

# A learning experience of pandemic COVID-19 management at our medical institute

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## ABSTRACT

**Background:** Coronavirus disease-19 (COVID-19) pandemic caused by Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) is a novel disease. **Objectives:** Our healthcare sector is at the epicentre of this unprecedented global pandemic challenge and we are not fully aware of it's management. Here we have discussed our learning experience in managing and tackling the COVID-19 pandemic at our institute which will set an example for other hospitals as well as instill confidence in our primary care physicians who are the frontline warriors. **Methods and Results:** For combating COVID-19, dedicated teams for its management including logistic support was streamlined. Our capacity was built up for 200 isolation beds including 40 ventilator equipped beds and 645 defined quarantine rooms, to be implemented in phased manner. Till date more than 200 COVID-19 patients have been admitted here. Fever and cough were common presentations. Mortality was high in patients with advanced age or who had multiple co-morbid conditions. Efficient training and infection prevention control have resulted in a satisfactory outcome. **Conclusion:** In the wake of this pandemic all hospital setup, with collective responsibility should follow a specified protocol so that our hospital is not converted to the hotspot. COVID-19 has imposed a new challenge where not only patients have to be managed but our health care workers also need to be protected. Telemedicine and our primary care physicians will play a crucial role. Here at a medical institute, medical teaching, and learning atmosphere has to be created amidst the pandemic apprehension for our budding medicos.

**Keywords:** Isolation, primary care physician, quarantine, SARS- CoV- 2, SARI

## Introduction

In India, when three students of Kerala who returned from Wuhan of Hubei, China on 30 January 2020, were first reported positive for novel coronavirus disease (COVID-19), our health system got alerted.<sup>[1,2]</sup> As the disease was a newer one and the healthcare sector was at the epicenter of this unprecedented global pandemic challenge, our medical infrastructure was

unaware of it's management. The Indian Council of Medical Research (ICMR) got activated and with leading institute All India Institute of Medical Sciences (AIIMS), New Delhi released guidelines and standard operating procedures (SOP) for prevention and management of this dreadful infectious disease. Management of this disease was not only about patients but also to take care of health care workers, the other vulnerable patients, and as well as of society. The practicality of the above guidelines and SOPs was needed to be implemented on the ground level. Our institute in Lucknow, geared up for tackling this disease with the help of the state government support. Here we have discussed our learning experience in managing and tackling the COVID-19 pandemic at our institute which will set an example

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for other hospitals as well as instill confidence in our primary care physicians who are the frontline warriors. At present from 1<sup>st</sup> June 2020 onwards, we are now in the unlock phase after a nationwide lockdown which was imposed from 25<sup>th</sup> March 2020. The preparedness of our institute has been challenging through all phases, as patients of both COVID and non-COVID has swelled, post lockdown.

### First testing of COVID-19 and establishment of the laboratory facility

On 9<sup>th</sup> March 2020, a positive report of COVID-19, by real-time reverse transcription-polymerase chain reaction (rRT-PCR) method of a trader along with his family members from Agra was reported by our Microbiology department and was reconfirmed by National Institute of Virology (NIV), Pune. Later on, our laboratory (Lab.) became the leading center of excellence for COVID testing as well as for validation of kits for COVID-19 testing by ICMR, taking care of all biosafety hazards. Recently we got equipped with the Truenat beta CoV test.

### Sample collection and testing

As per ICMR/MoHFW (Ministry of Health and Family Welfare) guidelines, whom to test and when to test, equipment required for a nasal swab or throat swab collection, triple packing system, labelling of the specimen, requisition form, transport conditions, handling of specimen leakage, and spillage explained to sample collection team. SOP for biosafety in laboratories and testing SARS-CoV-2 by Real-Time reverse transcriptase-polymerase chain reaction (rRT-PCR), general Instructions in the lab, sample receipt area, sample processing, and nucleic acid extraction, master mix preparation, template addition, amplification, waste discarding, cleaning and disinfection of sample collection area/laboratory area and spill management are were explained and trained.

### Admission of the first case in the institute

On 11 March 2020, a first COVID-19 patient got hospitalized in the isolation ward of the infectious disease unit. The responsibility of managing this patient was taken up by the Department of Medicine (infectious disease unit) who made an isolation ward duty team including faculty, residents, nurses, ward boy, paramedical staffs and other supporting staffs and every health care worker was trained in taking precaution and handling the situation. Initially, the duty roster was not streamlined. Unfortunately, one resident got unknowingly exposed and within a few days got symptomatic and turned out to be COVID-19 positive. Immediately all staff posted there, including a faculty were quarantined in private rooms of the hospital premises.

### Formation of various committees

In the wake of this crisis, various committees were constituted including faculties of all medical and dental departments Approval obtained on date 27-06-2020. The following committee was formed and told to adhere to a protocol that was modified by our institute also for smooth and effective functioning. The team

comprised of Isolation Care, Fever Clinic, Trauma Emergency, Critical Care for ventilator support, Triage/Holding area, Quarantine, Logistics, Hospital resource management, Fooding and Nutrition, Infection & Prevention Control Training, Media and Data, Control room, Sanitisation, dedicated COVID Surgical team and a Medical Board.

### Lockdown phase

With the advent of this disease in our state, our university took precautionary advice from the state government. The teaching of MBBS, BDS, nursing, and paramedical classes was suspended in the second week of March. To prevent overcrowding in the outpatient department (OPD), it was closed, and as well as elective surgeries were postponed from 23 March 2020. All focus was now concentrated on for the Corona crisis, as one infected case can infect many others and every hospital staff was at vulnerable risk. This initial lockdown phase gave time for our institute to work out further plans and get equipped with logistic support.

### Logistic and infrastructure support

Like other medical universities and hospitals, we also had a limited supply of personal protective equipment (PPE), sanitizer, gloves, and N95 masks. It was a hard time and difficult for medical staff to indulge in the active care of patients. Fortunately, as this disease was confined to Stage 2, we had time but all work and planning were to be expedited. As per government directives, our institute had to cater both COVID/non-COVID patients and also to ensure that health care workers are protected, a place was identified within hospital premises where triage would be done for the management of above patients. Our capacity was built up for 200 isolation beds including 40 ventilator equipped beds and 645 defined quarantine rooms, to be functional in a phased manner.

Budgeting of resources was done, as per patient's load, doctors, and other medical staff were placed at the Corona care unit so that the personal protective equipment (PPE) kit would be wisely consumed. Materials consumed were judiciously used and monitored so that misuse can be prevented. The state government also ensured that with the given helpline number of district Chief Medical Officer (CMO) suspected patients need not come to the hospital as this would be very dangerous in spreading this disease wildly in community. As most patients of COVID-19 are stable and there is no definitive treatment,<sup>[3]</sup> it was advised that they should be admitted at their respective district, designated COVID hospitals. This would not let the burden on the tertiary hospital.

### ICMR Guidelines and training to all medical healthcare workers

Elements of standard precautions like hand hygiene, respiratory hygiene, PPE as per risk, PPE donning and doffing, environment cleaning and disinfection, safe handling, and cleaning of soiled linen/patient cloth, waste management were discussed to all

health workers by PowerPoint presentations and demonstrations. Later on, this knowledge was imparted to healthcare workers of other hospitals.

### Corona ward posting duty and quarantine/isolation protocol

Health care workers over 55 years of age and persons having multiple comorbidities were spared from an active corona care team. Non-clinical department was posted at screening/ outpatient department, para-clinical and clinical at isolation and triage while for intensive care, medical department managing ventilator unit were deployed [Table 1]. A roster of staff including medical, nursing, paramedical, and non-medical was made. The team taking active care of patients was kept in active quarantine and was followed by 2 weeks of passive quarantine. As per the disease course, 2 weeks of quarantine is recommended for asymptomatic individuals.

### Environment cleaning outside wards/isolation rooms

Policy for sanitizing corona ward and quarantine places was made. Environmental cleaning, terminal disinfection, and decontamination procedures were applied. This included high/ low touch surfaces of corridors, lift, ramp following guidelines are followed-

1. Cleaning is to be done thrice in a day or whenever surfaces are visibly soiled or when contamination of the environment is suspected (such as after patient sneeze/cough on surfaces).
2. Wear PPE before doing disinfection and cleaning procedure.
3. Clean with detergent and water followed by cleaning with 0.5% hypochlorite solution (prepare by mixing 1 part of 5-6% sodium hypochlorite to 9 part of water) or with bleaching powder solution (prepare by mixing 4 teaspoons in 1 litre of water).
4. For metal surfaces, this should be followed by wiping with 70% isopropyl or ethyl alcohol.
5. Walls must be cleaned with detergent and water followed by disinfection with a 0.5% hypochlorite solution or with bleaching powder solution.
6. Floor and surface cleaning and disinfection are to be done with a 0.5% hypochlorite solution or with bleaching powder solution (use 3 bucket system).
7. Take off PPE and wash hands with soap and water. Safe handling and cleaning of soiled linen practice were discussed and applied.

### Dead bodies of COVID-19 handling

As per guidelines issued by Govt. of India, Ministry of Health & Family Welfare & other scientific bodies the SOP for management of dead bodies was explained and handed over to attendant with due precautions.

### Stress relieving and counselling

COVID-19 has created lots of fear, apprehension, and social stigma as well. Not only patients but medical fraternity are being counseled telephonically. Counselling here is being done before

**Table 1: Guidelines for duty posting at active corona care unit**

<p>Following points were discussed before initiating duty at corona ward. The team posted in Corona patient ward shall work with standard recommended PPE.</p> <p>All the team members shall be taking hydroxychloroquine prophylaxis as per recommendations, use refused on personal preference or contraindicated.</p> <p>These members shall be trained for work in the Corona Ward and use of PPE.</p> <p>The previous team shall give a detailed handover at the end of their duty and apprise the joining team of how work has been performed in the ward.</p> <p>One team shall be posted in rotation for a period of 14 days as per schedule, during which the team members will not be allowed to leave the allotted premises (except emergent situations). Please make necessary personal arrangements for the same. Yes</p> <p>On Day 15, the outgoing whole team will be sent for home quarantine for a further period of 14 days. Those who do not wish to go home for quarantine will be provided quarantine facilities by the University (as possible, per situation). The outgoing team members shall be tested for virus, if required, as per prevailing norms and recommendations.</p> <p>If any of the team members develops symptoms in his/her 14 day shift, he/she shall be isolated and tested. If he turns out to be positive, he/she continues in isolation and the rest of the team shall be in compulsory hospital quarantine. They shall be tested as per recommendations prevailing at that time. At this time the next/standby team shall take over. Any team member who thinks that he/she has been exposed due to any breach in the protective gear will be quarantined/isolated, depending on the magnitude of the exposure and shall be tested as per prevailing guidelines at that time/as per requirement.</p> <p>The number of people in a team shall be increased depending on requirement.</p> <p>Food and lodging during the period of duty/quarantine isolation shall be arranged by the University unless requested otherwise.</p> <p><small>PPE=Personal Protective Equipment, COVID-19=Corona Virus Disease-19</small></p>
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posting, during posting, and as well as during quarantine period also. Being confined in a room, the emphasis was also made on yoga, meditation, reading books, listening to music, and light workout.

### Medical board

The medical board was formed to tackle personal problems and behavior's of medical staff, as some were leaving the duties in fear of COVID-19.

### Emergency operation theaters

In the case of emergency dedicated surgical and obstetrician team was made ready with a marked operation theatre. Cath lab (Catheterization laboratory) was also made ready.

### Telemedicine

This extended period of lockdown has also caused inconvenience for a large number of patients coming to OPD for which telemedicine has been initiated for connecting and treating a patient in remote areas. Institute has started taking the help of an algorithm-based health radar system which will use Artificial Intelligence (AI) for screening of suspected

coronavirus patients and the treatment of confirmed cases, in a bid to reduce the chances of viral transmission among healthcare professionals. (AI) will test the suspects and provide treatment to the patients via ‘intelligent patient screening’ and surveillance system. The Evolko Health Radar will also help us in rapid screening of suspected individuals. Ours is the first medical institute to start using Artificial Intelligence for patient management during an epidemic like COVID-19.

### Digital Class

Another issue was that the teaching and training of undergraduates were affected. Our institute took initiative for digital classes through google meet and other software.

### eCCS (electronic COVID Control Support)

To help other hospitals or peripheral health centers eCCS was started for guiding the management of the COVID patients at their respective places.

### Unlock phase

From 1 June 2020 onwards, despite the increasing number of COVID-19 cases, our nation started gradually to unlock phase, taking precaution and with the hope that our socio-economic crisis did not deepened. Having done our homework, now our preparedness was put to test.

### Patients’ Data

#### Fever/corona screening OPD

As per screening and testing criteria [Table 2] which was revised at different intervals, patients were subjected to COVID-19 testing at a designated place [Figure 1]. In this 3-month duration,

**Table 2: Strategy of testing for COVID-19 in India (Strategy for COVID 19 testing in India: ICMR Guideline (Revised at regular intervals) and Uttar Pradesh Health Advisory/MoHFW**

- All symptomatic individuals who have undertaken International travel within 28 days.
- All symptomatic contacts of laboratory confirmed COVID 19 positive patients
- All participants and contacts of Tablighi Jamaat within 28 days irrespective of symptoms.
- All symptomatic health care workers engaged in patient management.
- All patients with Severe Acute Respiratory Illness (SARI) (fever AND cough and/or shortness of breath)
- Asymptomatic direct and high-risk contacts of a confirmed case should be tested once between day 5 and day 10 of coming in his/her contact.
- In area of hotspot/clusters and in large migration gathering/evacuees centers. All symptomatic ILI (fever, cough, sore throat, runny nose) Within 7 days of illness - rRT-PCR
- After 7 days of illness - Antibody test (if negative, confirmed by rRT-PCR)
- Patients were also enquired upon similar family history or in neighbour if not in above criteria

COVID-19=Corona Virus Disease-19, ICMR=Indian Council of Medical Research, MoHFW=Ministry of Health and Family Welfare, ILI=Influenza like illness, rRT-PCR=Real time-Reverse transcriptase-Polymerase chain reaction

about more than 5000 had been screened. About 10% were suspected but none turned out to be positive. Among these, one-third of them were health care workers and police personnel. Asymptomatic suspected COVID was advised for 14 days quarantine and was advised to follow up with the respective district CMO. Symptomatic patients not fulfilling the ICMR criteria for testing were given supportive treatment and were asked to review if there was no improvement.

### Triage

As per protocol patients of Severe Acute Respiratory illness (SARI) were managed at triage [Figure 2]. Non-ambulatory or unstable patients were screened at Trauma Emergency and patients with SARI were managed at Triage as per protocol. Here also in the last 3 months about more than 500 patients were received. During this unlock phase, now more of SARI patients are being found positive for COVID-19 and we are encountering more serious patients.

### Holding area

During this unlock phase, few patients though non- suspected COVID got admitted for other medical conditions but turned out to be COVID positive and which was worrisome.

### Isolation ward/ventilator unit

Till now we have admitted more than 200 COVID-19 patients of whom 130 have recovered and discharged while 17 have expired. Among admitted patients 2/3<sup>rd</sup> are male. The majority of the patients are in the middle age group. Fever and cough were the common presentations and it subsided within 3–5 days and they remained asymptomatic thereafter.<sup>[4]</sup> Nasal and throat swab were repeated at regular intervals and when once two consecutive reports, 24 hours apart came negative, then the patient was discharged. The mean duration of the hospital stay of the discharged patient was about 10–14 days. Patients after being discharged in satisfactory condition were further advised of home quarantine for the next 2 weeks. All critical patients were elderly with multiple co-morbidities like diabetes and hypertension.

## Discussion

### Increase testing

At present, our government has authorized many certified laboratories in both government as well as in private sector for testing.<sup>[5]</sup> With increasing testing capacity, we are now detecting the higher number of COVID 19 cases in our country compared to other worst-affected countries. Now with increasing test facility, a large population can be tested, and as early as possible patients can be identified, so that disease is halted. Our laboratory is working round the clock and despite handling a large number of testing of our state, it is providing reports within 24 hours, thus making management of our patients as well as their high-risk contacts convenient and more effective. With the Truenat technique, which reports within 2 hours it would be a boon for serious patients who requires urgent intervention.

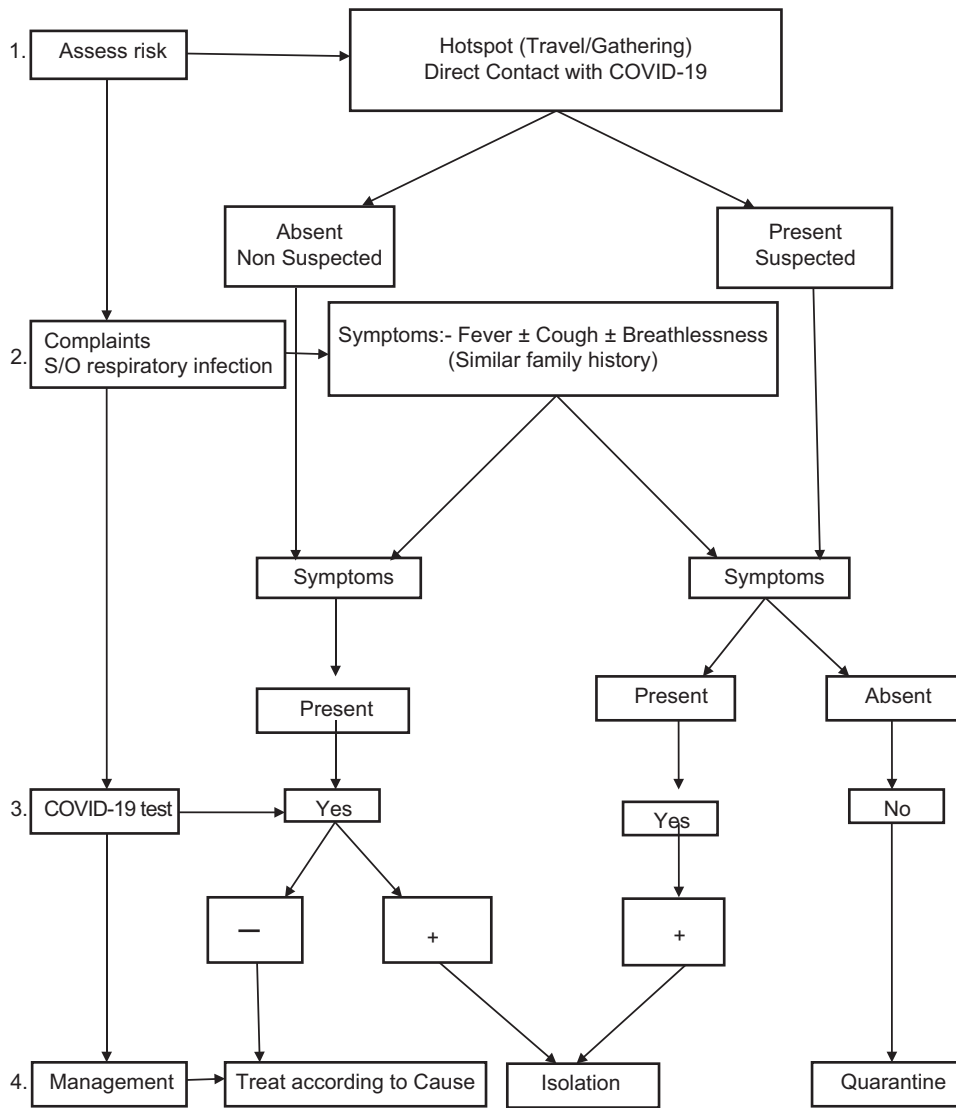


Figure 1: Protocol at Fever/Corona Screening OPD

### Apprehension in community

In our screening OPD, it was the apprehension in the community as well as in medical and police personal, that they had turned up. During this season common cold and flu which are also prevalent and mimics Corona infection, patients were cautious. Mental health is a greater issue that is going to be critical in managing the COVID-19 pandemic. Panic and fear are overcoming the mental peace of citizens, leading into irritating behavior and social chaos, thus superseding evidence and jeopardizing the pandemic control efforts.<sup>[6,7]</sup>

The role of primary care physicians (PCPs) will be very important for taking care of such patients at peripheral centers.

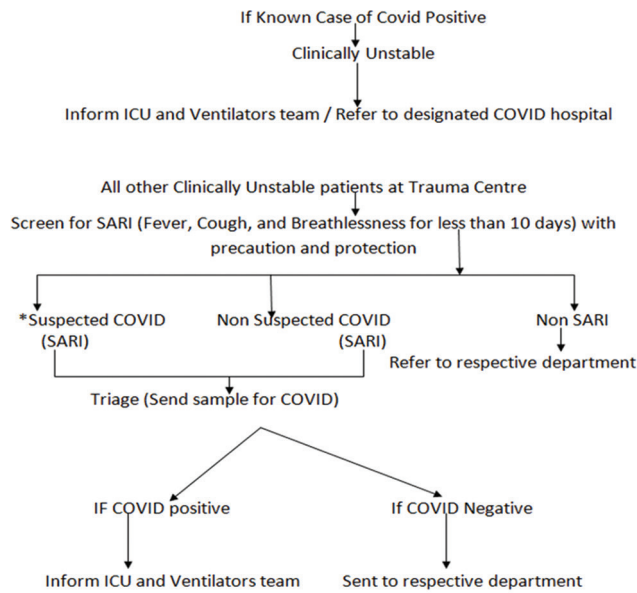
### Clinical data

As projected by ICMR data that the majority (70–80%) of patients had mild symptoms or were asymptomatic and here also most patients admitted here were stable. Patients coming

up with SARI were mostly due to acute exacerbation of their underlying chronic disease like diabetes, hypertension, ischemic heart disease, chronic lung disease, chronic kidney disease, malignancy, where their immunity is lowered.<sup>[8-10]</sup> At times patients of such underlying disease did not report of fever and they came as a case of acute breathlessness. As observed worldwide older age and multiple comorbid conditions and substance abuse like smoking/alcohol were the cause of increased mortality as we also witnessed in our critically ill patients.

### Research activity

Being this a research institute, with the collaboration of ICMR/CSIR-CDRI (Council of Scientific and Industrial Research-Central Drug Research Institute)/AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy), data of COVID patient is being collected. Various permutation and combination of allopathic as well as herbal drugs are being tried, the antibody test is being validated and role of convalescent plasma administration is being studied.<sup>[11,12]</sup> Disease duration



**Figure 2:** Protocol of SARI Management at triage SARI (Severe Acute Respiratory Illness) Definition: An ARI with a history of fever or measured temperature  $\geq 38^{\circ}\text{C}$  and cough; onset within the last ~ 10 days; and requiring hospitalization (Tachypnea, Respiratory distress,  $\text{SpO}_2$ )

of admitted patients varied a lot and hence details and factors affecting would be studied for epidemiological purposes.

### Hospital becoming hotspot

However, the hospital set up has become a hotspot area where many health workers have been accidentally infected and many had to be quarantined as these setup may be still lacking in planning and logistics as desired.<sup>[13]</sup> Several reputed hospitals across the nation have to bear the brunt of it.<sup>[14-16]</sup> Fortunately our infection prevention control was satisfactory due to dedicated team efforts.

### Relevance of our institutional experience upon the practice of primary care physician

With the easing of lockdown, patients are now not only confined to big cities but also present in small cities as well as rural areas where our PCPs will be at the forefront.<sup>[3]</sup> At institute level with swelling of cases, it is becoming challenging to manage COVID-19 patients. As revealed by ICMR data that 70–80% may be asymptomatic or mildly symptomatic and only about 5% of patients are critical and needs hospitalization. Our passing on our experience to PCPs will reduce their apprehension and hence young, stable patients could be managed at primary centers taking due precaution and ensuring proper sanitization. Family Medicine physicians with the help of telemedicine will play a crucial role in managing both COVID and non-COVID patients.<sup>[17]</sup> They will also get assistance and guidance from such institutes through both audio-visual modes. Needy patients of SARI, with the co-ordination of PCP and respective district CMO could be transferred to the nearest health care institutes. From our collective team effort, a holistic approach can be incorporated by health care workers at the periphery also. Primary care physicians

always look upon the leading institutes for any breakthrough in managing COVID patients like pharmacotherapy, new modalities of investigations, or vaccination and be updated.

## Conclusions

Compared to developed countries, where despite an advanced healthcare system, they witnessed high mortality. Our country is a second populous city in the world with a poor medical facility, so this disease which has no definitive treatment, maintaining healthy hygiene, good nutrition, and social/physical distancing is of utmost importance. This lockdown allowed us to vitalize our health infrastructure and medical awareness for COVID 19. Being a medical institute apart from patient care, teaching, and training, other medical research has to be started. In the future with this resurgence of contagious infectious disease, Infectious Disease hospitals will be required to be built at an isolated place so that other patients are not vulnerable. It appears that in the long run, either vaccine or herd immunity will overcome this disease.

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## Key messages

1. Experiences and expertise of reputed institute will benefit other hospitals as well as to primary physicians
2. Collective responsibility and dedication are required to overcome this pandemic
3. Telemedicine will integrate our peripheral center with the leading institute and hence patients will be benefitted.

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## Conflicts of interest

There are no conflicts of interest.

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