

Report from the Field

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Corresponding author:

Makhdoom Killedar,
E-mail: makhdoom305@gmail.com

Establishment of a Rapid Response, 100-Bedded COVID-19 Hospital With General Wards and Intensive Care Unit Within 35 Days in North Karnataka, India: Report From the Field

Kiran Hegde, Himanshu Sharma , Makhdoom Killedar and Deepak Betadur

Department of Hospital Administration, SDM College of Medical Sciences & Hospital, Karnataka, India

Abstract

In the state of Karnataka, India, the first case of coronavirus disease (COVID-19) was diagnosed on March 9, 2020. As stated by the WHO, around 15% of COVID-19 patients require treatment in the Intensive Care Unit (ICU). Keeping this in mind, along with the increase in COVID-19 patients in Karnataka, it was predicted that the prevailing general wards and ICUs would be overburdened with the added non-COVID-19 diseases and infirmities. Hence, it was decided to set up a separate infrastructure to reduce the chances of transmission among the patients within the hospital. Thus, the board at SDM College of Medical Sciences & Hospital, Dharwad, Karnataka, took the responsibility to establish a fully equipped 100-bedded hospital in its premise as part of the national and state services to combat the outbreak. The aim of the study was to establish an isolated, fully functional hospital, equipped with all necessary diagnostic and critical care facilities to treat patients diagnosed with COVID-19 in North Karnataka, India.

The design was a conversion of a Cranio-Facial Unit (CFU) building, consisting of 3 floors into a 102-bedded hospital, divided into COVID-19 wards and the ICU. The bed strength of the CFU building was utilized, adding more beds to wards where feasible and converting the building to a fully functional COVID hospital.

The setting was a temporarily closed (due to the COVID-19 pandemic) CFU building at SDM College of Dental Sciences & Hospital in North Karnataka, India. The facility is located near the main hospital, that is, SDM College of Medical Sciences & Hospital, Dharwad, Karnataka, on the outskirts of district Dharwad, near a small village called Sattur.

The results were a complete stand-alone hospital setup, comprising an 88-bedded, fully functional general ward, 6-bedded fully equipped ICU, and 8-bedded fully equipped stepdown ward and 1 operation theater (OT). Due to the prompt setup of a fully functional hospital, 290 patients were admitted and treated. The same was duplicated in the main hospital's super specialty building during the second wave in India for which the beds were increased to 513 (53 ICU beds and 460 ward beds).

Given the sudden surge of cases, it became imperative to set up a facility that can manage the patients on a short notice; this was solved by transforming the CFU building that was inactive at that time because of the nationwide lockdown. This Brownfield project was undertaken as an ideal location to convert the CFU unit into a COVID-19-specific hospital that can handle the requirement of beds as asked for initially by the government and administrative agencies.

A facility set up on a war footing to tackle the pandemic in the region with focus on factors like adequate infrastructure, contactless treatment, establishment of strong communication channels to ensure proper counseling of the patients and their relatives, and adherence to the timeline is an example of a situational approach in disaster medicine.

The first suspected case of SARS-CoV-2 (COVID-19) was reported by China to the World Health Organization (WHO) on December 31, 2019, in Wuhan.^{1,2} It was declared a Public Health Emergency of International Concern, by the WHO on January 30, 2020. COVID-19 was declared a pandemic by the WHO on March 11, 2020.³ Till now, the pandemic has affected 216 countries and territories around the globe.⁴ India recorded its first case on January 30, 2020,⁵ and as of February 28, 2021, the numbers of positive cases have been 11 112 172.⁶ India was one of the pioneer countries that went for a prompt lockdown (on March 23, 2020) and has since stressed on contact tracing of all positive cases with its innovative Arogya SetuTM application.⁷ In addition, all state governments have set up prompt divisional health care bodies to manage the progress, containment, and treatment of COVID-19 along with the National Disaster Management Authority.⁸

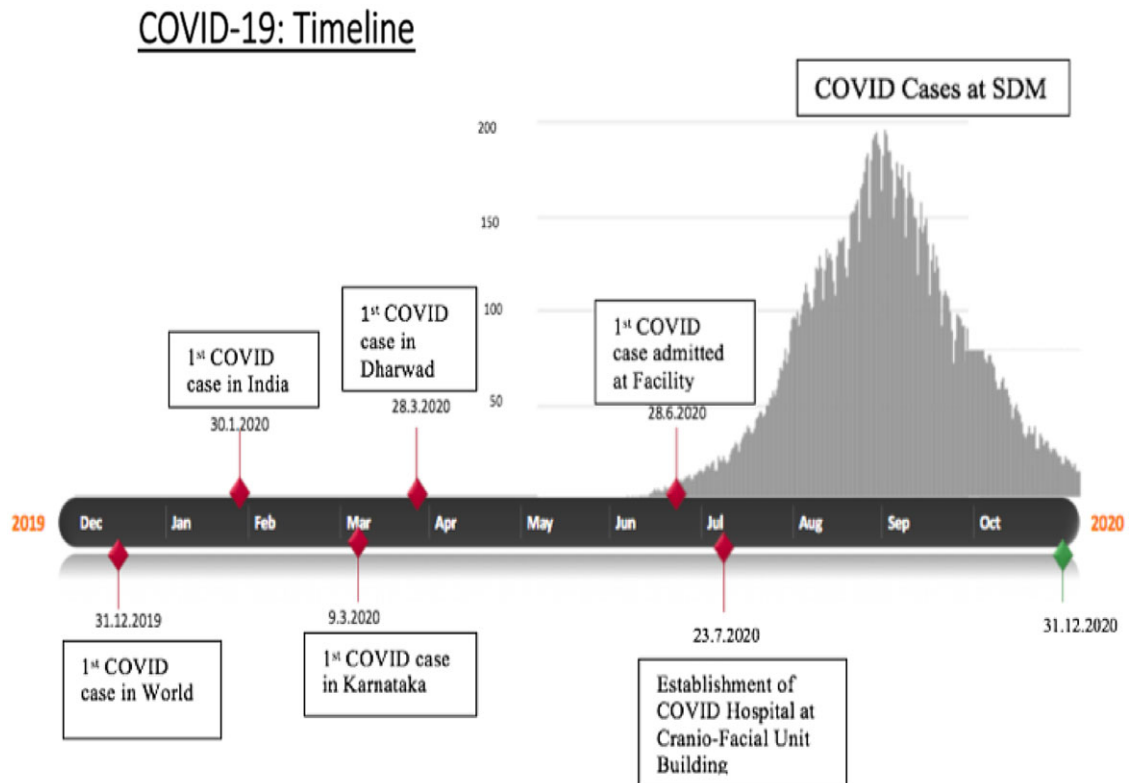


Figure 1. COVID-19 timeline (cases on y-axis are in the 1000s in India).

In the State of Karnataka, the first case was diagnosed on March 9, 2020.⁹ As of February 28, 2021, Karnataka has had 951 251 cases.¹⁰ In the district of Dharwad, Karnataka, as of February 28, 2021, there have been 22 339 COVID-19 positive cases.¹¹ As stated by the WHO, around 15% of COVID-19 patients require ICU (Intensive Care Unit) care.¹² Keeping this in mind, along with the increase in COVID-19 patients in Karnataka, it was predicted that the prevailing general wards and ICUs would be overburdened with the added non-COVID-19 diseases and infirmities. Hence, it was decided to set up a separate infrastructure to reduce the chances of transmission among the patients within the hospital. Thus, the board at SDM College of Medical Sciences & Hospital, Dharwad, Karnataka, took the responsibility to establish a fully equipped 100-bedded hospital in its premises as part of the national and state services to combat the outbreak (see timeline in Figure 1). For this, a project design committee and implementation board was formed on June 18, 2020, to achieve the target with precision and efficiency. This paper will discuss the approach toward setting up a stand-alone, fully functional facility, dealing exclusively with COVID-19, with the limited resources within 35 days, in a district of Karnataka. The objective of this paper is to enable the replication of this ideal model of infrastructure preparedness to treat and manage COVID-19 patients or any similar pandemic in the future.

Aim

The aim was to establish an isolated, fully functional hospital, equipped with all necessary diagnostic and critical care facilities to treat patients diagnosed with COVID-19 in North Karnataka, India.

Methods

Location of the Facility

The COVID-19 hospital was set up at an empty stand-alone Cranio-Facial Unit (CFU) building available within the university campus, at the Dental College & Hospital, on July 23, 2020, which was 1 kilometer from the institute main hospital. The site was chosen for its availability and proximity to the main hospital. This helped transfer the necessary equipment and items from the main hospital to the new facility. The segregation of the building removed the mixing of the COVID-19 patients with the non-COVID-19 patients, which reduced the risk of nosocomial infection and catastrophic shutdown of medical services if COVID-positive patients had been admitted along with other patients in the existing wards and ICU. The WHO manual to set up and manage a severe acute respiratory illness (SARI) treatment center and SARI screening facility in health care facilities requires an isolated closed space within the hospital that can be temporarily upgraded to an ICU,^{12,13} which was readily available as the CFU building had a functional (before the pandemic) ICU unit consisting of 6 beds.

Project Planning, Design, and Maintenance Committee

After intensive meetings with the state government and district commissioner's office about the imminent increase in the number of cases in the state of Karnataka, it was decided by the board of the institute that a prompt setup and functioning of the facility was of utmost priority. The COVID-19 hospital was set up with adherence to the guidelines by the WHO, regarding the location criteria, as follows¹²:

- Ensure that the site is as close as possible to the main entrance of the health facility in order to centralize all entrances
- Ensure easy access for patients and staff with guaranteed security
- Aim for a unidirectional flow for all patients and visitors accessing the health facility
- The location should ideally be inside the premise of the health care facility for optimum manpower management but should ideally be an isolated structure separated from existing patient treatment areas to prevent possible cross-infection

Facility Planning

The project planning committee utilized the “ground floor and 2 floors” (G + 2) building to its full potential. The ground floor had 2 entrances, consisting of a front and rear gates. The front gate was restricted to the entry of laboratory diagnosed COVID-19 patients only. The rear gate was restricted to the hospital staff. The rear entrance’s room doubled up as the nursing station that was equipped with the necessary protective equipment, pharmaceutical materials, drugs, and diagnostic items. A log book was maintained by the efficient nursing staff. The ground floor had 1 general ward comprising 18 beds. The ground floor was utilized with emphasis on the protection of the health care staff in the nursing station. A small cafeteria was set up for the staff on the ground floor. Three mobile phones with see-through touch sensitive plastic seals were provided for each floor for communication of the staff. The escalator was used exclusively for the COVID-19 patients (admissions and discharges). A separate staircase was used by the staff for their commute to the various floors and operation theater (OT).

The CFU building had an initial capacity of 40 beds, which was upgraded by the planning and design committee to 102 beds in the various wards on the ground, first and second floors with the following bed capacity (along with area in square meters):

• One ICU Ward with 6 beds:	58.16 sq mt
• One General Ward with 18 beds:	120.98 sq mt
• One Female Ward with 13 beds:	107.63 sq mt
• Two Male Wards with 7 beds each:	87.52 sq mt
• One Pediatric Ward with 11 beds:	107.63 sq mt
• Two Semi-Special Wards with 6 beds each:	57.42 sq mt
• Two Stepdown Ward with 4 beds each:	31.73 sq mt
• One Special Ward with 8 beds:	196.87 sq mt
• Two Backup Wards with 6 beds each:	59.00 sq mt

Figure 2 shows the directional flow of doctors, patients, and support staff: (1) Nursing Station, (2) Donning Room, (3) Doffing Room, (4) staircase, and (5) General Ward with 18 beds.

Doctors and Staff—Before Donning: ■ After Donning: ■ Patients: ■

Resource Mobilization (Engineering and Other Resources)

Non-renewable and non-reliable items like electric filament bulbs were replaced with LED bulbs. Priority for deciding the items was their sustainability. Any minor repairs to equipment and items were done outside the hospital premises after proper decontamination. New geysers that don’t take time to heat were fixed and set up on each floor.

To provide the best service available was the priority of the institution. A state-of-the-art 200 L/hr RO plant was set up for the 18 dialysis points that were available in the facility. A 5000-L syntax water tank was kept at the CFU building, which acted as the extra reservoir for any emergency situations (which fortunately did not

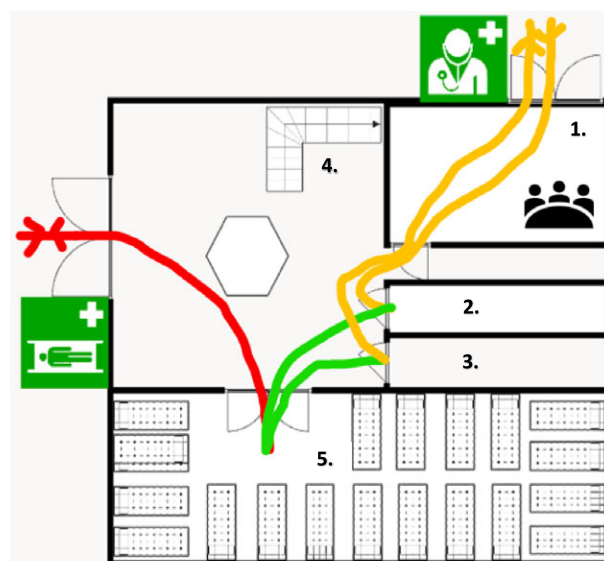


Figure 2. Spaghetti diagram of the ground floor.

arise). For the oxygen consumption, as oxygen is required for high flow nasal cannula (HFNC), ventilators, and oxygen masks, which are used for the management of COVID-19 patients (with consumption of around 50–60 L of O₂ per minute), 10 oxygen cylinders were already available at the CFU building. Initially, a 1000-L liquid oxygen tank was considered and to be provided by Karnataka Industrial Gases™, but given the lack of time, space, and expense to procure and set up the tank, in compliance to the safety measures of the authorities of India,¹⁴ the liquid oxygen tank idea was dropped and other available resources were researched. In compliance with the safety measures and regulation authorities in India,¹⁴ 20 more cylinders were procured from the manifold bank in the main hospital, with 1 day backup of oxygen always available for emergency predicaments.

For the smooth functioning of the hospital, a continuous supply of electric power was a prime requirement. For no break in power to diesel generator backup, the capacity of an uninterruptible power supply (UPS) backup was increased. As the dental college was empty during the pandemic, it was decided to transfer all power of electricity to just the CFU building, in case of an emergency (which fortunately did not arise).

Wards were upgraded by the design and maintenance committee to provide oxygen lines and dialysis points. A total of 18 oxygen beds were available on the first floor. Ventilators were procured from the main hospital and shifted to the facility; 18 fully functional ventilators were set up on the first floor. One OT was present in the building, which was utilized for emergency procedures.

The second floor consisted of a special ward that had 8 beds, with 6 oxygen lines and 6 ventilators. Each special room had separate lavatories. Each room on all the floors was well-ventilated with meshes on the top window panels for fresh air. The other windows accessible to the patients were screwed and locked so the patients could not throw anything outside.

The adjacent building was used to set up an enquiry counter on the ground floor for the patient’s family’s queries and billing. This helped segregate any potential risk to the health care providers outside the CFU building and also the patients’ families. Proper consultation of the patient and the patient’s family was done to alleviate any anxiety and stress. The building was functional within

a few days and cost-efficient. Most of the workers required were taken from the hospital. Security played a vital role in ensuring that the designated route for the segregation of the doctors, patients, and the support staff was maintained and strictly followed.

Human Resource Management

Staffing

The personnel required for COVID-19 to set up and sustain the infrastructure were called upon. Most of the staff were mobilized from the main hospital. The shifts were divided with 6-hour duties each, considering the difficulty of executing duties in a personal protective equipment (PPE) suit. The duty roster was prepared by the hospital administration department, where the staff had 1 week duty and a post-duty 4 days quarantine period,¹⁵ after which the doctor would undergo COVID reverse-transcriptase polymerase chain reaction (RT-PCR) testing. After the assigned shifts, the doctors would use the separate staircase and exit from the rear gate. The nursing staff was posted for 7 days at the CFU with 4 days post-duty quarantine, as the median time from exposure to symptom onset is 4–5 days,¹⁵ after which they would undergo COVID RT-PCR testing. The staffing of ICU nurses was done in compliance with the revised nurse-to-patient ratio as per the COVID guidelines at 1:1.5.¹⁶ Six nurses were posted in the wards, of which 2 were senior nurses. The shifts were for 6 hours each. Four counter nurses were posted at the nursing station. Staffing and scheduling for duties during the pandemic were prerequisites and a challenge. The hospital administration department got full support from all the non-, para-, and clinical departments to create a flexible health-care-provider pool for COVID-19 duties. Deployment of the staff was done in compliance with the Standard Operating Procedure (SOP), laid out by the Government of India.¹⁷ The priority to provide the best health care services to the patients was the objective for which everyone came together in unison. The duty roster was prepared as follows and with the following factors in mind:

- Four shifts of 6 hours
- One staff doctor from the medicine department in each shift, along with 2 resident doctors from various departments
- This would continue for a duration of 1 week after which 4 days of institutional quarantine was done at the hotel near the COVID-19 facility.
- The roster was prepared well in advance, with flexibility and backup staff available in case the duty staff contracted COVID-19.
- Continuity of the non-COVID services at the main hospital
- Each department pitched in, while simultaneously the departments were always functioning for Out-Patient Department (OPD) and In-Patient Department (IPD) at the main hospital.
- Limiting the exposure of the staff at the COVID facility by not exceeding their duties to more than 6 hours
- No staff to be posted for COVID duty who is above the age of 45
- The doctors were senior and junior residents.

Training

Training of the staff during the pandemic was prompt and efficiently done with accordance to the guidelines laid out by the National Centre for Disease Control, Government of India.¹⁸ Virtual sessions on donning and doffing were done and repeated every month from April to August. A total of 4 virtual sessions were conducted. Easy and step-by-step guides on how to don and doff were taught to the duty doctors and also the residents and interns of SDM medical college. This helped remove any stigma or doubts

to the health care staff regarding their protection to the virus. A big concern was the chaotic way in which the doffed PPE and other apparels were kept at the doffing site. To overcome this, easy-to-comprehend standees were created and kept at the donning/doffing areas with easy step-by-step instructions regarding the same with dustbins marked so the PPE and the scrubs could be better disposed of by the housekeeping staff.

A hotel with good accommodation that was available near the campus premise, at a short distance from the facility, was made exclusive to the doctors and staff after their shifts. It doubled up for the quarantine of the staff after their duties also. Food was provided to their rooms, taking all the necessary precautions and hygiene measures.

Management of Patient Data Recording and Storage by Information Technology (IT) Linkage

For the proper recording of the patients, an efficient desktop application was created exclusively by the social networking department. The application named *COVID Details* was created exclusively for COVID-19.

COVID Details was coded and initiated with the patient's data consisting of IP number, age, address, phone number, district, date, and time of admission and discharge. The data were in compliance with the format requested by the state government of Karnataka.¹⁹ These data were regularly updated and sent to the district authorities. This helped with the contact tracing of the patients and helped find clusters of "hot zones" in the region. It helped with the billing and maintenance of records of the patient. Once the patient reached the hospital, he/she was directed to the fever clinic (triaging area) where he/she was triaged by a physician and on the basis of the clinical evaluation, directed to either give a sample for RT-PCR or referred to other departments. As soon as the process for taking a sample was initiated, a unique Specimen Referral Form (SRF) ID, exclusive to the patient, was generated, the sample taken, and using the universal precautions sent to the microbiology department. The same SRF ID was sent to the Indian Council of Medical Research (ICMR) portal for recording and transparency. The report of the sample was uploaded to the *COVID Details* for swift shifting of positive patients to the CFU COVID-19 hospital. The transportation of the patients was done using the hospital ambulances that were operating round the clock. *COVID Details* also recorded the COVID-19 deaths that happened at the hospital premises. Each death, with the time and date, along with the ward/ICU of death, and the provisional diagnosis was updated on the application and swift steps taken for shifting of the bodies to the mortuary of the hospital. The same records were provided to the district authorities in compliance with the directives by the central and state government on a real-time basis.

Adaptation of War Room Concept for Effective Administration of Clinical and Support Services

In a pandemic, it becomes rather haphazard and chaotic at the site of action, that is, the hospital. For the smooth functioning of all the arms working to run the machine, a central war room with visual boards was set up at the department of hospital administration, which helped plan, organize, staff, and lead the health care personnel. The Hospital Information System (HIS), exclusive to COVID-19, was a challenge given that a central system at the main hospital had to be created for fetching data from a distant building. For this, a new local area network (LAN) application was created that would fetch the necessary records and be updated at a daily

level. The same data were provided to the district authorities and proved helpful for epidemiological study of the pandemic. The HIS named *COVID Details* was later extended to the whole hospital to track and fetch data of COVID-19 and non-COVID-19 patients.

Management of Infection Control and Safety of Health Care Providers

Protection of the health care staff that served ardently was the prime priority of the board of the institute. PPE was procured and stored on the ground floor. Two donning and doffing areas (1 on the ground floor and 1 on the second floor) were set up. A showering area, with 3 showers, for the staff was set up on the ground floor. Separate lavatories were available for the staff and patients on each floor. The nursing station along with the donning/doffing areas were sterilized daily by the housekeeping department. Training for donning/doffing of staff was conducted via virtual meetings by the hospital authorities in accordance with the Centre for Disease Prevention.²⁰ In total, 4 virtual meetings were held every month from April to August. The design committee planned a separate entry-and-exit plan for the patients and hospital staff, making segregation a priority between the 2. Sign posts to direct the staff to their assigned routes were put up.

Laundry and waste collection was done twice in a day at 9:00 AM and 3:30 PM. Proper precaution and hygiene were maintained throughout the process of collection and disposal. Biomedical waste was segregated into yellow-color coded bags, with stickers pasted on them to segregate them into “wet” and “dry” waste. The biomedical waste was collected daily at 10:00 AM and 6:00 PM, and removed from the premises from the rear entrance gate of the hospital.

Challenges

The urgency in setting up a COVID-19 hospital, as directed by the district government authorities, was an initial hurdle that was passed relatively quickly, because of the acuteness of the board of the institute. The dilemma to either initiate the COVID-19 exclusive facility within the campus (which would have helped with ease of availability of materials within the hospital) or outside was solved by the availability of the then inactive CFU building because of the nationwide lockdown.

The stigma, doubts, and uncertainty about COVID-19 were challenging to the hospital. To ease patients' concerns and encourage them to come to the hospital for triage and sample collection was an obstruction that required empathy, and working in cooperation with the state and central government. Contact tracing given the high population in the country, and the villages that were sometimes not taking the universal precautions proved to be a hurdle for which attempts were made by the institute by carrying out advisory and instructional promotions at the local level to create more awareness at these remote areas. The unprecedented pandemic made it difficult to estimate the number of beds that would be required as the statistics on the patients varied from state to state.

The setting up of oxygen lines and dialysis points at the hospital was challenging, with regard to employees and resources. The procurement of oxygen cylinders from the manifold, while also balancing and estimating the requirement of the same at the main hospital was dealt with effectively by the maintenance department. Provision of electricity power to the CFU, which could prove a deterrent to the management of the patient care was solved by

upgrading the capacity of UPS to provide power to diesel generator backup in case of loss of power. Allocation of employees, with enough backup to fill the positions in case the duty staff tested positive, was a challenge that was dealt with efficiently by the hospital administration department.

Biomedical waste management, especially related to COVID-19, was a big hurdle given the stigma attached to the COVID-19 pandemic, along with difficulty to dispose of the waste. The assigned collector of the waste also asked for a hike to compensate for the expenses to dispose of the COVID waste. Following the fourth revision by Central Pollution Control Board, Delhi, on guidelines for handling, treatment, and disposal of waste generated during treatment/diagnosis/quarantine of COVID-19 patients,²¹ the necessary tweaks were made and the waste disposed of. The biomedical waste was outsourced to a government-approved local firm that would use incinerators for COVID waste disposal. It created a problem as the waste collected in yellow bags did not segregate between wet and dry waste and the wet waste would consume more fuel. This was solved by tagging the yellow bags and segregating them into “wet” and “dry” waste, in compliance with the COVID-19 directions for disposal of biomedical waste.

Discussion

The concept adopted here was different from the original concepts of disaster medicine. Preparedness is the central issue in disaster management. Preparedness, which is based on risk assessment, hazard assessment, and vulnerability analysis, has a greater chance of evoking an appropriate response when disaster strikes.²² This main component of disaster management could not be applied to COVID-19, given the sudden eruption of the disease and its unknown and disputed basis of origin.²³ This with a proper establishment of global protocols for an outbreak, a prompt response from the central and local governments and establishments could have been handled in a more efficient manner. Given these hurdles and the sudden surge of cases, it became imperative to set up a facility that can manage the patients on a short notice; this was solved by the availability of the CFU building that was inactive at that time because of the nationwide lockdown. This Brownfield project was undertaken as an ideal location to convert the CFU unit into a COVID-19-specific hospital that can handle the requirement of beds as asked for initially by the government and administrative agencies. Hence, no other design models were created/planned which were done in other countries, as reviewed in an article on hospital surge capacity planning.²⁴

As stated in a study conducted by Matteo Paganani, “There is no argument that the evidence-based medicine approach using the Delphi method would have been in line with prior research in the field. These are extraordinary times, and the authors accept this limitation to produce a checklist to guide the team that has been tasked to reconfigure their structure for their surge COVID-19 response.”²⁵ A similar approach was used by the executives of SDM hospital, where daily meetings were conducted by the medical superintendent of the hospital with the clinical team of physicians, civil engineers, and maintenance department on setting up a facility quickly that can manage COVID-19 patients. As emphasized in a study conducted by Kyusik Kim, “Healthcare resource availability is potentially associated with COVID-19 mortality, and the potentially uneven geographical distribution of resources is a looming concern in the global pandemic. Given that access to healthcare resources is important to overall population health, assessing COVID-19 patients' access to healthcare resources is

needed.²⁶ The CFU building was chosen, keeping the same concern in mind, as the site for setting up the COVID-19 hospital, for its close proximity to the main hospital which also acted as an isolation site to segregate the COVID-19 patients from the non-COVID-19 patients. The priority was easy accessibility of the patient for COVID services and prompt transit of the patient from the entrance to his/her allotted bed. As per a study conducted by Dr Liji Thomas, “Risk stratification is essential in the management of COVID-19 due to the need to prioritize critical care services in situations of overwhelming numbers of patients. Since a subgroup of patients with this illness are severely sick and rapidly progress to life-threatening illness, it is necessary to have a reliable system to distinguish patients who will develop such symptoms and require mechanical ventilation and ICU admission, from low-risk patients who can be discharged to their homes.”²⁷ The hospital staff did the same stratification of COVID-19 patients on the basis of their severity, with beds allotted according to the severity of the patient’s condition and a ward specified as a high dependency unit from where they could be shifted to the ICU if their condition deteriorated further.

The WHO has provided guidelines with respect to the location of the COVID center, which are as follows¹²:

- a. Ensure that the site is as close as possible to the main entrance of the health facility in order to centralize all entrances
- b. Ensure easy access for patients and staff with guaranteed security
- c. Aim for a unidirectional flow for all patients and visitors accessing the health facility
- d. The location should ideally be inside the premise of the healthcare facility for optimum manpower management but should ideally be an isolated structure separated from existing patient treatment areas to prevent possible cross-infection

With this in mind, separate entrances and exits for the COVID-19 patients and the health care staff were ensured. Separate and restricted routes were discovered, and strict adherence to the assigned routes was maintained (as shown in Figure 2). Infection control measures were ensured by training the health care workers to don and doff the PPE at the specified areas, to always wear the PPE during the hours of duty, and by making sure the staff gets adequate time to quarantine post duty. The duty roster was prepared with emphasis on proper time and spacing of the staff members. As mentioned by Ken Junyang Goh, “Strict adherence to droplet and contact precautions including hand hygiene, eye protection, and safe donning and doffing of personal protective equipment (PPE) will be the main defences against transmission. HCWs must doff and dispose of PPE safely within designated areas, with equipment and environmental decontamination enforced.”²⁸ This was carried out ardently during the duty done by the health care workers at our hospital.

Due to the time constraints and sudden surge of the pandemic, all the health care workers of the various cadres were put in 1 pool and, on the basis of their expertise, divided and their duty roster prepared. The staff scheduling policies with no mixing of the health care workers post-duty till the quarantine period were as mentioned by Vishnunarayan Girishan Prabhu on staff scheduling policies: “Protecting the healthcare workers during a pandemic is very crucial, and all health systems should be prepared with an alternative to their regular staffing/scheduling to maximize the availability of their staff.”²⁹

Further, as stated by the International Monetary Fund members in a joint statement: “We have formed a Task Force, as a ‘war room’ to help track, coordinate and advance delivery of COVID-19 health

Table 1. COVID-19 statistics at the hospital/institute till February 28, 2021

Total patients admitted	2190
ICU admissions	309
Total operations	104
Total dialysis	640
COVID-19 testing (RT-PCR & RAT)	13 683

tools to developing countries and to mobilize relevant stakeholders and national leaders to remove critical roadblocks—in support of the priorities set out by World Bank Group, IMF, WHO, and WTO.”³⁰ “War room” as a concept was used by the institute as the administrative control room planned, organized, lead, and staffed the health care personnel to provide ideal care to the patients.

Visual boards were used to maintain and track various statistics, via the HIS, “COVID Details.” PPE, N-95 masks, and hand sanitizers were provided to the health care staff. PPE donning/doffing training was done as per the Centres for Disease Control and Prevention guidelines.³¹ The workforce of duty staff and supporting hands was spaced out efficiently while retaining backups in case of emergency.

The hospital had an initial capacity of 40 beds, which was increased to 102 beds, which was the estimated requirement by the district authorities. But, with the massive and sudden surge of cases of COVID-19, the number of cases increased, after which it was unanimously decided that the number of beds had to be increased. As per the requirement estimated by the institute and the directive of the district authorities, 50% beds were reserved for COVID-19 patients during the second wave in India. For this, using the CFU COVID-19 facility as the benchmark, the capacity was scaled up to cater to the increase in the number of cases, and the setup was duplicated in the super speciality hospital in the main hospital campus, where the number of beds was increased to 460 general ward beds and 53 beds in ICU, with continuity of care and deploying the staff for COVID-19 operations as required. The CFU building was closed as a COVID-19 facility and eventually reopened for its pre-pandemic services once the first wave of COVID-19 subsided in November 2020.

In total, 290 patients were admitted and managed over a span of over a month at the COVID-19 hospital (CFU), from July 23, 2020, till its closure on August 24, 2020. Out of the 290 patients, 175 were from Dharwad, Karnataka, and 115 from outside the district of Dharwad. A total of 23 surgical operations were performed at the COVID facility, with 19 lower section esarean surgeries (LSCS) and 4 operations. Table 1 shows, as of February 28, 2021, the hospital has admitted and managed 2190 COVID-19 patients, with 309 admissions to the COVID ICU. A cumulative of 83 LSCS have been performed; 104 operations have been conducted on COVID-19-positive patients; 640 COVID-positive patients have undergone dialysis at the hospital. A cumulative total of 13 683 RT-PCR and rapid antigen tests have been performed at the institute.

Conclusion

When the said facility was set up, the following factors were under focus:

- The entire patient care had to be contactless, as the disease was highly contagious.
- The infrastructure had to be adequate considering the clinical profile of the patients infected with COVID-19, with oxygen lines to each COVID bed in wards and ICU.

- Efficient management of employees to avoid any sort of burn-out amongst the health care workers.
- Timely and effective counseling of the patients and their relatives to allay the anxiety and fear.
- Last, an important factor was time. Everything had to be done on war footing since the number of cases was increasing exponentially.

This can be considered an example of a situational approach in disaster medicine. The institute has been successful in handling this pandemic regionally in an efficient and effective manner and continues to do so.

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