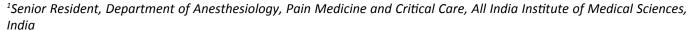# International Archives of
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COMMENTARY

Is India's Health Care Infrastructure Sufficient for Handling COVID 19 Pandemic?

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Abbreviations

WHO: World Health Organization; Covid: Corona Virus Disease; ICU: Intensive Care Unit; PPE: Personal Protective Equipment; HDU: High Dependency Unit

Introduction

In the last week of December 2019, the first case of pneumonia caused by a novel corona virus in Wuhan city, China, was diagnosed. Person to person transmission of novel coronavirus was confirmed by china on 21 January 2020 with more than 200 diagnosed cases and 4 death [1]. On 30th January 2020, WHO declared the Chinese outbreak of COVID-19 to be a Public Health Emergency of International Concern posing a high risk to countries with the poor health care system [2]. On 11 March 2020 WHO declared COVID-19 outbreak as a pandemic with more than 11800 cases and 4291 death in 114 countries [3]. The main source of transmission of the coronavirusis are the infected patients. It is mainly transmitted by respiratory droplets, contact, or high-concentration aerosol exposure in a closed environment [4]. Among 72,314 confirmed SARS-CoV-2 patients in china, 81% had mild symptoms, nearly 14% develop severe symp-

toms like dyspnoea and hypoxia, 5% became critically ill and 1 to 3% required intubation [5]. It is mainly the patients with mild symptoms that contribute to the spread of disease as they are not picked by the current screening technique [6]. The current outbreak is not going to end very soon and there is a high possibility of the second wave which happened in 1918 Spanish flu [7]. Since it is a new disease, little is known regarding its natural history, pathophysiology, and treatment. This kind of viral pandemic creates a sustained demand for healthcare infrastructure, support staff, and healthcare personnel that is often limited in a developing country [8]. Such demand requires us to use our resources carefully for a better outcome. All the countries of the world that have been affected by the pandemic has already started mobilizing their healthcare resource for combating the disease. At present, the total number of confirmed cases in India is around 78000 with 2549 confirmed deaths [9]. We need to prepare ourselves about how best we can handle this situation.

COVID-19 Impact on the Healthcare

It has now become clear that the COVID 19 pandemic is going to put significant stress on our already limit-

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ed healthcare resource. An initial study concerning the infectivity of coronavirus has reported that an infected patient will infect the other two-person during the early phase of the epidemic [10]. It is very difficult to predict the exact number of populations that will be affected in the near future. According to the world health organization, COVID- 19 took nearly 67 days to infect the first one lakh population while the next one lakh was added in 12 days. The next one lakh contracted the infection in just 4 days. Now the number of confirmed cases is around 41.7 lakh globally showing exponential growth [9].

Assessing the Existing Healthcare Capacity

Following a global trend, we can easily say that healthcare needs created by coronavirus pandemic will go beyond our capacity. India has 1154686 registered doctors in the speciality of modern medicine. At present single Government Allopathic Doctor cater to the need of 10926 persons. Currently, 60% of the total of India's population lives in rural India. To provide healthcare facilities to the people living in rural India, the government has established 25743 Primary Health Centers, 158417 Sub Centers, and 5624 Community Health Centers [11]. Currently, 713986 beds are available in government hospitals in India which amounts to 0.55 beds per 1000 population. Some states like Jharkhand, Assam, Haryana, Bihar, Gujrat, Odisha, Madhya Pradesh, Maharashtra and Manipur which is home to more than 70% of the total Indian population has the population to bed ratio even lower than the national average but some states like Kerala, Sikkim, and Tami Nadu has the better population to bed ratio [11].

Anticipating the Surge in Cases

The current situation indicates that there is going to be an imbalance between demand and availability of hospital beds, ICU beds, ventilators, PPE, and trained medical personals throughout the country. If we consider that only 0.1% of the total population gets infected in the next 2 months and only 5% among them need ICU beds, then we will be needing 65000 ICU beds. Now if one patient remains on the ventilator for 15 days, then it creates a demand for 975000 ventilator days. This is the simple calculation when we have considered the rate of infection at 0.1 percent. We can imagine the demand created by this pandemic if we consider the rate to be 1%. We can still buy the ventilator, but the major limiting factor will be the availability of healthcare professionals and support staff to run the ventilator safely as they are already getting infected and being sent for quarantine [12]. Infrastructure for diagnostic and therapeutic intervention is also going to be limited shortly. Important medical equipment like testing kits, hemodynamic monitors, and personal protective equipment [PPE] are already limited and with worldwide demand, we are going to face more difficulties. Therefore, in such circumstances, authorities will find it difficult to provide appropriate healthcare facilities to all sections of society particularly if we have a massive outbreak like that happened in Italy, Iran, Spain, and United States. While dealing with the sickest of patients, we should not forget to take care of mild to moderately ill patients whose number will be huge with a better prognosis. We will have to judiciously allocate resources so that we get a better outcome with the minimum casualty. All medical specialties should work together and in co-ordinated fashion in this time of crisis so that we can flatten the curve of the pandemic.

Generating Resources

By looking at the transmission potential of SARS coronavirus, it is important to separate healthcare services for COVID and non-covid patients because treating both groups at the same facility may lead to the dissemination of infection [13]. But this strategy needs robust testing of a large number of people as well as need availability of hospitals with acute care infrastructure which can be converted into COVID hospitals. These COVID hospitals should have a larger proportion of beds allocated to the high dependency unit (HDU) and ICU. This will create demands for various ICU equipment like ventilators, vital monitors, infusion pumps, pulse oximeters, non-invasive ventilators, and constant supply of oxygen. Apart from taking care of moderate to severe symptomatic patents, another important consideration will be developing infrastructure for reducing the burden on already strained healthcare facilities due to asymptomatic or mildly cases that will be nearly 80% of infected cases. A new platform for teleconsultation and video conferencing should be developed for taking care of asymptomatic or mildly symptomatic patients so that a large number of a visit by these patients and their attendant can be prevented [14]. In this COVID time, when our maximum effort is directed towards dealing with COVID patients, we should also make sure that non-covid emergencies also get full attention. Similarly, all those patients suffering from chronic illness should also get timely treatment and consultation. It is also the responsibility of public and private healthcare facilities to motivate people to seek help in case of emergency and come forward for getting their regular medication.

Development of Human Resource

For proper care and preventing transmission of infection, it is important to train doctors, nurses, technicians, support staff, and sanitation workers in each hospital quickly. The trained person from the frontline department should come together to form virtual disaster prevention and management department. This may include people from anesthesiology, infectious disease, medicine, pediatrics, public health, pulmonary medicine, critical care, microbiology, and hospital administration. In charge of this department can form small

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teams covering different dimensions of relief work. Each team can discuss among themselves about their specific need, availability of resource and their use, and develop two-way communication for effective implementation of relief measures [15]. The important areas of training should include prevention of infection, donning and doffing of PPE, respiratory support of critically ill patients, using various oxygen delivery equipment's and proving in and outpatient services. This training can be scaled up at the national level by telemedicine, video-conferencing, and webinars. Medical colleges can adopt smaller centers and provide the necessary support.

PPE, Ventilators, ICU, and HDU-Steps Taken by the Government

Ministry of health and family welfare has placed an order for PPE from global providers along with taking the effort to increase its domestic production. Earlier in April, domestic production capacity was 6000-7,000 PPE per day which has now increased to 2 lakh PPE per day [16]. India is trying its best to increase the stock of ventilators. An order has been placed for 40000 ventilators from Agva Healthcare and Bharat Electronics Limited. Apart from domestic suppliers, international companies like Hamilton, Mindray, and Dragger has been asked to supply ventilators [17]. All government-owned hospitals have started increasing beds in the intensive care unit, isolation unit and high dependency to deal with disease burden during COVID-19 pandemic [18]. To save healthcare resource and to avoid physician burnout over non-essential services, all routine operation and outpatient services has been suspended throughout the country [19].

Preventive Outbreak and Community Transmission - Steps Taken by the Government

Promptand efficient measures, as well as guidelines,are being chalked out to control the COVID-19 pandemic in India. The 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 but due to sustained increase in the number of cases, it has been extended thrice till 17 May, 2020. Social distancing is the primary measure to prevent coronavirus infections as it stops the spread of airborne droplets that are released when infected people cough or sneeze. A massive campaign is launched to educate people about social distancing and avoid the spread of the virus [20]. In addition to Government labs, several private sector laboratories are being accredited for COVID-19 testing. Presently testing is being limited to symptomatic cases who are most likely to harbor the disease. This will prevent overwhelming the limited laboratory resources and laboratories will process the specimen faster giving early reports [21,22]. Apart from the above measures, isolation of confirmed cases in healthcare facilities, categorization of cases based on severity, and providing treatment to deserving patients is being done with utmost care.

Care of HCP

Proper care of medical professionals working at the front line is the responsibility of hospital administration. They are at significant risk of getting infected and falling sick. Each hospital should prepare guidelines for giving priority treatment to their healthcare workers if they fall ill while discharging their duty [23]. It is important to keep them motivated and focused. The roaster should be made in such a way that they get adequate rest. Training of staff should be done regularly so that adequate numbers are available for rotation and for replacing the workforce getting infected or requiring rest.

Mental Health

Country's premier institute, All India Institute of Medical Sciences, New Delhi has released telepsychiatry guidelines which include services of psychiatric evaluation, therapy, medical management, and education which has been made available to the physicians in the country.

Food Safety During a Pandemic

The government has announced a 1.7 trillion rupees economic stimulus plan to help the people affected by the nationwide lockdown. The Government also plans to distribute five kilograms of staple food (wheat or rice) to feed poor people over the lockdown period. Many NGO's are also taking part in food packages distribution to the migrant workers and poor families [24].

Funding and Resources

PM CARES, or the Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund have been setup to collect donations from citizens of India as well as for overseas donations. It is a separate fund to deal with the COVID-19 pandemic. Citizens and corporate houses are being encouraged to contribute to the fund because everyone is impacted by the Coronavirus outbreak [25]. During the early days of COVID-19 Pandemic, PM of India has proposed SAARC COVID-19 Emergency Fund on a volunteer basis to tackle coronavirus pandemic in ASIA. To strengthen the national and state health systems, the government of India has released COVID-19 Emergency response and Health system preparedness package, to procure essential medical equipment, consumables, drugs, for setting up of laboratories, and for the strengthening of surveillance activities [26].

Regular Assessment and Media Briefing

Media plays an important role during the pandemic in circulating genuine information, keeping people updated with government orders, announcements, and increasing awareness regarding health care services. Ministry is regularly briefing the media and public regarding caseloads, new management strategies, and

control measures to build the confidence of people so that panic and anxiety in public can be prevented.

Administrative Issues, Ethical Challenges and Triage

Whenever the gap between demand and supply increases, it puts immense pressure on the team working in screening and triage areas, ICUs, and laboratories for getting admission, investigation, and ventilator for their patients. Many times the clinicians suffer from the dilemma of starting or removing life support in critically ill patients with poor prognosis. The clinical team may find it difficult to take such a crucial decision, therefore it's the responsibility of higher authorities to form guidelines considering the current scenario. We would like to recommend following guiding principles which may help the authorities.

Recommendation 1: Our aim should be to maximize benefit. We should try to save either the maximum number of people or people with maximum life years.

Recommendation 2: Our critical care resource should first be allotted to the frontline workers who are risking their lives to keep the critical care infrastructure running.

Recommendation 3: Those who are participating in research and vaccine development should receive first COVID-19 related intervention.

Recommendation 4: There should not be any disparity in allocating recourse between COVID-19 patients and patients with other serious illnesses.

Conclusions

The coronavirus pandemic has resulted in multiple challenges for developed countries and these challenges are going to be even more for developing countries like India if there is an increase in infected cases. Hence it is our responsibility to judiciously use healthcare resources with the aim of protecting our frontline warriors. With no hope of treatment soon, it is the supportive care of infected patients and various preventive strategy is going to help us to contain this pandemic.

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None.

Authors Contribution

All author have contributed for this manuscript.

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