



The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) In Bangladesh: A Descriptive Study

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Abstract

COVID-19 was first confirmed in Bangladesh in 8 March, 2020. Here, we report results of a descriptive, and exploratory analysis of all cases diagnosed as of 16 April, 2020. COVID-19 cases reported until 16 April, 2020 were extracted from official press briefings of IEDCR, DGHS, and MoHFW. Reports from different newspapers and online news portals were also reviewed. In Bangladesh, till 16 April, 2020, 17003 tests had been carried out which amounts 103 tests per million populations. These tests resulted in detection of 1572 confirmed COVID-19 cases over a period of 40 days. The female to male ratio of confirmed cases was 1:2.33. Of the total confirmed patients, 10% were 20 years of age or under, and 43% were in the age range of 21 to 40 years; elderly group over 60 years old were about 13%. Most cases (about 48.9%) reported that they lived in or had come to Dhaka within 14 days before the onset of illness or had been in close contact with any Dhaka resident. Healthcare providers constituted 4.83% (76) of the detected cases and among them 85.5% were doctors. Since the detection of the 1st case till 16 April, 2020, 106308 people were placed in home quarantine, 3875 were placed in institutional quarantine, and another 461 individuals had been placed in isolation. Among those who had been hospitalized, only 3.18% were discharged after recovery. With the numbers of deaths reaching 60, the case fatality rate (CFR) was 3.9%. COVID-19 is spreading throughout Bangladesh. Testing for infection is both inadequate and not easily accessible. Infections are occurring in all age groups and case fatality is quite high. Healthcare workers especially doctors are possibly at highest risk because of their occupation.

Keywords: *Epidemiological Characteristics, Outbreak, Novel corona virus, COVID-19.*

Introduction

Since early December, 2019, a number of people who worked at or lived around the local seafood wholesale market in Wuhan, China initially contracted pneumonia of unknown cause that was

followed by severe acute respiratory distress syndrome, acute respiratory failure, and other serious complications. On 7 January, 2020 the Chinese Center for Disease Control and Prevention identified a new corona virus from a

throat swab sample of a patient. Subsequently World Health Organization (WHO) named this novel coronavirus as 2019-nCoV1. This coronavirus belongs to large family of enveloped RNA virus and is highly contagious, and it spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.² Initially it is thought the virus had been transmitted from animal to humans. Subsequently the virus had travelled around the globe as air droplet, and ultimately human-to-human transmission continues to be reported from different parts of the world.³ On 29 December, 2019, World Health Organizations (WHO) addressed lower respiratory tract affecting coronavirus as 2019 novel coronavirus or just simply COVID-19. Outbreaks in different countries prompted the Ministry of Health and Family Welfare (MoHFW) Bangladesh to equip its PCR (Polymerase chain reaction) lab at IEDCR (Institute of Epidemiology, Disease Control, and Research) for testing samples from suspected COVID-19 cases for 2019-nCoV. The first confirmed cases of COVID-19 Bangladesh was reported on 8 March, 2020.⁴ PCR is a method used widely in molecular biology to make millions to billions of copies of a specific DNA sample rapidly, allowing scientists to take a very small sample of DNA and amplify it to a large enough amount to study in detail.

Materials and Methods

COVID-19 cases reported until 16 April, 2020 were extracted from official press briefings of IEDCR, DGHS (Director General of Health Service) and MoHFW. Reports from different local newspapers and online news portals were also reviewed.⁵⁻¹⁴ Analysis included patient characteristics; number of diagnostic tests (Real time RT-PCR) conducted and their results; overall quarantine and isolation situation; and case fatality in Bangladesh. In Bangladesh from 8 March, 2020 to 17 March, 2020 IEDCR arranged daily official press briefing on behalf of MoHFW to describe the daily situation of COVID-19.

Thereafter DGHS and IEDCR jointly held press briefing on the issue and the information was made available in the MoHFW-DGHS webpage. We extracted all the data from the case reporting system, and removed the personally identifiable information of all cases during the analysis to protect personal privacy. If a patient was engaged in any form of work in a medical institution, the occupational variables are classified as health-care provider (that is, this category includes not only doctors and nurses, but anyone working in a medical facility); if the patient had recently lived in Dhaka, or had traveled, or has been close contact with anyone living in Dhaka, they are classified as Dhaka-related exposures. This data analysis relates to information collected from 8 March, 2020 to 16 April, 2020 in relation to outbreak handling of COVID-19 epidemic situation in Bangladesh.

Results

In Bangladesh real time RT-PCR (real time Reverse Transcription–Polymerase Chain Reaction) for diagnosis of COVID-19 was initiated in early March, and the first 3 cases were reported on the 8 March, 2020.⁴ Real time RT-PCR is a nuclear-derived method for detecting the presence of specific genetic material from any pathogen, including a virus. Till date (16 April, 2020), 17003 tests had been carried out which sums up to be 103 tests per million population. These tests resulted in detection of 1572 confirmed COVID-19 cases over a period of 40 days (Figure 1). The female to male ratio of confirmed cases was 1:2.33. Of the total patients, 10% were 20 years of age or under, and 43% were in the age range of 21 to 40 years. Elderly group was over 60 years old accounted about 13% of the detected cases (Figure 2). At present COVID-19 has been detected in 53 districts in all 8 divisions of Bangladesh (Figure 3). Most cases (48.9%) reported that they lived in or had come to Dhaka within 14 days before the onset of illness, or had been in close contact with any of Dhaka resident. The Dhaka cases are scattered throughout the city

with higher number of cases in Wari, Tolarbagh, Dhanmondi, Lalbagh, Mirpur, Mohammadpur, Uttara, Basabo, and Jatrabari (Figure 4). Healthcare providers constituted 4.83% (76) of the detected cases and among them 85.5% were doctors. Since the detection of the 1st case till 16 April 2020, 106308 people were placed in home quarantine, 3875 were placed in institutional quarantine and another 461 individuals had been placed in isolation. Among those who had been

hospitalized only 3.18% were discharged after they tested negative for the virus in 2 consecutive sets of nasopharyngeal throat swabs collected ≥ 24 hours apart. With the numbers of deaths reaching 60 the Case fatality rate (CFR) was 3.9%. Initially the CFR was high but in recent dates it had been diluted by increase in case detection because of increase in the number of testing (Figure 1 & 5).

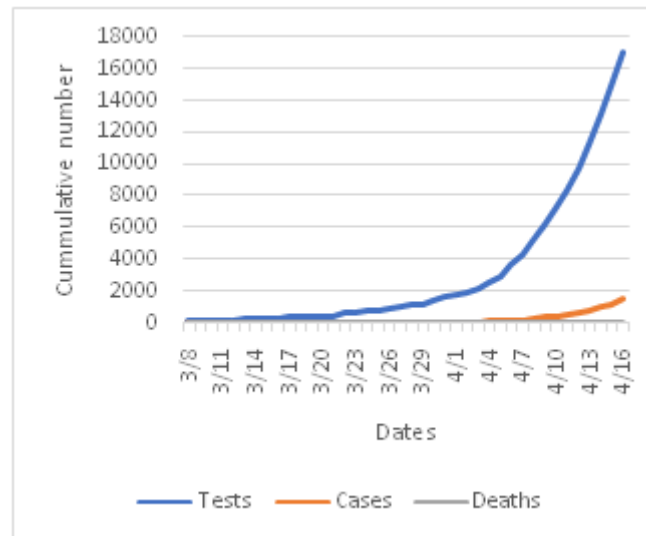


Figure-1: RT-PCR tests, COVID-19 cases and deaths

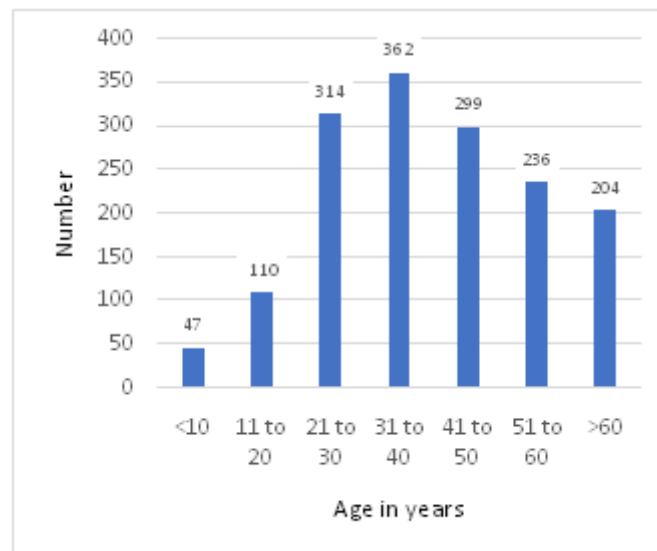


Figure-2: Age distribution of COVID-19 patients

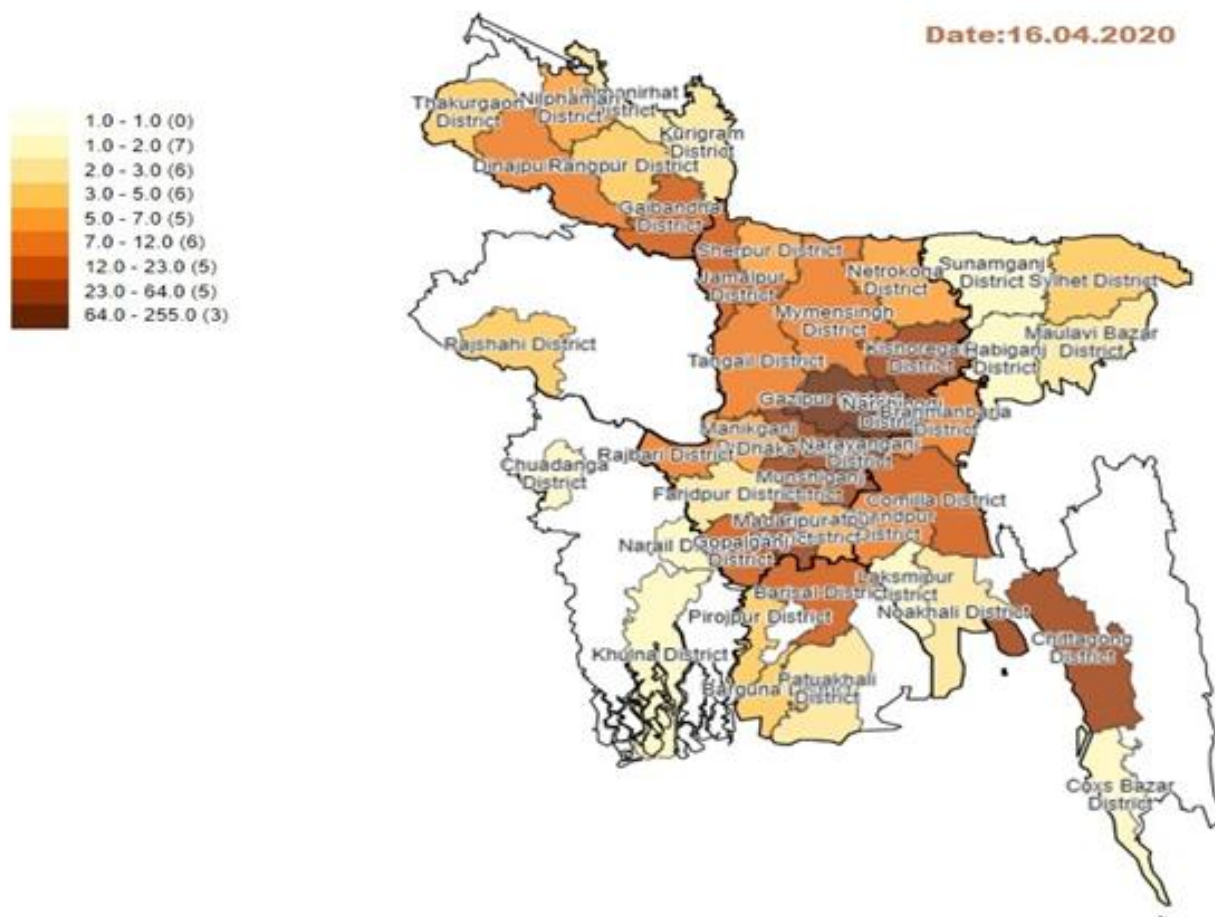


Figure-3: District-wise distribution of COVID-19 cases as on 16 April, 2020

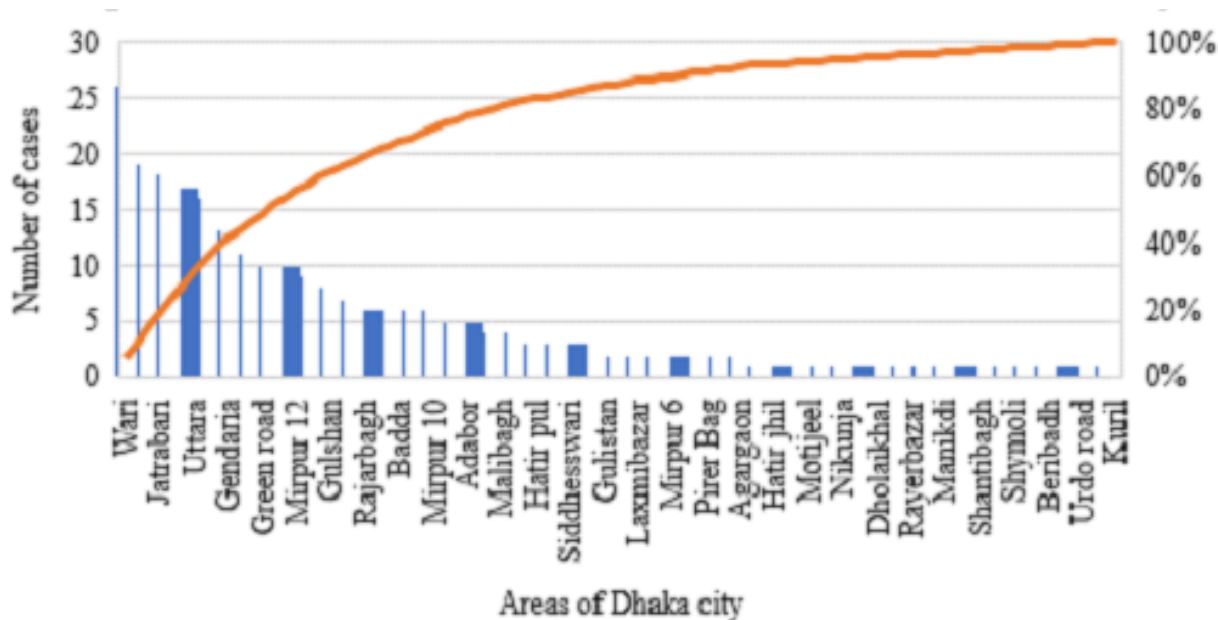


Figure-4: COVID-19 cases detected in different areas of Dhaka city

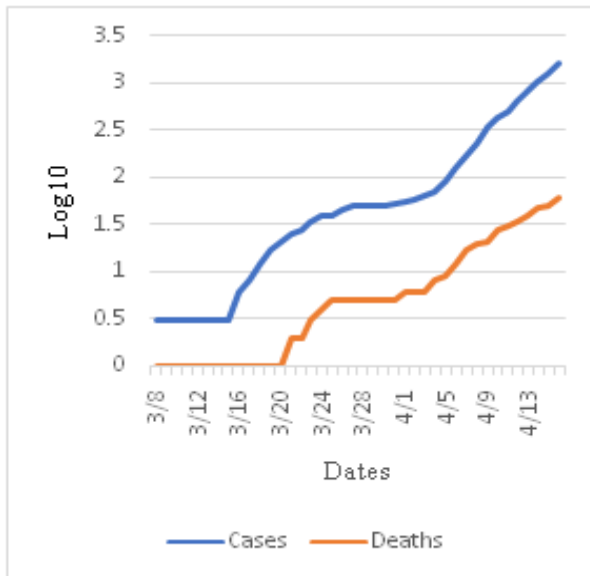


Figure-5: COVID-19 cases and deaths

Discussion

In December 2019, a cluster of severe acute respiratory illness (atypical pneumonia), occurred in Wuhan, Hubei Province, China.¹⁵⁻¹⁹ On 31 December, 2019, the WHO, China Country Office was informed of the cases of pneumonia of unknown etiology. Later on, 7 January, 2020 The Chinese authorities identified a new type of coronavirus as the causative agent, which was later named as 2019 n-CoV. By 20 January, 2020 patients surfaced in some parts of China, Japan, Thailand, and Republic of Korea. On 2 January, the incident management system was activated across the three levels of World Health Organization (country office, regional office, and headquarters) and informed other countries about the situation.²⁰ As the virus continued to spread, WHO on 22 January assessed the risk of the event to be high at the global level.²¹ Though there was increasing discussions of atypical pneumonia and its possibility of spread, preparation for facing outbreaks was real slow. On the 1st day of February, 312 Bangladeshis returned from Wuhan the epicenter of covid-19.²² This group of returnees were formally quarantined, but thereafter groups of Bangladeshis who had been returning from the virus affected countries i.e. Italy were simply screened from fever and allowed to go to their residences with a request to

keep themselves isolated from others for 14 days. None of them were tested for n-CoV-19 soon after arrival. Among them some could have had asymptomatic infection and played the role of infection spreaders. The ones being asymptomatic had flaunted quarantine and were busy socializing and moving around different parts of the country.^{23,24} Bangladesh took 45 days to roll out its first test for virus detection since being informed by WHO (World Health Organization) of the global emergency. Throughout March and early April, tests appear to have restricted or highly selective (Figure 1) and was available only in IEDCR. In April, ultimately initiative was taken to increase the number of tests and the capacity of selected government facilities to carryout testing. The private healthcare sector remains to be taken onboard. In regard to testing, Bangladesh ranks the second lowest among Asian countries having undertaken 103 tests per million population (as on 16 April, 2020). In recent days as testing continues, cases have been found to have increased manifold (Figure 1). Besides the movements of expatriates, movement of large groups of people to and from Dhaka²²⁻²⁷ have possibly aided the rapid spread of the virus in the population many parts of the country (Figure 3). As for ICU (Intensive care unit) beds and ventilators in the government hospitals, the picture is grim both in term of number and functionality.^{28,29} nCoV-19 infections in healthcare workers have been reported and among them most (85.5%) were doctors. Infection in healthcare communities may have been because of the close contact to asymptomatic individuals seeking medical attention for other causes; non-availability, inadequacy, and inefficiency of PPEs (Personal protective equipment); and inadequate training, and monitoring of PPE use.

Conclusions & Recommendations

COVID-19 is spreading throughout Bangladesh. Testing for infection is inadequate and at the same time not easily accessible. Number of per day tests needs to be ramped up exponentially and

immediately. Infections are occurring in all age groups and case fatality is quite high. Healthcare workers especially doctors and nurses are possibly at highest risk because their occupation puts them in front line of close contact to patients. PPEs that complies with WHO (World Health Organization) or NIOSH (National Institute for Occupational Safety and Health) standards and useable in scenarios of droplet spread need to be made available to healthcare workers in adequate number. Facilities for management of moderate and severe case have to be boosted; adequate isolation facilities, ICUs, ventilators, and other relevant equipment need to be put into place. Private healthcare sector needs to be on board for diagnosis of infection and management of moderate and severe cases. Time is running out, if response to the threat is flawed or delayed, the country will have to pay dearly.

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