**Collateral Effects on Health and Healthcare during the COVID-19 Pandemic**

Sujith J. Chandy, Jaya Ranjalkar\* and Sheeba S. Chandy

*Short title: Collateral Effects of COVID-19*

\*Corresponding author:

Jaya Ranjalkar

Email – [drjayarap@gmail.com](mailto:drjayarap@gmail.com)

Author Contact details and affiliation:

1. Sujith J Chandy, Email: sjchandycmc@gmail.com, Ph: 0416-2282135,

Professor, Dept of Pharmacology and Clinical Pharmacology,

Christian Medical College and Hospital, Vellore, Tamil Nadu, India 632004

1. Jaya Ranjalkar, Email: drjayarap@gmail.com, Ph: 9790210720

Senior Research Officer, Dept of Pharmacology and Clinical Pharmacology,

Christian Medical College and Hospital, Vellore, Tamil Nadu, India 632004.

1. Sheeba S. Chandy, Email: sheebachandy@gmail.com, Ph: 0416-2284360

Independent Ethicist, College Campus,

Christian Medical College, Vellore, Tamil Nadu, India 632002

**Abstract**

COVID-19 has affected the daily activities of people across the globe. The effects of the pandemic have not just been medical, but also societal and economical. The counter-responses of government and the public have been varied in different countries. Measures have ranged from improving hygiene, information dissemination, and social distancing to more radical measures such as social isolation, quarantine and lockdown. The disease and human responses have had consequences on the way we live, work, eat and rest. Life and livelihoods have been affected. This article highlights how the response to the pandemic has affected various aspects of healthcare, and ethical dilemmas this has raised. As the pandemic progresses, awareness and evaluation of the unintended consequences of the pandemic and responses on our health and healthcare systems are needed. Discussing these points and being aware of the ethical issues may help countries plan suitable strategies to mitigate these collateral effects, especially before a potential second wave and further counter-response. It is hoped that this article will stimulate the public and policymakers to realize the urgent need for such strategies and support robust and sustainable health care systems for public health. This would then help effectively combat future epidemics, and most importantly, mitigate the adverse collateral effects on healthcare that people are experiencing.

**Introduction**

The advent of the COVID-19 pandemic throughout the world has impacted our lives in ways that we could not have imagined, and for most, changed the way we live and behave. Countries across the world have had to plan, finalize and implement policies on how to counter COVID-19. Many countries in the world have employed war footing measures to curb the spread of SARS-CoV-2 or the COVID-19 pandemic. These measures include improved infection control measures such as hand hygiene, usage of masks and social distancing for everyone, coupled with isolation and quarantining for those suspected or confirmed to have COVID-19. Some of these measures have had adverse effects on the population leading to disruptions in social, economic, educational, psychological and health realms.

Many countries implemented a lockdown using laws under the epidemic provisions of their legal system. The purpose of the lockdown and other measures was to slow down the coronavirus spread and to flatten the epidemiological curve (1). Policymakers instituted these measures so that the existing health infrastructure can be ramped up to manage the potential influx of COVID patients when the pandemic reaches its peak (2). The lockdown, however, has had a variety of effects on countries and populations, both positive and negative. The benefits and harm the lockdown has caused can be debated for hours without definitive conclusions due to the diverse nature of demographics, a plethora of factors, and the individual situations we all face.

One area in particular, however, needs to be explicitly discussed because of its overwhelming importance in life, namely, our healthcare, and specifically, the everyday health needs of our population. In this brief piece, we would like to discuss some of the healthcare issues that have been affected due to COVID-19 and the potential consequences of this. Even though lockdown is being lifted slowly in many countries, normality is far from achieved. Also, in case the situation worsens in the coming days, or a second wave appears on the horizon, a repeat lockdown may be inevitable. Hence it is essential to understand the collateral effects on healthcare and health and design optimal strategies to mitigate those. The main intention of this piece is to raise awareness about these issues, touch on some of the ethical dimensions and hopefully spur the planning of strategies to mitigate some potential adverse consequences.

**Healthcare access**

The COVID-19 pandemic has changed the way healthcare is approached. The priorities of governments, policymakers, bureaucrats and administrators have been altered almost overnight. Devising ways to curb the spread of the virus has assumed supreme importance. All of a sudden, managing COVID-19 patients has become an utmost priority due to the very nature of the pandemic, its global spread, as well as the natural fear and anxiety related to complications and mortality. Unfortunately, either directly or indirectly, the treatment of other routine health conditions has suffered a setback. Though this is true of almost any country, Low and Middle-Income Countries (LMICs) have been exposed more due to their vulnerable and non-optimal healthcare systems, lack of resources, and poor infrastructure. In India, the pandemic had initially brought life to such a standstill that people who did not have their vehicles found it difficult to visit a hospital, as all means of public and private transport facilities were suspended except in emergencies (3). Lack of transportation facilities, restrictions on travel, conversion of regular hospitals into COVID-19 'exclusive' hospitals, stoppage of non-essential elective surgeries, and closure of outpatient departments severely affected healthcare services in both urban and rural areas in differing ways. This inability to access hospitals significantly impaired the principle of autonomy through the right to access healthcare. Besides, the situation of non-optimal access touched upon justice issues. After all, the mainly affected sections of society were: (i) the elderly who could not quickly readjust to alternative strategies and were already vulnerable to exposure and existing infirmities, (ii) those who could not afford travel to farther places or more expensive healthcare facilities and (iii) those in rural areas who just could not summon the means to transport themselves due to their remoteness.

**Chronic disease management**

It is not just a case of healthcare access. In India, many existing patients with chronic diseases and co-morbidities, especially with non-communicable diseases, faced a great deal of hardship when their routine treatment visits, consultations and follow up reviews came to an abrupt stop. According to the state-level disease burden study by the Indian Council of Medical Research (ICMR) in 2017, non-communicable diseases (such as cardiovascular diseases, chronic respiratory diseases, cancers) accounted for 62% of deaths every year. Communicable diseases (such as diarrhea, lower respiratory tract infections, and other infectious diseases) accounted for 27% of deaths. Death due to injuries (such as transport accidents) accounted for 11% of the overall death burden in 2017 (4). A majority of non-communicable conditions require routine checkups and procedures to prevent mortality and reduce morbidity. Examples of such procedures include angioplasty, chemotherapy, dialysis, and transplants. Though the circumstances and risks of the pandemic are harsh, the principle of non-maleficence needs to be invoked in order to balance the risks of acute complications resulting from lack of regular follow-up care. Added to this, is the real and present danger that acute complications of a majority of these conditions (such as myocardial infarction, community-acquired pneumonia), require a visit to healthcare professionals and timely therapy. Unfortunately, some of these patients also face the risk of mortality due to COVID-19, if affected (5).

Treatment of non-communicable serious diseases such as cancers is significantly affected as only a handful of specialized centers are functioning (6). Besides, such patients have to travel to nodal centers or tertiary care centers. Similarly, specialized centers exist for conditions such as transplant, hematology and other higher specialty disciplines. Patients who usually travel long distances to reach these centers are not able to do so due to the lockdown and, therefore, are at risk of the sudden stoppage of medicines, irregular treatment, exhaustion of medication stock, and associated complications. Similar was the situation for patients attending specialized centers for rehabilitation, psychiatry inpatient facilities, HIV clinics and other disciplines that are relatively sparse in the country. The other big group of patients that have experienced significant delays in treatment is those due for elective surgery. This is especially the case when there are critical surgeries and conditions which may potentially move into complications at a later stage. Patients who managed to obtain passes for inter-state travel on healthcare-related grounds had to undergo quarantining as per applicable rules and duration in many Indian states. Most of the medicines used for severe conditions are parenteral and require an administration under careful supervision. It is not possible to administer such medicines at home or in small clinics. All of this could potentially lead to increased morbidity or mortality. The problem is further accentuated by the fact that some of the tertiary hospitals have been designated as 'Exclusive COVID-19' hospitals. This had initially led to stoppage of some of the normal services in hospitals which patients were accessing previously as part of their normal treatment.

**Optimal numbers of healthcare workers**

Most LMICs, including India, do have enough healthcare workers, especially in rural areas. In times of acute need such as the pandemic, any further shortfall in healthcare workers in the hospital and community can have precipitous consequences for patients and the public.

A lack of transport and closure of some healthcare facilities due to various factors had resulted in the unavailability or numerical decrease in attendance of general physicians, specialist doctors and other healthcare workers, thereby leading also to unfulfilled referrals. In India, it is not uncommon for specialist doctors who have their regular practice in major cities, to visit nearby district headquarters or secondary health centers (on selected days in week or month) in order to offer healthcare services to the suburban and rural populations. Besides affecting new patients, these healthcare professionals' unavailability could lead to mental stress and agony among patients who regularly depend on these services. The risk and potential harms do not stop there. Along with the above factors, reduced availability of doctors and midwives has also affected the routine care of pregnant women (who need to undergo regular checkups and ultrasonography). Similarly, children have faced delays in timely immunization, which could increase the risk of a resurgence of infectious diseases such as measles (7). All this could have disastrous consequences not just for the individuals concerned (in terms of infections), but also for the society at large due to the risk of future epidemic outbreaks.

The other aspect to consider in this pandemic is that healthcare workers who are at the forefront of care on the ground are vulnerable to the infection. This is, even more, the case if the healthcare worker has existing chronic disease conditions and other risk factors. As the pandemic progresses, the number of healthcare workers who have become sick has increased. In some hospitals, this has led to a shortage of staff and especially if the staff is experienced, even a small decrease in staff numbers becomes an acute problem. On the converse side, there have been instances of healthcare workers not attending work due to fear of contracting the infection. Fortunately, this has not been the case in most situations. However, the principle of beneficence has to be well entrenched in the minds and actions of healthcare workers at this time of acute need as the pandemic progresses, hospitals continue to have optimal numbers of healthcare workers on the ground.

**Anxiety and fear among healthcare recipients**

The fear and anxiety associated with COVID-19 itself, the constant bombarding of data and figures through mainstream and social media, the stigma in certain quarters of the society, lack of daily wage employment, and financial instability have all contributed to increased mental stress. A potential plethora of psychological issues remains uncovered in society. Besides, social isolation and the overhanging threat of being quarantined play a part in the psychological impact of the overall health situation. One can anticipate that the increased mental stress due to any unexpected turn of events as the pandemic progresses may have a sudden upswing, especially in light of the research and development of treatment and vaccination still being in the process stage with no definite cure or vaccination as of yet.

The fear of acquiring new COVID-19 infection has resulted in patients willingly delaying hospital visits and presenting late in the course of illness. The delay may result in either complications or increased mortality. The overall consequences of the disease burden can be estimated only once detailed comparisons are available for different conditions before and after the lockdown. As the pandemic may continue for quite some time, it is imperative to be proactive in preventing a situation of non-optimal health care delivery. In order to counter due to these anxieties and fears among the patients and public, the principle of non-maleficence needs to be supported. This can be done by understanding the minds of the public and give clear messages in understandable language regarding the disease and how to prevent it, and why social distancing is essential, and so on. There also has to be frequent updates and clear directions since the pandemic is continuing to evolve and responses are also dynamically changing. The media also needs to take a principled stand and ensure that they have a constructive role in sensitizing the public. Efforts to avoid sensationalism and breaking confidentiality of those falling victim to COVID-19 are to be encouraged.

**Access and affordability of medicines**

The availability, affordability and accessibility to medicines are a prime source of concern. This is especially so considering the issues of benefit and harm if these patients cannot access these medicines. India and many other countries depend on China for Active Pharmaceutical Ingredients (APIs) for different medicines, especially antibiotics. Due to the initial shutdown in China due to COVID 19, there were disruptions in the supply chain of medicines (problems in the production of APIs, import delays and transportation issues resulting in reduced stocks of essential medicines) (8). The supply of antibiotics used for treating multiple conditions, including pneumonia, and other medicines needed for maintenance therapy in certain disease conditions were initially affected. That phase appears to have passed, but the availability of functioning pharmacy facilities in various geographical areas has not always been optimal. Access to medicines in rural areas was probably most affected. Price fluctuation and an increase in prices of items such as masks were also affecting the overall protection of healthcare workers and the public over the last few months. A paucity of certain medicines was also a problem. This became an acute issue due to hoarding when certain medicines were highlighted to have promising effects against COVID-19 in the media. One such case was that of hydroxychloroquine, which patients were routinely taking for rheumatoid arthritis. Such patients had a difficult time purchasing this medicine, again compounding the harm of a lack of sufficient medicine access. Though the situation is still far from optimal in certain hospitals, forward momentum through the efforts of regulators in price control of essential medicines and actively discouraging hoarding of essential items such as Personal Protective Equipment (PPE) needs to be appreciated.

**Effect on the healthcare system**

Healthcare systems in countries have been heavily affected due to the COVID-19 pandemic. Difficult situations have arisen due to overloading the system and a capacity crunch due to COVID or COVID suspect patients. Healthcare professionals have been thrown into an ethical dilemma of choosing between patients who need admission. In certain situations, those who were sick had to do with being quarantined at home due to a paucity of available hospital beds. This situation becomes even more critical in severe COVID as existing intensive care unit (ICU) beds and ventilators are limited in most hospitals and negligible in many rural areas. The ethical complexities in such a situation are enormous; for the health system, for the healthcare worker, and the healthcare recipient. For the healthcare worker, a plethora of decisional dilemmas in diagnosis and treatment have to be made due to the COVID situation. Significant changes in work style and practice due to COVID-19 has often impeded the autonomy of decision making and treatment flexibility. Besides, the risks to the healthcare worker have been enhanced due to the trauma of overwork, lack of personal protection in many facilities and issues of stigma and public pressure. For the healthcare recipient, the difficulties of not being able to access their trusted physicians and the earlier mentioned difficulties have probably contributed to both psychological and physical trauma.

For the healthcare system, the autonomy to treat patients based on capacity has had to be compromised and their own protocols superseded by pandemic guidelines. Since human resource and infrastructural capacity have their limits, issues of distributive justice also come to the forefront in many hospitals. The risks of turning away many patients due to lack of beds, the benefits of small numbers whose lives have been saved in intensive care, demand versus supply in medicines and PPEs, have all created a plethora of justice issues. Fortunately, most countries, through delaying the peak of the curve through social distancing and lockdown, have been able to ramp up the capacity. This has helped, but the situation is still far from ideal in many countries.

Data from the Association of Healthcare Providers in India (9) suggests that private hospitals bore the brunt of the lockdown. The suspension of all forms and means of transportation, coupled with the fear of contracting COVID-19 in hospitals, kept many patients at bay. While many private hospitals functioned to less than 25% of their usual capacity, a few remained wholly shut in the initial lockdown phase. The situation in clinics was no different. Few clinics closed voluntarily since the beginning of the lockdown, while other clinics were sealed, following the visit of patients who were later tested positive for COVID-19. This has posed ethical dilemmas and challenges to the medical profession. During pandemic situations, healthcare staff accepts the risk of contracting the disease and enter the battlefield of offering treatment. It is of no surprise that healthcare workers who breathe life into healthcare systems through their tireless services are no exception to the infection. A number of healthcare staff and community physicians have contracted the infection all over the country while treating patients (10). A few died, while the rest are undergoing treatment or are being quarantined. This has further burdened the already overstretched healthcare system in India. Lack of Personal Protecting Equipment (PPEs), inability to follow social distancing norms with patients in hospitals and lack of sanitizers have been cited as some of the reasons behind this. Also, the predominance of asymptomatic patients, a long incubation period of illness (5 – 14 days), limited testing centers during the initial stages of the pandemic have further increased the risk of transmission to treating healthcare staff.

**Effect on other health-related issues**

The outbreak and the ensuing lockdown have also brought other risks into the limelight, which need to be mitigated at the earliest through direct and well-planned interventional strategies. A few events such as distress deaths and suicides due to the social stigma surrounding COVID-19 (isolation, quarantining, etc.), have caused distressing news. Healthcare workers on the field and inside hospitals have had difficult encounters with the public, and a few were denied entry into rented apartments and localities. Other issues that have directly affected health has been an alarming rise in domestic abuse and gender-based violence, leading to physical and psychological injury. The mass migration of people enduring long walks with very little protection, water, or nutrition has had inestimable health effects. The closure of schools for months has meant a lack of access to mid-day meals among poor students, thereby posing the problem of cumulative malnutrition and the consequences to the growth and health of children in the long term.

**Beneficial Effects during the Pandemic**

The lockdown also brought its share of benefits. Nature and mother Earth, which were choked and gasping for fresh air due to pollution and deforestation, got a new lease of life. Air and water pollution appear to have significantly reduced. This has meant a new lease of life for asthmatic patients, those suffering allergies, and many other types of patients. River waters appear to have become cleaner and clearer. This has given the public who did not have access to clean water, a chance to drink and bathe in relatively clean water, thereby reducing diarrhea and other waterborne diseases. Among other things, public awareness on the prevention and control of infectious diseases has increased. Incidence of food and water-borne diseases has decreased due to improved hand hygiene and frequent sanitization. Reduced visits to hospitals by patients and their caretakers have also reduced Hospital Acquired Infections (HAIs). Decreased number of vehicles on the road may have reduced road accidents (head and tendon injuries), and occupational hazards. New lifestyle norms such as work from home, online meetings, online seminars, conferences, teleconsultations and telemedicine have been explored during the lockdown.

**Conclusion**

The collateral effects on health and healthcare during the time of COVID-19 have been enormous and cannot be wished away. The basic principles of life have been stretched as we fight collectively to contain and extinguish the virus. It is said that “Life is a hard teacher as it takes the test first and then teaches the lesson." The outbreak of COVID-19 has taught us quite a few lessons as we introspect our healthcare preparedness. It has shown how a pandemic can throw healthcare priorities topsy-turvy at the expense of health systems, individuals, and countries at large. Effects have been felt on healthcare recipients, healthcare workers, healthcare systems and the public at large. At the end of this pandemic, when all the analysis is done, let us not be left wishing that we as healthcare workers, policymakers and the public should have paid more attention to the collateral effects of COVID-19 in our populations, especially in the field of healthcare, lest we forget that each human life and livelihood is precious.

It is hoped that the discussion points in this article would spur further thinking on how to mitigate the adverse effects on health and healthcare. There is a dire need for countries to plan cost-effective and sustainable strategies to minimize these collateral effects, especially before further waves and counter-responses happen. Also, it will stimulate the policymakers, public and key stakeholders to realize the urgent need for such strategies, especially in LMIC where vulnerabilities can be easily exposed by this pandemic and where there is a dire need to support robust and sustainable health care systems for public health. Such strategies, if quickly implemented would hopefully help to combat future epidemics and prevent the adverse collateral effects on healthcare that people are currently experiencing.

**Conflicts of Interest:** Nil

**Funding information:** This work did not receive any funding.

**References:**

1. Ji T, Chen H-L, Xu J, Wu L-N, Li J-J, Chen K, et al. Lockdown contained the spread of 2019 novel coronavirus disease in Huangshi city, China: Early epidemiological findings. Clin Infect Dis Off Publ Infect Dis Soc Am. 2020 Apr 7;

2. Kenyon C. Flattening-the-curve associated with reduced COVID-19 case fatality rates- an ecological analysis of 65 countries. J Infect [Internet]. 2020 Apr 17 [cited 2020 May 22]; Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7162747/

3. Lancet T. India under COVID-19 lockdown. The Lancet. 2020 Apr 25;395(10233):1315.

4. The India State-Level Disease Burden Initiative [Internet]. Institute for Health Metrics and Evaluation. 2015 [cited 2020 Apr 29]. Available from: http://www.healthdata.org/disease-burden-india

5. Jordan RE, Adab P, Cheng KK. Covid-19: risk factors for severe disease and death. BMJ [Internet]. 2020 Mar 26 [cited 2020 May 5];368. Available from: https://www.bmj.com/content/368/bmj.m1198

6. Pramesh CS, Badwe RA. Cancer Management in India during Covid-19. N Engl J Med. 2020 Apr 28;0(0):null.

7. The impact of COVID-19 on routine vaccinations [Internet]. [cited 2020 May 22]. Available from: https://www.unicef.org/eap/stories/impact-covid-19-routine-vaccinations

8. Covid-19 impact: Government panel lists essential drugs that can run out [Internet]. The Economic Times. [cited 2020 May 22]. Available from: https://m.economictimes.com/industry/healthcare/biotech/pharmaceuticals/covid-19-impact-government-panel-lists-essential-drugs-that-can-run-out/articleshow/74449944.cms

9. Association of Healthcare Providers (India) [Internet]. [cited 2020 May 22]. Available from: https://www.ahpi.in/

10. 548 doctors, nurses, paramedics infected with Covid-19 across India: Report [Internet]. Hindustan Times. 2020 [cited 2020 May 22]. Available from: https://www.hindustantimes.com/india-news/548-docs-nurses-paramedics-infected-with-covid-19-across-india-report/story-o2pM3w2adM4g3PXI6TBlkN.html

11. Gautam S. The Influence of COVID-19 on Air Quality in India: A Boon or Inutile. Bull Environ Contam Toxicol. 2020 May 11;