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Covid19 in Bangladesh: Comparative Analysis of Infected Situation and Control Strategy

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Conflicts of Interest
There are no conflicts to declare.

ABSTRACT

An outbreak of a COVID-19 pandemic disease, caused by a novel coronavirus SARS-CoV-2, has posed a serious threat to global human health. Bangladesh has also come under the attack of this viral disease. Here, we aimed to describe the responses of Bangladesh to tackle the COVID-19, particularly on how Bangladesh is dealing with this novel viral disease with its limited resources. The first case of a COVID-19 patient was detected in Bangladesh on March 8, 2020. Since then, a total of 727,780 peoples are officially reported as COVID-19 infected with 10,588 deaths and Recovered: 628,111 until April 22, 2021. To combat the COVID-19, the government has taken various steps viz. diagnosis of the suspected cases, quarantine of doubted people and isolation of infected patients, local or regional lockdown, closure of all government and private offices, increase public awareness and enforce social distancing, etc. Moreover, to address the socio-economic situations, the government announced several financial stimulus packages of about USD 11.90 billion. However, the government got 3 months since the disease was first reported in China, but the country failed in making proper strategies including contact tracing, introducing antibody/antigen-based rapid detection kit, and also failed to make multi-disciplinary team to combat this disease. Further, limited testing facilities and inadequate treatment service along with public unawareness are the major challenges for Bangladesh to tackle this situation effectively. Along with the government, personal awareness and assistance of non-government organizations, private organizations, researchers, doctors, industrialists, and international organizations are

firmly required to mitigate this highly contagious disease. Covid-19 was first detected at Wuhan in China at the end of 2019 on 31st December 2019. On 11th March 2020 World Health Organization (WHO) declares SARS-CoV-2 as highly transmissible zoonotic disease and advised every country to take it seriously. The first case of COVID-19 in Bangladesh was detected on 8th March 2020. Gradually, due to community transmission, the government of Bangladesh announced a nationwide lockdown. After few months of lockdown when the case of COVID-19 started to fall the government withdrawn the lockdown and people started to go back to their normal life. But in the winter season of Bangladesh people usually get infected by a different influenza-like virus. In winter season the problem related to the respiratory system normally increases in Bangladesh. So, this tendency can give a spike to COVID-19 infection again. So, researchers are anticipating that the COVID-19 infected case will rise significantly than the first time in this winter that may cause another wave of COVID-19 infection that may cause a nationwide lockdown again.

Keywords: COVID19, SARS-COV-2, BANGLADESH, PANDEMIC, CONTROL STRATEGY

1. Introduction

In Bangladesh, from 3 January 2020 to 3:57pm CEST, 20 April 2021, there have been 723,221 confirmed cases of COVID-19 with 10,497 deaths, reported to WHO. As of 10 April 2021, a total of 6,010,824 vaccine doses have been administered [1]. CDC in USA make Bangladesh level4, high level area for COVID situation [2].

The ongoing pandemic of coronavirus disease 19 (COVID19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has become a global concern since January 2020. As of July 10, 2020, more than 12418777 cases of COVID-19 have been reported in 213 countries and territories of the world, resulting in more than 558082 deaths, and more than 7244835 people have recovered.1 Bangladesh is also facing an overwhelming outbreak of COVID-19 where the first three identified cases of COVID19 were reported in this country on March 8, 2020.2 As of July 10, 2020, a total of 178443 COVID-19 cases have been reported in this country [3]. Infections stayed low till the end of March 2020, but it has been on a rapid surge since April 2020.2 In this short commentary, we describe the initiatives that Bangladesh has taken to respond to the current challenges of COVID-19, and suggest the possible strategies to resist the COVID-19 outbreaks in a less restricted and no shutdown situation.

The COVID-19 pandemic in Bangladesh is part of the worldwide pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus was confirmed to have spread to Bangladesh in March 2020. The first three known cases were reported on 8 March 2020 by the country's epidemiology institute, IEDCR. Since then, the pandemic has spread day by day over the whole nation and the number of affected people has been increasing.

In order to protect the population, the government declared "lockdown" throughout the nation from 23

March to 30 May and prepared some necessary steps to spread awareness to keep this syndrome away from them [4].

Infections remained low until the end of March but saw a steep rise in April [4]. In the week ending on 11 April, new cases in Bangladesh grew by 1,155 percent, the highest in Asia, ahead of Indonesia, with 186 percent [5]. On 6 May, cases were confirmed in all districts. Rangamati was the last district to report confirmed cases of COVID-19. On 13 June, the number of cases in Bangladesh exceeded the number of cases in China, the country where the outbreak began. Bangladesh reached two grim milestones of 160,000 cases and 2,000 deaths on 5 July and overtook France in terms of the number of cases two days later. The number of recoveries in the country exceeded the number of active cases on 12 July.

2. Materials and methods

The Secondary information have been utilized for the investigation, information has been gathered from the distributed sources like books, diaries, inquire about reports, online pursuit, diverse important laws and so forth. The deadly COVID-19 is a recent outbreak, thus there is lack of availability of scientific publications from which we can collect information reflecting the ultimate impacts. For this reason, we chose numerous materials published by different research agencies, media outlets, newspapers, and policy experts in order to retrieve details information. Along with these resources, internet was used accurately as another source of information. We searched writing the Search items SARS CoV2, COVID-19, Social Distancing‖, public awareness‖, Economical effects‖, Agricultural effects, Health Impact using several combinations and permutations. This study was organized based on themes such as effects of COVID-19 on common people, COVID-19 impacts on economic sector, COVID-19 impacts on agricultural sector as well as situation of healthcare system in this pandemic.

3. Results

3.1. Lack of research fund

The universities of Bangladesh have inadequate fund for molecular research, which is reflected on the lower amount of scientific papers published every year in the international open access scientific journals. Due to inadequate facilities including limited modern laboratory equipment's, Bangladeshi researchers could not work intensively on this important issue of COVID-19. It is important to note that the developed countries have been investing billions of dollars for research on COVID-19 and other infectious diseases, Bangladeshi researchers depend only on limited resources. Therefore, it is essential to allocate adequate funds from government and non-government sources to perform more research and study about the ongoing COVID-19 and other fatal diseases in Bangladesh.

3.2. Government Initiatives

The government of Bangladesh has taken different initiatives to contain the outbreak of COVID-19. In response to COVID-19, on March 16, 2020, the government declared the closure of all educational institutes (schools, colleges, and universities). To avoid mass gatherings in order to prevent the spread of coronavirus in the country, on March 19, 2020, the government prohibited political and religious rallies; social and cultural gatherings; and on March 21, 2020, canceled all state public programs and events, including the celebration of the Independence Day. All public and private offices remained closed from March 26, 2020, to May 30, 2020, except for emergency services; the government stopped public transportation and limited banking services also.5 On April 12, 2020, it was informed that all on-arrival visas remain suspended till the next notification, wherein the foreigners with valid visas arriving in Bangladesh from any coronavirus-affected country would be advised to remain under quarantine for two weeks after the arrival.

3.3. What are the Challenges?

At the very beginning of the outbreak, not enough tests were conducted in the country, which has a population of more than 160 million. Newspaper and social media continued to report about additional deaths of patients with COVID-19 symptoms. Some of the suspected were treated at COVID-19 isolation centers at different hospitals and others were denied treatment, though no tests were conducted to confirm the diagnosis. For a long time, testing was only conducted at the Institute of Epidemiology, Disease Control and Research (IEDCR) in the capital Dhaka, although patients with symptoms were reported all around the country. In Bangladesh, at the time of writing, only 77 laboratories are conducting tests for COVID-19.7 The current test rate in Bangladesh is only 5593/1 000 000 population, which is the lowest among the South Asian countries except for Afghanistan (2027/1000000) and Sri Lanka (5359/1000 000). As of July 10, 2020, 921272 tests have been conducted all over the country with a high percentage of positive test results2 (Table 1). At the time of writing this article, the country had 14945 beds for COVID19 patients with only 394 intensive care unit beds in COVID-19 dedicated hospitals [7]. There were 11766 oxygen cylinders, 140 high-follow nasal cannula, and 99 oxygen concentrators in COVID-19 dedicated hospitals in Bangladesh, which is low in number in comparison to the number of infected persons.

3.4. Tests capacity of Bangladesh

As there is no effective treatment against COVID-19, this is very important to follow test, trace and treatment policies to tackle this highly contagious disease. It is crucial to diagnose the disease at the earliest stage so that immediate contact tracing, isolation of the patient and quarantine of the person(s), who have the possibility to come in contact with the patient, could be ensured. Less than ten thousand daily test capacity is very low in a country of 170 million of population. Until August 11, 2020, Bangladesh has tested only 7,812 samples per million people whereas Russia has tested 212,414 samples (Figure 1A). Thus, it is believed that most of the people having COVID-19 were left undetected due to the lower number of tests. But after increasing

the number of tests, the number of positive cases is growing high very rapidly in Bangladesh. An extremely limited number of tests is increasing the chances of leaving a higher number of COVID-19 cases undetected in Bangladesh. It is highly recommended to increase the number of tests for suspected and asymptomatic people as soon as possible. Besides this, all identified and suspected cases must be quarantined and treatment should be provided if needed. The government must need to include all research institutes, universities, and other organizations that have the laboratory facility to increase the number of tests for diagnosing COVID-19. Rapid test protocol is yet to be used in Bangladesh for diagnostic purpose of COVID-19. Thus, Bangladesh urgently needs to introduce effective rapid tests such as antigen/antibody-based test protocols to satisfy the skyrocketing demand not only for diagnosis of COVID-19 but also for sero prevalence study to tackle this socially spread fatal disease in a sustainable manner. To tackle this situation, convenient, effective, and specific rapid test methods should be urgently introduced.

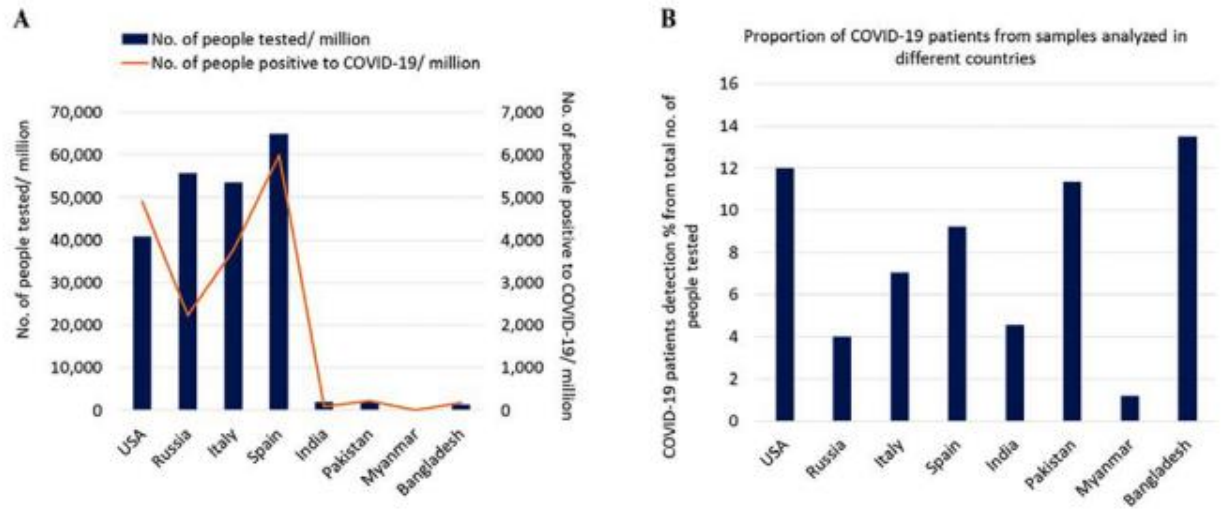

Figure 1. A) Trends in diagnosis of COVID-19 positive cases with number of people tested. Until August 11, 2020, Bangladesh has completed 7,812 tests per million people with 1,598 positive cases per million people. On the other hand, USA, Russia, Italy, Spain and Pakistan has completed large number of test and got increased number of positive cases. The data show that possibility for detection of positive cases is increased when more people are tested for COVID-19. B) The proportion of COVID-19 positive patients detected from total number of people tested in different countries including Bangladesh. The results show that the detection rate of COVID-19 positive cases is the second highest in Bangladesh.

3.5. Analysis of recovery and death rate of covid-19 infected rate in Bangladesh

On March 8, 2020, three cases of pandemic COVID-19 were confirmed by the Institute of Epidemiology, Disease Control and Research (IEDCR) for the first time in Bangladesh. 12 Till August 11, 2020, a total of 263,503 COVID-19 patients were officially reported with 3,471 deaths in Bangladesh. 8,13 COVID-19 patients were found in all 64 districts of the country; however, Dhaka, Narayanganj, Gazipur and Chattogram have been mostly affected (Figure 1) [13]. Dhaka is the capital city of Bangladesh, and one of the fastest growing cities of the world. It supports more than 15 million people in less than 325 square kilometres of area that makes it one of the most densely populated megacities [14]. Moreover, most of the industries

of the country such as textiles, tanneries, fertilizer plants, pharmaceuticals companies, cement factories, pulp and paper industries, and most of the government and non-government offices are located in these major cities, which might be one of the possible reasons for higher prevalence of this disease in these areas. The number of tests per day by real-time RT-PCR is still very low compared to the demand. Possibility for detection of positive cases will be increased when more people will be tested for COVID-19. The lower number of positive cases and deaths might be attributed to the lower test of samples in comparison to other developed countries (Figure 2A). These results indicate that a large number of infected patients are remained undetected, which hand, only 27.2% people aged between 19 to 50 years have been infected with COVID-19 in Italy. In the USA, COVID-19 infected people, aged over 50 years old, accounted for 50.63% [16]. The reason(s) why young and working people have been mostly affected by COVID-19 in Bangladesh is not known. However, young people may be little bit careless regarding COVID-19 and working-age people need to go outside to work for maintaining their daily life, which might contribute for getting infection in those people.

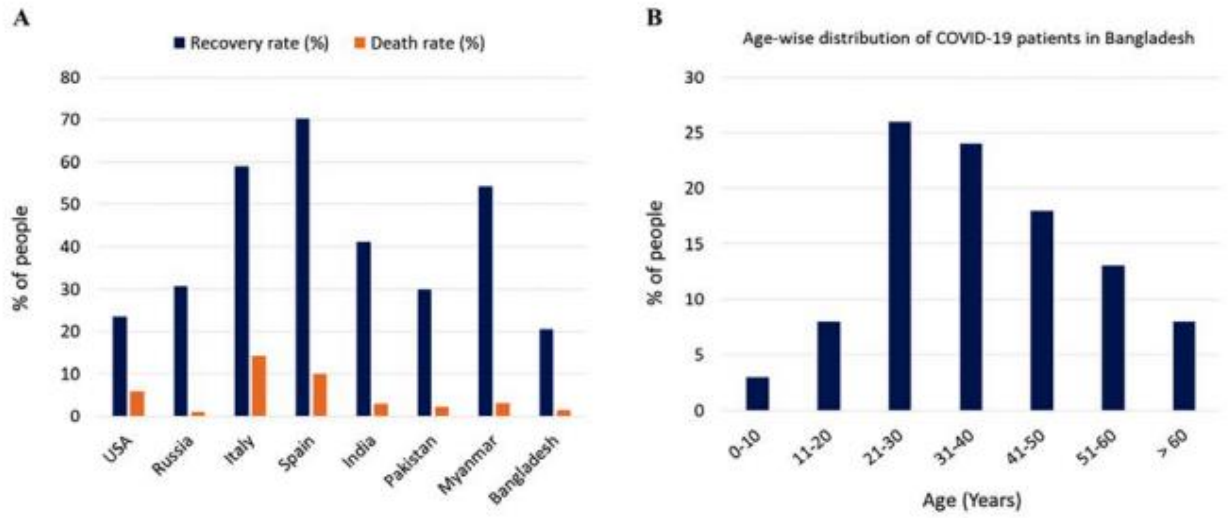

Figure 2. A) The recovery and death rate of COVID-19 patients in some selected countries including Bangladesh. The result reveals that the recovery rate in Bangladesh is lower than that compared to other countries, even though death rate is very low. B) Age-wise distribution of COVID-19 patients in Bangladesh. The result shows that people aged between 21-50 years are likely to have COVID-19 infection under Bangladesh situation.

3.6. Covid-19 vaccination: Bangladesh ranks

Covid-19 vaccination: Bangladesh ranks 17th globally, 2nd in South Asia. The country has vaccinated a total of 2,673,038 people till now. Despite being a developing country, Bangladesh has managed to secure the 17th position in the list of countries with the most number of people vaccinated for Covid-19.The country achieved the feat in under a month as the nationwide inoculation program was launched on February 7 while countries like the UK, the first country to launch the Covid-19 vaccination program in the world, began in early December.

The comparison was made through using data provided by Our World in Data and the Directorate General of Health Services (DGHS). According to the DGHS, Bangladesh had administered 2.67 million vaccine doses

till Wednesday while some 216,167,273 doses of vaccines have been administered globally. According to global media, 95 countries in the world are administering the vaccine currently, with at least 15 countries having begun administering a second dose of the vaccine. Data show that Bangladesh is ahead of countries like Australia, Singapore, Japan, South Korea and Canada in terms of the number of people vaccinated.

Statistics from Our World in Data also showed that the US was leading the way, having administered 65 million doses of the vaccine till 7pm on Wednesday. China holds the second position with inoculating over 40 million vaccines to its people, followed by the UK administering 18 million vaccines nationwide.

Among the top five countries, India, the only country from South Asia, and Israel have the highest percentage (88%) of vaccines in terms of population and total vaccines administered. Bangladesh could outstrip Morocco within a couple of days as it has been administering vaccines to 225,000 people on average in the last seven days. The figure for Morocco is 100,000 a day, according to a Moroccan daily.

3.7. Current Situation of infected rate in Bangladesh compared to south Asian countries

Some of India's neighbors are also experiencing an increase in infections. After going through a second wave in October, Pakistan is witnessing a third surge with infections picking up sharply throughout March. It has imposed new restrictions in areas with rising cases, making masks mandatory and limiting public gatherings.

Table1: Comparison of COVID-19 Cases in South Asian Countries[a]**.**

Country	Total cases	Total deaths	Total recovered	Total tests	Tests/1 million population
India	822 603	22 144	516 206	11 024 491	7987
Pakistan	243 599	5058	149 092	1 514 858	6855
Bangladesh	178 443	2275	86 406	921 272	5593
Afghanistan	34 194	971	20 882	78 959	2027
Nepal	16 649	35	8011	588 353	20 185
Maldives	2617	13	2238	59 981	110 923
Sri Lanka	2454	11	1980	114 765	5359
Bhutan	80	—	55	26 559	34 424

Abbreviation: COVID-19, coronavirus disease-19.

[a]Data from the dashboard of the Worldometer for COVID-19.

After watering down plans for a lockdown in early April, the Bangladesh government now says there will be a full lockdown for a week from 14 April.

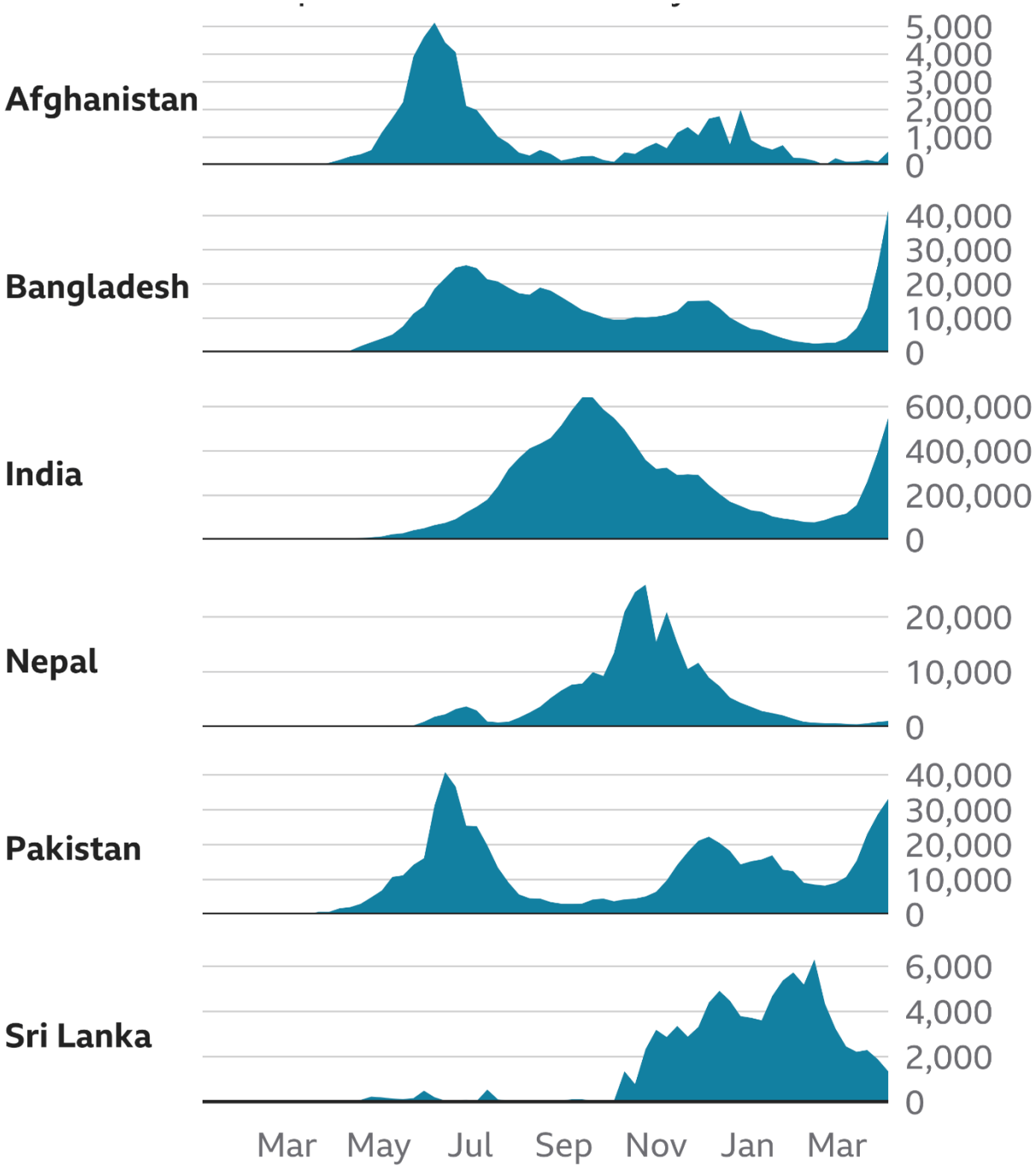

Figure 3: Shape of pandemic in south Asia. Number of cases per week. Each country on its on scale. Source: ECDC. Data up to 4 April, 2021.BBC.

3.8. Overview of the Covid-19 shocks in Bangladesh

Bangladesh reported its first covid-19 case on 08th March 2020, it reached 100 cases on 9th April 2020 [1]. As per Bangladesh covid-19 situation we have summarized it as three scenarios. "Scenario-1" indicates the time range from 8th March to 15th April 2020. "Scenario-2" indicates the time range from 15th April to 30th May 2020. "Scenario-3" indicates the time range from 1st June to 30th June 2020.

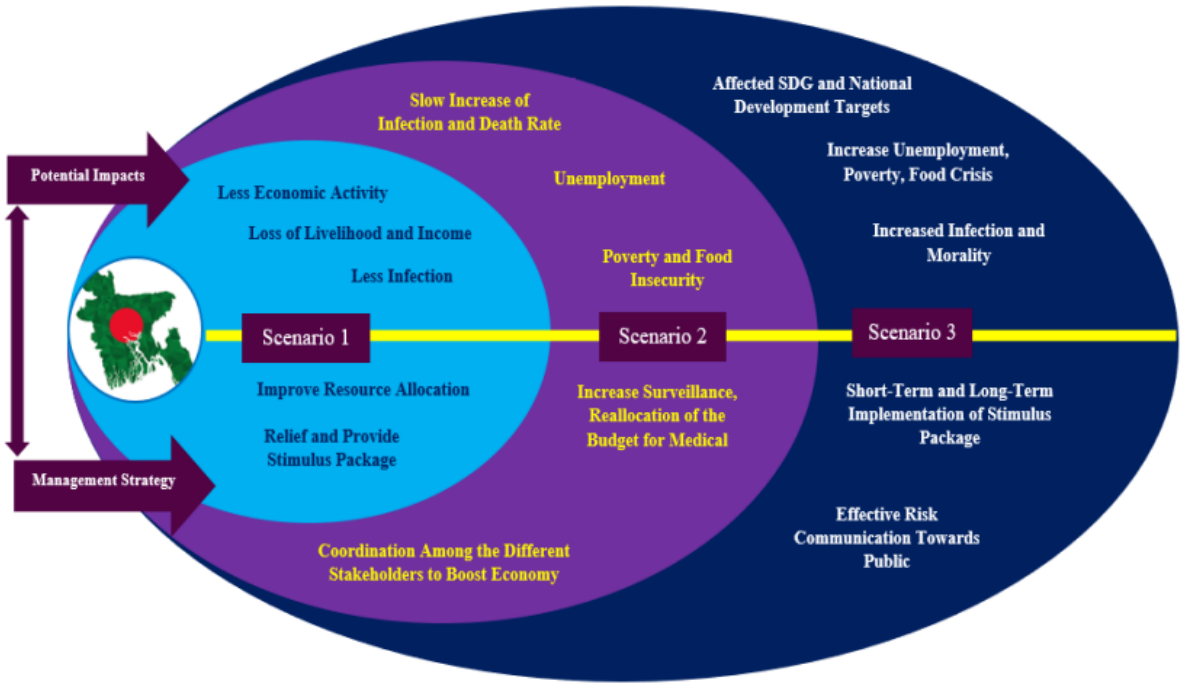

Figure 4: Graphical Representation of COVID 19 Shocks in Bangladesh

4. Discussion

New strains of coronavirus are emerging every few months. In various reports, we have seen that these new variants are more powerful than the previous ones. Since the testing rate is very low in Bangladesh, it will take a long time to reach the peak of the epidemic curve of COVID-19 cases. In these circumstances, we recommend following strategic actions to resist the growing trend of COVID-19:

(1) testing capacity should be increased immediately by establishing more testing centers in all district levels to cover all the suspected population including marginalized population of the country;

(2) contact tracing should be performed to identify the suspected people in the community level;

(3) ensure organizational accessibility, that is, garments, industries, and so on to conduct the tests for their employees

(4) use risk stratification methods and identify high-risk individuals, that is, older aged people, patients with comorbidities, immune-compromised people, and special attention should be given to them;

(5) containment measures including lockdown should be applied strictly based on the specific risk zone;

(6) health facilities and their capacity should be increased with establishing more isolation centers and also by providing care in all tertiary-level public and private hospitals of the country;

(7) more health care personnel should be recruited to tackle the upcoming situation;

(8) ensure all the preventive measures at all settings;

(9) use advanced technology, that is, developing mobile apps to provide information to the people regarding COVID-19, to inform about the location of suspected COVID-19 positive cases, to provide information when to conduct a test, and when to seek medical treatment;

(10) government should conduct integrated community and seroepidemiologic surveys combined with modeling and multiplier approaches to assess the current status of the pandemic in the community, because

a large number of COVID-19 patients are asymptomatic and an expressive number of persons are not being included in the tests where some are reluctant to be tested and some are not getting the opportunity.

This approach is essential to estimate the incidence and prevalence of COVID-19 at the community, to identify the proportion of the community with protective immunity (herd immunity), to plan ongoing and future interventions, and to inform decision-making for gradually returning to normal activities within communities.

An intense and sustained vaccination campaign can play a pivotal role in Bangladesh's future economic benefits up to more than 10 percent of its current GDP, according to a new report of the World Bank. The country's gross domestic product (GDP) is projected to be $284.4 billion this year, but the cumulative future GDP gains because of the vaccination will be from 3.6 percent to 10.8 percent of the forecast GDP, it said. The global lender in the report, however, identified some challenges in terms of ensuring a sustained vaccination programme. "Vaccines are cost effective, yet it is not easy to finance them due to the strict limits on domestic resource mobilisation in South Asia," it said. Besides, there remains other challenges with regard to health facility access, and the limited number of nurses and doctors relative to the population. The report said the number of health professionals in South Asia is small relative to the population, and access to services is sharply limited.

This pandemic-a global calamity, is not only a health concern, it is a threat to life and livelihoods worldwide. In addition to health, major disruptions are also occurred in business, education, transport and other areas. It causes interruption in every aspect of day-to-day life. For better response, well-coordinated and cooperated global efforts, including exchange of information, scientific knowledge, research findings, expertise and best practices are important. All countries should implement WHO guidelines and recommendations.

In Bangladesh, the Ministry of Health and Family Welfare alone cannot mitigate this pandemic. Strengthening of the coordinated efforts among the ministries, and effective and timely engagement of the non-government and private sectors are strongly recommended. Intensification of RT-PCR lab tests for case detection, and isolation and management of cases, and to trace the contacts and ensure quarantine, surveillance, and research, serological tests to detect SARS-CoV-2 specific immunoglobulins (IgG and IgM) to estimate the population exposure, strengthening public awareness and risk communication, strict implementation of personal hygiene, use of face mask, social distancing and other measures are thus suggested to prevent and control COVID-19 in Bangladesh.

Our results reveal that regional lockdown and social awareness (e.g., wearing a face mask, washing hands, social distancing) can reduce the pandemic of the current outbreak of novel coronavirus in a most densely populated country like Bangladesh.

5. Conclusion

A combination of comprehensive and integrated measures may help resist the growing trend of COVID-19 in a less restricted and non-shutdown situation in Bangladesh when the government is trying to sustain the economy of the country. The COVID-19 poses a serious health and economic problem in a resource-poor highly

dense populated country, Bangladesh. The government of Bangladesh has taken many initiatives such as diagnosis of suspected cases, quarantine of doubted people and isolation of infected patients, local or regional lockdown, increasing public awareness and social distancing to combat the COVID-19. Furthermore, the government has announced many financial stimulus packages for industries, agricultural production, and daily workers. However, lack of facilities for testing required number of suspected samples, scarcity of diagnostic kits, insufficient PPE, ICU, and ventilators in the hospitals, limited number of health workers along with public unawareness are the major challenges for this developing nation for combating the COVID-19. Therefore, the government should take the necessary actions to address these challenges and ensure public health. At the same time, the government also needs to use rapid detection kit for diagnostic purpose and import PPE, ventilators, and ICU beds on an urgent basis to fight against lethal COVID-19. Furthermore, the government should order mandatory lockdown in vulnerable places. The government also needs to allocate sufficient research funds to conduct research on COVID-19. Moreover, it is needed to circulate the news and instruction continuously regarding COVID-19.

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