

EDITORIAL VIEW

CORONA EXPERIENCE

The impact of corona pandemic on critical care medicine

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Abstract

A pandemic is defined as an epidemic of an infectious etiology that crosses the international boundaries and infects a large number of people. This has happened several times in the human history; influenza, smallpox, bubonic plague and cholera being some of the examples. Smallpox alone has resulted in death of 300–500 million people. As a frontline healthcare professional fighting against the COVID-19 pandemic, the author has experienced its socio-economic and psychological consequences. In addition, critical care units faced ethical challenges to meet with the bed requirement. Dedicated and modified COVID-19 critical care services were started in both the public and private sectors. Because of high workload and lack of trained medical and nursing staff, extra staff has to be recruited on temporary basis. Some commonly performed procedures were modified to decrease the risk of infection spread. ICUs faced shortage of personal protective equipment and ventilators. Training programs were developed to help improve the understanding of novel COVID-19 infection. ICU staff was probably at lower risk of acquiring this infection as compared to other hospital staff.

Key words: COVID-19, Implications, Critical Care Medicine

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The World Health Organization declared COVID-19 a healthcare emergency on 11th of March 2020. The first case of COVID-19 in Pakistan was reported on February 26, 2020. Critical care physicians faced its socio-economic and psychological challenges. There was a 25% decrease in my monthly income. In fact, this financial squeeze was also seen elsewhere.¹ Moreover, social distancing practices affected the relationship among the people.² There is no doubt that the ICU environment is different from the general wards which puts the health of its staff at risk of developing mental health issues such a burnout phenomenon. This mental impact of the pandemic was more intense during the first couple of weeks and then it gradually decreased. In a study carried out at Dow

University of Health Sciences Karachi, it was observed that 95% of the healthcare staff was suffering from moderate to severe level of anxiety.³ The fear was probably multifactorial in origin such as intense working conditions, high workload and in some of the hospitals there was lack of personal protective equipment (PPEs). Moreover, some of the staff members perceived health risks to their families, especially when they had to look after their elderly relatives at home. There was also a knowledge gap of how to treat a COVID patient, which was more apparent among those who had no earlier ICU experience. For example, one participant of the above-mentioned study raised these issues like this: "The drill to work as a team should be improved. We know how

to work as a team in our respective departments but working collectively as a team with different departments must be learned and improved.” At Shaukat Khanum Hospital, we arranged webinars to create awareness about the mental health issues among healthcare workers and psychological interventions were offered by the clinical psychologists and psychiatrists to help cope with this quite often underreported problem.

Theoretically speaking ICU admission criteria should be same during an epidemic as it is practiced in normal circumstances. Unfortunately, the number of patients suffering from severe ARDS exceeded the available bed capacity. This resulted in modification of admission criteria so that a larger part of the society can get benefit from the limited resources available. Although challenging, ethically this approach can be justified during a pandemic. National and international societies released guidelines to help the physicians in difficult decision making during the ICU admission process.^{4,5} These recommendations suggested that a combination of patients’ age, probability of survival and expected outcome should be taken into consideration during the pandemic when deciding about the allocation of scarce resources. For example, old age group with comorbid conditions and evidence of end organ damage, and poor functional status were unlikely to get benefit from ICU admission and were considered for comfort care. Unsurprisingly, the guidelines issued by National Bioethics Committee of Pakistan recommended that the healthcare professionals must be provided with indemnity against prosecution and penalization for decisions taken that were connected to the COVID-19 pandemic. Occasionally, lifesaving treatments were withdrawn from stable or improving patients to help those who had the capacity to benefit quickly.

As the number of infected cases increased, we at Shaukat Khanum Hospital Lahore made a strategic decision to increase ventilated beds in our ICU from 11 to 35. The new ICU setup was quite different from the conventional unit because of the highly contagious nature of the disease. This COVID ICU was attached with a COVID ward/ high-dependency unit (HDU) where stable patients who were at risk of deterioration were kept. This HDU was also used as a step-down unit for patients after successful weaning from mechanical ventilation. Two separate rooms were allocated for doffing and donning purposes. More negative pressure rooms were added to the unit by

installing exhaust fans to decrease the risk of transmitting COVID infection to other areas of the hospital. These negative pressure rooms are mandatory if aerosol generating procedures are performed. In addition to this the heating, ventilation and air conditioning (HVAC) system was separated from the rest of the hospital as part of the infection control strategy. As there was shortage of ventilators in the local market when the pandemic started, we decided to use operating room anesthesia machines in the ICU to provide the mechanical ventilation. In addition, elective surgery was stopped for two weeks to increase the ICU capacity for COVID patients. We initially started day-care cases, when the OR work resumed, so that adequate number of ICU beds remained available.

As trained ICU medical and nursing staff was not adequate to cope up with the increased workload, measures were taken to meet with this problem. Critical Care Medicine was recognized by the College of Physicians and Surgeons of Pakistan (CPSP) in 2004 for a structured training scheme, but unfortunately just twenty-seven doctors obtained the fellowship from the CPSP,⁶ probably due to a limited number of the institutions offering training opportunities in critical care. On top of this, approximately ninety-five percent nurses who were then managing the ICU patients in various hospitals, had no formal training in the specialty. This shortage of medical and nursing staff was a major hurdle in the provision of quality care to the COVID-19 patients. To overcome this shortage of trained staff, various strategies were adopted. For instance, the hospitals temporarily suspended the medical and surgical procedures, some countries speed up the credentialing process and eased the visa restrictions for the expatriates, introducing telemedicine to increase the number of qualified staff overseeing the daily work, and more medical and nursing students were recruited. At SKMCH, we ran crash training programs for the inexperienced staff, who then started working under supervision of the qualified team members. This issue also highlights the need for a long-term strategic plan to be prepared by the governments to tackle this problem in the future.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) resulted in the change of some of the routine clinical practices in the intensive care units. This change in the practice was due to the highly

contagious nature of this virus putting health of both patient and healthcare workers at considerable risk. Guidelines recommended that the endotracheal intubation should be performed by the most experienced person and minimal number of persons should be present in the room. It was recommended to clamp the ETT for a period of disconnection from the ventilator and avoiding the bag mask ventilation. In addition to this, two-handed mask ventilation was suggested. We prepared intubation kits and checklist at our center, and training sessions were arranged for the staff. Videolaryngoscope and disposable laryngoscope blades were preferred at some centers.

Similarly, some changes were made in the CPR guidelines.⁷ Cardiac arrest is again a situation where many people are working together under pressure and carrying out aerosol generating procedures. It was recommended to pause the chest compressions during intubation. For endotracheal suctioning closed suctioning was considered superior to open suctioning technique. We avoided nebulization in non-intubated patients to further minimize the risk of disease spread. Visitors were discouraged from visiting the patients and they were offered alternatives in the form of internet and video calling. In addition to this the medical staff was not allowed to work in the OPDs and see non-COVID cases.

A greatly increased demand for PPE, ventilators and oxygen posed a huge challenge to the healthcare systems around the world. Acute need in healthcare and a panicked market behavior, were probably the two main reasons for PPE shortage. This led to a compromised care for both staff as well as the patients. As a result of this shortage extended use and re-use protocols were adopted.⁸ But as the PPEs were meant to be for single use only, this approach led to adverse effects, for example, acne mechanica and facial bruises. Some hospitals resorted to electronic consults and virtual visits.

Challenges were also faced by the critical care units in meeting the ever-increasing requirement of ventilators. It is understood that the numbers of available beds for complicated cases and ventilators play a central role in the disaster management. Unfortunately, at the start of the pandemic, in Pakistan with a population of 212.8 million, the number of available ventilators were just 1650.⁹ In my institution, the number of ventilated beds were increased by

moving anesthesia machines from operating rooms to the ICU. Pakistani government decided to import 10,000 new ventilators.¹⁰ And to help overcome this shortage China and United States donated a good number of ventilators to Pakistan. Present situation is that just 253 COVID patients are on the ventilators. Luckily, Pakistan has started local manufacture of ventilators, which not only will help in handling the present pandemic but will also be useful in the management of natural disasters in the future. There were occasional reports of oxygen shortage creating problems in the ICU. For example, twelve ICU patients died in one Indian hospital due to poor supply of oxygen. In another public hospital in India's western Maharashtra state 22 patients died, when their oxygen supply ran out after a leak in the tank during refilling.^{11,12} Lack of these essential medical devices and drugs had a huge impact on the delivery of health care to COVID-19 patients admitted in the ICUs.

Special training programs were launched to prepare non-ICU staff to care for COVID-19 patients.¹³ Both theoretical and practical aspects of the patient care were covered during these training sessions. A small number of this staff had previously worked in ICU or anesthesia and they found this intervention very helpful. During these workshops, particular attention was given to infection control/prevention, donning and doffing of PPE, endotracheal intubation of the COVID-19 cases, CPR and defibrillation, handling of mechanical ventilators and basics of non-invasive ventilation. In addition, staff also received training in prone position which was later used in very sick cases with respiratory compromise. Some institutions and international societies organized Webinars as part of their educational interventions.

According to the data available, anesthesiologists and intensivists are probably at lower risk of acquiring SARS-Cov-2 infection and its resultant harm and death, as compared to the other healthcare workers managing this pandemic. It was probably due to better knowledge and practice of principles of infection control and prevention, which we routinely practice in operating rooms and the intensive care units. In addition to this, working in a well-ventilated environment was also a contributory factor. These findings also suggest that aerosol generating and droplet events occur much more commonly in the general wards due to coughing and sneezing as

compared to the ICU. It can also be argued that tracheal intubation, non-invasive ventilation and high-flow nasal oxygen, and extubation might not be associated with production of clinically significant amount of aerosols.¹⁴ Therefore, probably due to these reasons, the healthcare workers working in the ICU were at low risk of acquiring this infection.

In summary, COVID-19 pandemic resulted in increased workload on some of the ICUs and the ICU staff exponentially. Mental health issues were reported among those caring for sick patients. ICU bed shortage led to a change in the admission and discharge criteria. A significant increase in the number of ventilated beds was observed to accommodate the rising number of infected cases. ICU staff training programs were introduced to help them improve their understanding of this new global health emergency. We had to deal with the shortage of ICU trained medical and nursing staff with new ideas. Introduction of infection control protocols resulted in a change of commonly performed ICU procedures. This pandemic highlighted the shortage of PPE and ventilators to fight a natural disaster. Interestingly, not many ICU staff contracted the infection at work. The pandemic has, however, led to generation of scores of new knowledge and new clinical practices, which would be helpful in dealing with any future epidemic / pandemic in a more organized and scientific way.

1. Conflict of interest

None declared by the author.

2. Authors' contribution

FM is the sole author of this manuscript.

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