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Radical change in healthcare safety post COVID-19: An insight.

Subhash Khanna, Arup Kumar Hazarika and **Unmilan Kalita**
Trustee and International Academic Coordinator, Indian Association of Gastrointestinal Endo Surgeons (IAGES); Chief Medical Director, Swagat Super Specialty Surgical Research Institute and Dean, Swagat Academy of Medical Sciences, Guwahati, India

Department of Zoology, Cotton University, Guwahati, India and Director, Centre for Environment, Education and Economic Development (CEEED), India

Department of Economics, Cotton University, Guwahati, India

Abstract

The impact of the COVID-19 pandemic is being felt across all sectors of the global economy, heralding the onset of clear and irreversible changes to come. Despite the full backing of governments and communities, public and private healthcare systems are fighting an uphill battle against a largely unknown enemy, while also coping with lack of adequate personnel and resources. In this article, we discussed how the robust stance taken by doctors and healthcare professionals during the present emergence of COVID-19 has nothing but cemented their role as true protectors of humanity. They have put their lives at risk by fighting this disease at the frontlines saving countless people. However, this has led to quarantine of thousands of medical workers and full or partial closure of hospitals. Inability of curtailing contagion of medicos has partly crippled the global healthcare. Further, the environmental hazards associated with PPE kit disposal has attracted worldwide concern. Tackling and improvising upon all such novel challenges is ultimately going to increase the price of healthcare delivery. Therefore, as part of this study, we feel that an overhaul of healthcare delivery through establishment of a robust, collaborative, scalable, and agile digital healthcare infrastructure is a necessity in the post-COVID era.

Keywords: Healthcare system; Healthcare workers; COVID-19; Economics of healthcare; Environmental hazards; PPE disposal.

1. Introduction

The Coronavirus disease 2019 (COVID-19) today possesses a significant threat to the global healthcare system since the 2002 SARS outbreak. World Health Organization (WHO) has declared this outbreak as a "public health emergency of international concern" on January 31, 2020. Within the first two months of the outbreak, the epidemic has spread rapidly around the world, infecting people irrespective of race, sex, caste or creed. As of the last week of August 2020, a total of 23,025,622 confirmed cases and 800,420 deaths have been reported globally. This novel outbreak which is considered an unusual disease with unique biological characteristics, clinical symptoms and imaging manifestations, has brought the healthcare management system of developed nations on its knees. An important part of this otherwise formidable system is the network of healthcare professionals and medicos that have been fighting this disease vigorously since its known origin in the Wuhan province of China. Unfortunately, these frontline warriors have not been spared of the COVID contagion as they frequently come in contact with infected patients for care and treatment (Ng et al., 2020). Unavailability of adequate protective gear as well as safety measures and clean working environments has led the global healthcare system to this grim state of affairs (Kowalski et al., 2020). Therefore, it is imperative to analyse and read

Corresponding author : profsubhashkhanna@gmail.com
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between the lines of the present scenario so as to ensure appropriate protective standards and mechanisms for safety of these brave souls and a complete remodelling of the healthcare system for effective healthcare delivery.

2. Protecting the protectors of humanity

It is well known that the Hippocratic Oath, taken by medical students after clearing the MBBS exam, is considered very sacred for the physicians. The Oath states that a physician will attempt to provide full care or protection to her/his patients in any circumstances whatsoever. A physician is also supposed to not turn any patient away, even those with dreaded, contagious diseases like AIDS. The Oath also commands a physician to volunteer for free care to the poor, the homeless, the disadvantaged and the helpless. This Oath, over thousands of years, have substantially connoted the crucial role of physicians in a society which is riddled with poverty and disease. The robust stance taken by doctors and healthcare professionals during the present emergence of COVID-19 has nothing but cemented their role as true protectors of humanity (Liu et al., 2020). They have put their lives at risk by fighting this disease at the frontlines saving countless people. Millions of stories worldwide now speak of their bravery and sacrifice. In this solemn light, it has become necessary to revisit the Hippocratic Oath. Besides essential patient care, a restatement of the Oath should include physicians' responsibility to save themselves, their co-workers and the paramedical staff (Vaccaro et al., 2020). This is because it takes about a decade to become a doctor and given the shortage of qualified doctors in most parts of the world today, protecting these protectors has become very important.

Global evidence indicate that thousands of healthcare professionals have been infected by the novel coronavirus. In USA itself, the reported tally is 9,200 which translates into more than 12% of the nation's confirmed cases. Further, approximately 100 doctors and 160 nurses have tested positive for COVID across India. Most of these infections were transmitted by patients in a hospital environment. In India, this has led to quarantine of thousands of medical workers and full or partial closure of at least 20 hospitals. Inability of curtailing contagion of medicos is ultimately going to cripple the entire healthcare system nationally as well as globally.

In view of this, international guidelines have been released by the WHO and other healthcare related organisations, which intend to protect these healthcare professionals from getting infected. These guidelines strictly provide for use of Personal Protective Equipment (PPE). PPE kits for airborne high-risk infections typically include gloves, boots, respiratory masks that work through positive pressure ventilation and a coverall with head cover. However, due to the sudden spike of the pandemic incidence, high shortage of PPE kits was witnessed globally. This has led to healthcare professionals in wearing conventional surgical or N95 masks. This situation has worsened in the developing and less developed nations where nurses have to put on scarves and bandanas while caring for the sick. This went on until it was realised that if the lives of these frontline warriors are not adequately secured, it will result in defeat of the larger cause for which they are fighting. In some of the states like Assam, the healthcare facilities currently are divided into two types, namely, COVID and non-COVID hospitals. However, it is important to note that even the medicos of non-COVID hospitals are at high risk from asymptomatic patients. They also require adequate protection. It is understandable that ventilators or life-saving drugs can be bought with money, however expensive they are. But, the lives of doctors and nurses fighting an unknown disease cannot be restored in a short span of time. Besides, there is high uncertainty about how long this pandemic is going to last.

3. Remodelling the healthcare system

Considering several novel challenges that confront the healthcare system at this time makes it clear that the future of the healthcare industry will completely change in the aftermath of COVID-19. For this, it is necessary the healthcare facilities are remodelled based on learnings from this pandemic period. At the foremost, with regard to surgical practices and patient care, new and full-proof safety protocols are to be introduced. For instance, it is known that surgical teams and surgical suits are kept readily available for surgical emergencies in situations of extreme challenges such as accidents, blasts, warzones and so on (Aminian et al., 2020). This present pandemic situation bears requirements of a similar nature, apart from additional necessities such as large number of beds, PPE and large-scale ventilators. However, apart from COVID patients, there is another group of patients which also need effective care just like the former. Such patients include the emergent, urgent, semi-urgent, urgent-elective or elective patients. The emergent and urgent

patients require surgery within a period of 24 hours. They may be ailing from a burst appendix, blocked hernia, large abscess or when cancer has obstructed a patient's gut (Farrell et al., 2020) and he is not able to eat. The question here is that who will be handling these kinds of situations? If a hospital has to deal with such cases, its medical personnel would essentially require adequate protective gear, not only during this pandemic period but also in the times to come. How can we achieve this in a sustainable manner?

Tackling such an issue will requiring establishment of Triage areas which will be placed outside the emergency room (ER). Therein a patient will be assessed for COVID infection or other such deadly diseases, before being allowed to the ER. In Triage areas, a medico with full protective PPE will make an assessment of these patients based on their medical history which will reveal whether they are inflicted with any contagious infection. Such centres can be put up in garages or in facilities within the hospital compound. Apart from this, the patients would have to follow standard hygiene practices and maintain social distancing, if needed at times. Large gatherings would have to be prevented in the OPD. This will require expansion of sitting areas in hospitals and clinics. The visitation time for a patient could be limited from 5 – 10 minutes so as to limit contagion. Besides, the doctors' chambers will have to be well ventilated and constructed within a closed and centrally air-conditioned setting (Søreide et al., 2020). We have been working on guidelines that require a patient to sit at a distance of 6 feet from the doctor. Additionally, development of guidelines for implementation of negative pressure operation theatres, wherein the negative air from infected patients cannot contaminate the ICU or OT corridors, is under process.

Although the society is self-quarantined now, the present state of affairs cannot go on forever. We have to gradually learn to live in an environment where people infected with COVID exist (Hirschmann et al., 2020). Nevertheless, in the present scenario, each hospital may create both COVID and non-COVID facilities within their campus with different dedicated medical staff. The major focus will have to be on maintaining precautions in every corner of a healthcare facility, right from the ERs to CT scan and MRI departments as well as the general sitting areas. In designated COVID hospitals, PPE should be used at all times, from OTs to doctors' chambers. Further, the policy of online or tele-consultation could be made a norm gradually. In March 25, 2020, the Medical Council of India has already approved this policy for patient consultation. Notably, the use of robotic technology can assist us in going a step beyond wherein a patient can be diagnosed even without touching her/him. It should be noted that the cost of such remodelling of healthcare facilities as well as treatment delivery will be very high (Forrester et al., 2020), particularly more so in case of surgical procedures. Further, the extensive use testing kits as well as PPEs and disposable safety gear for protection of the doctors and nurses will add to these costs. Therefore, in the aftermath of COVID, all such aspects have to be considered in order to develop various standards and procedures for ensuring round-the-clock safety of healthcare workers.

Further, a significant aspect often gets overlooked is the disposal of used PPEs (World Health Organization, 2020a). In general, hospital-grade PPE is made for one-time usage and discarded immediately to avoid risk of spreading infection (Xiao & Torok, 2020). Since all components of PPE kits are made of plastic, when they are discarded into the environment, they contaminate the sewer systems and freshwater bodies. Microplastics are formed after they are further broken down. These particles are not only consumed by the aquatic fauna but also absorbed by the soil fauna (World Health Organization, 2020b). The National Health Service of England has termed these wastes as "infectious" (contaminated with body fluids), "offensive" (contaminated but not infectious) or "municipal" (similar to household waste) (Livingston et al., 2020). Such waste is generally burnt in high-powered incinerators that reduce the amount of waste left over in general. However, this disposal method is controversial as unwanted toxic gases are released during the burning process (Phua et al., 2020). Absence of any other disposal method except incineration, rings concern for those who care about the environment. The simplicity and low-cost feature of incineration we are heading towards a technological lock-in (Cook et al., 2020), where are we are bound to become dependent on a less efficient technology due to the long lifespan of the plant. And the continued need to feed the beast means that some materials that would have been recycled are diverted into plants to ensure enough is available to burn (Klemeš et al., 2020).

While the UK has relaxed rules around infectious waste, other countries have approached the issue of increased clinical waste differently (Zambrano-Monserrate et al., 2020). Italy has introduced extra safe procedures for its PPE. The waste generated is put away in several air tight containers which are then

moved away from hospitals to the disposal sites. In China, where at the peak of the virus hospitals in Wuhan were generating up to six times more waste than normal (Sarkis et al., 2020), a new medical waste plant and 46 mobile treatment facilities were constructed to deal with the excess. However, for countries with primitive experience and methods of handling biomedical waste, it would be a nightmare to dispose huge amounts of COVID-19 without contaminating the environment (Ouhsine et al., 2020). For instance, India is known to have poor disposal facilities which are often not monitored by the government while illegal dumping of mixed waste near rivers is a common phenomenon (Capolongo et al., 2020). In fact, since the start of the pandemic, large amounts of used PPE have been found dumped in open spaces of New Delhi and significant volumes stored by workers in the informal sector for potential resale.

Replacing single-use with reusable PPE that is cleaned between uses would reduce the amount of waste. However, the use of chemical cleaning may have other environmental impacts (Barton & Ainerua, 2020). To reduce the risk of infection, technology that sterilises wastes and separation techniques that reduce the mixing of infectious waste with general waste could also be introduced. With more waste classed as non-infectious, more recycling options would become available (Hastings, 2020). Because they require new systems and infrastructure as well as extra staffing (Zapata, 2020; Lindholm et al., 2020), these options should only be considered during a time of reflection when the pandemic is over.

4. Conclusion

The impact of the COVID-19 pandemic is being felt across all sectors of the global economy, heralding the onset of clear and irreversible changes to come. At present, public and private healthcare systems are fighting an arduous battle against a largely unknown enemy, while also coping with lack of adequate personnel and resources. COVID-19 has firmly established the need for active action and the establishment of a robust, collaborative, scalable, and agile digital healthcare infrastructure. It must be noted here that doctors are not replaceable like other equipment which makes their lives valuable more than anything else. This has been acknowledged and praised by all sections of the society worldwide. Nevertheless, such praise will matter even more if these frontline warriors are sufficiently protected while performing their duties. On the other hand, the doctors need to be careful about not engaging heroically to save a patient without proper safety measures as she/he is supposed to save hundreds of lives, not just one. One does not have to set oneself on fire to keep other people warm. Further, an efficient, state of the art digital healthcare system that is built to be continuously evolving can offer a lot to superspeciality facilities. Introduction of advanced AR and VR for patient-doctor communications supported by AI and machine learning that can superbly advance the speed of diagnosis as well as provide rapid crisis management capabilities. Therefore, healthcare reform is paramount in a post-COVID-19 era if we expect to achieve the quadruple aim of healthcare: better health outcomes, improved patient and staff lives, and effective cost of care.

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