Bracing for the Pandemic: The Udupi-Manipal Experience

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Abstract

COVID-19 was an unprecedented pandemic of our lifetime. Uncertainties were part of daily life and were the only certainty. Bracing for this pandemic at the level of a hospital was challenging. From infection control to patient management, from training healthcare workers to taking care of them, from public education to fighting fake news and misinformation, the pandemic presented with unique challenges and opportunities. This paper briefly discusses some of the important areas of focus and the experience of a dedicated COVID-19 hospital and the district during the pandemic.

Keywords: Bracing, COVID-19, dedicated hospital, infection control, pandemic, public-private partnership, training

INTRODUCTION

A pandemic is a period of anguish, rapid changes and never-ending questions. It is also a period rife with opportunities to abate the anguish, cope with changes, and begin answering the important questions.

SARS-CoV-2, the causative agent of coronavirus disease (COVID-19), is one of the most highly infectious microorganisms seen so far, spreading worldwide in a span of just 4 months. The COVID-19 public health emergency was soon declared as a pandemic by the World Health Organization by the end of March 2020, hardly 4 months from its origin at China's Wuhan in the early December 2019.^[1] This unprecedented pandemic situation forced nations to lockdown their entire commercial and economic activities for months together.^[2] When COVID-19 was reported to be spreading in Italy and Spain, overwhelming their health systems and resulting in significant mortality, the whole world was watching with bated breath, hoping against hope that their countries and regions will be spared.

The reality of the COVID-19 pandemic dawned on citizens of India on Sunday, March 22, 2020, when the Prime Minister called for a *Janta curfew*. One of the world's strictest lockdowns ensued, which kept the spread of COVID-19 under a tight restraint, and importantly, gave our public health and healthcare systems sufficient time and a head start to gear up to face the novel challenge of COVID-19.^[3]

Udupi district in coastal Karnataka has a good record of accomplishment in healthcare and human development indices and ranks in the top five districts of Karnataka state.^[4] The district health department has a strong network of surveillance, monitoring, and reporting systems. The performance of many departments of the district administration is generally among the top few in the state. Despite having these robust systems on the ground, bracing for COVID-19 was a challenge like no other. With a population of about 13.2 lakhs, Udupi required all the resources that the district could muster.

NEED FOR A DEDICATED COVID-19 HOSPITAL AND ITS IMPACT

Udupi district was created in 1997, about 23 years before COVID-19 would land here, but the government hospital in Udupi is yet to be upgraded with facilities expected in a district hospital. Clinical healthcare requirements of the district are mainly

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How to cite this article: Umakanth S, Bhat P, Jagadeesha G, Shetty A. Bracing for the pandemic: The udupi-manipal experience. Indian J Respir Care 2021;10:S3-7.

Received: 15-03-2021
Accepted: 16-03-2021

Revised: 16-03-2021
Published: 29-04-2021

Access this article online

Quick Response Code:

Website:
www.ijrc.in

DOI:
10.4103/ijrc.ijrc_44_21

catered to by the private sector. The largest hospitals of the private sector are the ones belonging to the Manipal Academy of Higher Education (MAHE), a reputed university that is recognized by the Government of India as one of the Institutes of Eminence.^[5]

Most cities in the world were managing COVID-19 patients in dedicated hospitals with strict infection control measures. China had already built a 1000-bed hospital in Wuhan in <10 days to face this viral illness.^[6] However, building a new hospital or getting a government hospital ready to deal with the challenge of highly transmissible COVID-19 was a challenge. With the threat of the pandemic looming large, realizing the resource requirements, the District Administration and MAHE jointly announced on March 20, 2020, that a 200-bed hospital of MAHE in Udupi city – Dr. TMA Pai Hospital, would be the dedicated COVID-19 hospital (DCH) for the district and would also provide free treatment. More than 250 clinical and support staff would continue to work in the DCH, along with additional specialist and clinical support provided from the larger 2000-bed Kasturba Hospital, a teaching hospital of Kasturba Medical College, Manipal. It would not only function as an isolation facility but also provide complete care including intensive care unit (ICU) services for COVID-19 patients.

Over the next 2 weeks, the hospital was upgraded to manage COVID-19 patients by additional infrastructure for following the strict infection control practices, equipment including more ventilators, and expansion of central oxygen supply to most of the inpatient beds. Internal training for healthcare personnel on infection control practices and clinical care and triaging of COVID-19 was initiated.

Dr. TMA Pai Hospital, named after the founder of MAHE, was the first private hospital in India that was designated as a DCH in March 2020 itself, thanks to the timely cooperation between the Udupi District Administration and MAHE. Allocation of clinical expertise, workforce, and resources was generous, enabling close monitoring of vulnerable patients and protocol-based timely escalation of care.

This arrangement of being the DCH gave the District Administration adequate time to upgrade the capacity and

workforce in the government hospitals and train the doctors, nurses, and support staff in infection prevention and control practices, as well as in the management of moderately sick patients.

There was a trickle of cases initially among the Gulf returnees, followed by a surge among returnees from Mumbai and Bangalore [Figure 1]. By the end of May, the two taluk hospitals were also ready for accepting COVID-19 patients in separate blocks of their campuses. Patients were managed in these three designated hospitals based on the clinical category. MAHE also allocated an additional large 200-bed facility for isolation of mild COVID-19 cases. The taluk hospitals and nonhospital isolation facilities managed asymptomatic and mild cases until home isolation was permitted. Dr. TMA Pai Hospital at Udupi managed all the significantly symptomatic, vulnerable, and sick patients, as the teaching college at Manipal had the facility and expertise for managing critical cases.

By July, as these hospitals were overwhelmed, other hospitals also had to reserve a few beds for COVID-19 patients. More and more villages and suburban areas started reporting rising COVID-19 cases, as witnessed in other districts and countries [Figure 2]. By August, more ICUs were converted to COVID-19 ICUs in Kasturba Hospital also, as the number of cases and critical patients surged skyward. September and October witnessed the height of cases in number and severity that put significant strain on the healthcare workers and hospitals.

Thankfully, despite the surge in cases and severity, mortality remained low (0.81%) [Figure 3]. Survival in those who required ICU care and ventilator support was also good.

LOCKDOWN RESTRICTIONS, CONTACT TRACING, AND SURVEILLANCE

Planning for and responding to a pandemic is a complex undertaking. The district administration anticipated the return of many natives of Udupi district from other places, especially Bangalore, Mumbai, and Gulf countries, where a sizeable population has migrated for employment. Quarantining the

Figure 1: Timeline of COVID-19 cases in Udupi district, with the likely source of cases. The surge that started in mid-June began to subside by October

Figure 2: Monthly incidence of COVID-19 cases in Udupi district, shown in PHC-wise distribution

Figure 3: Timeline of COVID-19 active cases, recovery, and mortality in Udupi district

returnees, testing, and tracing their contacts were a high priority. Officers and staff of various nonhealth departments, including the Department of Revenue, were deployed along with the health department for contact tracing, surveillance, and quarantine monitoring.

A strict lockdown was imposed at the district borders and within the district, as per the Government of India's policies. Hotels and lodges were converted into quarantine centers. A meticulous contact tracing identified dozens of contacts for each COVID-19-positive individual. Primary contacts were promptly quarantined and tested. The initial delay in getting SARS-CoV-2 testing results placed high pressure on quarantine facilities.

DIAGNOSTIC CAPACITY

The district did not have an approved laboratory to test SARS-CoV-2 until May 17, 2020. The district had to use the limited testing capacity of very few laboratories that were then available in the state. This resulted in substantial delays in diagnosis [Figure 4]. On May 17, 2020, the Microbiology Laboratory of Kasturba Hospital, MAHE, got approved for testing and subsequently escalated the reverse transcription polymerase chain reaction testing up to 1000 samples per day, easing out the delay in testing. By July 2020, a new laboratory was set up at the government hospital at Udupi, which also escalated daily testing to 1000 samples to further improve the district's testing capacity.

Figure 4: Delays experienced in reverse transcription polymerase chain reaction sample processing in the Udupi district

All vulnerable and symptomatic returnees were tested on priority. As early as April 17, the Udupi district topped the state of Karnataka in the number of samples collected per million population. As more and more natives returned, hundreds, sometimes thousands, of samples were collected per day, as per the prevalent testing strategy. On June 18, the Udupi district numbers for tests per million population crossed 10,000, which was more than double the national-level testing of 4600 at that time and maintained the testing tempo throughout the pandemic.

PLANNING PROVISION OF CARE

When the hospital was designated as the DCH, it was imperative that major changes were needed for effective infection control and case management. There were many uncertainties with COVID-19, but what we knew clearly was that it was highly infectious.

A nodal officer was appointed at the hospital to deal with the situation and was supported by a core group of clinical administrators, along with heads of the hospital infection control committee, and departments of internal medicine, infectious diseases, critical care medicine, emergency medicine, and anesthesiology.

In view of the high transmissibility of this virus, buffer zones were created between the patient areas and nursing counters. Buffer zones were marked with tapes on the floors and prominent sign boards. ICUs required special attention. Intubation protocols and escalation protocols were put in place, based on the available clinical information from other countries. New high-dependency units were created in the existing wards with better monitoring facilities along with enhanced oxygen ports. The entire oxygen supply chain was reviewed, given the utmost importance of oxygen supplementation in the management of moderate and severe COVID-19.

Nurses and housekeeping staff were trained about donning, entering the patient areas, safe behavior when inside the patient areas, doffing, and exiting the patient areas. An

entire floor was vacated to create duty rooms for doctors, nurses, and other emergency staff. Each duty room was allocated for one healthcare worker to avoid transmission in the nonpatient areas. All staff were instructed to take bath immediately after doffing in the designated rooms before leaving the hospital.

In view of the lockdown, food was provided for all healthcare workers in the hospital itself and the entire cost borne by the hospital. All staff were requested to avoid eating together to prevent the virus transmission. Duty rosters and schedules were created to ensure adequate number of rest days for each healthcare worker so that burn-out could be avoided. A typical work pattern during the pandemic was 6 days of work followed by 3 days of rest period. All healthcare workers were assured that their medical care would be covered by the university, in the event of them contracting COVID-19.

Doctors, nurses, and housekeeping staff who had significant comorbidities or above 55 years of age were given paid leave. Those who had vulnerable family members at home were provided hostel rooms to stay when they were not on duty.

TRAINING OF HEALTHCARE WORKERS

Infection control practices required for preventing the transmission of SARS-CoV-2 are very stringent. Healthcare workers assigned to take care of suspected and confirmed COVID-19 patients were trained using online sessions. While the District Administration organized these sessions, infectious disease and infection control specialists from MAHE were the resource persons. Doctors and nurses from public hospitals visited Dr. TMA Pai Hospital and observed infection prevention and patient management protocols. Following this, combined teams of government health authorities and MAHE consultants visited various government and private health facilities on many occasions and offered suggestions for improving their infection control practices.

The District Administration conducted sessions to motivate the team leaders of healthcare and surveillance departments

and arranged motivational talks by prominent individuals, including the Vice-Chancellor of MAHE.

Treatment protocols in the hospital were revised regularly based on the emerging evidence as well as the experience in other hospitals.

PERSONAL PROTECTIVE EQUIPMENT, VENTILATORS, AND ESSENTIAL MEDICATIONS

Personal protective equipment (PPE), including masks, were initially in short supply, as in other parts of the world. However, the District Administration could mobilize a few local manufacturers to get good-quality PPE in adequate quantities. The Indian textile industry was one such local agency that took up this challenge. Many generous donors also supported the District Administration in this regard. MAHE administration ensured an adequate supply of essential PPE using their traditional supply chains, and the government supply of these essentials got steady later. The district did not face any severe shortage of PPE at any time during the pandemic.

The District Administration motivated many individuals and organizations to generously donate advanced ventilators and high-flow nasal cannula (HFNC) devices and provided them to private and public hospitals that were managing moderate-to-severe COVID-19 patients. The local branch of Indian Medical Association (Udupi-Karavali) also provided various hospitals with HFNC devices and other essentials using crowd-funding from members.

By July–August 2020, there was emerging evidence that remdesivir was helpful in moderate–severe COVID-19. The District Administration arranged for the supply of remdesivir through the state government supply chain and provided it free of cost to hospitals managing such patients, including private hospitals. MAHE also procured additional doses of remdesivir and tocilizumab as the cases surged.

COMMUNITY EDUCATION

Pandemics affect everyone and everything. They are an evolving situation, resulting in pain, suffering, and a lot of open-ended questions. Fake news and misinformation add to the complexity of dealing with a pandemic in almost all societies. Gullible people often believe this fake news and misinformation and become their victims.

The Udupi District Administration maintained a direct line of communication with the general public through social media, releasing frequent short bytes of essential information to convey the right messages and nip misinformation in the bud. Interactions with the press, almost daily, kept the flow of reliable information to counter fake news.

As the administrative head of the district, the Deputy Commissioner motivated many prominent doctors and other respected personalities to reassure the general public about the measures being taken by the government authorities and

to disseminate authentic information on mainstream media, including local television channels and social media.

CONCLUSION

Intense coordination and planning are essential while bracing for a pandemic. Cooperation from all involved, from healthcare workers to administrators, is vital for the success of any hospital, region, or country.

A public–private partnership (PPP) is a collaboration between public and private sectors that enables the fulfillment of shared goals by overcoming the apparent limitations. The common goal here was to brace for the challenges posed by COVID-19. The obvious limitation was that of the healthcare system, where countries such as Italy, the UK, France, and the USA were struggling despite their efficient and modern healthcare systems.

With a well-coordinated PPP arrangement, the Udupi district braced to meet the challenge of COVID-19. As of January 2021, the Udupi district had one of the lowest mortality rates due to COVID-19 in Karnataka state. The success of Udupi district in maintaining a low mortality rate is due to the proactive district administration, the cooperative private university, triaging of patients based on clinical condition, and expert clinical management of high-risk patients at designated private hospitals with adequate facilities – a classic example of a PPP at the time of a public health emergency.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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