

Original Article

Combating the COVID-19 Pandemic: Experience of a Tertiary Care Children Hospital in Dhaka, Bangladesh

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Abstract

Background: Corona virus disease is a global health threat since December 2019 which was declared a pandemic in March 2020. **Objective:** This study was undertaken to address various measures initiated during the pandemic in the Dr. M R Khan Shishu (Children) Hospital, a tertiary level childcare hospital in Dhaka, Bangladesh. **Methods:** This cross-sectional, observational study was conducted over a period of 9 months from March 2020 to November 2020. Necessary steps implemented during 'lock down' Phase were tabulated. Sample was collected from patients as well as Health care providers with sign/symptoms of COVID-19 disease. Verified reports were analyzed to observe the prevalence and trends of corona virus affected population. **Results:** Improvement of situation was observed following modification of the infrastructure as well as delivery of service to people. Hand sanitization, COVID sampling, PPE availability and isolation facility were improved from baseline to 100% during the study period. A total of 736 cases were tested with 246 Positive cases having male predominance (64%). Less than two years children infected with COVID-19 required admission more comparing to other children. Total 102 health care providers were tested among them 50% were found positive for COVID-19. **Conclusion:** Throughout the pandemic, Dr. M R Khan Shishu Hospital & ICH, have taken all affordable measures to combat the situation with a positive outcome. Moreover, hundred percent testing facilities for COVID-19 enabled us to diagnose significant portion of health care providers as well as patients and to take appropriate measure in management.

Keywords: COVID-19, preventive measures, corona pandemic, Bangladesh

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Introduction

Corona virus disease 2019 is a global health threat since its first case was identified in Wuhan, China in December 2019. It is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), a newly discovered virus closely related to bat corona virus, pangolin corona viruses and SARS-COV.¹ It has spread worldwide, leading

to an ongoing pandemic. The World Health Organization declared the outbreak a Public Health Emergency of International Concern in January 2020 and a pandemic in March 2020. More than 89.7 million cases have been confirmed, with more than 1.92 million deaths attributed to COVID-19 as of 10 January 2021.² COVID-19 spreads from person to person mainly

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through the respiratory droplet when an infected person coughs, sneezes, talks or breathes. Even virus containing particles when exhaled from infected person, it gets into the mouth, nose, or eyes of the other person who are in close contact with the infected person.³This is more infectious than influenza and has a major role in spreading infection in clusters.⁴

The clinical presentation of COVID 19 is variable ranging from mild to severe illness.⁵⁻⁶Most people (81%) develop mild to moderate symptoms (up to mild pneumonia), while 14% develop severe symptoms (dyspnea, hypoxia, or more than 50% lung involvement on imaging) and 5% of patients suffer critical symptoms (respiratory failure, shock, or multi-organ dysfunction).⁷⁻⁹ Children usually have milder presentation than adults.¹⁰ The asymptomatic carriers can spread the virus as they are not tested during the incubation period.^{9,11-12}

Due to the huge outbreak of the virus, preventive measures have been taken worldwide including Bangladesh to reduce its spread like staying at home, wearing a mask in public, social distancing, washing hands and many more.¹²⁻¹⁶ Different hospitals have also followed rules and guidelines provided by World Health Organization and Center for Disease Control and Prevention (CDC) to provide adequate care for the affected people.¹⁷⁻¹⁸ Dr. M R Khan Shishu Hospital is a tertiary care children hospital of Dhaka city which has been serving the patients around the whole country since emergence of the corona pandemic. So, this study was undertaken to address the various measures initiated during the pandemic to ensure safe medical service. This study also aimed to observe the prevalence of corona virus affected population visited and or admitted to the hospital.

Methods

This cross-sectional, observational study was conducted over a period of 9 months from March to November of 2020 in Dr. M R Khan Shishu (Children) Hospital, Dhaka, Bangladesh. With the emergence of the disease in Bangladesh, the Government declared 'lock down' throughout the country and initiated some necessary steps to be implemented in the health facilities to protect the people as well as the health care workers. According to those rolling plans, Dr. M R Khan Shishu Hospital which is specialized for childcare, took initiatives to modify the infrastructure and service. These measures were tabulated and improvement

of the situation was observed. Sample collection (Nasopharyngeal Swab/Oropharyngeal Swab), patient admission and data collection were going on side by side. Sample was collected for admitted patients as well as outpatients who were having clinical sign/symptoms with suspicion of COVID 19 disease. Health care providers (doctors, nurses, medical technologists) and other health care staffs with suspected COVID 19 were also included for investigation. Permission was granted from Directorate General of Health Services under the Ministry of Health and Family Welfare to carry out RT-PCR test for suspected COVID cases of DR. M R Khan Shishu Hospital and ICH. The institute does not poses a PCR machine, so a memorandum of understanding was created with our long-time partner in research, Child Health Research Foundation (CHRF). They are one of the designated organisations for testing COVID-19 sample since the start of the pandemic. Following testing, reports were sent to IEDCR for verification. The verified reports were then stored and analyzed in our institute. During the analysis, the proportion of the COVID 19 affected patients compared to tested cases was measured. Distribution of positive cases in different age category was identified. Frequency of affected health care workers was also picked out. All data were collected in Google sheet and analyzed in Statistical Analysis System (SAS) for Academics.

Results

During the study period measures were taken related to modification of the infrastructure as well as delivery of service to people which were not present before the pandemic (Table1). Figure 1 shows the changes in situation throughout the study period in different sector and services of the hospital. Initially, in the first three months of the study, there was increased demand but limited supply of Personal Protective Equipment (PPE). So, the hospital decided to provide PPE only to the Doctors and nurses working in the red and yellow zone which cover almost 30% of the total health care staffs in that time. In subsequent months, with increased supply, gradually the hospital avail PPE supply to all staffs. Throughout the study period, the hospital ensured mask use to 100% of the patient's attendant. Limited supply compelled the institute to deliver hand sanitizer only to working front liners initially; however, it was overcome sequentially. Our hospital ensured hand washing facility with soap for every staff

and attendant. The hospital provided COVID-19 testing service only to admitted patients in the initial months but gradually involved the health care workers and finally included testing the outpatients as well. During the first three months, there was no isolation facility for the affected staffs. Then arrangement was made to isolate the COVID -19 sample collection technicians and first line of health care providers. Throughout the study period, the hospital successfully provided telemedicine service as demanded (100%) by the patients. Also, Transport facility was provided to every first liner HCP as needed (100%).

The first COVID 19 confirmed case was identified on 17th March 2020, was a 5 months old boy. Since the first case, a total of 736 cases were tested in suspicion of COVID-19. Among them male were predominant (n=473, 64%). Regarding the number, male affected more than female (Figure 2). However, among total tested male, 33% were found positive whereas 34% of total tested female found positive. Some test results were reported as 'inconclusive', 'no human RNA found' or 'not enough quantity' probably due to damage during transportation or faulty technique.

During analysis of the positive cases, 62% were children. It was found that less than two years children required admission more for COVID-19. On the other hand, 2 years-<15 years children visited outpatient more and did not require admission and preferred to be treated at home (Table 2).

Figure 3 shows the proportion of Positive and Negative cases in each department. Among the tested population, 86% (n=634) were patients and the rest 14% (n=102) were health care provider from which 31% patients and 50% of the HCP were found COVID-19 positive respectively. Only 1 case expired due to COVID related complications.

Table1: Interventions during COVID-19 pandemic

Infrastructure	
1.	Restricted entry of excess attendant in hospital
2.	Ensuring passage through disinfection chamber while entering the hospital
3.	Providing hand wash and sanitization facility on entering hospital premise and in every defined place inside hospital

Infrastructure	
4.	Segregation of the pediatric wards depending on the presence of COVID like respiratory features and further sub-classification into Red zone [confirmed covid], Yellow zone [respiratory sign/symptoms] and Green zone [safe zone]
5.	Isolated COVID ward for confirmed COVID affected children
6.	Isolation of the immune-compromised patients
7.	Fixed cabin for COVID infected hospital staff
8.	COVID sample collection booth where sample is being collected and sent to Institute of Epidemiology, Disease Control and Research (IEDCR) through CHRf for RT-PCR test
9.	Providing telemedicine facility for mild to moderate illness for ensuring minimum hospital visit
10.	Allowing isolation facility for the COVID sample collection staff in separate cabin for 14 days.
Health Care Service	
1.	Availability of locally made personal protective measures (PPE) for all health care personnel
2.	Ensuring masks for all staff
3.	Making use of mask mandatory for all attendants
4.	Collection of COVID sample from the suspected patients, their parents and hospital staff
5.	Making three groups among health care providers for proper service implementation as well as safety purpose (to ensure 14 days isolation after 7 days duty)
6.	Arranging transport facility for the staff during 'lock down' phase
7.	Providing isolation facility for staffs who were uncomfortable to stay at home (concerning safety of family members) during the asymptomatic period.

Table 2: Age distribution of COVID-19 positive cases

Age group	IPD	OPD
Less than 1 month	7	0
1 month - <6 month	9	3
6 month - <12 month	10	10
12 month - <2 years	20	8
2 years - <5 years	12	20
5 years - <10 years	11	30
10 years - <15 years	4	9
15 years - 18 years	3	1

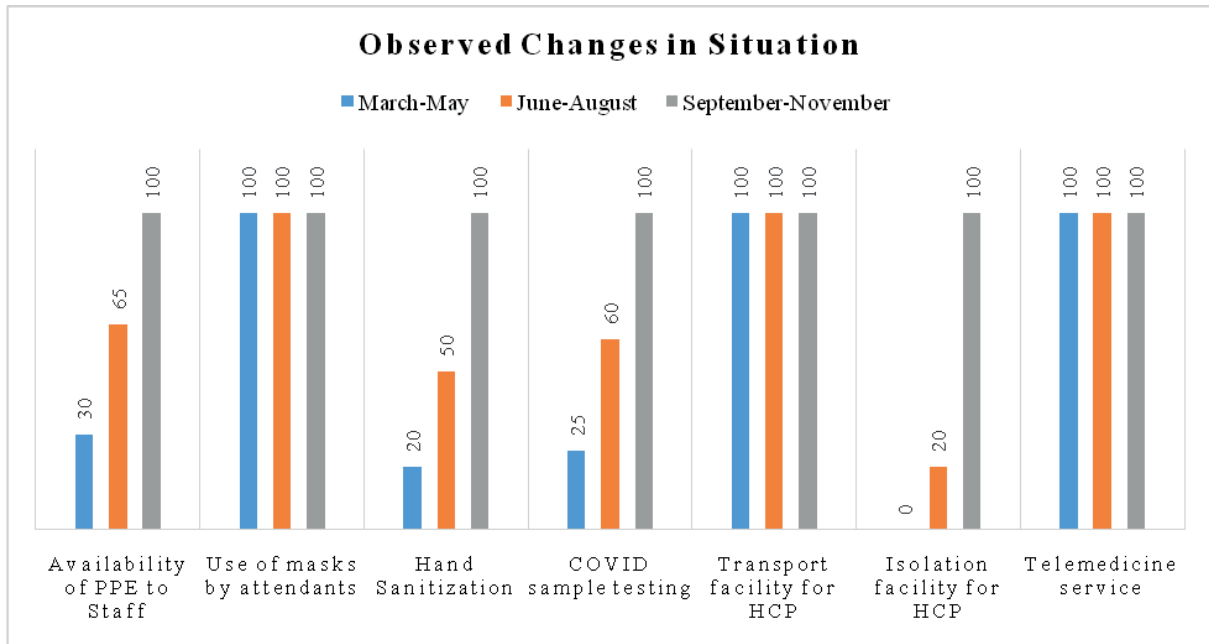


Figure 1: Trends in different service delivery point during COVID-19

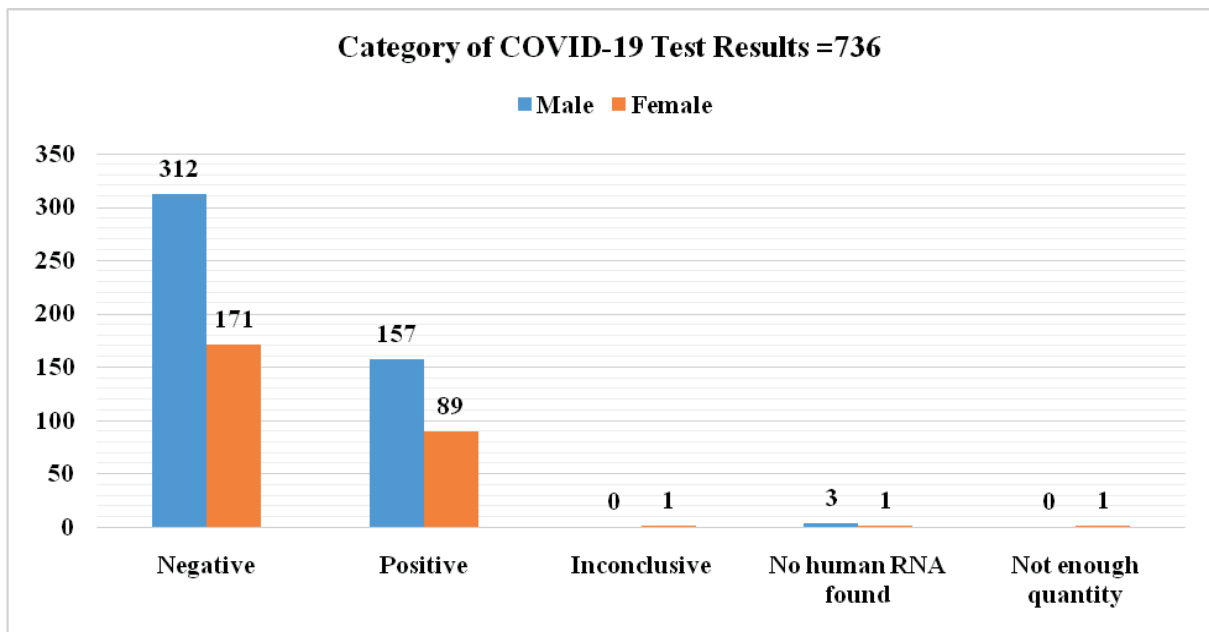


Figure 2: Category of COVID-19 Test Results according to gender

Discussion

As a part of worldwide corona pandemic, Bangladesh found its first confirmed case on 8th March 2020 by Institute of Epidemiology, Disease Control and Research (IEDCR).¹⁹ In order to protect population the Government has adopted several measures and has implemented efficiently. In response to the initiatives taken by the Government, health care facilities all over the country have taken mitigation measures to fight against COVID 19 with limited resources.

Initially there were shortage in testing kits, PPE, masks and infra-red thermometers in the country as well as in health facilities; however, with time, these challenges were overcome.²⁰⁻²¹ Our hospital also had initial shortage of these materials due to unavailability of supply. Over time, local garments started producing PPE at low cost using locally available material and WHO guideline for ensuring quality was maintained. The institute used those PPE to ensure safety of the health care providers. Subsequently, the institute ensured regular supply of the PPE for every staff.

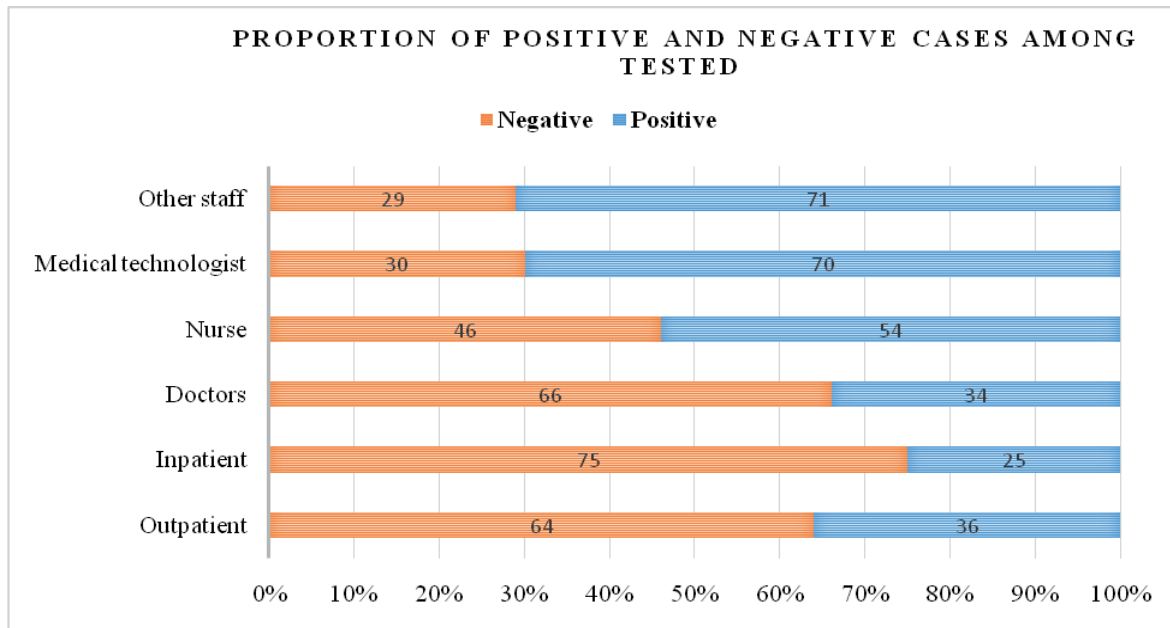


Figure 3: Proportion of positive and negative cases among tested

Hand hygiene has been recommended as an important strategy in prevention of the spread of corona virus. During our observation, we could not offer full hand washing service and hand sanitizers to the health care providers as well as the visitors due to lack of availability. From 3rd month of the study this service was improved from 20% to 50% and at the end reached to 100%. This result is similar with findings of a multi-center study where hand hygiene performance rate increased from 46 to 56% during the stages of pandemic.²²

During the 'Lock down' phase it was difficult for the people to move in emergency situations. Maintaining the Government order, the study institute arranged transport for the health care providers from the beginning which was essential for continuation of the health service.²³ During the pandemic, our hospital has isolated wards for infectious corona positive patients and affected health care workers which is a real learning like all other hospitals worldwide in dealing of infectious diseases.²⁴ Among the studied population, male were found more and this finding co-related with other reports. This may be due to the range of outdoor activities is more among males and thus having an increased risk of being exposed.²⁵ In our study, 85% of the total tested patients were children. It is slightly higher in comparison to other studies may be the fact that ours is specialized hospital for children only.²⁶ Corona pandemic has taught us the importance of rotational duties for the sake of saving resource persons especially

the health personnel.²⁷ Our hospital maintained this system from the initiation of the process and maintained throughout to decrease their risk of being infected.²⁸

Since the inception of the corona emergence, health care providers are working as front liners and it is found that 1 in every 10 health care workers is being infected with the deadly virus as observed in a corona dedicated hospital in Bangladesh.²⁹ Similar picture has been found in other hospitals including ours which is alarming.

Conclusion

Preparedness is the key to address any health crisis and so far, Dr. M R Khan Shishu (Children) Hospital, being a non-profitable private institution for middle and lower middle-income people, have tried all possible measures to combat the situation. Despite numerous limitations, the hospital has expanded the testing facilities for COVID-19 for all the patients as well as health care staff and has identified significant proportion being affected.

Conflict of interest: The authors have no conflict of interest.

Ethical statement: The study was approved by the Ethics Review Board of Dr. M R Khan Shishu (Children) Hospital, Dhaka, Bangladesh.

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Authors' contribution: All authors were involved equally in data collection, manuscript writing, revision and finalizing.

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