


Converting a British-era hospital into a state-of-the-art COVID-19 care centre

Saurabh Dawra ¹, S Patnaik,² M S Tevatia,³ S Hasnain,⁴ U Patnaik,⁵ S Srivastava,¹ T Rajnikanth,⁶ K Satish⁶

As of 13 May 2021, the COVID-19, caused by SARS-CoV-2, has affected 161 162 786 people worldwide with 3 347 577 confirmed fatalities.¹ India is precariously placed with 23 703 665 confirmed cases and 258 351 deaths.² The country is amidst a deadly second wave. Our hospital, a tertiary care super specialty centre in Western Maharashtra, caters to the serving personnel, veterans of the Indian Armed Forces and their dependents. The hospital, originally established in 1869, was at the forefront in providing medical care during the two world wars, the wars fought by the Indian Republic and during natural calamities (earthquakes at Bhuj and Latur, and the tsunami in Southern India).³ When the pandemic struck, we were tasked with establishing a state-of-the-art COVID-19 care centre at a British-era hospital while at the same time handling routine medical emergencies. We have written this article with a unique perspective of a doctor and a soldier. We have dwelled on the standard operating procedures (SOPs) established by our hospital during COVID-19 pandemic. The protocols described in the article were retrieved from unit 'War Diary', a regularly updated official record, beginning from January 2020 to March 2021.

The first and the foremost job was to plan for the difficult times that lay ahead. Thus, the administrative block turned into a war room by March 2020. A nodal officer was nominated, and our infantry made its humble beginnings along with a nursing officer (NO) of the hospital infection control committee (HICC), a couple of medical officers (MOs), nursing assistants

(NAs) and a single junior commissioned officer (JCO) who later on would be the manpower of the influenza clinic. Our hospital has a distinct advantage. It is spread over 105 acres of land.³ We first identified an outpatient department (OPD) complex, which is separate from the main hospital building, as the location of a six-bedded isolation facility. Changes were done in existing OPDs by providing screen/physical barrier between healthcare workers and patients, and arranging the seating arrangement in waiting area so as to avoid overcrowding. Certain engineering modification of existing inpatient infrastructure was done to ensure better ventilation, increased air changes and air filters. Disinfection of all surfaces was being done at required frequencies to ensure that no viral transmission occurs through fomites. Parallel defence screens were set up at the main gate which was the only designated entry and exit point to the hospital. This screening at main gate continued 24/7.

The second important aspect was to establish a functional isolation ward. The following aspects were critical in planning of isolation ward and other work premises:

Donning room: a separate donning and doffing room was established for wearing personal protective equipment (PPE). The PPE/clothing had to be donned prior to entry into the isolated contamination area. Performing hand hygiene with an alcohol-based hand rub was ensured. Adequate storage cabinets were made available in the donning room for storage of PPE.

Doffing room: separate doffing room was established where PPE would be removed before leaving the isolated contamination area. General principles like removing the most contaminated PPE items first, performing hand hygiene immediately after removing gloves, removing the mask or particulate respirator last by grasping the ties and discarding it in a touch-free bin were all ensured. Special signage boards highlighting the procedure of donning and doffing were placed in respective rooms.

Air conditioning: since the isolation ward would cater to COVID-19-positive

patients with mild or moderate symptoms, modification to air conditioning was done with an aim to provide comfortable environment to the patient, removal of contaminants, non-turbulent unidirectional airflow and prevention of leak of contaminated air to surrounding non-infected areas. Where the wards were not air-conditioned, additional exhaust fans were installed to create dilution and removal of contaminated air, increased unidirectional air flow and negative pressure (Figure 1).

The influenza clinic, a separate OPD location for screening patients with influenza-like illness and severe acute respiratory illness (SARI), with the nodal officer as its medical officer in charge, 2× MOs, 1× NA/JCO, 2× NAs and 1× ambulance assistant, was established in the erstwhile general OPD. From here on, the influenza clinic became a nodal point for handling all COVID-19 and non-COVID-19 queries related to the hospital through three help lines. The help line rang every 5 min from civilians stuck up at various places in India during the lockdown period. Most of them were for administrative help and the MOs never said 'no' to any of these. To quote a couple of instances, we helped a serving JCO posted at a forward post in arranging rations for his next of kin stuck up near Chennai and provided help to a civilian ward sahayika working at a private hospital in Hyderabad from getting evicted from her rental home.

A very important aspect was training the manpower and emphasising adherence to standard SOPs. A rigorous training schedule was initiated to train our warriors to better protect themselves and recruit new ones to be a strength multiplier. Members of HICC and the intensivists played an active role in training and in circulating videos on them for bettering awareness on safe healthcare practices during COVID-19, biomedical waste disposal, etc. The final step but not the last to occur in actualisation was procurement of non-expendables and expendables, our arms and ammunition, which continued at war footing. The Department of Microbiology established their reverse transcription (RT)-PCR services in April 2020. They were our sighters for the enemy and have been working 24/7 to cater for this additional load apart from the handling of routine samples of the entire hospital until this date.

A separate triage intensive care unit (ICU) was set up where all critical patients and unstable SARIs were being admitted. It was a full-fledged state-of-the-art

¹Gastroenterology, Command Hospital, Pune, Maharashtra, India

²Hospital Administration, Armed Forces Medical College, Pune, India

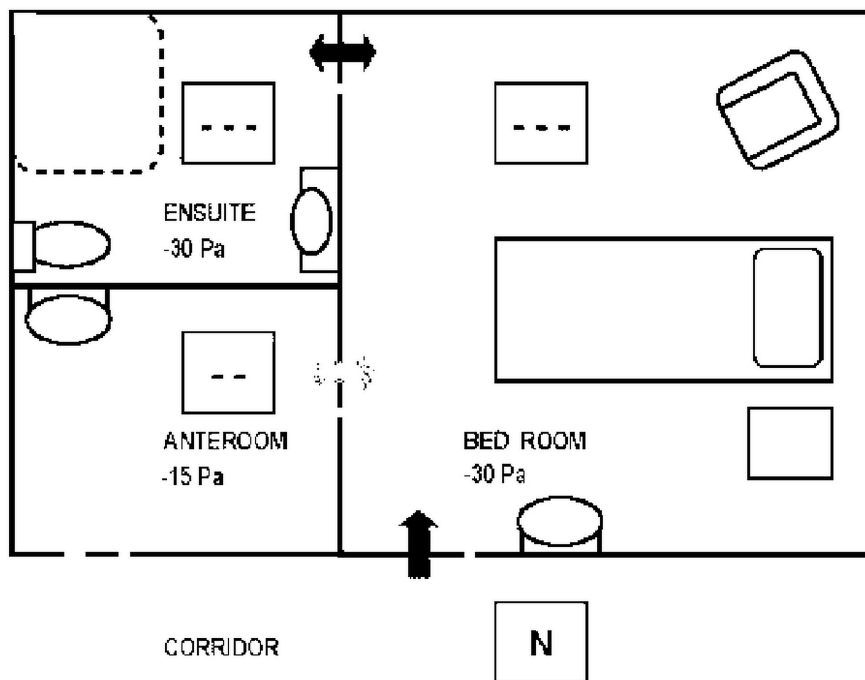
³Commandant, Command Hospital, Pune, Maharashtra, India

⁴Ex Commandant, Command Hospital, Pune, Maharashtra, India

⁵ENT, Command Hospital, Pune, Maharashtra, India

⁶Internal Medicine, Command Hospital, Pune, Maharashtra, India

Correspondence to Lt Col Saurabh Dawra, Gastroenterology, Command Hospital, Pune, Maharashtra 411040, India; saurabhdawra2@gmail.com



Bedroom: Negative pressure (-30 Pa), Ensuite (Negative pressure: (-30 Pa), Anteroom: Negative pressure (-15 Pa)

Pa: Pascals

Figure 1 Setting up of isolation room.

eight-bedded critical care facility manned by the intensivists and paramedical staff in eight hourly shifts. Dialysis here was being done using a dedicated dialyser with reverse osmosis water ferried from the existing plant in the dialysis centre.

By mid-June, the enemy started having an upper hand. There was a surge in cases across the country. Civilian set-up was on the verge of breakdown and hence Armed Forces were called for help. Few major steps needed to be taken. The first step was romping in the subspecialists (our cavalry and armoured) as the task was too daunting for a handful of people to manage. Teams delegated for COVID-19 wards were handled separately by a single senior advisor, while another was handling demand for consumables and reporting. The second step was to widen the battle-front. Two new wards were relocated, the wards renovated, furniture provided and separate donning/doffing areas created all at a record pace. The result was that the complex could now hold 150 (later 185) patients. It could also handle moderately severe oxygen-requiring cases during the peak.

What was a more humongous task was to create a new COVID-19 ICU. A redesignated ward became the chosen ground as it was close to the existing medical ICU. It was made battle ready with 15 ventilators,

28 multipara monitors, adequate oxygen cylinders and concentrators. We had created 15 new ventilator beds and 50 new high dependency unit (HDU) beds. Another ward with 50 beds acted as a step downward initially and then accommodated stable male patients after the peak was through. Two wards were identified as step-down wards for those that were now RT-PCR negative but were scarred by COVID-19 (pulmonary fibrosis). This particular requirement gave birth to the idea of creating a new central oxygen facility for step downward which materialised with great efforts in a record time.

This renewed viral surge required close coordination between different departments. Leading the fight were the Department of Medicine, the Department of Anesthesiology and Critical Care, the Department of Microbiology and the members of the Military Nursing Service. Deployed far and wide, depleted to the last man, the Department of Medicine and their residents were the ground soldiers, which delegated a nodal officer, managed influenza clinic and isolation ward, and were the physicians managing all COVID-19 wards including the COVID-19 ICU. They were in the forefront in planning and execution, including identifying wards for COVID-19 zones, creation of facilities, formulating SOPs,

and identifying demand of vital expendable drugs and procurement. The Department of Anesthesiology and Critical Care handled the triage ICU, COVID-19 ICU and COVID-19 operation theatres (OTs) in addition to handling emergency surgeries. They were instrumental in establishing critical care facilities in HDU and COVID-19 ICU. They worked 24/7 managing critical patients and in transporting them to respective wards. NOs in various wards were the backbone of COVID-19 care. Their care and compassion along with administrative responsibilities of wards created that 'critical difference'. The Ophthalmology and Ear, Nose and Throat departments handled quarantine and COVID-19 statistics, respectively. The station health officer spent sleepless nights tracing contacts of confirmed cases. While a separate COVID-19 labour room was commissioned in June 2020 capable of managing three simultaneous normal deliveries, the Department of Paediatrics created a two-bedded completely equipped neonatal ICU, earmarked two dedicated residents to the influenza clinic and restarted its routine mandatory vaccination for children in the service OPD complex. The existing OT was converted to COVID-19 OT, and emergency surgeries like lower segment caesarean section, trauma surgery and surgery for other emergencies were performed in full complement of PPE. The efforts were coordinated and the result was a teamwork that put us on a sound footing.

As of 01 January 2021, our hospital had screened a total of 42 247 individuals. A total of 16 801 RT-PCR samples were carried out of which 3306 individuals tested positive for COVID-19. The total COVID-19-related admissions stood at 1596 with 127 fatalities. A total of 1710 individuals were in home quarantine (Figure 2). A dedicated 'WhatsApp' group was created for each date, and individual queries and medical advice were promptly provided for those in domiciliary quarantine.

A very important aspect was to create SOPs for the handling of the deceased patients in accordance with the guidelines issued by Indian Council of Medical Research, Pune Municipal Corporation and the State of Maharashtra. The SOPs were strictly adhered to in handling of the deceased.⁴

During this entire period, we faced multiple challenges. Each challenge helped us develop new insight into handling a hitherto unknown pandemic. There was threat of in-hospital transmission if our

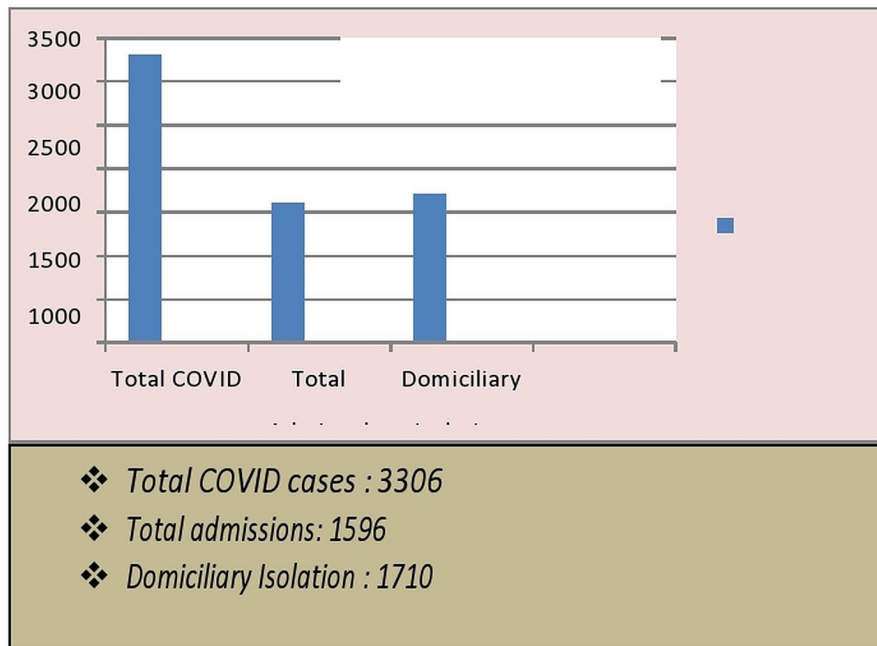


Figure 2 Total number of patients with confirmed COVID-19, hospital admissions and patients on domiciliary isolation (January 2021).

staff became positive. This was effectively contained by mandatory screening of all patients and their attendants. Emergencies had to be treated when COVID-19 status was unknown. This was done by a dedicated earmarked team in full PPE. Meanwhile, our hospital was simultaneously providing comprehensive non-COVID-19 care during the pandemic. Roving teams were put into place, and regular medical check-up and medicines were provided to the clientele living in the cantonment area, at their doorstep during the period of country-wide lockdown. Medicines for chronic diseases were expended for extended duration. Specialty and subspecialty OPD consult was being done after mandatory clinical screening.

Telemedicine services were established, and medical queries were attended to 24/7. Several innovating approaches like creating date-wise WhatsApp groups for patients under domiciliary quarantine decreased the number of hospital visits thereby decreasing the risk of disease transmission and giving clientele satisfaction. We believe that the important learning points for healthcare professionals are to synchronise our resources, assess the efficacy of innovations in improving healthcare services, and prepare for the pandemics and calamities that lie ahead.

Contributors SD—conceptualisation, writing (original draft), writing (review and editing), software and responsible for the overall content

as the guarantor. SP—data curation, supervision, validation and writing (review and editing). MST—conceptualisation. SH—conceptualisation and project administration. SS—data curation and formal analysis. RT—data curation, supervision, validation and writing (review and editing). UP—conceptualisation and formal analysis. SK—conceptualisation, methodology, resources and software.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

This article is made freely available for personal use in accordance with BMJ's website terms and conditions for the duration of the covid-19 pandemic or until otherwise determined by BMJ. You may download and print the article for any lawful, non-commercial purpose (including text and data mining) provided that all copyright notices and trade marks are retained.

© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.



To cite Dawra S, Patnaik S, Tevatia MS, et al. *BMJ Mil Health* 2022;**168**:250–252.

Received 17 May 2021

Accepted 1 June 2021

Published Online First 12 July 2021

BMJ Mil Health 2022;**168**:250–252.

doi:10.1136/bmj.military-2021-001895

ORCID iD

Saurabh Dawra <http://orcid.org/0000-0002-7679-9491>

REFERENCES

- 1 World Health Organization. *Coronavirus disease (COVID-19)*, 2020.
- 2 Ministry of health and family welfare. [Internet]. Available: <https://www.mohfw.gov.in/>
- 3 Welcome to armed forces medical college [Internet]. Available: <https://www.afmc.nic.in/Departments/Hospitals/chsc.html>
- 4 Government of India, Ministry of Health and Family welfare, Director General of Health Services (EMR) division. *COVID-19: guidelines on dead body management*, 2020.