

Opportunities and Challenges of COVID-19 Overall Case Handling in Bangladesh: Testing- Isolation- Contact Tracing- Quarantine- Hospitalization



REPORT, SEPTEMBER 2020

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Funded by

Bangladesh Health Watch (BHW)
BRAC James P Grant School of Public Health, BRAC University

Implemented by

Bangladesh University of Health Sciences (BUHS)
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Acknowledgment

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Abbreviations

BDT	Bangladeshi Taka
BUHS	Bangladesh University of Health Sciences
DGHS	Directorate General of Health Services
ERC	Ethical Review Committee
GIS	Geographic Information System
ICU	Intensive Care Unite
IDIs	In-depth interviews
IEDCR	Institute of Epidemiology Disease Control and Research
IPC	Infection Prevention and Control
KIIs	Key Informant Interviews
MOHFW	Ministry of Health and Family Welfare
PPE	Personal Protective Equipment
SSC	Secondary School Certificate
WHO	World Health Organization

EXECUTIVE SUMMARY

Introduction: COVID-19 is a highly infectious disease causing a worldwide pandemic situation declared by World Health Organization (WHO) on March 11, 2020. It is a severe acute respiratory infection caused by a novel evolving virus causing the severe acute respiratory syndrome, in other words, called (SARS-CoV-2). Bangladesh confirmed the first case of Coronavirus on March 8, 2020. COVID-19 infection numbers are reported from the Directorate General of Health Services (DGHS) daily with confirmed positive cases and deaths having community transmission (dated March 28, 2020). Though there is no confirm treatment or vaccine for it, still prevention and early detection (test) is the best way. Institutional or home-based quarantine for suspected cases and institutional isolation for confirmed cases can play a significant role in facing deadly COVID-19. DGHS has started the COVID-19 case management system through quarantine - testing - isolation - and then admitting the positive patients if there is a need. This process of patient management is very new. Its opportunities and challenges need to be assessed to strengthen the country's overall COVID-19 case management system.

Objectives: To find out the opportunities and challenges to enhance the COVID-19 case management system in Bangladesh

Methods: This study was a qualitative study conducted in the different hospitals of all eight divisions in Bangladesh within two months. We used the purposive sampling technique. A total of 23 Key Informant Interviews (KIIs) from the direct service providers (both doctors, nurses, and other health care providers) from 8 divisions (6, from Dhaka division and 17, from other seven divisions), and a total of 24 in-depth interviews (IDIs) was conducted among the COVID-19 treated patients and their attendants (8 from Dhaka division and 16 from other seven divisions) who already received the services from the selected hospitals. Besides this, opinions from 4 relevant Experts (MOHFW appointed Dhaka, Chittagong, Sylhet, and Mymensingh divisional Expert) was also collected. Thematic analysis was done to present the data, and the findings were presented under few themes like: 'COVID 19 infection in Bangladesh'; 'Testing'; 'Contact Tracing'; 'Isolation'; 'Quarantine'; 'Hospital management'; and 'Capacity Building.' Ethical approval was taken from the Ethical Review Committee (ERC) of Bangladesh University of Health Sciences (BUHS).

Results: This study uncovered very limited, confined, dissatisfied, and unfavorable opportunities of the system of keeping in-home or institutional-based quarantine for the people at risk; the system of keeping in-home or institutional-based isolation for the positive cases; and the system of the referral and admission of confirming COVID-19 patients in the hospitals from all of the different types of participant's point of views. It has also reflected that these scenarios were due to varying types of challenges and mismanagement from the authority and the mass population. Moreover, the inability to differentiate between quarantine and isolation and insufficient and inappropriate restorative measures among the patients and attendants, and the lack of proper infrastructure, living facilities, and livelihood support significantly increased the burden of challenges. However, the study's Experts showed the avenue of opportunities to strengthen the COVID-19 case management system to overcome the situation by planning or reforming and implementing national action plans and guidelines with local community engagement and vigorous enforcement of laws with proper monitoring.

Conclusions: A mixed scenario was explored regarding the hospitals' COVID-19 case management system, reflecting a partially resource deficient and unorganized management system in the hospitals throughout the country. The Key informants behind this scenario highlighted a lack of monitoring system, lack of law enforcement, inadequately trained healthcare providers, and a lack of local community engagement. Also, delayed and inadequate testing, absence of contact tracing, insufficient and improper quarantine and isolation procedure, the inadequacy of medical supplies, facilities, and services, lack of knowledge and awareness among the population, etc., increased the barriers challenges of COVID-19 case management system. Tackling these barriers and challenges may bring potential future opportunities for strengthening the COVID-19 case management system in Bangladesh more efficiently.

BACKGROUND

Health systems in both developed and developing countries are now struggling to respond to the challenges posed by Coronavirus Disease-2019 (COVID-19) pandemic. As of September 29, 210 countries and territories have been affected by the pandemic, with more than 33,249,563 cases and 1,000,040 deaths globally (WHO, 2020). With the outbreak of COVID-19, the entire world is working to address it as an international public health emergency. As the outbreak quickly surges worldwide, many countries adopt non-therapeutic preventive measures, including travel bans, remote office activities, country lockdown, and, most importantly, social distancing. However, these measures face challenges in Bangladesh, a lower-middle-income economy with one of the world's densest populations, where a significant proportion of the total population lives hand to mouth; lockdown is not a feasible idea. Social distancing is also difficult in many areas of the country, and with the minimal resources the country has, it would be very challenging to implement mitigation measures. Mobile sanitization facilities, temporary quarantine sites, and healthcare facilities could help mitigate the pandemic's impact at a local level. **(National Guidelines on Clinical Management of COVID-19, 2020).**

Coronavirus's first case in Bangladesh was confirmed on March 8, 2020, and the first death on 18th March, 2020. In the first three weeks after detecting the first COVID-19 case in Bangladesh, the IEDCR was the sole diagnostic facility in the country of 180 million people, and the daily testing rate persisted below 100 per day (Dhaka Tribune, 2020). Five weeks after detecting the first COVID-19 case in Bangladesh, the IEDCR had only tested 11,223 people, constituting approximately 68 tests per million population **(DGHS press release, 2020; Worldometer, 2020)**. The centralization of COVID-19 diagnosis facilities is somewhat plausible, as most hospitals do not have enough personal protective equipment (PPE). However, this left the mass of people and healthcare workers in a susceptible condition. Bangladesh had a severe shortage of testing kits, PPE, masks, which only covered a small portion of the country's actual needs **(Chowdhury SI, 2020)**. Due to the combined lack of PPE and diagnostic testing capacity, fear and anxiety geared up among the mass population, and many healthcare workers refused to provide any service **(Anwar S. et al., April 2020)**.

Following the detection of the first few COVID-19 cases in early March, Bangladesh has stepped up its efforts to strengthen the healthcare system's capacity to avert a crisis in the event of a surge in the number of cases **(Khan MHR et al. May 2020)**. Bangladesh has started preparing to control and contain its pandemic based on the National Preparation and Response Plan. As a part of the preparation process, a guideline on clinical management was developed by the Bangladesh Society of Medicine in late January 2020. Nevertheless, the number of cases per million exceeds the number of available isolation beds per million in the major hotspots, indicating a risk of the healthcare system becoming overwhelmed. It is especially true for the Dhaka Division, where the ratio of COVID-19 patients to doctors appears to be alarmingly high. Among the eight divisions, prevalence is uppermost in the Dhaka Division, followed by Mymensingh and Barishal. With partial resources, expanding healthcare capacity remains a challenge for Bangladesh. There are about one hundred hospitals with ICU facilities in Bangladesh, and 80% of them are situated in Dhaka **(“Message from president. Criticon Bangladesh 2018”, 2018)**. Hospitals in Bangladesh presently have a total of 1,169 ICU beds. 432 are in government hospitals, and only 110 are outside the capital Dhaka, and 737 are in private hospitals **(Khan & Hossain, 2020)**. According to "The Daily Dhaka Tribune," on March 21, 2020, Bangladesh currently has a total of 141,903 hospital beds or 0.84 beds per 1000 people. Whether these resources are adequate to tackle the COVID-19 pandemic needs more in-depth analysis. This paper tries to determine the opportunities and challenges needed to strengthen the COVID-19 case management in Bangladesh through a qualitative approach.

OBJECTIVES

- To identify the system's opportunities and challenges of keeping the people at risk in-home or institutional-based quarantine.
- To identify the opportunities and challenges of the system of keeping positive patients in-home or institutional-based isolation.
- To identify the referral and admission process's opportunities and challenges to confirm COVID-19 patients in the hospitals.

METHODS

Study Settings

A qualitative study was conducted to identify the opportunities and challenges of Bangladesh's health system during this COVID-19 pandemic situation involving the service providers, service users, and Experts. The study involved the few COVID dedicated hospitals in eight divisions (Barisal, Chottogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet) of Bangladesh. It was completed within two months, from June 15 to August 15, 2020 (**Annex-1**).

Table 1: Distribution of the data collection sites

Division Name	Data collection area	Participant Types	
Barisal	Barisal Sher E Bangla Medical College & Hospital	Nurse-1	
	Barguna General Hospital	Patient-1 Physician-1	
Chottogram	Cox's Bazar Sadar Hospital	Nurse-1 Physician-1	Advisor-1
	Chottogram Medical College	Patients-1 Physician-2	
	Cumilla Medical College & Hospital	Patient-1 Attendant-1	
Dhaka	Dhaka Medical College Hospital	Physician-1	Advisor-1
	Bangabandhu Sheikh Mujib Medical University	Nurse-1	
	Shaheed Syed Nazrul Islam Medical College	Patient-1	
	Mirpur Maternity Hospital	Patient-1 Attendant-1	
	National Chest Infectious Diseases Hospital	Patient-1	
	Reagent Hospital, Mirpur	Patient-1 Physician-1	
	Kuwait Bangladesh Friendship Government Hospital	Patient-1 Physician-1	
	Bashundhara Isolation Centre	Nurse-1	
	Faridpur Medical College & Hospital	Patient-1	
	Sarkari Kormochari Hospital	Attendant-1	
National Institute of Laboratory Medicine and Referral Center	Physician-1		
Khulna	Khulna Diabetic Hospital	Physician-1 Nurse-1	
	Khulna Medical College	Patient-1	
Mymensingh	Mymensingh Medical College Hospital	Physician-1, Nurse-1 Patient-1, Attendant-1	Advisor-1
Rajshahi	TMSS Medical College	Physician-1, Nurse-1, Patient-2, Attendant-1	
	Rafatullah Community Hospital, Bogra	Physician-1, Patient-1	
Rangpur	Upazilla Health Complex, Ranisankail, Thakurgaon	Physician-1, Nurse-1 Patients-2, Attendant-1	
Sylhet	Shahid Shamsuddin Ahmed Hospital	Patients-2, Attendants-1 Physician-1, Nurse-1	Advisor-1

Study population

Representatives of key stakeholders related to the COVID-19 management directly or indirectly were included in the study. They were service providers (physicians, nurses), service receivers, including patients who had been treated as COVID positive, their attendants, and MOHFW appointed divisional advisers. The participants were selected purposively based on access to the study team to these participants.

Data collection procedure

Due to the COVID-19 pandemic, the data was collected from the service providers and users through telephone interviews outside the Dhaka division. In the Dhaka division (Epicenter for COVID-19), both telephone and face-to-face interviews were conducted using a guided questionnaire and prefixed interview schedule (**Annex: 2a to 2c**). The interviews were recorded with the permission of the respondents.

Total 23 Key Informant Interviews (KIIs) with the direct service providers (both doctors and nurses) from 8 divisions (6 from Dhaka division and 17 from the other seven divisions) were conducted. Moreover, 24 in-depth interviews (IDIs) were conducted among the COVID-19 treated patients and their attendants (8 from the Dhaka division and 16 from the other seven divisions) who already received the services from the selected hospitals. Besides this, opinions from 4 relevant Experts (MOHFW appointed Dhaka, Chottogram, Sylhet, and Mymensingh divisional Experts) were also collected. Data collectors were recruited to conduct the interviews and their transcription, who worked along with the investigators. Though we approached almost all Dhaka city participants for face-to-face KIIs and IDIs, we succeeded only for seven. Due to the COVID situation, the rest denied face-to-face interviews but agreed to a telephone interview. In the case of face-to-face KIIs and IDIs, both data collectors and participants used maximum PPE protection.

Though we had an intention, we could not visit a quarantine center (Dhaka Hajj Camp) to see the arrangement and services they are providing as we failed to manage the permission from the concerned authorities.

Thematic analysis was done for data presentation. After transcribing the interviews from the record, it was organized under different themes, including 'COVID 19 infection in 'Bangladesh,' 'Testing,' 'Contact Tracing,' 'Isolation,' 'Quarantine'; 'Hospital ' management'; and 'Capacity Building.'

Table 2: Distribution of the participants according to the divisions and nature of the interview (KIIs or IDIs)

Divisions	Key Informant Interview (KII)		In-depth interview (IDI)	Total
	Service providers (Participants: Physician and Nurse)	Expert's opinion (Participants: MOHFW appointed divisional Advisor)	Service users (Participants: patients and their attendants)	
Barisal	2	0	1	3
Chottogram	3	1	3	7
Dhaka	7	1	8	16
Khulna	2	0	1	3
Mymensingh	2	1	2	5
Rajshahi	3	0	3	6
Rangpur	2	0	3	5
Sylhet	2	1	3	6
Total	23	4	24	51

RESULTS

Socio-demographic information of the participants

The overall participants of the study were categorized as healthcare providers (physicians and nurses), healthcare receivers (patients and patient's attendants), and Experts (MOHFW appointed divisional Advisors). All the physicians were men, nurses were mostly women, patients and their attendants were primarily men, and all the Experts were men. The age of the physicians and nurses ranged from 26 to 48 years, reflecting the young to middle adult age group, it was 23 to 64 for patients and their attendants reflecting the same age group as physicians and nurses, and it was 57 to 62 years for the Divisional Experts reflecting middle adult age group. Most of the patients and their attendants completed Secondary School Certificate (SSC) or more were employed.

Table 3: Socio-demographic information of the participants

Characteristics	Targeted participants and number (51)		
	Physicians and nurses	Patients and their attendants	MOHFW appointed divisional Expert
	23 (13 + 10)	24	4
Sex			
Men	16	20	4
Women	7	4	-
Age (in years)			
Below 30	10	5	-
30 to 49	8	6	-
50 and above	-	5	4
Education			
Below SSC		3	
SSC and HSC		7	
Graduation & +		6	
Occupation			
Employed		13	
Business		3	
Others		2	
Monthly family income (in BDT)			
Below 20,000		7	
20,000 & +		4	

SSC= Secondary School Certificate; HSC= Higher Secondary School Certificate; BDT= Bangladeshi taka (currency)

Findings of thematic Analysis

The participants (service providers, service users, and the Experts) expressed their views regarding the management system and prevention of COVID-19 infection in the country, organized under different themes, and presented descriptively using direct speech quoting and case stories. Except for one, all of the service users were treated in the hospitals.

COVID-19 infection in Bangladesh

Kills:

Reasons for spreading COVID-19 infection:

Regarding the reasons for spreading COVID-19 disease among the general people, the Experts highlighted the lack of monitoring from the administration and law enforcement agencies enforcement. They also underlined the behavior of general people like not maintaining the social distance, doesn't wear the mask, doesn't follow the handwashing procedure, doesn't follow the quarantine instruction properly, breakdown of the lockdown instruction.

About the spreading of infection among the health care providers, the Experts identified inadequate supply of PPE, low quality of PPE, lack of knowledge on COVID-19 infection prevention and control (IPC) law, lack of training on IPC and PPE use, no negative pressure room for PPE change (donning & doffing), inappropriate disposal of PPE as the main reasons. They said, 'doctors didn't follow the appropriate steps to prevent COVID-19 spread, and the donning and doffing of PPE' weren't appropriate. A flawed hospital waste management system is another cause as nobody is monitoring about spreading of COVID-19 from the hospital waste.

In this aspect, one mentioned!

“ You will find a hanged towel besides every basin in the hospital rooms. Even after disinfecting their hands using sanitizer or soap water, doctors/nurses may get infected if they use the infected towel. ”

COVID-19 Testing

Availability of COVID-19 testing facilities:

Whether COVID-19 testing is adequate or not in Bangladesh, the respondents gave their views in this regard. Almost all (100%) agreed that the testing of COVID-19 in Bangladesh was inadequate from the very beginning till the date. Regarding the possible reasons for insufficient testing of COVID-19, they mentioned that lack of testing facilities (laboratories) and kits, deficiency of technologists or technicians, lack of COVID-19 testing skill and lack of monitoring for quality of Corona testing, reporting delay, a public gathering in testing sites, fear of getting infected from the testing sites.

Kills:

“ We failed to do sufficient number of testing that WHO emphasized on and also failed to keep them in isolation after testing. ”

“ Initially, the COVID-19 test was free of cost. But now it requires 100 BDT (in the Govt. hospitals). So now, people are not complying with this. Also, gradually a phobia was developed within the people regarding being infected by Corona virus while going for testing. ”

IDs:

Most (80%) of the service users had little knowledge of COVID testing, like, where the testing can be done? What is the procedure of testing? Whether any chance of getting infected from the testing site? What is the benefit of testing?

A little over half (60%) of the service users were not interested in testing due to the social stigma and fears of separation from the community people and family members.

Few (20%) of the service users had bad experiences due to false-negative testing results as they did test three times, and only the last time they were confirmed as COVID positive. They also complained about the delay in getting test results. One of them said that he received positive test results after 12 days when the symptoms had disappeared, and the treatment course was almost finished.

Most (85%) of the attendants reported that they did not test themselves as they did not have any COVID like symptoms. Even no one had suggested that they have to do the COVID test despite having COVID like symptoms.

The majority (60%) of the service users thought that the testing facilities should be at their doorstep or mobile. Some of them said that they had to go to other districts through public transport, an ill condition for testing as it was absent in their district, leading to COVID spreading.

CASE REPORT-1

A 50 YEARS OLD JOB HOLDERS FROM BORGUNA TOLD LIKE THIS THAT WHEN HE CONFIRMED AS COVID POSITIVE, HE DID NOT TESTED OTHER FAMILY MEMBERS IN SPIE OF HAVING THE COVID LIKE SYMPTOMS. HIS PERCEPTION WAS, ALL WERE COVID POSITIVE AND THEY ALSO NEED THE SAME TREATMENT LIKE HIM.

Contact Tracing

KIIs:

All (100%) respondents reported that proper contact tracing reduces the health care burden due to COVID-19. Without contact tracing, COVID prevention and control is impossible. For contact tracing, they advised a team to be put in place at every Upazila level, and they need to know it. One Expert mentioned,

“ We need 100 times more testing compare to current number of testing as a lot of asymptomatic cases persists.” and
“At the beginning of the infection we successfully did contract tracing, and after that we failed due to a lot of people came from Europe especially from Italy.”

According to the Expert's complete local patient information system regarding the total number of patients, the total number of isolated cases, or the total number of quarantined people was absent. There was no patient transport management system in an emergency. It required time-bound action for emergency patient management, but there was no system in terms of time-bound action.

IDs:

One service user informed that when he was confirmed as COVID-19 positive, his family members were not tested. Another service user said-

“ As my result was positive all of my family members performed tests ”

All (100%) the service users reported that when they became COVID positive, no one came to them to know about the persons who came in contact with them.

Isolation

KIIs

Institutional isolation:

When asked about the institutional isolation procedure, all the respondents (100%) said it was not followed appropriately. Evaluating the possible reasons for inappropriate institutional isolation procedure in Bangladesh, several potential reasons were explored as follows -

The main reason is the inability to differentiate between quarantine and isolation. If it could determine, the spread would be less. Like one of the Experts mentioned:

“ In our country, people couldn't differentiate between quarantine and isolation. ”

If they could find out the positive cases from quarantine, the quarantined population would be less as the positive cases would go for isolation, and they would stay separated. We couldn't be able to make proper coordination regarding these two different processes. There was also no coordination regarding isolated corona wards in hospitals and the dedicated hospitals for corona treatment.

Lack of infrastructure, lack of monitoring by the administration, and law enforcement agencies were other reasons.

Home isolation:

Similar to the context of institutional isolation, the Experts also thought that the home-based isolation procedure was not followed appropriately in our community. As possible reasons, an Expert emphasized on lack of community engagement besides lack of monitoring by the administration and law enforcement agencies. The remaining Experts also reported it as similar to institutional isolation.

IDIs:

Most (90%) of the service users treated at home thought they had maintained isolation strictly. They were in a separate room with an attached bathroom, which indicated their good socioeconomic status. They used different amenities than others. For their entertainment and communication, they used their mobile phones with the internet. They received services from the younger persons of their home. Most (95%) were admitted to the hospitals for better treatment with the disease progression.

Few reported that they stayed in the same room and could not maintain distance as they had space limitations. Nevertheless, they tried to use masks always. During home isolation, all of them received treatment over mobile phones from doctors. Some of them received advice from their relatives who were from a medical background.

CASE REPORT-2

A 32 YEARS GOVERNMENT OFFICERS REPORTED THAT HE HAS TO STAY IN THE GOVT. STAFF QUARTER AND HIS FAMILY STAY IN DHAKA. WHEN HE CAME TO KNOW ABOUT COVID POSITIVE. HE STAYED IN THE QUARTER UNTIL HE BECAME NEGATIVE. DURING HIS ISOLATION PERIOD HE PASSED HIS TIME READING, LISTENING TO MUSIC, GOSSIPING WITH FAMILY MEMBERS OVER MOBILE PHONE, AND PRAYING. HE THOUGHT THAT INITIALLY FIRST 2 TO 3 DAYS HE WAS TRAUMATIZED AS HE WAS ALONE WHEN HE CAME TO KNOW HIS REPORT. AFTER THAT IT WAS OK TO HIM AND HE WAS NORMAL AND RECEIVED TREATMENT FROM THE DOCTOR OVER PHONE. HE DID THE PHYSICAL EXERCISE REGULARLY AND HE THOUGHT IT HELPED HIM TO RECOVER QUICKLY.

Community engagement:

KIIs:

All (100%) Experts strongly emphasized the community engagement for successful home isolation and quarantine, as they mentioned.

“ There was no monitoring of the quarantine and isolation system by the local community. Therefore, home quarantine & isolation were not done properly and we also failed to do so in the urban area. ”

Promoting the individual's health awareness could significantly impact strengthening the COVID-19 case management system: Community people can ensure proper home quarantine and isolation through monitoring, by ensuring all necessary supplies, by guaranteeing treatment at the critical moment. Even they can build community isolation or quarantine centers with minimal facilities. They can provide food to the affected people through community kitchens like in Kerala, India. What happened in Tolarbagh, Mirpur, Dhaka was the best example of community engagement. Community people did everything for the affected people so that they could stay in their homes. The community volunteers shopped all the necessary and emergency goods like foods and medicines for the COVID positive patients and their family members. They collect money from all community people, and they established a community kitchen in the local mosque area with the help of Imam and security guards. Besides this community, peoples also voluntarily donated many goods there like rice, vegetables, fruits, dals, oils, meats, etc. They regularly distributed the cooked food to the COVID affected families and poor's successfully in that area.

CASE REPORT-3

AN ORGANIZATION NAME POCAA (PLATFORM OF COMMUNITY ACTION AND ARCHITECTURE) HAD TAKEN AN INITIATIVE NAMED “ALADA GHAR” FOR COVID-19. THEY DESIGNED THE SPACE VERY NICELY SO THAT NO ONE NEEDED TO COME INTO CONTACT WITH OTHERS. THEY IMPLEMENTED SCHOOL AND COLLEGE BASED QUARANTINING AND ISOLATION PROCEDURES. THERE, THEY DEMONSTRATED HOW TO USE ROOM, TOILET AND OTHERS, AND THEY MONITORED THE PERSONS SUCH AS WHEN BREATHING DIFFICULTY APPEARS, WHEN PATIENTS NEEDED TO BE TAKEN TO HOSPITALS ETC.

THEY UNDERTOOK THIS INITIATIVE FOR THE POOR PEOPLE WHO HAVE LIMITED RESOURCES.

Example of local engagement and arrangement

The Anti-Corruption Commission Chairman asked the consultant physician of Borguna (his hometown) District Hospital about their requirements. The physician asked for few pulse oximeters. Then the Chairman provided total 16 pulse oximeters, and the physician managed the patients with these 16-pulse oximeters.

Quarantine

KIIs:

Home and Institution-based quarantine:

Whether quarantine (institutional and home-based) procedure was maintained appropriately for expatriates, the Divisional Experts expressed different views. Regarding possible reasons for inappropriate institutional quarantine, all (100%) of the Experts indicated people's reluctance and lack of knowledge of COVID-19, inadequate facilities in the quarantine centers, and lack of monitoring administration and law enforcement agencies.

People were not appropriately informed about why this quarantine center was set up and about the spread of COVID-19 infection.

Evaluating the possible reasons for inappropriate home-based quarantine, the respondents directly or indirectly indicated scarcity of space at home; the COVID positive person went outside as he or she was only the earning person of their families, if they did not attend the workshop, they would remain hungry and, lack of financial support.

CASE REPORT-4

ONE RELATIVE OF MY SON WHILE COMING FROM ABROAD, HE WAS ASKED SOME QUESTIONS BY THE AUTHORIZED PERSON ABOUT HIS DEPARTURE PLACE, TIME OF FLIGHT, WHETHER ANY HISTORY OF FEVER AND COUGHING. THEN THE AUTHORIZED PERSON FILLED UP A PAPER WITH THIS INFORMATION. THAT PAPER WAS ACTUALLY THE COVID-19 QUARANTINE FORM WHEREAS, ALL OF THE QUARANTINE RELATED INFORMATION SUCH AS WHY AND FOR HOW LONG THIS QUARANTINE, WERE WRITTEN. HOWEVER, THE AUTHORIZED PERSON DIDN'T DESCRIBE ANYTHING VERBALLY. WE COULDN'T DEVELOP QUARANTINE MANAGEMENT SYSTEM PROPERLY.

“ Here, the community engagement wasn't proper. There was no proper monitoring of the quarantine system by the local community with making small groups. Therefore, quarantining, isolation and treatment which was assumed to be done at home weren't done properly. ”

Also, there was confusion about home-quarantine and home-isolation, as there was a lack of follow-up procedures. The respondents mentioned that the urban quarantine system could not be established quickly, like in a rural setting. At the Upazila and rural level, sometimes health workers visited the homes and did follow up, and the authority could lock few houses down. However, in the urban areas, that could not be done, even in cases where people died at home. One respondent also reported the absence of functional 'public' primary health care in urban areas and lack of planning" in this context; most of the experts opined that community quarantine center is established for people who have limited space in their home; people need to be forced to stay at home by the law enforcement agencies. 50% of respondents recommended that monetary support and quality food be provided to the community-based quarantined individual or family from the Government and local authority; community engagement and NGO support were also needed. People should be made aware mainly of the benefits and risks of home quarantine.

One Expert mentioned:

“ The underprivileged people should be fed by the community group or engagement ”

The Experts emphasized the development of proper guidelines for maintaining institutional quarantine and isolation. Because the mentality of a home-based quarantine system has not been developed yet among the people in Bangladesh.

When the physicians and nurses were asked about the self-quarantine at home after completing his hospital duty, most (91%) reported that their hospital authority provided accommodation facilities for themselves in selected hotels or the hospital dormitory hostel with a meal facility. They mentioned that, after completing their duty, they underwent a COVID-19 test after five days, and they are allowed to go home if the result was negative.

A 26 years old nurse said:

“Previously, our hospital authority managed hotels to keep us in quarantine. And now, the hospital dormitories have been managed for us. We will be kept there for 14 days followed by a COVID-19 test. If test result is negative, then we can go home. And, we will also be self-quarantined for another 6 days in our home.”

However, some of them had to stay with their family, keeping themselves separated from the other family members.

A 42 years old nurse mentioned:

“Yes, I maintain self-quarantine at my home. As my husband is a diabetic patient, I don't want to put him at potential risk. So, I stay in a separate room alone.”

One nurse mentioned that home quarantine could not be ensured, only the infected staff were disinfected, and the self-hygiene protocol was followed. During analysis, dissimilarity was found in the doctors' duty roster in different hospitals. In some (40%) hospitals, a 10-day duty roster was followed by 14-day quarantine at the hotel, followed by a 7-day quality period with family, and then back to the duty again for ten days. However, other hospitals did not follow the same.

A 36 years old physician reported:

“Talking about me, I have to go to the hospital on every single day. So, it's not possible for me to spend 14-days quarantine period at the hotel. In that case, senior citizens of my family are staying at different floor other than me and I am wearing mask at home too to ensure safety.”

IDs:

Maintenance of home quarantine after discharge from hospital:

None of the attendants reported maintaining home quarantine properly after discharge from the hospital. Moreover, the possible reasons for that were that they would not be affected, and no one told them that they would have to maintain 14 days quarantine after the discharge. Some (30%) reported that it was impossible to maintain quarantine as they had limited space in their homes. Some (20%) of them said that they have to earn their food to eat.

For example, an attendant stated:

“ Each and every person of my family went to hospital for my father. I went too. ”
So, it was not possible to maintain quarantine.

Another one said:

“ As I didn't have any symptoms, so I wasn't in home quarantine ”

Another 30 years old patient-cum-attendant mentioned:

“ All five members of our family were COVID positive. So, we all used to stay together ”

Accommodation for the attendants:

Few (30%) of the patients' attendants reported no residential facility for the hospitals' attendants. In comparison, some (40%) reported getting the facility to stay in a separate room, and few (30%) remained in the same place with the patients.

An attendant stated:

“ There was no residential facility at the hospital for the attendants. If anything was required for the patient, the hospital authority used to call the attendants over phone followed by collection of the required things from them at hospital gate. ”

Another attendant mentioned:

“ I was with my father all the time. It was not possible to maintain distance or other formalities with my father. ”

Regarding safety, 90% of attendants said they used various sorts of self-protective equipment during their hospital stays, like N95 masks, hand gloves, and protective glasses. Furthermore, this PPE they had to purchase on their own. The hospital authority did not provide any PPE or proper counselling for protection.

Example of quarantine using the local technique

At the very beginning of the COVID 19, when we faced a lot of difficulties to control spread of the infection, at that time tribal population in the hill track at Bandarban district ensured separate and temporary house for the each and every single family members came from their work places from different districts and they bound all to stay there for 14 days, and that's why COVID 19 is still control there compare to the plain land area.

CASE REPORT-5

A 30 YEARS OLD ATTENDANT REPORTED THAT WHEN HE CAME TO THE HOSPITAL FOR HIS FATHER COVID TREATMENT, HE ASKED THE DOCTORS WHO WILL TAKE CARE OF HIS FATHER AT NIGHT AS HIS FATHER HAD SOME COMORBIDITY. THEN THE DOCTORS SUGGESTED ANY ONE FROM THE FAMILY WHO WERE YOUNG AND DO NOT HAVE ANY COMPLICATION OR COMORBIDITY COULD STAY WITH THE FATHER. AS AT NIGHT NO ONE WILL VISIT UNLESS ANY EMERGENCY SITUATION ARISE. NURSES GAVE INSTRUCTIONS OVER PHONE FOR MEDICATION. HOWEVER, THEY WERE VERY PLEASED WITH THEIR SERVICES AND BEHAVIOR OF THE SERVICE PROVIDERS.

Hospital Management of COVID-19 Patients

IDs:

Difficulties faced to get admitted into a hospital:

When asked about the institutional isolation procedure, all the respondents (100%) said it was not followed appropriately. Evaluating the possible reasons for inappropriate institutional isolation procedure in Bangladesh, several potential reasons were explored as follows -

The main reason is the inability to differentiate between quarantine and isolation. If it could determine, the spread would be less. Like one of the Experts mentioned:

In this regard, a mixed sort of scenario was reported by the patients. Although all (90%) reported that they did not face any difficulties, a few (10%) reported little hassle and problems during admission. Those referred from another hospital as a COVID-positive case or showed the positive report themselves got admitted readily.

KIIs:

Management of hospital admitted patients:

Regarding patient handling, the physicians mentioned two different systems prevailing-

- In General hospital – the first patient attends the emergency, is tested for COVID-19, and then referred to the COVID dedicated hospital if tested positive. It is one of the possible reasons for delayed treatment.
- In COVID dedicated hospital – when patients attend the emergency, medical officers sort out the patients as positive/negative/suspected based on their symptoms and advise admission if they fulfil the hospital guideline's admission criteria. Patients with mild to moderate symptoms are admitted to the ward, and patients admitted in the emergency department with critical status are referred to the ICU unit.

CASE REPORT-6

A PATIENT FACED LOTS OF DIFFICULTIES. DURING ADMISSION, THEY JUST HANDED OVER THE ADMISSION FORM TO ME AND SAID GO TO THE WARD AND GET ADMITTED. THEY DIDN'T MENTION IN WHICH WARD, WHERE IS THAT WARD, WHETHER THE SEAT/BED IS ALREADY PREPARED OR NOT. THEY SHOWED A WARD BOY. THEN THE WARD BOY INSTRUCTED TO GO TO 2ND FLOOR, THEN TO FIND OUT THE CORONA WARD, AND TO CHOOSE ANY BED AS MY WISH. I DID ALL THE TASKS MYSELF. THERE WAS NO DOCTOR. JUST THE DOCTORS SENT FEW MEDICINES".

Regarding the components of the COVID-19 case management system:

the service providers mentioned that the primary care management system includes ICU support, oxygen support, ventilation, maintaining social distance, and maintaining the doffing area. They also had all the PPE that they use to protect themselves, like face shields, gloves, head cover, mask, surgical mask, N95 mask, surgical gloves, PPE, gumboot, shoe cover as the components of the case management system.

Practicing COVID-19 case management protocol:

Regarding whether the COVID-19 case management protocol was practiced adequately or not, mixed responses were found among the physicians and nurses. More than half (56%) reported that they practiced; a few (20%) said they did not practice. The others (24%) practiced with some limitations (means followed the protocol partially like they used the medicines as per the protocol but sometimes added or deducted few drugs and increased or decreased the doses based on the sign and symptoms as well as sometimes, they used their skill also for the treatment.

Those who practiced the protocol stated by a 36 years old physician:

“ We are following 100% of the Govt. protocol of COVID-19 case management system. We have adjusted the protocol based on the local availability”. A 26 years old nurse mentioned, “Yes, at first we had some lacking, but now we are providing all sort of necessary things. ”

“ Yes, I think these are practiced in our hospital. We have adequate PPEs and other facilities. But here, we are in shortage of manpower. There is one service provider against 15-20 patients, *stated a 29 years old nurse!* ”

“ Actually, maintaining the full protection procedures for patients and attendants is a quite tough job. We have room for PPE donning and doffing but there isn't any maintaining system, so it's ultimately useless. ”

Few of them reported that they did not practice or unable to practice adequately. One physician stated:

“ Being a govt. hospital, we have huge manpower but for managing COVID-19 patients, we lag behind due to lack of oxygen supple and masks. We can't provide better ICU support and can't supply oxygen for more than 15 liters. ”

CASE REPORT-7

A 32 YEARS PHYSICIAN REPORTED THAT WHEN A PATIENT COMES WITH COVID-19 SYMPTOMS, HE/SHE IS REFERRED TO THE ISOLATION UNIT. THEN A COVID-19 TEST IS DONE, IF THE REPORT IS POSITIVE THEN HE/SHE IS REFERRED TO THE DEDICATED CORONA HOSPITAL FOR ADMISSION. THAT HOSPITAL WILL PROVIDE CORONA TREATMENT. WE ALSO COUNSEL AND MOTIVATE THE CORONA PATIENTS AND GIVE MENTAL SUPPORT MOSTLY, AS THEY BECOME MENTALLY WEAK, PSYCHOLOGICALLY DEPRESSED”.

Some of the respondents reported that the beds' gaps are not enough to maintain safety protocol in the corona ward. Moreover, they could not manage to provide the residential facility to the attendants.

Existing facilities in the hospitals:

The physicians and nurses reported both positive and negative views regarding the existing facilities in the hospital. The cause of this difference was that different hospitals had different facilities available for COVID-19 management. Some (40%) of them mentioned that ICU, CCU, central oxygen supply system were available, some (35%) reported not available (either they had the ventilators but not working or they were working with alternatives like working with oxygen cylinder instead of central oxygen supply system) rest of them not answered (they refused to talk about this issue and referred to the hospital authorities) about this.

A physician mentioned:

“We have all facilities for COVID 19 positive patients. Even if they need surgery, gynecological or other medicine support we can provide them all. If any child becomes positive, we have especial pediatric corona unit for”

A 28 years old physician also expressed their inability to provide service properly despite having plenty of workforces.

Medical equipment supplies:

Regarding the supply of medical equipment, most (85%) physicians and nurses reported that their hospitals did not have adequate medical supplies such as PPEs like N-95 masks, hand gloves, shoe covers, oxygen delivery devices, and few medicines. Sometimes they needed to buy a few things personally for themselves or need to reuse. Some (40%) of them was expressed their concern about the quality of the PPEs. To identify the possible reasons for these inadequate supplies, they reported limitations of Govt. budget, bureaucratic complexities, mismanagements, political issues, etc.

A 28 years old physician stated!

“We have some lacking of N-95 masks, shoe covers and others. As Bangladesh is a developing country, our Govt. must have some limitations and bureaucratic complexities. However, we have to consider this. Moreover, we doctor are committed to serve the people in crisis. So being in this noble profession, we have to overlook many such lacking and try to serve with our best.”

CASE REPORT-8

A PHYSICIAN REPORTED THAT HIS HOSPITAL WAS FACING THE SHOTAGE OF SOME ESSENTIAL MEDICINE, HAND GLOVES, OXYGEN DELIVERY DEVICES. HE THOUGHT THAT THE PROBLEMS CAN BE SOLVED BY INTERNAL COLLABORATION BETWEEN THE ORGANIZATIONS. SOMETIMES, IT CAN ALSO BE MANAGED LOCALLY.

WHEREAS, THAT OXYGEN, ANTIVIRAL MEDICINE, ANTI-INFLAMMATORY MEDICINE, STEROID AND ANTIBIOTICS AVAILABLE IN ORAL FORM OR INTRAVENOUS FORM. HYDRO-NASAL CANNULA/MASK IS ALSO AVAILABLE IN NEARBY HOSPITAL WHERE ONE OF MY FRIENDS WORKING

A 28 years old physician mentioned!

“ We have enough gown supply, but we face lacking of N-95 masks & shoe covers. So, we need to use normal surgical masks with doubled layer. So, confusion is there all around about our safety. ”

IDs:

Among the patients, who had been admitted to hospitals, most (90%) of them chose the hospital according to their wishes based on their severity of illness. Moreover, few (10%) of them were advised by doctors, colleagues, or authorities of their company where they worked. Almost all of the study patients reported that they were admitted to the hospital after getting COVID-19 infection except one, who was in self-isolation at home for 14 days. Regarding the service, the patients stated that some patients were kept in the general ward. Some were kept in separate rooms/cabins or isolated corona ward/unit with maintaining proper rules. There were also separated wards for the hospital staff reported by a patient-cum-nurse.

Mixed sort of experiences and comments were reported by the patients and attendants regarding the hospital services. Although most (85%) of the patients and attendants reported very positively about the hospital facilities and services, some of the patients and attendants reported negative (15%) ways of lack of hospital staff such as nurses, ward boys, and cleaners. Few of them said an inadequate supply of oxygen and some medicines and mentioned delayed test results delivery. Community engagement also influenced hospital admission. However, few patients and attendants reported negative dissatisfaction experiences and hospital services comments, whereas most (90%) were satisfied.

IDs:

One patient mentioned:

“ We were kept in general ward, but the beds were placed maintaining 3 feet distances ”

CASE REPORT-10

A 33 YEARS OLD PATIENT ENUMERATED, “NEITHER THE DOCTORS, NOR THE NURSES EVEN THE WARD BOYS CAME TO US FOR NONE OF THE DAY.... THERE WAS NO IMPORTANCE ON HOW I WAS, SUCH AS WHETHER I HAD MEAL OR NOT, AND I GOT THE THINGS PROPERLY OR NOT. USUALLY, JUST THEY WERE USED TO CONTACT OVER TELEPHONE RATHER THAN COMING BY SELF TO KNOW. THERE WAS NO IMPORTANCE ON WHAT I SHALL NEEDED, JUST I NEEDED TO PUSH THEM. TO MEET WHAT I NEEDED, I CONTACTED THEM OVER TELEPHONE, AND THEN THEY BROUGHT THE THINGS, KEPT IN A PLACE AND INFORMED ME, THEN I WENT TO RECEIVE THESE. SAME THING HAPPENED REGARDING PROVIDING MEAL. SOMETIMES, NURSES CONTACTED ME OVER PHONE AROUND 10 AM WHETHER I NEEDED ANY MEDICINE OR NOT. JUST THAT'S IT. ...”.

CASE REPORT-11

A 37 YEARS OLD PATIENT MENTIONED, “THE AUTHORITY IS TRYING THEIR BEST TO PROVIDE THE BEST SERVICES, AND WE ARE SATISFIED WITH THEIR SERVICES. IN CASE OF MEDICINES OF A COVID-19 PATIENT, HOSPITAL AUTHORITY BEARS FULL PACKAGE THROUGH SOCIAL WELFARE UNIT OF THE HOSPITAL. FOOD QUALITY IS VERY GOOD. NURSES TAKE GOOD CARE OF THE PATIENTS. WHEN I WAS THERE WHAT I SAW, THEY VISITED US VERY OFTEN AND LOOKED AFTER IF WE NEED ANYTHING, HOW WERE WE FEELING, GAVE US MEDICINES, LIKE THAT. HOWEVER, THERE ARE LACK OF OXYGEN SUPPLY, WARD BOYS AND NURSES”.

IDs:

In the context of a new sudden arisen widespread COVID-19 pandemic situation in Bangladesh, the hospitals were needed to set up a more contemporary strategy compiling the staff's infrastructure, facilities, and services, including doctors, nurses, lab technologists, and other support professionals. Somewhere, the scenarios with an excellent service were reported by the patients and their attendants. However, several facilities like washrooms, food quality, and testing facilities were questionable that also bothered them.

A 50 years old patient stated:

“ Services as a new hospital are pretty much satisfactory. All the doctors and nurses were very cordial to all patients. They took proper care of us. They took care of us with patience and were always concern about how were we doing, what we needed, and all. Only the washrooms were not clean and food quality should be improved. At last I can say our hospital provides the best services as a govt. hospital. ”

An Attendant reported:

“ Here, the services are quite good but the test facility is very poor here because of lack of manpower. So very often we had to take patients out to test from other private centers, which were sometimes difficult for severely ill patients. ”

Capacity building of the healthcare providers

KIIs:

Training on the use of PPE:

Most (85%) of the physicians and nurses reported that they did not receive any training on PPE use. They have just learned it from the internet, from the hospital authority, the online guideline from DG Health, or the senior doctors. In contrast, few (15%) of them reported that they received institutional training.

A 28 years old physician mentioned:

“ We were briefed by our hospital authority. And, I also collected some information from internet about how to use PPE appropriately. ”

A 26 years old nurse enumerated:

“ Yes, I got the training on how we will wear PPE, how we will put off PPE, where we will keep PPE after putting off, how we will wear mask, how we will put off mask. I also suggest increase the training facilities more. ”

Training on hospital case management:

Most (80%) of the physicians and nurses reported that they did not receive any training. They have just gathered some knowledge from the internet, from the COVID-19 case management guidelines, and the senior doctors or Director of their hospital. Few (20%) reported that they received training, either institutional-based, such as DG Health and Civil Surgeon's office, or online-based. Most of the training receivers said they felt competent enough to manage a COVID-19 case after the training. However, a nurse also believed that more training sessions should be held to make the health professionals more confident, and though there are still some scopes for improvement.

Kills:

A 42 years old nurse enumerated:

“No institutional training. I only completed an online based course on COVID-19 case management upon my own interest.”

Another 29 years old physician said:

“Before starting duty in COVID-19 dedicated unit, no official training was held. Doctors are working just as the demand for the situation.”

A 30 years old physician stated:

“Of course, the training was good AND trained by medical consultants. We were trained about donning doffing, how to use PPE and feel confident enough to manage patients.”

Risk Reduction:

All the Experts believed that the risk reduction process of being infected by COVID-19 among the doctors and nurses could significantly impact the COVID-19 case management system. As a risk reduction process, PPE's use properly is one of the main strategies. In this regard, when they were asked whether they are following all the instructions of PPE use or not, most (90%) of them replied they were following appropriately. Some (10%) of them also reported that all instructions could not be followed accurately.

CASE REPORT-12

A 28 YEARS OLD PHYSICIAN MENTIONED THAT WHEN HE JOINED, THIS DISEASE WAS COMPLETELY NEW IN THE COUNTRY. THERE WAS NO SUCH OPPORTUNITY FOR INSTITUTIONAL TRAINING OR SOMETHING. THEY WERE ONLY INSTRUCTED BY THE DIRECTOR SIR AND OTHER SENIOR DOCTORS ABOUT THE PROTECTION, DUTY TIME, CASE MANAGEMENT, AND ALL OTHER THINGS”.

CASE REPORT-13

[ONE PHYSICIAN AGED 36 SAID THAT SCREENING FACILITY SHOULD BE THE PRIORITY NUMBER ONE. THE PATIENTS WILL RECEIVE TREATMENT IN THE HOSPITAL, BUT HOSPITAL SHOULD BE IDENTIFIED WITH ZONING FACILITY LIKE GREEN, YELLOW AND RED ZONE. DOCTORS WILL BE AT THE GREEN ZONE, PATIENTS COMING WITH SYMPTOMS AND NOT CONFIRMED POSITIVE WILL BE IN THE YELLOW ZONE, AND LASTLY THE RED ZONE FOR POSITIVE PATIENTS. DOCTOR AND NURSE WILL KEEP COMMUNICATION WITH PATIENTS THROUGH MICROPHONE WHILE ISOLATED PATIENTS WILL BE KEPT IN A ROOM WITH GLASS PROTECTION, AND LASTLY THE AVAILABLE MANPOWER. AFTER FULFILLING ALL THESE COMPONENTS, THE TREATMENT SHOULD BE CONTINUED ON. I THINK THESE ENLISTED FACILITIES ARE THE COMPONENTS OF CASE MANAGEMENT OF COVID-19 PATIENTS TO PREVENT AND CONTROL INFECTION]

Kills:

One of the Experts stated:

“ If the risk reduction process of being infected by COVID-19 among doctors and nurses is implemented, their risk of infection will be less. ”

One nurse said:

“ Yes, obviously. If we don't follow, we will be affected, we will suffer, and we will be died. ”

A 36 years old physician mentioned:

“ To be honest, all instructions can't be followed accurately. We don't have separate donning and doffing room at every floor. Due to lack of infrastructure and manpower for this sudden arisen situation we are facing this problem. Specially, the interns are not quite well acquainted regarding proper donning and doffing. So, I think training should be arranged for PPE maintaining, donning doffing formalities. ”

DISCUSSION

Currently, Bangladesh, along with the other countries of the world, more or less, is going through an unfavourable COVID-19 pandemic situation. After 6 to 7 months of fighting against the COVID-19 pandemic situation in the whole country, it was highly essential to emphasize evaluating the current opportunities and challenges and future opportunities and challenges based on empirical data to further strengthen the COVID-19 case management system in Bangladesh. The present study firstly explored the opportunities and challenges of improving the COVID-19 case management system in Bangladesh. We are targeting to evaluate these. This study uncovered the current opportunities and challenges of keeping the people at risk in quarantine, keeping the positive patients in isolation, and referral and admitting confirmed COVID-19 patients in the hospitals. For this purpose, we included the health care providers, patients and attendants, and expert panel for their point of view.

Moreover, this study also uncovered the current opportunities and challenges of facilities and services of COVID-19 case management in Bangladesh from mostly the health care providers and the receiver's point of view. This study revealed highly significant information about the opportunities and challenges of strengthening the COVID-19 case management system in Bangladesh. WHO also emphasized these issues in the guideline on Clinical Management of COVID 19 (WHO, 2020).

In the context of possible reasons for spreading of COVID-19 among the mass population as well as health care providers in Bangladesh, the Expert panel of this study identified several potential possible causes, mostly lack of monitoring from the administration and law enforcement agencies, the reluctant attitude of the people of not abiding the restorative measures and lack of proper quarantine and isolation process, delayed diagnosis and test report providing, inadequate number testing, failing to establish community engagement, failing to control the root of virus entry (source control), scarcity along with the questionable quality of protective equipment, lack of medical supplies, failing to contact tracing, lack testing facilities, inadequate pieces of training for the health care providers, improper patient and overall management, etc. The findings of this study appear quite similar to a very recent report published in a national journal, namely 'Journal of Bangladesh College of Physicians and surgeons' which also focused on delayed diagnosis, delayed test result providing, lack of diagnostic capacity, the inertia of resource mobilizing process for the implementation of public health interventions (such as social distancing, intense contact tracing, quarantine, case isolation, etc.) that exacerbated the situation fast (Faiz MA, 2020).

A mixed scenario has been reported by the health care providers (physicians and nurses) in terms of available facilities and services for COVID-19 case management in different country hospitals. Although few hospitals have been reported with well-equipped and accessible facilities and services and few hospitals with lacking, yet the lacking of different types of medical supplies (such as PPE, different kinds of masks, sanitizers, oxygen supply, few medicines in some cases, etc.) as well as workforce (such as physicians, nurses, technologists, cleaners, etc.) have been reported most commonly. Similar sorts of mixed scenarios and experiences have also been reported by the health care receiver group, such as patients and their attendants in different country hospitals. These deficiencies in the facilities, services, and medical supplies in the hospitals can be considered a potentially favourable condition, leading to a more exacerbated COVID-19 pandemic situation in the whole of Bangladesh, which is extremely alarming. According to Yeasmin et al. 2020, more than 1 in 10 health care workers at Mugdha Medical College Hospital were infected with SARS-CoV-2 while working at the hospital; a similar perception was reported from the respondents of our study.

This study uncovered very limited, confined, dissatisfied, and unfavorable opportunities of the system of keeping in a home or institutional-based quarantine for the people at risk, the system of keeping in a home or institutional-based isolation for the positive cases, and the system of the referral and admitting confirm COVID-19 patients in the hospitals from all of the different types of participant's point of views. It has also been reflected that these scenarios were due to varying types of challenges, and mismanagement from the authority and reluctant manners of the mass population. Moreover, the inability to differentiate between quarantine and isolation and inadequate and improper relevant healthy measures among the patients and attendants, and the lack of proper infrastructure, living facilities, and livelihood support significantly increased the burden of challenges. However, the study's expert panel showed the avenue of opportunities to strengthen the COVID-19 case management system to overcome the situation by planning or reforming and implementing national action plans and guidelines with the local community engagement vigorous

enforcement of laws with proper monitoring. None of the studies in Bangladesh could compare the findings with the present one to the best of our knowledge. However, the "proactive" measures taken by Kerala, such as early detection of cases and extensive social support measures that are a "model for India and the world" that we should be followed (Km et al., 2020).

Still, there is scope for strengthening the COVID-19 case management system. To uncover the possible scopes of strengthening the COVID-19 case management system, the local authority engagement, training of the health care providers, and evidence creation are the key. In comparison, Kerala announced a complete lockdown before the announcement of the national lockdown. The most vital step was taken on March 15 by announcing an awareness campaign named 'Break the Chain' to create awareness and promote social distancing. In high-risk areas, the police force created an online delivery system of essential food items. Innovative products have been developed as part of beating the Covid-19 in the state. A smart bin called 'BIN-'19' has been launched to collect and disinfect Used Face-Mask, based on the Internet of Things (IoT) (Km et al., 2020).

This study's respondents think the proper set up of quarantine and isolation centre will come at first. There should be an adequate number of health care providers, such as doctors and nurses. If needed, they can be brought from other hospitals or parts of a country like China. There should be proper facilities. Should have COVID hospitals where the patients will be admitted. Need appropriate ICU supports. It needs regular training for doctors and nurses. Another most crucial matter is research. We need researches to find out the effective ways of COVID-19 case management. However, we can follow similar Kerala like a model, the first state in India that does away with 'zonal' classification' of districts based on Covid-19 spread using GIS technology where more police would be deployed to ensure the strict adherence of quarantine and lockdown norms (Manorama online. COVID-19 Timeline: A chronology of Kerala's fight against the pandemic. 2020).

We need to improve the capacity of both the 'stable' platform' (such as trained human resources and infrastructure) and infusion of 'fast' variables' (such as quarantine and isolation units) for fast emergency response in handling COVID-19 emergency patients. We need to control the sources of COVID-19 infection and need to diagnose early and ensure early case isolation, intense contact tracing, quarantining, and social distancing. We need to engage the community to ensure the quarantining and isolation system. Whereas, Kerala, India, announces its strategy as a trace, quarantine, test, isolate, and treat in the beginning only. The state soon began implementing mandatory quarantines for visitors arriving from abroad and from outside of the state, weeks before the Centre instituted similar measures across the country. They also imposed strict controls, supported by an excellent healthcare system, government accountability, transparency, public trust, civil rights, and importantly, decentralized governance and healthy grass-root level institutions (Km et al., 2020).

In the context of how resource mobilization processes such as training for doctors and nurses, prioritizing essential health services, ensuring medical supplies, etc., can help strengthen the COVID-19 case management system, very distinctive and vital opinions have been reported in this study. Mobilizing the resources will help implement the front-line non-pharmaceutical public health interventions (such as social distancing, intense contact tracing, and case-isolation). Training can lead to a significant role. However, now there is a problem that the pieces of training are online-based. So, it is not doing appropriately.

Moreover, half of the doctors did not attend online training even. Those who attended did not understand properly. If it is possible to bring a single doctor of the peripheral hospitals to Dhaka and train up, they can train up to other doctors and nurses.

A public-private strategic partnership can have a role in strengthening the COVID-19 case management system in Bangladesh, and the respondents expressed their views in this regard: Now, few hospitals are providing COVID -19 care. However, there should have proper coordination. The private sector also should maintain the WHO guidelines for COVID -19 case management system. It can bear a remarkable and essential impact, but it needs to ensure quality.

The respondents explored strengthening the COVID-19 case management system in Bangladesh, several high potential aspects of strategies. All of them said that the patient management system and overall management need to be strengthened. The administration and law enforcement agencies' monitoring system should also be improved and need to contact tracing. They also emphasized on development of a national plan. We need to make a national plan. The national plan's actions are required to be monitored and followed up properly, whether these are maintained. We need to train the health care providers, engage the people of all classes, and collaborate and coordinate with other ministries.

CONCLUSIONS

- The COVID-19 case handling system in Bangladesh faces many crucial challenges like inadequate testing, improper isolation procedure, contact tracing on a small scale, inadequate quarantine facility and delayed hospitalization, etc.
- At the same time, the COVID-19 case handling system in Bangladesh identified many opportunities to strengthen our health system in the future like ensure community engagement; adequate training; skilled workforce; proper utilization of the existing health facilities; creation of zoning facilities in hospitals; mandatory mask use by all; mass awareness development.

LIMITATIONS

There were some limitations in the study which could not be overcome by the researchers. As the study period was concise, more Experts could not be involved in this study. Moreover, it was challenging to interview the health care providers (physicians and nurses) and Experts (Divisional experts) as they were busy with their respective jobs. There was no pre-existing specific data-based available report in Bangladesh to compare this current study's findings.

BARRIERS AND CHALLENGES

COVID 19 is a new experience for the world as well as for Bangladesh. We found the developed countries also failed to prevent their massive deaths. However, Bangladesh is one of the densely populated countries globally, and Bangladesh still manages COVID 19 successfully but, yet Bangladesh is not out of danger for a massive attack. If Bangladesh addressed all the barriers and challenges related to COVID 19, we would overcome the situation.

The barriers and challenges of strengthening the COVID-19 case management system in Bangladesh are-

- We have infectious diseases prevention and control (IPC) act but lacking implementation
- Overall mismanagement and also individual level mismanagement on COVID case handling system
- Lacking coordination between administration and law enforcement agencies which is needed to address by a coordinating body
- WHO always emphasize an adequate number of testing and timely test results, but we found inadequate testing in Bangladesh
- Almost absence of contact tracing is the biggest challenge for Bangladesh; community transmission is the resultants of its
- Inadequate and improper quarantine and isolation procedure along with the absence or improper monitoring system
- Lack of proper infrastructures, facilities, services, and livelihood management for the quarantined and isolated individuals
- Lack of local community engagement
- Inadequacy of medical supplies, facilities, and services for the patients as well as health care providers
- Lack of workforce in the hospitals such as physicians, nurses, lab technologists, ward 'boys' cleaners, and other relevant
- Inappropriate control the root of entry of Coronavirus (source control) in the ports
- Inadequate level of knowledge and awareness among the population, including patients and attendants
- Reluctant attitude on social distancing, hand washing, mask using, and testing of the population, including patients and attendants
- Provision of 'patient's attendants in the hospital is another issue of COVID spreading in Bangladesh
- Unable to identify the asymptomatic cases due to lack of testing and awareness

RECOMMENDATIONS

a. General recommendations

Based on the findings of the study, in general, it is recommended-

- The facilities (central oxygen system, ventilator, ICU), services (physicians and nurses and cleaner need to visit more), and supplies (necessary medicines, PPEs, hand sanitizers, etc.) for COVID-19 case management system in the hospitals should be ensured
- National guidelines for COVID-19 case management should be followed
- Adaptation of national guideline according to local resources
- Most of the service providers had the opportunity to remain in quarantine for different periods but need to ensure proper duration for all
- Local community engagement should be ensured for successful home quarantine and isolation for the general people
- Ensure quality services to the quarantined and isolated individuals by providing food, monetary supports, and other relevant facilities
- Need to strengthen the quarantine system in airports
- Ensure contact tracing system followed by quarantine, testing, and isolation
- Most of the health care providers already received training, whether formally or informally, on PPE and case management but should ensure formal periodical training to update them
- Increase the level of knowledge and awareness regarding COVID-19 infection among the mass-population through mass media
- The number of testing should be increased by ensuring
 - adequate testing kits
 - more skilled technologists
 - test report delivery time should be minimized
 - test cost should be reduced

b. Recommendations at the policy level

Based on the findings of the study, the following can be recommended for the policymakers

- Should establish a national action plan for COVID-19 case management, monitoring, enforcement from the law enforcement agencies to abide by the rules and healthy measures
- To update the guidelines for the referral and hospital admission system for COVID-19
- Zoning facilities can be a good option for improving the case management system and infection prevention and control
- To strengthen the monitoring of the institutional and home quarantine system by the administration and law enforcement agencies
- To incorporate the law enforcement agencies with the standard guidelines for the management, implementation, and monitoring systems
- To make standard guidelines to establish community and institutional-based quarantine and isolation centres as well as to figure out the minimum requirements for the primary and comprehensive facilities, services, and supplies
- To strengthen resource mobilization processes such as prioritizing essential health services, pathways for medical supplies, public-private strategic partnerships, hospital waste management, and disposal procedures, etc.
- To design and plan the most effective strategies to improve the level of knowledge and awareness regarding COVID-19 infection among the mass-population
- To control the root of entry of the Coronavirus in the ports and the local authorities such as police, armed force as well as health care team should be engaged in this regard

ANNEXURES

Activities	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Finalizing the protocol								
Instrument development								
Data collector's recruitment								
Ethical Approval								
Data collectors training								
Data collection								
Data synthesis								
Data analysis								
Report drafting								
Final report submission								
Dissemination								

Annex 2a: Interview Schedule/Guideline (Experts)

Basic information:

DOB:.....

Name of the Division working for:

COVID related information:

1. What are the possible reasons for the spread of COVID 19 in Bangladesh?
2. What are the possible reasons for the spread of COVID 19 among the health care providers in Bangladesh?
3. Do you think that the quarantine procedure maintained appropriately in Bangladesh for those who came from abroad?
4. Which type of quarantine procedure was followed?
5. If no, what are the possible reasons not to maintain the institutional quarantine procedure?
6. What are your suggestions regarding the improvement of the institutional quarantine procedure?
7. If no, what are the possible reasons not to maintain the home quarantine procedure?
8. What are your suggestions regarding the improvement of the home quarantine procedure?
9. Do you think COVID 19 testing is adequate for Bangladesh?
10. What are the possible reasons for inadequate testing?
11. Do you think that the institutional isolation procedure followed appropriately in Bangladesh?
12. What are the possible reasons for lacking institutional isolation?
13. What are your suggestions regarding the improvement of the institutional isolation procedure?
14. Do you think that the home isolation procedure followed appropriately in Bangladesh?
15. What are the possible reasons for not maintaining a home isolation procedure?
16. What are your suggestions regarding the improvement of the home isolation procedure?
17. Do you think that the people are getting admission and treatment to the hospital smoothly for COVID 19 treatment?
18. What is the possible reason do you think not getting admission and treatment?
19. How can we overcome this situation for hospital admission and treatment?
20. Do you think there is a scope for strengthening the COVID 19 case management system?
21. What are the possible scopes for strengthening the COVID 19 case management system?
22. How does the resource mobilization process such as training for doctors and nurses, prioritizing essential health services, pathways for medical supplies, etc. can significantly impact strengthening

- the COVID-19 case management system?
23. Do you think the public-private strategic partnership can bear a high impact on strengthening the COVID-19 case management system?
24. Do you think community participation, cohesion and compliance, and promoting the 'individual's health awareness can significantly impact strengthening the COVID-19 case management system?
- a. Yes
b. No
25. If yes, comment on that.
-
26. Do you think the risk reduction process of being infected by COVID-19 among doctors and nurses can significantly impact strengthening the COVID-19 case management system?
- a. Yes
b. No
27. If yes, how?
-
28. What challenges may Bangladesh face to strengthen the skilled and effective COVID-19 case management system?
29. What strategies can be implemented to overcome the challenges of strengthening the COVID-19 case management system in Bangladesh?

Annex 2b: Interview Schedule/Guideline in English and Bangla (Physicians, Nurses)

ID:

Age:

Gender:

Participant: physician/ nurse:

Hospital/clinic:

Questions:

- Q1. What are the components of the case management system of COVID 19 patients in Bangladesh?
- Q2. Do you think these are adequately practiced in your hospital/clinic?
- Q3. If not, what are the possible ways to strengthen the case management system of COVID 19?
- Q4. Did you receive any training on the case management system of COVID 19? Yes/No
- Q5. If yes, was it online or institutional?
- Q6. Do you feel competent enough to manage a COVID 19 case after the training?
- Q7. If not, do you think that there are still some scopes for improvement?
- Q8. Did you receive training on PPE use?
- Q9. Are you following all the instructions when you use PPE? If not, why?
- Q10. Does your hospital/clinic have adequate medical supplies to manage COVID 19 case? If no, what could be the possible reasons for inadequate supplies?
- Q11. How do you ensure self-quarantine in the home or other place after went back from the hospital duty?

আইডি:

বয়স:

লিঙ্গ:

অংশগ্রহণকারী: চিকিৎসক/নার্স:

কর্মক্ষেত্রের প্রকার: হাসপাতাল/ক্লিনিক:

প্রশ্নাবলি:

- প্রশ্ন-১. বাংলাদেশের করিড-১৯ রোগী ব্যবস্থাপনা পদ্ধতির উপাদানগুলি কি কি?
- প্রশ্ন-২. আপনি কি মনে করেন এগুলি আপনার হাসপাতাল/ক্লিনিকে পর্যাপ্তভাবে মেনে চলা হয়?
- প্রশ্ন-৩. যদি তা না হয় তবে, করিড-১৯ রোগী ব্যবস্থাপনা পদ্ধতি দৃঢ়করণ করার সম্ভাব্য উপায়গুলো কী কী?
- প্রশ্ন-৪. আপনি কি করিড-১৯ রোগী ব্যবস্থাপনা পদ্ধতি সম্পর্কিত কোন প্রশিক্ষণ পেয়েছেন? হ্যাঁ/না
- প্রশ্ন-৫. যদি হ্যাঁ হয় তবে, সেটা অনলাইন না-কী প্রাতিষ্ঠানিক ছিল?
- প্রশ্ন-৬. প্রশিক্ষণের পরে আপনি কোন করিড-১৯ রোগী ব্যবস্থাপনা করতে নিজেকে যথেষ্ট যোগ্য বোধ করেন?
- প্রশ্ন-৭. যদি তা না হয় তবে, আপনি কি মনে করেন যে এখানে উন্নতির কিছু সুযোগ আছে?

- প্রশ্ন-৮. আপনি কি পিপিই ব্যবহার সম্পর্কে প্রশিক্ষণ পেয়েছেন?
- প্রশ্ন-৯. আপনি কি পিপিই ব্যবহার করার সময় সমস্ত নির্দেশনাবলী অনুসরণ করছেন, তা না হলে কেন?
- প্রশ্ন-১০. আপনার হাসপাতাল/ক্লিনিকে কি কভিড-১৯ রোগী ব্যবস্থাপনা করার জন্য পর্যাপ্ত চিকিৎসা সামগ্রী সরবরাহ রয়েছে? যদি না হয় তবে, অপর্যাপ্ত সরবরাহের সম্ভাব্য কারণগুলি কী হতে পারে?
- প্রশ্ন-১১. হাসপাতালের দায়িত্ব থেকে ফিরে যাওয়ার পরে আপনি কীভাবে বাড়িতে বা অন্য জায়গায় সেফ-কোয়ারেন্টাইন (স্ব-সঙ্গনিরোধ) নিশ্চিত করছেন?

Annex 2c: Interview Schedule/Guideline in English and Bangla (Patients and Caregivers)

ID:

Age:

Area of residence:

Occupation:

Monthly income:

Educational status:

Questions:

Q1. Can you differentiate between quarantine and isolation?

(Participants: Patients)

Q2. Have you had any overseas travel before you catch COVID 19 infection?

Q3. If yes, where gone?

Q4. Were you in self-isolation or admitted to hospital when you got COVID 19 infection?

Q5. If you were not in self-isolation, who did give you the advice to be hospitalized?

Q6. Did you face any difficulties to get admitted into the hospital?

Q7. If yes, could you please tell us in a little?

Q8. Were you kept in the hospital in a separate room or a general ward?

(Participants: Attendants)

Q9. Did you stay in the same room with the patients or in a separate room?

Q10. What type of self-protection measures did you take during the stay in the hospital?

Q11. If not, why did you not take any measures?

Q12. Were you in-home quarantine for 14 days after I went back from the hospital?

Q13. If not, what were the possible reasons?

Q14. Please share your experience in little during the stay in hospital.

আইডি:

বয়স:

বসবাসের স্থান:

পেশা:

মাসিক আয়:

শিক্ষাগত অবস্থা:

প্রশ্নাবলি:

প্রশ্ন-১. আপনি কি কোয়ারেন্টাইন (সঙ্গনিরোধ) এবং আইসোলেশন (বিচ্ছিন্নতাকরণ) এর মধ্যে পার্থক্য করতে পারেন?

(অংশগ্রহণকারী: রোগী)

প্রশ্ন-২. কভিড-১৯ সংক্রমণটি ধরা পরার আগে আপনার কি কোনও বিদেশ ভ্রমণ ইতিহাস ছিল?

প্রশ্ন-৩. যদি হ্যাঁ হয় তবে, কোথায় গিয়েছিলেন?

প্রশ্ন-৪. যখন আপনি কভিড-১৯ সংক্রমিত হলেন তখন কি আপনি সেফ-আইসোলেশন (স্ব-বিচ্ছিন্ন) হয়ে ছিলেন বা হাসপাতালে ভর্তি হয়ে ছিলেন?

প্রশ্ন-৫. আপনি যদি সেফ-আইসোলেশন (স্ব-বিচ্ছিন্ন) না হয়ে থাকেন তবে, কে আপনাকে হাসপাতালে ভর্তি হতে পরামর্শ দিয়েছিল?

প্রশ্ন-৬. আপনি কি হাসপাতালে ভর্তি হতে কোন অসুবিধার সম্মুখীন হয়েছিলেন?

প্রশ্ন-৭. যদি হ্যাঁ হয় তবে, আপনি দয়া করে আমাদের একটু বলবেন?

প্রশ্ন-৮. হাসপাতালে আপনাকে কি আলাদা রাখা হয়েছিল না-কী সাধারণ ওয়ার্ডে?

(অংশগ্রহণকারী: রোগীর পরিচর্যািকারী)

- প্রশ্ন-৯. আপনি কি রোগীদের সাথে একই ঘরে থাকতেন না-কী পৃথক?
- প্রশ্ন-১০. হাসপাতালে থাকার সময় আপনি কী ধরনের স্ব-সুরক্ষা ব্যবস্থা নিয়েছিলেন?
- প্রশ্ন-১১. যদি তা না নিয়ে থাকেন তবে, কেন আপনি কোনও পদক্ষেপ নেননি?
- প্রশ্ন-১২. হাসপাতাল থেকে ফিরে যাওয়ার পরে আপনি কি ১৪ দিনের জন্য বাড়িতে কোয়ারেন্টাইনে (সঙ্গনিরোধে) ছিলেন?
- প্রশ্ন-১৩. যদি তা না হয়ে থাকে তবে, এর সম্ভাব্য কারণগুলো কী ছিল?
- প্রশ্ন-১৪. দয়া করে হাসপাতালে থাকার সময় আপনার অভিজ্ঞতাটি একটু বলুন

Annex 3: Ethical Approval Letter



বাংলাদেশ ইউনিভার্সিটি অব হেলথ সায়েন্সেস BANGLADESH UNIVERSITY OF HEALTH SCIENCES

Memo No: BUHS/ERC/20/15
Date: 11/06/2020

To
Palash Chandra Banik
Assistant Professor
Dept. of Noncommunicable Diseases
Faculty of Public Health
Bangladesh University of Health Sciences (BUHS)

Subject: Ethical Clearance

The Ethical Review Committee (ERC) of the Bangladesh University of Health Sciences (BUHS) has the pleasure to accord ethical clearance to your Protocol “**Opportunities and challenges of strengthening the COVID- 19 case management system in Bangladesh**” subject to the condition that the guidelines overleaf must be followed carefully.

(Prof MA Hafez)
Chairman
Ethical Review Committee

125/1 Darus Salam Mirpur Dhaka – 1216 Email : info@buhs.ac.bd Website: www.buhs.ac.bd

REFERENCES

- New Age. Chowdhury SI. China to Give Bangladesh Testing Kits, Protective Gears, 2020. Available online at <https://www.newagebd.net/article/102576/china-to-give-bangladesh-testing-kits-protective-gears>.
- Dhaka Tribune. Bangladesh Expands Covid-19 Testing 2020. Available online at <https://www.dhakatribune.com/bangladesh/2020/04/03/bangladesh-expands-covid-19-testing> (accessed on July 27, 2020).
- Directorate General of Health Services. Novel Coronavirus (COVID-19) Press Release, 2020. Available online at <https://www.dghs.gov.bd/index.php/en/home/5373-novel-coronavirus-covid-19-press-release> (accessed on July 27, 2020).
- Faiz, M.A., 2020. Coronavirus Diseases 2019 (COVID-19): An Opportunity to Understand the Health System. *Journal of Bangladesh College of Physicians and Surgeons*, 1-2.
- Khan, M. H. R., & Hossain, A., 2020. COVID-19 Outbreak Situations in Bangladesh: An Empirical Analysis. *medRxiv*, Doi: 10.1101/2020.04.16.20068312.
- Km, S., T, M., Ap, M. R., & K, A. (2020). Trace, Quarantine, Test, Isolate, and Treat: A Kerala Model of Covid-19 Response. *medRxiv*, 2020.2006.2015.20132308. DOI:10.1101/2020.06.15.20132308
- Manorama Online. COVID-19 Timeline: A chronology of 'Kerala's fight against the pandemic. 2020; Available from <https://english.manoramaonline.com/news/kerala/2020/05/06/covid-19-timeline-kerala-india-coronavirus-chronology-important-dates.html>
- Md Hasinur Rahaman Khan, Tamanna Howlader, and Md. Mazharul Islam. Battling the COVID-19 Pandemic: Is Bangladesh Prepared? *medRxiv preprint DOI: https://doi.org/10.1101/2020.04.29.20084236*. Posted, May 5, 2020.
- Message from president. Criticon Bangladesh, 2018. Bangladesh Society of Critical Care Medicine.
- National Guidelines on Clinical Management of Coronavirus Disease 2019 (COVID-19). Version 7.0; 28 May 2020. Disease Control Division, Directorate General of Health Services, Ministry of Health & Family Welfare, Government of the People's Republic of Bangladesh. Available at: https://mofa.portal.gov.bd/sites/default/files/files/mofa.portal.gov.bd/page/ad1f289c_47cf_4f6c_8dee_887957be3176/National%20Guidelines%20on%20Clinical%20Management%20of%20Covid-19-%20DGHS.pdf
- Sayeed Anwar, Mohammad Nasrullah, and Mohammad Jakir Hosen. COVID-19 and Bangladesh: Challenges and How to Address Them: A policy brief article. *Front. Public Health*, April 30, 2020, | <https://doi.org/10.3389/fpubh.2020.00154>
- The Daily Dhaka Tribune. (March 21, 2020).
- World Health Organization. Clinical Management of COVID 19 (2020). Available at <https://www.who.int/publications/i/item/clinical-management-of-covid-19> (Accessed on September 29, 2020)
- World Health Organization. WHO Corona Virus Diseases Dashboard (2020). Available at <https://covid19.who.int/> (Accessed on September 29, 2020)
- Worldometer. Covid-19 Coronavirus Pandemic, 2020. Available online at www.worldometers.info/coronavirus/ (accessed on July 27, 2020).
- Yasmin, R., Parveen, R., Azad, N., Deb, S., Paul, N., Haque, M. M., Haque, M. A., & Azad, S. (2020). Corona Virus Infection among Healthcare Workers in a COVID Dedicated Tertiary Care Hospital in Dhaka, Bangladesh. *Journal of Bangladesh College of Physicians and Surgeons*, 38, 43-49. <https://doi.org/10.3329/jbcps.v38i0.47442>



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