NOVEL CORONAVIRUS DISEASE (COVID-19): PANDEMIC SITUATION IN BANGLADESH

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Abstract

The study was carried out from 8 March to 19 June 2020 to observe the status of Bangladesh towards rampant COVID-19. The aim of this study was compared the present situation of active cases, death and recovery of people against COVID-19 of Bangladesh and different geological located countries like the United States, Canada, Mexico, Italy, Spain, France, Germany, United Kingdom, Russia, India, Pakistan, South Korea, Turkey, Saudi Arabia, Qatar and Bangladesh in the world. The data of this research was collected from the Institute of Epidemiology, Disease Control and Research (IEDCR), Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare (MoHFW), different newspapers and online news portals. Up to 19 June, total tests, infection, recovered and died were 550567, 100703, 26005 and 1355 in Bangladesh. The positive correlation found between infestation with recovered and death by people 2020 (R^2= 0.4804 and 0.3159; 0.7242 and 0.4902; 0.4432 and 0.3449, $p<0.05$) in April to June. The total infestation, recovery, and death were less than the selective countries of the world. Daily mortality percentage rate was less than 1% where the month-wise mortality rate was 12.24488, 2.0678, 1.3073, and 1.2658 % in March, April, May, and 19 June 2020; respectively in Bangladesh. The morality rate of Bangladesh was lower than the other selective countries of different geological locations. Month wise recovered rate was 51.0204, 1.6834, 21.3574, and 31.5782 % in March, April, May, and 19 June 2020; respectively in Bangladesh. We should have a good practice of protective awareness, and the government should take originating the training and supervision of rural and town trainees for minimizing COVID-19 infestation in Bangladesh.

Keywords: Bangladesh, COVID-19, Infection rate, Recovered rate, Death rate

I. Introduction

The novel coronavirus is called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which was known as COVID-19. It was identified in Wuhan, China in December 2019 [1, 2,3,4]. On 7 January 2020, the Chinese Center for Disease Control, and Prevention identified a new coronavirus from a throat swab sample of a patient. The World Health Organization[5] declared the name of this novel coronavirus as 2019-nCoV [6], and has spread worldwide since then, causing epidemic threat for the world, also in Bangladesh [7, 8]. The novel coronavirus was a new strain which is caused by SARS-CoV-2. It belongs to the family of coronaviridae subgenus Sarbecovirus, genus Betacoronavirus, and order Noroviruses [9]. It is a gram-positive RNA virus genome ranging from 26 to 32 kb in length, crown-shape people with 80-160 nM in size, and next-generation sequencing, and phylogenetic examination of the genome exposed COVID-19 [9]. It

was very much identical (88%) to two bat-derived SARS-like coronaviruses, and more distant from SARS-CoV (79%), and MERS-CoV (50%) [10, 11].

In the beginning, diagnostic tests were conducted by IEDCR only; however, since last month 59 diagnostic facilities were opened countrywide and thus the infection cases increased. Since then, tests, infection rate, recovery, and death is gradually increasing, and to the date June 19 it has reached (550567, 100703, 26005, and 1355), respectively in Bangladesh. The COVID-19 was pandemic in December 2019. Bangladesh got a long preparatory time to get prepared as the first confirmed. Three individuals were confirmed with COVID-19 on 8 March 2020 [12, 13, 14]. BRAC survey throughout the nation found that nearly 40% of the respondents had no idea about how to prevent getting infected[15]. Non-availability, inadequacy, and inefficiency of Personal Protective Equipment (PPEs) nCoV-19 infections in healthcare workers have been reported, and among the most (85.5%) were doctors. In the medical sector, there is also an inadequate training, and monitoring of PPE used. Beds and ventilators were other key factors to overcome this situation [16, 17].

The shutdown was first declared on March 26 [18, 19]. Partial lockdown and social distancing focused on controlling the virus for some times [20]. The government forbade movement after 6 pm, instructing everyone to stay at home, and stay safe [21]. In a lockdown, the government cancelled public programs including 50th Independence Day. There are 3 divisions, 50 districts, and 400 Upazila that were under lockdown in May 2020. The lockdown, however, resulted in various negative impacts especially in the sharp decline in the agricultural produce by the farmers [22, 23, 24]. They also faced many problems in harvesting the *boro* rice as the labor cost was high and the product price declined [24]. The Prime Minister of Bangladesh announced five financial packages, and a special agricultural package to overcome the economic losses caused by the lethal COVID-19. The financial packages are about USD 11.17 billion to tackle the COVID-19. The government has taken various steps to overcome the epidemic outbreak of it such as diagnosis of the alleged cases, quarantine of people, and isolation of infected patients, local or regional lockdown, granting general leave from workplaces, increased public awareness, enforcing social distancing, stopping public gatherings, and so on [26]. On 20 May 2020, COVID-19 has affected 216 countries around the world. On 23 July, total cases were 9,113,578, total recovery was 4,884,374, and total death was 471,856 in the world [7]. Considering the above fact, this study focuses on the present situation, and comparison of COVID-19 statistics with different countries like the United States, Canada, Mexico, Italy, Spain, France, Germany, United Kingdom, Russia, India, Pakistan, South Korea, Turkey, Saudi Arabia, Qatar and Bangladesh in the world.

II. Methods

***Study Period*:** COVID-19 was confirmed in Bangladesh on 8 March 2020 as stated by Dr. Nasima Sultana, Additional Director General of the DGHS. The collection of data periods was from 8 March to 19 June 2020.

***Data Retrieval*:** The data of COVID-19, for this study, since 19 June 2020 was extracted from official website information of IEDCR, DGHS, and MoHFW. The data from different local newspapers, and online news portals were reviewed [12, 27, 28]. This data analysis relates to information collected from 8 March to 19 June 2020 about the measures to handle the outbreak of the COVID-19 pandemic situation in Bangladesh.

***Equation*:** Percentage of infection rate, death, and recovery was observed in Bangladesh, and different countries during the study period. Infection rate, death, and recovered was calculated in percent using the following formula:

$$\text{Infestation } (\%) = \frac{\text{Infestation}}{\text{Total Infestation}} \text{x } 100$$

$$\text{Death } (\%) = \frac{\text{Death}}{\text{Total death}} \text{ x } 100$$

$$\text{Recovered } (\%) = \frac{\text{Recovered}}{\text{Total recovered}} \text{ x } 100$$

A comparative study among developing country and Bangladesh: We have selected different countries from different geographical locations like Europe [Italy, Spain, France, Germany, United Kingdom (UK), and Russia], North America [United States (USA), Canada, and Mexico, Latin America (Brazil), and Asia (India, Pakistan, South Korea, Turkey, Saudi Arabia, Qatar, and Bangladesh). This data was collected from Google, BBC news, and revised online news portals.

***Statistical Data Analysis*:** All the collected data were rechecked, coded, and entered into a database using Microsoft Excel 2016, and SPSS (IBM Version 22.0) software. The distributed data was used to determine the frequency with percentage, mean, total, and relationship data was calculated for all variables. Statistical significance was accepted at $p<0.05$.

III. Results

The present situation of coronavirus in Bangladesh since 19 June 2020

In Bangladesh, three individuals were confirmed with COVID-19 on 8 March 2020 [12,13]. Since then, tests, infection rate, and death was gradually increasing. From 8 March to 15 July 2020, the situation, and the percentage of infection rate recovered, and death was presented in Figure 1. In Bangladesh, total tests were 550567 whereas infection, recovery, and death was 100703, 26005, and 1355 respectively during the study period.

From March 2020, the total number of tests was 1482 whereas total recovery, and death was 49, 25, and 6; respectively. The percentage of the infected people, recovery, and the mortality rate was 3.3063, 51.0204, and 12.2449 respectively and was noted in March. Maximum, and minimum tests, infection rate, recovery, and death was found (264, and 7), (12, and 0), (6, and 0), and (1, and 0); respectively in Bangladesh.

From April 2020, the total number of tests was 101134 whereas total number recovered, and died 7544, 127, and 156; respectively. Percentage of the infection rate, recovery, and the mortality rate was 7.4594, 1.6834, and 2.0679 was noted in April. Maximum, and minimum tests, infection rate, recovery, and death were found (4968, and 147), (641, and 2), (16, and 0) and (15, and 0); respectively in Bangladesh.

From May 2020, the total number of tests was 203217 whereas total infection rate, recovery, and death 7593, 7417, and 454; respectively. Percentage of the infection rate, recovery, and the mortality rate was 16.3509, 22.3215, and 1.3663 respectively was noted in May. Maximum and minimum tests, infection rate, recovery, and death were found (11876 and 5368), (2545 and 552), (588 and 0) and (40 and 0); respectively in Bangladesh.

From June 2020, the total number of tests was 276616 whereas total infection rate, recovery, and death 58382, 18436, and 739; respectively. Percentage of the infection rate, recovery, and the mortality rate was 21.10579287, 31.57822617, and 1.265801103 was noted in June. Maximum and minimum tests, infection

rate, recovery, and death were found (16638 and 11439), (4008 and 2381), (2781 and 470), and (53 and 22); respectively in Bangladesh.

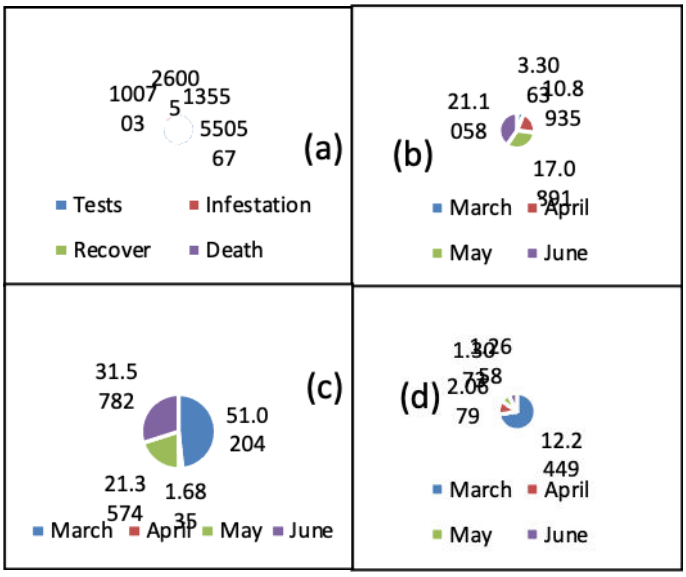

Figure 1. Novel coronavirus update since 19 June in Bangladesh

Note: (a). Total infestation, recovered and death, (b). Infestation (%), (c). Recover (%) and (d). Death (%)

Correlation between infected people with recovered and death people since 19 June 2020

A correlation study was done to establish the relationship between the infection of people with recovered and death of people by COVID-19 in Table 1 and Figure 2.

In March, a positive correlation was observed in recovered people and a negative relation found in death by COVID-19 in Bangladesh. It was evident that the equation y = 20.0725x + 0.1019; 0.0911x + 1.2277 gave a good fit to the data and the coefficient of determination R^2= 0.027, 0.27 fitted regression line had a significant regression coefficient. In April, a positive correlation was observed in recovered and dead people by COVID-19 in Bangladesh. It was evident that the equation y = 0.0153x + 0.6046; 01x + 2.9027 gave a good fit to the data and the coefficient of determination R^2= 0.4804, 0.3159 fitted regression line, had a significant regression coefficient.

Infection rate		Regression equation	% Role of individual factor	Significance	R^2 value
March	Recovered	y=0.0725x + 0.1019	02.70	p<0.05	0.0270
	Death	y =-0.0911x + 1.2277	27.00		0.2700
April	Recovered	y=0.0153x + 0.6046	48.04		0.4804
	Death	y=01x + 2.9027	31.59		0.3159
May	Recovered	y=0.0144x - 3.1639	72.42		0.7242
	Death	y=0.2001x + 10.111	49.02		0.4902
June	Recovered	y=1.0051x - 2118.1	44.32		0.4432
	Death	y=0.0087x + 12.278	39.49		0.3449

Table 1. The relationships between the infection of people of COVID-19 with recovered and death of people during the study period

In May, a positive correlation was observed in recovered and dead people by COVID-19 in Bangladesh. It was evident that the equation y = 0.0144x - 3.1639; 0.2001x + 10.111 gave a good fit to the data and the coefficient of determination R^2=

0.7242; 0.4902 fitted regression line had a significant regression coefficient. In June, a positive correlation was observed in recovered and dead people by COVID-19 in Bangladesh. It was evident that the equation y = 1.0051x - 2118.1; 0.0087x + 12.278 gave a good fit to the data and the coefficient of determination R^2= 00.4432; 0.3449 fitted regression line, had a significant regression coefficient.

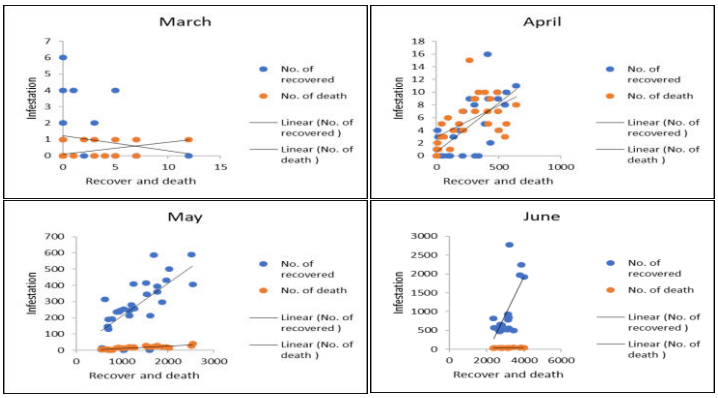

Figure 2. Relationship between infected people with recovery and death of people in Bangladesh

Compared study of the present situation among Bangladesh and different geological location of the world since 19 June 2020

***American countries*:** The COVID-19 pandemic on 19 January 2020 was identified as this disease in the place of Chicago, Illinois, USA. In the USA, total confirmed, recovered, and total death was found 2085769, 576334, and 115644 people, respectively since 19 June 2020. The recovered and death percentage was 27.6317 and 5.5444. The COVID-19 pandemic on 22 January 2020 was identified as this disease in the place of Toronto, Ontario, Canada. In Canada, total confirmed, recovered and death cases were found to be 99853, 62017, and 8254 people, respectively since 19 June 2020. The recovered and death percentage was 62.1083and 8.2662. The COVID-19 pandemic on 25 February 2020 was identified as this disease in the place of Sao Paulo, Brazil. In Brazil, the total confirmed, recovered, and dead were 955377, 463474, and 46510 people, respectively since 19 June 2020. The recovered and death percentage was 48.5122 and 4.8682 respectively. The COVID-19 pandemic on 28 February 2020 was identified in Mexico City and Los Mochis, Mexico. In Mexico, total confirmed, recovered and death cases was found 165455, 123095, and 19747 people, respectively since 19 June 2020. The recovered and death percentage was 74.3979 and 11.9350 (Figure 3 and 4).

***European countries*:** The COVID-19 pandemic on 24 January 2020 was identified in Bordeaux, France. In France, total confirmed, recovered and death cases was found 158174, 73667, and 29575 people, respectively, since 19 June 2020. The recovered and death percentage was 46.5734 and 18.6978 respectively. The COVID-19 pandemic on 27 January 2020 was identified in Munich, Bavaria, Germany. In Germany, total confirmed, recovered and death cases were found in 188382, 173100, and 8910 people, respectively, since 19 June 2020. The recovered and death percentage was 91.8878 and 4.7297. The COVID-19 pandemic on 31 January 2020 was identified in York, UK; Italy, and La Gomera, Canary Island, Spain, and Russia. In the UK, total confirmed, recovered, and death cases was found 300469, unknown, and 42288 people, respectively, 2020. The recovery and death percentage was unknown and 14.074 respectively. In Italy, total confirmed, recovered and death cases was found 237828, 179455, and 34448 people, respectively. The recovery and death percentage was 75.4558 and 14.4844. In Spain, total confirmed, recovery and death cases were found 241310, 150376, and 27135 people, respectively. The recovered and death percentage was 62.3165 and 11.2449. In Russia, total confirmed, recovered and death cases was found 569063, 324406, and 7841

people, respectively since 19 June 2020. The recovery and death percentage was 57.0070 and 1.3779 respectively (Figure 3 and 4).

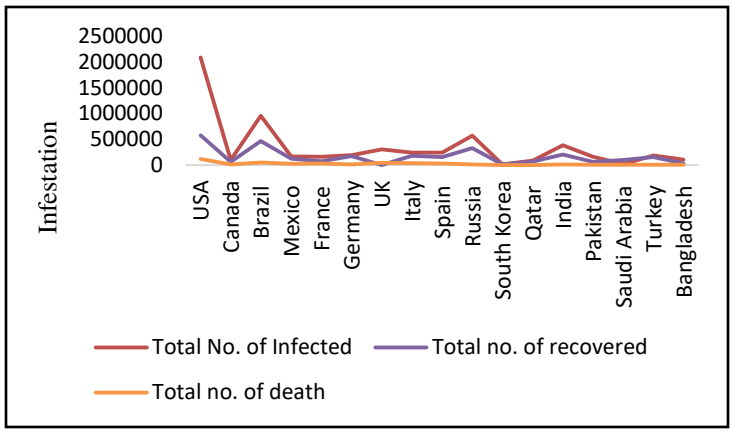

Figure 3. Total number of infestations, recovered and death in different countries

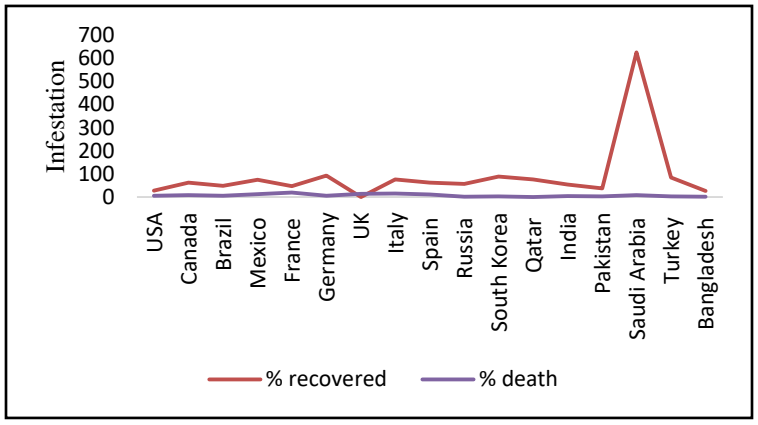

Figure 4. The death and recovery percentage rate of different countries

***Asian countries*:** The COVID-19 pandemic on 20 January 2020 was identified in South Korea. In South Korea, total confirmed, recovery and death case were observed 12257, 10800 and 280 people, respectively, since 19 June 2020. The recovered and death percentage was 88.1129 and 2.2844. The COVID-19 pandemic on 25 February 2020 was identified in Doha, Qatar. In Qatar, the total confirmed, recovered and death cases was found 84441, 63642, and 86 people, respectively since 19 June 2020. The recovery and death percentage was 75.3686 and 0.1018. The COVID-19 pandemic on 30 January 2020 was identified in Kerala, India. In India, total confirmed, recovered, and death cases was found 380532, 204711, and 12573 people, respectively since 19 June 2020. The recovered and death percentage was 53.7960 and 3.3041. The COVID-19 pandemic on 26 February 2020 was identified in Karachi, Pakistan. In Pakistan, total confirmed, recovered and death cases was found 160118, 59215, and 3093 people, respectively, since 19 June 2020. The recovery and death percentage was 36.9821 and 1.9317. The COVID-19 pandemic on 2 March 2020 was identified in Qatif, Eastern Province, Saudi Arabia. In Saudi Arabia, total confirmed, recovered and death cases was found 14991, 93915, and 1139 people, respectively since 19 June 2020. The recovery and death percentage was 626.4759 and 7.5979 respectively. The COVID-19 pandemic on 11 March 2020 was identified in Turkey. In Turkey, total confirmed, recovered and death cases was found 184031, 156022, and 4882 people, respectively since 19 June 2020. The recovery and death percentage was 84.7802 and 2.6528 respectively. The COVID-19 pandemic on 8 March 2020 was identified in Dhaka, Bangladesh. In Bangladesh, total confirmed, recovered and death cases was found 124775, 8626, and 1788 people, respectively since 19 June 2020 (Figures 3 and 4). The recovery and death percentage was 25.8235 and 1.3455 respectively. Comparatively, a smaller number of people were confirmed, recovered, and died in Bangladesh.

IV. Discussion

The present situation of the Bangladesh and selective countries of different geographical location

In December 2019, China reported to the UN agency cases of respiratory disorder with unidentified causes [5,

[29]. On seven Gregorian calendar months 2020, the UN agency identified and confirmed a new unique coronavirus that is responsible for respiratory disease in a very large cluster of individuals in metropolis town, Hubei Province, China. The virus has passed the burden of malady and death around the world [7]. Following the detection of the primary few COVID-19 cases in early March, Bangladesh has stepped up to strengthen the capability of the aid system to forestall a crisis within the event of flow within the range of cases. The COVID-19 cases are found in sixty-four districts of eight divisions in Bangladesh as of twenty-nine, April. Among the eight divisions, prevalence is highest in the capital of Bangladesh Division followed by Chattogram, Mymensingh, Rangpur, Khulna, Barisal, Sylhet, and Rajshahi division. Around seventy-fifth of the cases are known in five districts that embrace the capital of Bangladesh, Narayanganj, Gazipur, Narsingdi, and Kishoreganj. On 22nd March, Bangladesh declared a 10 day closing, effective from 26th March to 4th of April. From 5th to 30 April, the total test was 101969 whereas infected, death, and recovered cases were 7597, 160, and 130 respectively, in Bangladesh. Since 19 June, total tests were 708120 whereas infected, recovered and death cases was 124775, 8626, and 1788 respectively in Bangladesh. A series of hotline numbers, email addresses, and therefore the Facebook page of the IEDCR were provided for individuals to contact if they believe COVID-19 infection[30]. Bangladesh has 1,169 Intensive care unit (ICU) beds, amounting to 0.72 beds per 100,000 citizens. Of these 432 beds are in government hospitals and 737 in private hospitals and there are only 550 ventilators in the country[31]. On 21 March, the Institute of Epidemiology, Disease Control and Research (IEDCR) announced that 150 ICU beds would be made available for COVID treatment in Dhaka and more would be provided in other parts of Bangladesh. The FCV-19S significantly correlated with PHQ-9. FCV-19S was significantly associated with higher worries concerning lockdown [13]. In the USA, Canada, Mexico, Brazil, Italy, Spain, France, Germany, UK, Russia, India, Pakistan, South Korea, Turkey, Saudi Arabia, and Qatar fatality rate was (5.54, 8.27, 4.86, 11.93, 4.86, 14.48, 11.24. 18.70, 4.73, 14.07, 1.38, 3.30, 1.93, 2.28, 2.65, 7.59 and 0.10) %; respectively, and information collected from John Hopkins University WHO, 2020. In Bangladesh, a daily wise mortality rate of less than 1% in April and May 2020 is represented in Figure 1 [32]. In April 2020, the case fatality rate is about 7% in the world [33, 34]. The total confirmed, death and recovered cases was observed in Bangladesh than the USA, UK, Russia, Germany, India, Italy, Spain, Brazil, and Pakistan (as represented in Figures 3 and 4). As of February 12, 2020, a total of 43.103 confirmed cases and 1.018 deaths have been announced [33]. As of April 18, 2020, the disease has infected at least 2,261,425 people and has resulted in at least 154,734 deaths globally. As of 23 July, total cases were 9,113,578, total recovery is 4,884,374 and total death is 471,856 in the world [35]. Finally, this study noted that the mortality rate of Bangladesh is lower than in other selective countries across the world.

V. Conclusions

COVID-19 has highly spread over 64 districts of eight divisions in Bangladesh. The number of tests per day needs to be increased rapidly, which is comparatively lower than selective countries of different geological locations. Proper health hygiene, mass education, and social awareness programs would improve the strategies of management towards pandemic conditions. The government has already taken some steps and should

initiate the training and supervision of rural and town trainees minimizing the infection rate in Bangladesh.

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