

Up-gradation of Infrastructure at NINMAS to Combat the COVID 19 Pandemic: Preparation during 2020

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On 31st December 2019, coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first declared in Wuhan City, China. Bangladesh reported the first case on 8th March 2020. On 11th March 2020, COVID-19 was declared as a pandemic by World Health Organization (WHO). Positive cases started increasing at an alarming rate from mid-May till July 2020 in Bangladesh. Besides strict lockdowns, general holidays, and vaccinations against COVID-19, new waves of pandemic with newer strains are observed, thus putting the health system in serious challenges. The Government declared a general public holiday from 26th March to 30th May, closing government offices and non-essential businesses with movement restrictions. The COVID-19 case load started rising in June-July with the highest number of new cases per day on 29th July and it was 4019. At the end of September and December, the number of new cases dropped to 1106 and 1014 respectively. Highest number of actively infected patients in Bangladesh was counted 1, 15,779 on 19th August and 7559 total deaths until 31st December, 2020 (1).

This COVID-19 pandemic situation was unprecedented at home, work environment, and in the world. Nuclear Medicine (NM) personnel are also considered first-line health workers who are at risk of COVID infection. There was a great impact of this crisis in the departments of NM of the hospitals of Bangladesh. The post-corona world is totally different from the pre-pandemic period. Doctors, technical persons, administrative officials, staff, cleaners, patients, and attendants are at various risks of COVID-19 infection. Everyone was fearful, stressed to go through a totally unknown pandemic experience of their lifetime (2,3).

National Institute of Nuclear Medicine and Allied Sciences (NINMAS) is the apex referral institute of NM of the country with diversified practice. NINMAS had to figure out controlling disease spread in this pandemic while ensuring service and coping with the government decisions. Several meetings were arranged between the divisional heads and the director of NINMAS in presence of the professors during the time period of general holidays declared by the government. NINMAS authority promptly took steps to ensure the safety of dedicated health workers, employees, and patients accordingly (3-5).

Immediate telemedicine service (TMS) was introduced in April 2020 without prior experience, resources, or proper infrastructure. There was no established technological support for follow-up of the radioiodine-treated hyperthyroid and differentiated thyroid carcinoma (DTC) patients through TMS who had been being followed up after radioiodine therapy (RAIT). The aim was to provide essential service in a compromised situation due to pandemic and ensure continuous recognition of the priority cases for in-person visits and therapeutic procedures. Physicians are still using their personal smartphones for this purpose for the benefit of the patients. Doctors took all botherations of attending untimely calls from patients of remote corners of Bangladesh even at nights or holidays. Physicians showed immense patience to teach the etiquettes of using cell phones and converse with a doctor explaining their own problems briefly, developed instruction sheets for the patients, and arranged in-house audio-visual training sessions for the employees of all levels.

DTC patients and their family members needed to replace the anxiousness of therapeutic delays with the confidence of safely deferrable non-urgent visits through TMS after a careful and structured clinical triage. The team of thyroid physicians, technologists, and supporting staff properly scheduled and manage DTC patients by monitoring serum TSH, FT3, Thyroglobulin (Tg) using web-based reporting services of NINMAS and TMS as an excellent tool, though instructions to work from home (4) could not be availed fully due to lack of manpower. The physical presence of DTC patients significantly dropped in the COVID-19 outbreak. However, TMS continued regularly even during strict lockdowns and ensured follow-up of 812 patients from April to June 2020. During normal time usually, about 1800 patients are being followed up at 3 months' time at NINMAS. In this way, it can be said that 45% of follow-up consultation was done during this period. There was a backlog of 116 patients with DTC receiving radioactive iodine during the

strict lockdown. A total of 342 new DTC patients received RAIT in 2020 which was about 45% less than the previous year. About 25.6% reduce was noted in case of hyperthyroid patients who received ^{131}I (355 in 2019 vs. 264 in 2020). Positive history of COVID-19 infection was found in 3.1% of consulted DTC patients through TMS(6).

Divisional heads of NINMAS provided valuable suggestions and thoughtful ideas for the rearrangements of ground floor reception. Pedal-operated hand washing basins were installed at the entrance of NINMAS for patients and others (Figure 1). Attendants were partially restricted during imaging, in-vitro sample collection, and counseling according to requirements. Proper markings for queuing up at the entrance for maintaining safe distance were ensured with frequent announcements using hand mikes. Study reports were delivered from the ground floor to avoid the crowd (Figure-2).



Figure:1. a) Newly installed pedal operated hand-washing basins at the entrance of National Institute of Nuclear Medicine & Allied Sciences. b) All patients and attendants wash hands before queuing up



Figure: 2. a) Announcing the points of social distancing and awareness. b) Box marked areas for easy and safe distancing while in queue at entrance of NINMAS.

Protective tables screened by transparent acrylic partitions were designed and provided in Thyroid, Scintigraphy, PET-CT Divisions and in receptions for safe handling of patients since May, 2020 (Figure-3). A

draft of Standard Operation Procedures (SOP) was prepared for thyroid patient management at Thyroid Division, NINMAS according to the national & international guidance to combat COVID-19 pandemic.



Figure- 3: (a) Thyroid physician counseling patient in thyroid division behind protective acrylic partitions. (b) Thyroid reception has been upgraded by placing transparent acrylic screen for the safety of patients and workers.

Special measures were taken in Nuclear Cardiology, Nephrology, PET-CT, and Scintigraphy divisions of NINMAS for patient management. Most of the NM procedures require along stay of the patients (3-4 hours or more) in the department. Bangladesh Atomic Energy Commission (BAEC) authority supplied personal protective equipment (PPE) and a

continuous supply of masks for all NM workers throughout the centers of the whole country. Initially, the available facility of RT-PCR test for COVID-19 was very limited throughout the country including Dhaka city. Hence, NINMAS took the following measures to reduce the spread and keep the work environment safe.

I) Patient Scheduling

- Triage to identify COVID-19 suspected patients with primary screening through telephonic history.
- Scheduled tests were postponed if there was any potential risk of COVID infection.
- Patients were scheduled on pre-fixed time slots to avoid the crowd.
- NM procedures like PET-CT and scintigraphy of bone, kidney, thyroid, liver, etc. and cardiac studies were pre-appointed online with user-friendly online payment options.
- All medical records i.e. previous medical reports and history were assessed online and soft copies were collected.
- Patient preparations and patient counseling were done through TMS.
- Patient was counseled for social distancing at least 14 days prior to the scheduled scan.
- Patient was asked to notify or declare the history of contacts with any known COVID-19 infected patient e.g. family or friends.
- Patients were asked to notify or declare if there were any flu-like symptoms or H/O, COVID-19 infection prior to the NM procedure.
- Urgently appointed patients/ known contact with COVID-19 positive patients or patients with potential risk of infection were requested to submit RT-PCR test reports before the scan.

II) On arrival of the patients

- No mask no service policy for every person and patients
- Hand hygiene was maintained
- Temperature was measured
- Rapid and minimum contact protocols were introduced and followed
- Minimum waiting time and quick disposal of patients

III) Study Procedure with Safety Protocol

- Two groups of technologists worked for PET-CT and scintigraphy routinely:

Group 1-Dedicated for the dose preparation, injection, patient positioning & patient disposal.

Group 2- Image acquisition

- Institutional protocols for COVID-19 safety were strictly maintained for the protection of NM personnel, patients and disinfecting instruments.
- Special safety protocol was introduced for the evaluation of COVID-19 positive cases.

During the peak of pandemic and government announced general holidays, urgent NM studies were done only and preferences were given to inpatients and emergency cases. Non-essential nuclear medicine studies were downscaled accordingly. Myocardial Perfusion Imaging (MPI) studies started as soon as radiotracer was available but pharmacological stress tests were done with Adenosine while carefully avoiding exercise stress tests.

IV) Academic

- Academic events were scheduled by arranging online MD, NM classes since May 2020.
- Practical training was given in small groups with proper protection

Ultrasound (US) imaging rooms were upgraded by the addition of special screens with an aperture in the screen to introduce the imaging probe from a safe distance with proper shielding. Similar arrangements were done in the blood collection room (Figure-4). Donning and Doffing Rooms were allocated near US room. Lab coats were washed separately. Quick Response Team (QRT) was formed by BAEC in June 2020 to contact the infected employee and manage them in all possible ways. Leading doctors from NINMAS and INMAS served in this QRT team 24/7.



Figure 4: (a) Plexiglass partition in the blood collection tables allow patients and lab worker to see each other but safely prevent droplet spread. (b) Clear plastic screens with aperture to introduce probe are safely hung in between patients and doctors to maintain safe distance and prevent droplet contamination in ultrasound room.

Physicians took the responsibilities to educate the staff (liftman, cleaners) technologists, receptionists, accounts officers) about COVID-19, how to take measures of personal safety in their workplace, and combat stress. From time-to-time online meetings were arranged after work hours to modify and improve strategically and improve safety measures to fight against COVID-19 pandemic. The in-vitro laboratory was actively involved in the in-house production and distribution of sanitizers and up-gradation of the blood collection room and reception by providing protection screens and training manpower (4). In the above-mentioned ways, NINMAS has prepared and fought against the Covid-19 infection to maintain a safe working environment for workers, doctors, and patients during year 2020.

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