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SECOND WAVE AND PANDEMIC SITUATION OF COVID-(2020-2021) IN BANGLADESH

Ahasan Ullah Khan

Department of Entomology, and Climate-Smart Agriculture Lab,
Department of Agroforestry and Environmental Science, Faculty of Agriculture,
Sylhet Agricultural University, Sylhet-3100,
Bangladesh
Email: ahasanullahsau@gmail.com

Rumana Akter

MBBS Student
Sir Salimulah Medical College, Mitford, BabubazarDhaka-1000,
Bangladesh
Email: rumanaruna3@gmail.com

Foyj Ullah Khan

Master Student
Department of Information and Communication Technology,
Mawala Bhashani Science and Technology,
Tangail-1902,
Bangladesh
Email: md.foyjullahkhan@gmail.com

Shakhera Khanom

Student
Department of Information and Communication Technology,
Mawala Bhashani Science and Technology,
Tangail-1902,
Bangladesh
Email: shakheraictian33@gmail.com

Anayat Ullah Khan

Student
Department of Mathematics,
Jashore University of Science and Technology, Jashore-7408,
Bangladesh
Email: justianmath171521@gmail.com

Ayesha Shiddika Afsana

Department of Poultry Science,
Bangladesh Agricultural University,
Mymensingh-2202,
Bangladesh
Email: ayeshashiddika117bau@gmail.com

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***Abstract*—** In Bangladesh, the Institute of Epidemiology, Disease Control and Research (IEDCR) reported the first COVID-19 positive patients in the country on March 8, 2020. The world health organization (WHO) declared a COVID-19 epidemic on March 11, 2020. The aim of this study was related to the situation and relation of tests, infested, recovered and death of people against COVID-19 of Bangladesh. The study was carried out from 8 March 2020 to 30 April 2021 (N=419 days) to observe the status of Bangladesh towards rampant COVID-19. The data of this research was collected from IEDCR, Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare (MoHFW), and cross-checked with different newspapers and online news portals. Correlations were made using Spearman's rank correlation coefficient. The total tests, infection, recovered and died were 5357294, 747761, 669995 and 11250; respectively in Bangladesh. The tests of COVID-19 were 1482, 69252, 244064, 460528, 409503, 362113, 397452, 389452, 436862, 454892, 424034, 392403 and 722848 in March to December, 2020 to January to April 2021; respectively in Bangladesh. The infestation of COVID-19 was 49, 7616, 39486, 98330, 92125, 73070, 50457, 44205, 57248, 58948, 21629, 11077 and 128555 in March to December, 2020 to January to April 2021; respectively in Bangladesh. The recovered of COVID-19 was 25, 135, 7904, 34845, 76517, 69452, 71600, 48658, 56099, 70367, 22285, 17140 and 150816 in March to December, 2020 to January to April 2021; respectively in Bangladesh. The death of COVID-19 was 6, 163, 472, 1198, 1264, 1125, 970, 666, 718, 938, 568, 277 and 2237 in March to December, 2020 to January to April 2021; respectively in Bangladesh. The maximum number of people infested and death in April, 2021. The positive correlation found between infested with tests and recovered with tests of April, 2021 by people where (R^2= 0.5289, p<0.012 and 0.0000006 p<0.05) and the negative correlation found between tests with date and death with tests (R^2= 0.2567, p<0.01 and 0.3614, p<0.01). All the Spearman correlation positive with moderate to strong relation between the variables at the 0.01 level in two-tailed and the total number was n=419. The mean Spearman correlation for tests was 0.31 (range 0.553 to 0.634), for infested was 0.35 (range 0.611 to 0.880), for recovered was 0.796 (range 0.634 to 0.799), for death was 0.808 (range 0.553 to 0.880). March to December 2020 and January to February 2021, not much less than April 2021. More people infested and died in April, 2021 than previous year. This study also indicated that there is moderate to strong relation among tests, infested, recovered and death with COVID-(2020-2021).

***Keywords*—** Bangladesh, COVID-19, tests, infested, recovered, death.

I. INTRODUCTION

A new natural event of Corona Virus Disease 2019 (COVID-19) occurred in late Dec 2019 in metropolis, China, and has unfold to alternative countries declared as a world pandemic within the world [1,2]. The World Health Organization [3] declared the name of this novel coronavirus as 2019-nCoV [4], and has unfold worldwide since then, inflicting epidemic threat for the planet, conjointly in Asian nation, Bangladesh [5]. It is an infectious pandemic that recently infected more than two hundred countries in the world [6]. This virus is named Severe Acute Respiratory Syndrome Coronavirus a pair of (SARS-CoV-2) that was called COVID-19.

On seven Gregorian calendar month 2020, the Chinese Center for sickness management, and interference known a brand-new coronavirus from a throat swab sample of a patient. The novel coronavirus was a brand-new strain that is caused by SARS-CoV-2. It belongs to the family of coronaviridae taxonomic group Sarbecovirus, genus Betacoronavirus, and order Noroviruses. it's a gram-positive RNA virus ordering starting from twenty-six to thirty-two KB long, crown-shape folks with 80-160 nM in size, and next-generation sequencing, and biological process examination of the ordering exposed COVID-19 [7]. It absolutely was noticeably identical (88%) to 2 bat-derived SARS-like coronaviruses, and additional distant from SARS-CoV (79%), and MERS-CoV (50%) [8].

It is a scourge issue in People's Republic of Bangladesh that is breaking family relation and social bonding. within the starting, diagnostic tests were conducted by IEDCR solely, however, from last month fifty-nine diagnostic facilities were opened broad therefore the infection cases square measure enhanced. Since then, tests, infestation, recovery, and death were step by step increasing, and up to now April 30, 2021 it reaches (5357294, 747761, 669995 and 11250), severally in People's Republic of Bangladesh. The COVID-19 was pandemic in Dec 2019. People's Republic of Bangladesh got an extended propaedeutic time to induce ready because the 1st confirmed. 3 people were confirmed with COVID-19 on eight March 2020 [9, 10, 11]. The most variety of individuals in People's Republic of Bangladesh square measure update that unwellness will happen to anybody, and even cause death. BRAC survey throughout the state found concerning four-hundredth of the respondents don't have any plan about a way to forestall obtaining infected with the virus [12]. Non-availability, inadequacy, and unskillfulness of Personal Protective Equipment (PPEs) nCoV-19 infections in health care staff are rumored, and among the foremost (85.5%) were doctors. within the medical sector, there's conjointly inadequate coaching, and observance of PPE used. Beds and ventilators were different key factors to beat this example [13, 14].

The shutdown was first declared on March 26 [15]. The second lockdown was declared on April fourteen, 2021 in Bangladesh. Partial imprisonment aimed toward social disaffection could enable virus management for a few times [16]. The govt. has demoralized movement once six pm, instructing everybody to remain reception, and keep safe in home. In a very imprisonment, the governments cancel all public programs together with fiftieth July 4 [17]. In a lockdown, the governments cancel all public programs including 50th Independence Day in 2020. There are three divisions, fifty districts, and four hundred Upazila were lockdowns in May 2020. There are 8 divisions, 64 districts, and 492 Upazila were lockdowns in April 2021. In a lockdown, the product of farmers has declined sharply in a very lack of selling policy [18, 29, 20]. They additionally round-faced several issues to reap the boro rice because the labor value was high however the merchandise value declined [21]. The Prime Minister of People's Republic of Bangladesh proclaimed five monetary packages and a special agricultural package to overcome the economic losses caused by the fatal COVID-19. The monetary packages are concerning USD 11.17 billion to tackle the COVID-19 in 2020. The govt has taken numerous steps to overcome the epidemic occurrence of it like identification of the alleged cases, quarantine of individuals, and isolation of infected patients, native or regional imprisonment, grant general leave from all offices for staying home of individuals, increase public awareness, enforce social distancing, stop all political, and non-secular rallies, social, cultural gatherings, and so on [22]. In a pandemic situation, the COVID-19 tests, infestation, and death were gradually increasing day by day in Bangladesh. On 20 May 2020, COVID-19 has affected 216 countries around the world. In April, more than 7.2 million new cases and 160,000 deaths were recorded in countries in the Global Humanitarian Overview a 21% increase in cases and a 32% increase in deaths from March. In countries with an interagency Humanitarian Response Plan, cases and deaths continued to increase albeit at a slower pace than March [23].

Viruses mutate, and SARS-CoV-2 is no exception. Throughout the current global crisis, SARS-CoV-2 has been mutating at a rate of about 1–2 mutations per month [24]. Some recent emerging variants, however, have accumulated significantly more mutations in short periods of time, causing concern around the globe [25]. Scientists predict that these mutant lineages of the SARS-CoV-2 strain will not be the only concerning variants that emerge, as continued uncontrolled transmission of SARS-CoV-2 in many parts of the world and selective pressures, such as vaccines, are creating ideal conditions for additional, significant virus evolution [26]. The number of cases of coronavirus has been on the rise since the new stain was received in late March 2021, but it became more dangerous in April. Falls in the new Stein give a negative result but the affected person is living in the community, so it is going to be more difficult. To control this situation, the lockdown has been given for seven days on April 14, and the lockdown has been extended again. Considering the above fact, this study focuses on the present situation of tests, infested,

recovered and death of people in Bangladesh COVID-19 statistics within 2020 to 2021.

II. METHODS

Study Period: The COVID-19 was confirmed in Bangladesh on 8 March 2020 said Dr. Nasima Sultana, additional director general of the DGHS. The collection of data periods was from March 8, 2020 to April 30, 2021 (N=419 days).

Data Retrieval: This study included patients with test, infested, recovered and death of COVID-19 based on a positive result of the SARS-CoV-2 test by official website information of IEDCR, DGHS, and MoHFW. Data were obtained from different medical units in the Bangladesh states that belong to 59 different institutions integrating the Bangladesh health sector. Those data cross checked from different local newspapers, online news portals were reviewed, and social network [9, 27, 28]. This data analysis relates to information collected from March 8, 2020 to April 30, 2021about the outbreak handling of the COVID-19 epidemic situation in Bangladesh.

Equations: Percentage of infested, recovered and death was observed in Bangladesh during the study period. Infested, death, and recovered was calculated in percent using the following formula:

$$\text{Infested (\%)} = \frac{\text{Infested}}{\text{Total Infested}} \times 100$$

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

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

Statistical Data Analysis: All the collected data were rechecked, coded, and entered into a database using Microsoft Excel 2016. The distributed data was used to determine the frequency with percentage, total in all data. The regression relationship was calculated on April, 2021 and statistical significance was accepted at $p<0.05$. The correlation of the two variables was compared using the Spearman rank correlation and statistical significance was accepted at $p<0.01$. All statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version 25.0 software.

III. RESULTS

The present situation of coronavirus in Bangladesh since 30 April 2021

In Bangladesh, three individuals were confirmed with COVID-19 on 8 March 2020. It is now an epidemic issue for Bangladesh which is breaking family elation, social bonding. Since then, tests, infestation, and death were gradually increasing still now. From 8 March 2020 to 30 April 2021, the situation, and the total of infested, recovered, and death was presented in Figure 1. In Bangladesh, total tests were 5357294 whereas infested, recovered, and died was 747761, 669995, and 11250 during the study period (Figure 1).

In case of tests: The number of COVID-19 tests were 1482, 69252, 244064, 460528, 409503, 362113, 397452, 389452, 436862, 454892, 424034, 392403, 580409 and 722848, in March, April, May, June, July, August, September, October, November, December, January, February, March, and April; respectively (Figure 2).

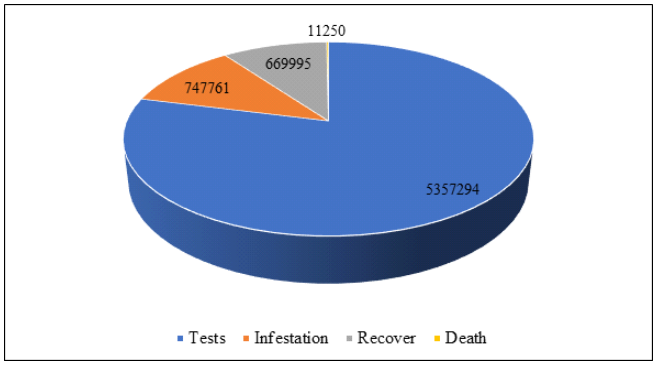

Fig. 1. Total number of coronavirus tests, infested, recovered and death, since March, 2020 to April, 2021 in Bangladesh

In case of infested: The number of COVID-19 infestation population were 49, 7616, 39486, 98330, 92125, 73070, 50457, 44205, 57248, 58948, 21629, 11077, 63366, and 128555 in March, April, May, June, July, August, September, October, November, December, January, February, March, and April; respectively (Figure 2). The percentage of COVID-19 infestation population were (0.007, 1.019, 5.281, 13.150, 12.320, 9.986, 6.748, 5.912, 7.656, 7.883, 2.893, 1.481, 8.474, and 17.192) % in March, April, May, June, July, August, September, October, November, December, January, February, March and April; respectively (Figure 3).

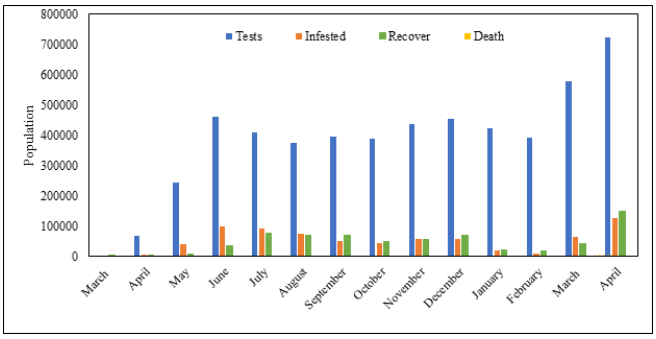

Fig. 2. Novel coronavirus update since March, 2020 to April, 2021 in Bangladesh (Tests, infested, recovered and death)

In case of recovered: The number of COVID-19 recovers population were 25, 135, 7904, 34845, 76517, 69452, 71600, 48658, 56099, 70367, 22285, 17140, 42772 and 150816 in March, April, May, June, July, August, September, October, November, December, January, February, March and April; respectively (Figure 2). The percentage of COVID-19 recovered population were (0.004, 0.020, 1.222, 5.201, 11.421, 10.530, 10.687, 7.262, 8.373, 10.503, 3.326, 2.558, 6.384, and 22.510) % in March, April, May, June, July, August, September, October, November, December, January, February, March, and April; respectively (Figure 3).

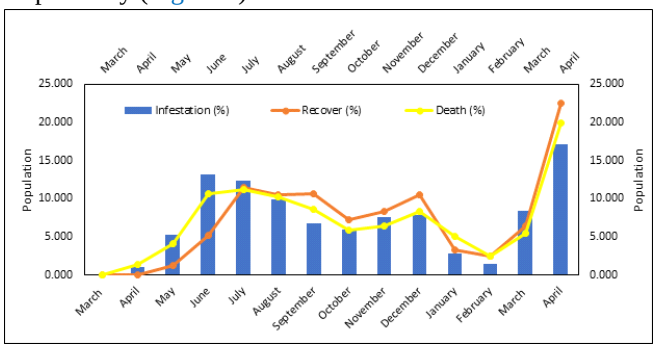

Fig. 3. Novel coronavirus update since March, 2020 to April, 2021 in Bangladesh (Percentage of Infested, Recovered and Death)

In case of death: The number of COVID-19 death population were 6, 163, 472, 1198, 1264, 1125, 970, 666, 718, 938, 568, 277, 618 and 2237 in March, April, May, June, July, August, September, October, November, December, January, February, March and April; respectively (Figure 2). The percentage of COVID-19 death population were (0.053, 1.449, 4.196, 10.649, 11.236, 10.267, 8.622, 5.920, 6.382, 8.338, 5.049, 2.462, 5.493, snd19.884) % in March, April, May, June, July, August, September, October, November, December, January, February, March, and April; respectively (Figure 3).

Spearman's rank order correlation among the variables

Spearman's rank order correlation was used to explore the relationship between variables (tests, infested, recovered, death) in COVID-19 of Bangladesh. There were statistically significant relationships found between variables. The results revealed positive, moderate to strong relationship between the variables at the 0.01 level in two-tailed and the total number was N=419 (Table 1).

In case of tests: The results revealed a moderate relationship between tests with infested (r_s=0.611), recovered (r_s=0.634) and death (r_s=0.553) people of COVID-19. **In case of infested:** the results revealed a moderate to strong relationship between infested with tests (r_s=0.611), recovered (r_s=0.747) and death (r_s=0.880) people of COVID-19. **In case of recovered:** The results revealed a moderate to strong relationship between recovered with tests (r_s=0.634), infested (r_s=0.747) and death (r_s=0.799) people of COVID-19. **In case of death:** The results revealed a moderate to strong relationship between death with tests (r_s=0.553), infested (r_s=0.880) and recovered (r_s=0.799) people of COVID-19. Prior to calculating r_s, visual inspection of the scatterplot of tests, infested, recovered and death confirmed that the relationship between these variables was non-linear and monotonic.

TABLE 1. SPEARMAN'S RHO CORRELATION ANALYSIS AMONG THE TESTS, INFESTED, RECOVERED AND DEATH OF COVID-2020-2021 IN BANGLADESH

Correlations	Tests	Infested	Recovered	Death
Correlation Coefficient	1.000	0.611**	0.634**	0.553**
Significance	-	0.000	0.000	0.000
N	419			
Correlation Coefficient	0.611**	1.000	0.747**	0.880**
Significance	0.000	-	0.000	0.000
N	419			
Correlation Coefficient	0.634**	0.747**	1.000	0.799**
Significance	0.000	0.000	-	0.000
N	419			
Correlation Coefficient	0.553**	0.880**	0.799**	1.000
Significance	0.000	0.000	0.000	-
N	419			

Note: **Correlation is significant at the 0.01 level (2-tailed), N=419 days

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

In April, 2021, maximum number (112 and 7626) of people death and infested by COVID-19. Total number of tests, infested, recovered and death number of people was more than 722 thousand, 128 thousand, 150 thousand and 2237 people in Bangladesh. A correlation study was done to establish the relationship between the infestation of people with recovered and death of people by COVID-19 in Table 2 and Figure 4. In April, a positive correlation was observed in infested and recovered people and a negative relation found in tests and death by COVID-19 in Bangladesh. It was evident that the positive and negative equation were y=0.2297x-1321.9, 0.2297x-1321.9 and y= -

317.45x+1E+07, y=-0.0019x+132.9 gave a good fit to the data and the coefficient of determination R^2= 0.5289, 0.0000006 and 0.2567, 0.3614 fitted regression line had a significant regression coefficient.

TABLE 2. THE RELATIONSHIPS BETWEEN THE INFESTATION OF PEOPLE OF COVID-19 WITH RECOVERED AND DEATH OF PEOPLE DURING THE STUDY PERIOD

Month	Regression items	Regression equation	#Factor	##Sig	R^2 value
April	Tests	y= -317.45x+1E+07	25.67	0.01	0.2567
	Infested	y= 0.2297x-1321.9	52.89	0.01	0.5289
	Recovered	y= 0.0008x+5250.9	6E-06	0.05	0.0000006
	Death	y= -0.0019x+132.9	36.14	0.01	0.3614

Note: #=% Role of individual factor; ##Sig.=Significance

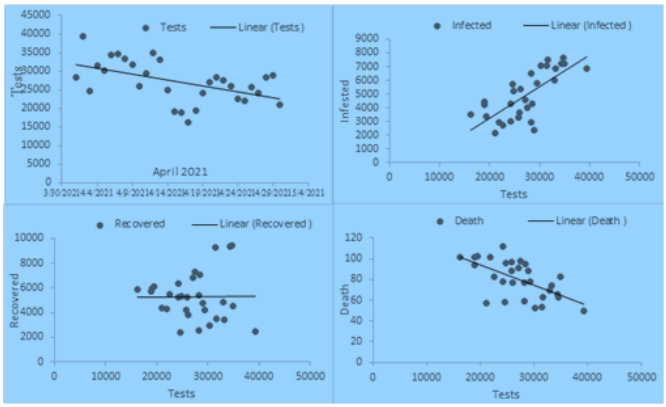

Fig. 4. Relationship between date with tests and tests with infested, recovered and death people of Bangladesh

IV. DISCUSSION

Coronavirus disease 2019 (COVID-19) is a transmittable disease caused by severe acute respiratory syndrome coronavirus. The virus that causes COVID-19 spreads mainly when an infected person is in close contact with another person [29]. The basic reproductive number R0 of SARS-Cov-2 was estimated to be 3.77, much higher than SARS-CoV (R0=2.7) and MERS-CoV (R0 < 1) [30]. The affinity between SARS-CoV-2 and ACE2 receptor is 10-20 times higher than that of SARS-CoV [31]. Without a therapeutic vaccine or specific antiviral drugs, early detection and intervention for the underlying severe patients were crucial for the reduction of mortality [32]. Day by day the coronavirus has taken shape and the epidemic has taken shape. Our neighboring country India is breaking new records day by day. The COVID-19 is going from double stain to triple stain. It is effect on the agricultural sectors in the world [33]. It has high infectivity and pathogenicity. In Bangladesh, total tests, infested, recovered, and died was 5357294, 747761, 669995, and 11250 from March 8, 2020 to April 30, 2021 (N=419 days) (Figure 1). The similar results also observed from 8 March 2020 to 30 April 2021, where total tests, infested, recovered, and died was 5345294, 746161, 668315, and 13220; respectively in Bangladesh [34]. In the world, the daily tests, infestation, recovered, and death was increased quickly. Again, Bangladesh has been defeated by the United Kingdom and Africa stain. As a neighboring country and for many imports and exports, Indian Stein will easily come to our country. Mutations COVID-19 virus found in the Bangladesh that was detected in Africa, the United Kingdom and India. As a country of extreme density, if it is not health conscious and does not mean that the government has not given a lockdown, then Bangladesh will go into the situation like April. In May 2021, Public Service Commission examinations were held in the divisional cities all over Bangladesh. Where there were 450,000 students and with them were parents or their siblings or husbands. No test in Bangladesh means there will be a crowd of parents. The medical admission test was done in April 2021. It is not only necessary to give a lockdown, but also to ensure that there is no public gathering rather than a lockdown. The vaccine was launched in February and vaccinations have been in full swing across the country since March 2, 2021. Maybe after giving the second dose, it was clear which way Corona was going but in April 2021 it broke all the records of our country. Where the number of infected was below 5% in winter, it has become 25%+. So now the lockdown should be controlled along with the public places. If necessary, the government should announce a new project so that it can help the country's poorest and the poorest people. Then we think Corona can be brought down to 5%. Now all ages of people were infested by COVID-19 [35]. It has affected the world health wise and in economic terms [35]. In 30 April, 2021 in India, the total new daily cases, infested and death were 402110, 3272256, 211835. In Pakistan, total new daily cases, and death were 820823, and 17811 [36]. Infested percentage less than 17, death rate less than 19, recovered percentage rate more than 22 in Bangladesh. In April. 2021, percentage of COVID-19 infested, recovered and death was (17.192, 22.510 and 19.884) % where wise mortality rate less than 2% in Bangladesh. The daily percentage rate of death less than 3%, recovered percentage rate more than 97 of 2021 in Pakistan. Death percentage rate less than 2%, recovered percentage rate more than 98 of 2021 in India [37]. The mean Spearman correlation for tests was 0.31 (range 0.553 to 0.634), for infested was 0.35 (range 0.611 to 0.880), for recovered was 0.796 (range 0.634 to 0.799), for death was 0.808 (range 0.553 to 0.880) in Bangladesh (Table 1). Similar results were also observed a study [38] and the mean Spearman correlation for incidence was 0.20 (range 0.66 to 0.76) and for mortality was 0.35 (range 0.75 to 0.85). It is also impact in the globalization [39]. In April, a positive correlation was observed in infested and recovered people and a negative relation found in tests and death by COVID-19 in Bangladesh (Table 2 and Figure 4). The similar results were also noted in Bangladesh and the finding were the positive correlation found between infestation with recovered and death by people (R^2= 0.4804 and 0.3159; 0.7242 and 0.4902; 0.4432 and 0.3449, $p<0.05$) in April to June, 2020 (40). The COVID-19 highly pathogenic and virulent, and it feasts very rapidly over

human-to-human contact that's the created the wave in the world. Bangladesh in December 2020 and April 2021, make the virus significantly more transmissible and raising prospects that the second wave could become even more dispersed. This is in stark contrast to the downward trajectory in Europe, China, and elsewhere in Asia, where the number of new cases has seen a decline ahead of an anticipated second wave (41). In China, the aggressive strategy, as the country opens up, there have been threats of a second wave, most notably in the capital city of Beijing during 2020 [42]. In Japan, has seen increasing cases in Tokyo from late May into June, but fears of it being a second wave has been dismissed by Governor Yuriko Koike during 2020 [43, 44]. In Myanmar, the first wave was reported on 16 July, 2020 where the cases, and death were 374, and 6; respectively and the last local transmission was found. The second wave started on 16 August in Rakhine State where the total
Cases, recoveries and death was 32,351, 14,706, and 765; respectively during 2020 [45]. The second wave of COVID-19 in Europe [46]. In Bangladesh, maximum number of people death and infested by COVID-19 (112 and 7626) in the month (19 and 7); respectively April 2021. The total number of tests (722,848) infested (128,555), recovered (150,816) and death (2237) in the month of April, 2021. Another study also was found the similar results [47]. The official numbers of infected people during the COVID-19 virus outbreak in Bangladesh are indicative of the spread of the infection. The government take necessary devise suitable policies such as total social distancing. The government already takes some steps and should take creating the training and supervision of rural and town trainees minimizing infestation in Bangladesh. We should practice protection, and awareness about COVID-19.

V. CONCLUSION

COVID-19 has spread over 64 districts of eight divisions in Bangladesh. The ongoing outbreak of COVID-19 infections has emphasized the importance of the quick and accurate 118 laboratory diagnosis to limit the spread as well as appropriately treat those patients who have a serious infection. In this situation, people should avoid public places as much as possible. It would not be right to go out without an urgent need. The government take necessary devise suitable policies such as total social distancing. If you have to go, you will have to go out after the necessary masks and return home as soon as possible after finishing work. The government should come up with new mega projects to help the poor so that Coronavirus can be kept under control.

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