



HANDLING COVID-19 PANDEMIC WITH LIMITED HEALTH AND CRITICAL CARE RESOURCE BY JUDICIAL USE AND FAIR ALLOCATION

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ABSTRACT Covid-19 has been officially declared as pandemic by the World health organization. At present Covid – 19 has spread to more than 185 countries affecting millions of people. Since it is a novel disease a lot is unknown about the natural history of the disease. Considering its impact and clinical manifestation, we are certain that our critical care resources will soon get exhausted. Such types of viral pandemics place us at a sustained demand of healthcare infrastructure and essential community resources. Such demands lead to the development of situation where we need to judiciously allocate our resources, equipment and manpower for their effective utilization and better outcome. It's the responsibility of critical care physician to rise to the occasion and make a long lasting impact while managing covid-19 pandemic.

KEYWORDS : corona virus, pandemic, healthcare infrastructure

Introduction

Covid-19 has been officially declared as pandemic by the WHO (1). It is a novel infection caused by SARS-COV-2 with broad spectrum of clinical manifestations. At one end, most of the population may remain asymptomatic, but at the other extreme it may manifest as acute respiratory distress syndrome requiring mechanical ventilation and even death. At present Covid – 19 has spread to more than 185 countries. Such types of viral pandemics place us at a sustained demand of healthcare infrastructure and essential community resources (2). Such demands lead to the development of situation where we need to judiciously allocate our resources, equipment and manpower for their effective utilization and better outcome.

Various countries in the world who have been ravished by this pandemic have already started allocating the limited resources for overcoming this disease. For example, healthcare workers in Italy have proposed to allocate ICU beds and ventilators to only those patients who have a better chance at survival (3, 4). Korea is facing gross imbalance between number of cases and available beds, with some of the patients dying at home without even getting admission (5). Looking at the global trend, India may also soon land up in a situation where the already limited healthcare resources will get exhausted. Hence, we need to address this problem early and judiciously allocate the healthcare infrastructure and resources.

Impact of covid-19 pandemic on the healthcare system

Various studies regarding infectivity of corona virus has shown that on an average an infected case will spread the virus to two other individual during the early phase of epidemic. It can also be transmitted by droplets which is generated when an infected person cough, sneeze or talk. Contact transmission and air borne transmission has also been noted. (6) Initial data from china and Italy has shown varied spectrum of clinical presentation(7,8). A recent analysis from china on confirmed covid -19 patient showed that nearly 80 percent of infected were either asymptomatic or experienced mild symptoms which means that only 20 % of infected will require advanced care in healthcare facility. Among these patients nearly 15 percent will have serious illness and 5 % will require critical care in the ICU. (8) Mortality rate from covid -19 vary from .25 % to as high as 3%.(9) According to world health organisation, the number of confirmed cases of COVID- 19 as on 13 aril 2020 is around 17.73 lakh globally showing exponential growth. (10) While in India total number of cases is around 9152 with 796 death.(10)

India's health system infrastructure

According to National Health Profile 2019, India has 1154686 registered allopathic doctors. At present 10,926 number of persons is served single allopathic doctor. Health-care is the right of every individual. 60% of population lives in rural India. To cater the health needs of these rural populations there are 158417 Sub Centers, 25743 Primary Health Centers and 5624 Community Health Centers in India as on 31st March 2018.9(11)

There are 713986 total government hospital beds available in India which amount to 0.55 beds per 1000 population. Many states in India like Bihar, Jharkhand, Gujarat, Uttar Pradesh, Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Haryana, Maharashtra, Odisha, Assam and Manipur which account for 70 % of total Indian population has hospital bed population ratio even below the national average while states like west Bengal, Tamil Nadu , Kerala and Sikkim has better availability of beds.(11) According to World Bank data, number of hospital bed per 1000 population is 6.5 in France, 11.5 in South Korea, 4.2 in China, 3.4 in Italy, and 2.8 in the US. (12)

It is estimated that 5-10 % of infected patients will require admission in ICU along with ventilator support. At present we don't have official figure about the number of ventilator available in government hospital. If we consider that out of total (713986) hospital bed, 5-8% are ICU bed, then it will come around 35699- 57119 ICU beds and if only 50% of ICU beds is equipped with ventilator then there will be only 17850 to 25556 ventilators in the country which means it will be impossible for the healthcare providers in India to provide ventilator to each case while treating covid -19 patients. Apart from availability of ventilator, one of the limiting factor will be availability of healthy respiratory physician and trained nursing staff to operate them safely as doctors and nurses are already becoming ill or being sent for quarantine. (13)

Measures taken for handling the pandemic by Government

Ministry of health and family welfare has placed order for 21 lakh PPE for healthcare personnel directly dealing with covid -19 patients along with 60000 PPE has been already delivered to various hospitals across the country. All efforts is being taken to boost the domestic production and supply of PPE. Indian government has placed order for 40000 ventilator with Agva Healthcare and Bharat Electronics Limited. Apart from domestic suppliers, international companies like Hamilton, Mindray and Dragger has been asked to supply ventilators. Even suppliers in china has been approached for sourcing 10,000 ventilators. (14) A large number of intensive care unit, isolation unit and high dependency unit is being created in all government hospital throughout India to deal with disease burden during covid-19 pandemic. Mobile ICU in train coaches is being made and access to expert critical care physicians being extended by telemedicine, telephone hotlines, and Internet. (15, 16).

Social measures like creating public awareness regarding importance of hand hygiene, use of face mask, avoiding close contact with suspected case or avoiding frequently touching mouth, nose or eyes is being done on mass scale. *The janta curfew* was observed on 22 march between 7 am and 9 pm. All the citizens was instructed to remain in their homes except for emergency and essential services .A massive campaign is launched to educate people about **social distancing** and avoid the spread of virus. [17] Government of India has announced the **world's largest lockdown** on 24 March, asking 1.3 billion Indians to stay home for 21 days to slow the spread of COVID-19. [18]

Measures to be taken by critical care community

Use of artificial intelligence- Artificial intelligence should be used to make more efficient discussion in the ICU. An algorithm should be developed using current evidence for risk stratification, determining survival trend, and risk classification & survival prediction. Artificial intelligence may be used for allocating beds in the ICU based on clinical condition and survival percentage as predicted by algorithm.

Use of technology to limit wastage of resources and disease transmission- latest technology like central monitoring of hemodynamic and video conferencing will reduce the requirement healthcare workers inside the ICU thus reducing the wastage of PPE and limiting the risk of disease transmission to healthcare worker.

Designing ideal PPE- it is the responsibility of critical care physician to give input to design ideal PPE which is simple to wear but resistant to infection.

Training the frontline warriors- They have responsibility of training the healthcare professional of other specialty by organizing workshop, simulation classes, and seminars so that they can be used at front line if our critical care physician fall sick or are sent for quarantine.

Who gets the ICU BED in a covid-19 pandemic?

This covid -19 pandemic is certainly going to exhaust our ICU infrastructure. So it is of prime importance that we design a policy and guiding principles which will benefit maximum section of patients. (Table 1)

Table 1- Guiding principle for who gets the ICU BED in a covid-19 pandemic

Guiding principle	Covid 19 pandemic
To maximise the benefit from ICU bed 1- Save all 2- Save the youngest with best prognosis	Top priority Top priority
Equality while bed allocation 1- First come, first serve basis 2- Two patients with same prognosis	Should not be followed, best prognosis first Try to admit both, if not possible then younger first
Acknowledge contributors or contribution	Give priority to healthcare workers for their selfless contribution
Based on severity 1- Sickest first	When it is going to give maximum benefit to community

CONCLUSION-

Being a resource limited country, it is our responsibility to judiciously use the limited critical care resource and take revolutionary measures so that we can tide over this crisis with minimum causality and maximum benefit.

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