	98.61%	Male (27,000 per km^2)	2494	98.05
Nepal	29.14	201	Doctor 6.5 Nurse 26.85	67.9 %	Banke (165 per km^2)	534	113.4
Pakistan	220.9	287	Doctor 9.75 Nurse 5	59.13%	Sindh (340 per km^2)	140	2.92
Sri Lanka	21.41	341	Doctor 9.5 Nurse 21.15	96.3%	Welisara Navy Camp cluster	369	5.24

Socio-economic impacts on South Asia

Social distancing, lockdown, school closure, and restriction in many other social gatherings have a profound impact on the social and economic life of the mass population of this region. The income of almost all people in this region is badly affected. The lockdown situation and border closure in this region create a more negative impact on their vulnerable economy, tourism, export-import business, local and international trading, etc.

The economy of Bangladesh largely depends upon the ready-made garments (RMG) sector, agriculture, and foreign remittance. Many orders of the garment industry are canceled due to COVID-19. An influx of foreign remittances is also declined due to unemployment worldwide. The situation also affects thousands of entrepreneurs (leveled from small to large) in Bangladesh. The tourist spots, restaurants everything is closed and resulted in many people having no income for a longer period. To tackle this Bangladesh Government declared incentives of an 8.5-billion-dollar package (Islam and Divadkar, 2020).

Due to COVID-19 pandemic, other South Asian countries are also exposed to economic stress. To tackle such immediate condition, some government issued multiple incentive packages for the people of low income and no income. The government was also given cash incentives to the people to support their life amid COVID-19. The Indian government also declared an insurance policy for healthcare workers. India's tourism sector has also come under immense threat along with other sustainable businesses (Kumar *et al.*, 2020).

The tourism sector of some small countries like Bhutan, Nepal, and the Maldives are struggling from the beginning of this pandemic due to the disconnection with the outside world (MOH, 2020; LeVine *et al.*, 2020; MOHP, 2020). However, the government has taken several steps to mitigate the impact of COVID-19 on the economy. By considering the economic impact of reduced tourism revenues the state-owned Bank of Maldives (BML) will provide working capital for its tourist industry (Xinhuanet, 2020).

The COVID-19 outbreak has brought the SAARC nations together to fight against the pandemic situation. Indian Prime Minister invited the member countries to a video conference on 15th March and proposed to set up an emergency fund that can be used by any member countries. As a part of the fund, India has spent $1.7 million to send medical resources to the SAARC member countries except for Pakistan, whereas Bangladesh has also supplied medical and food resources to the Maldives and Bhutan. To date, India had contributed the

US $10 million to the 'SAARC COVID-19 Emergency Fund'. Also, Sri Lanka had donated the US $3 million to the fund followed by Pakistan with the US $3 million, Bangladesh US

$1.5 million, Afghanistan and Nepal with the US $1 million each, the Maldives US $0.2 million, and Bhutan US $0.1 million donated to the fund (SAARC, Disaster Management Centre, 2020; The Daily Star, 2020b).

The number of cases and death of COVID-19 outbreak

Around South Asia, new COVID-19 infections and deaths are increasing continuously. In total 8,561,719 confirmed cases including 130,636 deaths were recorded in the countries of South Asia till the 20th of October. India among the eight countries had the highest number of positive cases of 7,649,158 as well as the highest death cases of 115,950; followed by Pakistan with 324,077 cases and Bangladesh with 391,586 cases whereas Bhutan has the lowest number of positive cases of 330 followed by Sri Lanka with 5,811 cases (Figure 1). Besides, no deaths were recorded until now in Bhutan as well (Table 2). Thus, the tiny Himalayan nation Bhutan has the most successful story with zero COVID-19

related death. Among the other South Asian countries, Sri Lanka and the Maldives have a very lower percentage of deaths among confirmed coronavirus patients which are 0.22% and 0.33% respectively. An effective nation-wide effort of quarantine, contact tracing, and mobility restriction in these regions might play a vital role to restrict the COVID-19 cases and overall COVID-19 related deaths. So far, the highest mortality rate was found in Afghanistan that is 3.71% (Table 2). All other South Asians still maintain a lower mortality rate of less than 2%. Despite the ramshackle health infrastructure and dense populations of South Asia, the total number of cases and the percentage of deaths among confirmed coronavirus patients are still lower (Table 1, 2). The incomplete or inaccurate data from public health and lack of testing might be the possible cause of the discrepancy in how COVID-19 is affecting populations of South Asia. Again, South Asia performed a low number of testing regarding total tests per

million populations for COVID-19. (Table 2) (WHO, 2020; Worldometer, 2020). Moreover, there are social stigma and fear from the beginning among the South Asian people that they do not want to bring the patient to the hospital and trying to hide the COVID-19 symptoms. Another possible cause of lower mortality ratse might be due to better immune characteristics of the South Asian population for their exposure to many chronic infections such as tuberculosis, dengue, hepatitis, etc. The relatively higher younger population demographics of South Asia also an important factor for lower mortality rates, whereas many deaths in developed countries happened in elderly people living in nursing homes (Leung, 2020).

Table-2. Overall Scenario of COVID-19 in South Asia. The data were collected from WHO and Worldometer: Last Updated: 20/10/2020 at 11.59PM (GMT +6)

Countries	Total Cases	Total Deaths	Mortality rate (%)	Total Recovered	Active Cases	Total Tests	Tests per Million Population
Afghanistan	40,357	1,499	3.71	33,790	5,068	118,045	3,012
Bangladesh	391,586	5,699	1.45	307,141	78,746	2,192,325	13,272
Bhutan	330	0	0	301	29	160,089	206,784
India	7,649,158	115,950	1.51	6,792,550	740,658	96,116,771	69,442
Maldives	11,271	37	0.33	10,234	1,000	150,743	277,407
Nepal	139,129	765	0.55	96,609	41,755	1,314,779	44,882
Pakistan	324,077	6,673	2.06	308,020	9,384	4,122,069	18,553
Sri Lanka	5,811	13	0.22	3,457	2,341	383,961	17,908

Comparison of COVID-19 Pandemic Pattern among South Asia, Europe, and North America

Comparing the first sixty to seventy days of data of South Asian and European countries, it was evident that the infection and fatality rate in South Asia is significantly lower than in Europe and America. For such instances, the first reason highly accountable is timely lockdown implementation in South Asian countries. Early lockdown resulted in much lower infection or community transmission compared to the countries where fatality just expedited too quickly. For example, Italy, Spain, and America implemented lockdown after the massive community transmission in those countries. This resulted in the greatest influx of COVID-19 patients at once in those countries. Besides, the death toll was high as Italy, Spain, UK, and the USA have many elderly populations. Also, some health complications like cardiovascular disease, diabetes are very frequent in those countries comparing to South Asian countries which made COVID-19 more severe.

However, more cases were detected in those regions as they conducted more tests compared to countries of South Asia where limited numbers of a few hundred to thousand tests were conducted per million populations (Table 2, Figure 3). Maldives and Bhutan did an exceptional job so do Sri Lanka in contact tracing. However, Bangladesh, India, and Pakistan failed to contain the situation as they need to waive lockdown to reduce the economic burden. Opening of industries and crowding in local shops resulted in a cluster of transmission. Also, the health sector of the European and North American continents is far better than South Asia, that is why the recovery rate is higher there comparing to South Asia. Besides, six countries except for Pakistan and Nepal were marked in Level-3 according to WHO's measures of the preparedness and risk assessments for combating COVID-19. Pakistan and Nepal were put in Level-2 in case of preparedness and risk assessments (WHO, 2020c).

	South Asia	Europe	North America
■ **Active Cases**	878981	3812061	3076610
■ **Recovered**	7552102	3266032	6796747
■ **Deaths**	130636	242057	336567
■ **Total Cases**	8561719	7320150	10209924
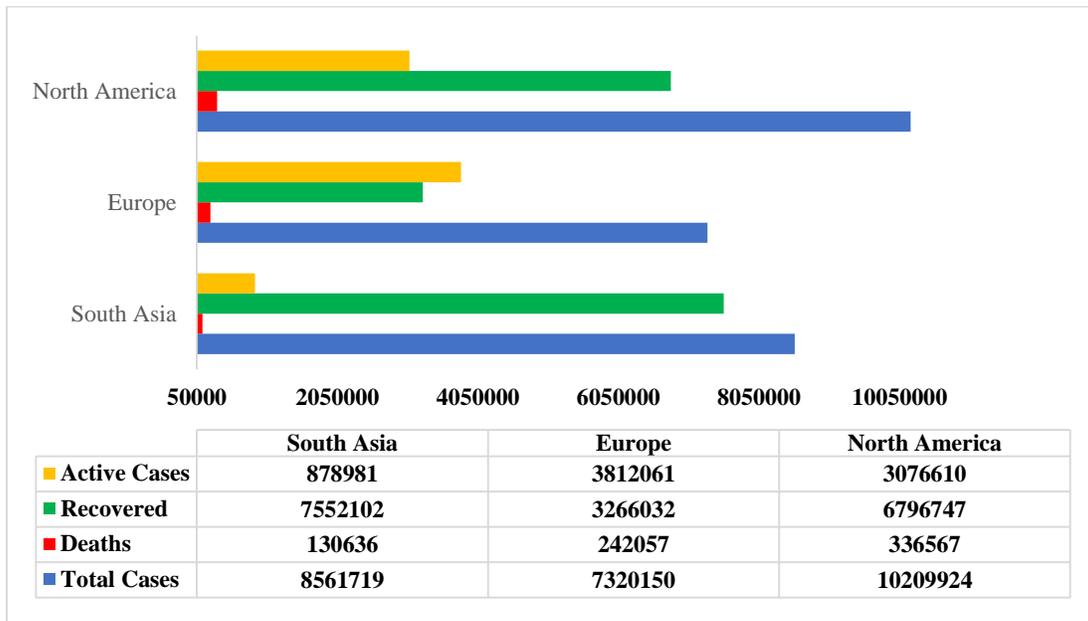
Figure-2. Comparison of overall COVID-19 scenarios among South Asian, European, and North American Countries. The data were collected from WHO, Worldometer. Last Updated: 20/10/2020 at 11.59PM (GMT +6).

South Asia has a minimum number of total cases compared to Europe, and North America. Europe, and North America accumulating more than 17.5 million cases whereas in South Asia total of 8.5 million cases were recorded to date (Figure 2). In reflection of this, the number of deaths also recorded much lower than in Europe and North America. However, Total tests conducted in South Asian nations were much lower compared to European and North American continents (Figure 3). Testing does have a linear correlation with the number of patients detected and died with COVID-19. The Maldives and Bhutan among South Asian continents made an exception with a higher number of tests per million. Temperature and humidity might also be a factor for the fluctuation of the number of cases in South Asia compared to Europe and America. Although, the measures are taken by the South Asian administrations and the early lockdown reflected in their result despite the limited number of tests (WHO, 2020; Worldometer, 2020).
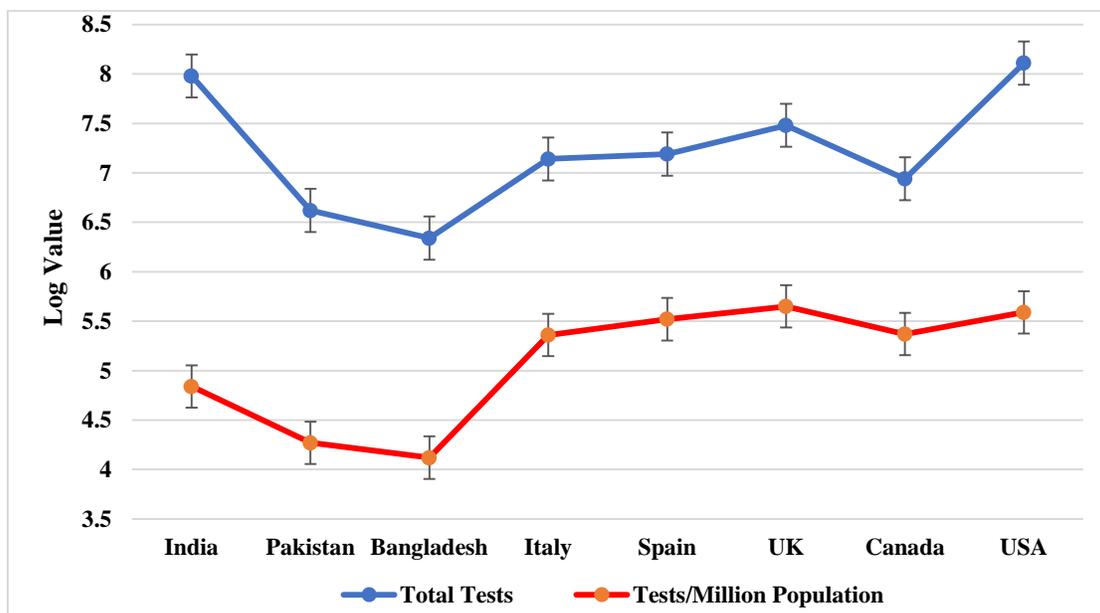
Figure-3. Comparison of the number of tests conducted by some countries of South Asia, Europe, and North America

Role of Herd Immunity

Herd Immunity is a strategy to stop or slow down the outbreak of an infectious disease that occurs in a population when a major portion of the population becomes immune to that disease. As the large portion becomes immune, the chances of transmission of that disease to non-immune individuals get low, thus stopping a pandemic situation (Fine *et al.*, 2011). Considering the massive impacts on the economy due to the outbreak, the countries have no choice than lifting the lockdown and start functioning almost normally like before and wait for the people to become resistant to the virus by themselves. Although it has to be known that herd immunity is achieved by protecting people from a virus, not by exposing them to it.

Some countries have already started following the herd immunity strategy and others are making plans to implement this. This strategy has raised some obvious concerns too as about 70% population of the country needs to get infected with the virus to acquire herd immunity. One of the main concerns is that it may cause a huge number of death tolls in the process of acquiring immunity. It may also cause a massive spread in the community and considering the current condition of medical facilities of almost all the member nations, they may not be able to tackle this emergency leading to a high spike in death tolls. For instance, Sweden is one of the leading countries that are following herd immunity and they are facing a spike in both the death and positive cases, raising questions about their strategy (Orlowski *et al.*, 2020). The healthcare facilities, social and financial conditions are better in Sweden than in these nations of South Asia, which is also a serious matter to concern before considering the herd immunity strategy (UNDP, 2019). The immunity declines over time for some other coronaviruses such as the common cold, SARS-CoV-1, and Middle East Respiratory Syndrome (MERS). While people infected with the SARS-CoV-2 virus develop antibodies and immunity, we do not yet know how long it lasts. Thus, there is still a lot of uncertainty to control this new pandemic.

Saving lives through strengthening public health measures

There are no alternatives except for ensuring social distancing to fight the COVID-19 pandemic. However, to reduce the economic burden the Officials have no choice rather than waiving the lockdown and going back to normal life. As countries of South Asia likely to open and withdraw lockdown, they have to ensure proper health measures and regulations. For example, to maintain social distancing, the public transports were carrying 50% of passengers rather than to its full capacity. Hand hygiene and the use of masks, while people are outside of the home, must be made compulsory for everyone. Likewise, offices can resume with 30-50% of workers and can formulate roster duties to ensure proper social distancing. Markets can reopen only by dealing with a specific number of clients at a time while maintaining proper health safeties. For example,'Aarong' a popular brand in Bangladesh reopened with an online booking system to control the influx of customers(University of Oxford, 2020). The educational institution should remain close for an extended period to avoid more aggressive transmission. Area-specific lockdown measures can implement if any clusters form in a certain area.

Intercity travel should be kept minimum to reduce the chances of transmission. However, passengers coming from abroad must be kept in quarantine for at least 14 days. Adapting to a new lifestyle is the only way of slowing down the spread of the virus. However, these measures can have a profound undesirable effect on individuals, communities, and societies. An Individual's social and economic life might be in danger and to a near stop. Such measures disproportionately affect disadvantaged groups of the South Asian region, including people in poverty, living in slums, migrants, internally displaced people, and refugees, who most often live in overpopulated and under-resourced situations, and depend on daily labor for survival.

However, each country should focus on more testing and also strengthening the healthcare system while reopening everything. Quarantine periods can be extended from 14 days to 21 days like Bhutan to reduce the probability of infection for suspected cases even after 14 days of WHO guidelines. Plasma therapy (a therapy where blood plasma from recovered COVID-19 patients is provided to infected ones) can be introduced to treat the infected COVID-19 patients. Antibody-dependent Rapid Test kits can be used as a post-treatment measure for the patients until the vaccine arrives. So far, Remdesivir, an antiviral drug showed excellent results for the treatment of COVID-19 (Beigel *et al.*, 2020). Many vaccines are now in the stage of clinical trials. Likewise, the vaccine ChAdOx1 nCoV-19 developed by the scientist from Oxford University is the most discussed and assume to be effective to boost the immune system. Lastly, the healthcare sector should be improved and well equipped to reduce the fatality rate of COVID-19.

Second wave of Transmission and Future Projection

The pandemic is not going to spread or end in the same way and same time in different place of the world. As the countries across the world including the South Asia region are considering withdrawal of lockdown, they might face the second wave of transmission. Evidence from Europe suggests that waiving of lockdown will result in the resurge of the virus. Meanwhile, countries of South Asia are highly dense, and they are already facing complications for voids in the health system. A second wave will deadly in terms of India, Pakistan, and Bangladesh as there are no adequate measures to tackle such a high rate of infection. Besides, the health system is incapable of treating a massive number of patients each day. But a second wave is on the card as regular life is going to be resumed soon. However, proper planning and appropriate operational module might help to reduce the chances of hitting by the second wave. The lesson from this pandemic also provides an opportunity for meaningful changes in the medical system of South Asia. WHO already warned the world about the deadly consequences of the second wave of COVID-19 transmission in the next winter if protective measures were not taken before (WHO, 2020). A single infected person might infect another four people during the second wave of transmission, which will make the situation even worse due to the compromised healthcare system. It will create more financial stress and people will have no earning sources. A second wave at this fall are threatening all over the world (Xu and Li, 2020) and a second wave together with "Dengue" will

make Bangladesh more vulnerable to combat COVID-19. Therefore a second wave of pandemic is going to create an imminent risk to society, with an immense toll in terms of human lives and a devastating economic impact. As the dry winter air improves the stability and transmission of respiratory viruses, there is likely to be an increase in transmission of COVID-19 in winter and infection will get worse. However it is now difficult to imagine about how and when the world get out of this COVID-19 pandemic. It seems that the COVID-19 is not play out soon, and the future will determined by a lot of unknowns, including whether publics develop long-lasting immunity to the virus and the availability of vaccine, whether the climate affects its spread, and maybe most importantly the decisions made by the governments and observe by the mass population. The future of COVID-19 spreading also depends on our social behavior and personal hygiene practice. If the immunity against COVID-19 is not long-lasting, there could be an annual surge of virus infection recurrently.

Conclusion

As we are still in the middle of the pandemic, countries should continue to share their experiences about proper treatment and prevention of COVID-19, protect vulnerable populations who are at risk, and suppress transmission to save lives. Moreover due to unknown nature of the virus, the developing countries of South Asia should plan and prepare more effectively for the worst-case situation. They should make some sustainable investment in public-health and health-system to improve the capacity of an effective find, test, trace, isolate, and support of all COVID-19 cases. An institution-based isolation monitored by proper authority could help to reduce the household and community transmission. A compulsory face coverings implemented by the government can significantly reduce the COVID-19 transmission from person-to-person. Instead of a nationwide lockdown, a regional survey systems should keep in place to closely monitor the local infection situation and implement necessary measures continuously. Due to dense population and overall poor healthcare sectors of South Asia, it is important for the government to educate and engage the mass population to participate in the pandemic response and facilitate the online based telemedicine and telehealth service to ensure proper care of all the members of the society. On the other hand, it will be scientifically very problematic and unethical to attempt to reach 'herd immunity' by exposing people to a virus in this overpopulated region. Unnecessary infections, suffering, and death will happen among people of any age or health status in this region, if adequate precaution and prevention were not taken now, and letting COVID-19 spread through populations with the misconception of achieving "herd immunity". WHO represents the data from seroprevalence studies, which suggests that less than 10% of the population has been infected globally, meaning that the vast majority of the world's population remains susceptible to this virus. The Delay of protective measures by the government and lack of cooperation from the people can also be responsible for the sudden increase of infected people in South Asia. Although a few countries are still likely to be successful to contain the infected cases to a lower number than the others, it will need more effort to maintain the situation in the upcoming days. Finally as the virus knows no borders and

the future of the virus is unknown, all the neighboring countries should have a clear and transparent strategy which could share each other to defeat the virus together.

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