**Article Title:**

**Ethical considerations and preparedness in the management of the COVID-19 pandemic in India: evolving an ethical framework**

**Running Title: Evolving an ethical framework for pandemic management in India**

**AUTHORS:**

1. Saurav Basu (MD)

Senior Resident, Dept. of Community Medicine, Maulana Azad Medical College, New Delhi

2. Nandini Sharma (MD)

Director Professor & Head, Dept. of Community Medicine, Maulana Azad Medical College, New Delhi

**Abstract**

The COVID-19 epidemic has spread across India with a persistent risk of exponential spurt in cases even as the country battles to flatten the curve. During these exceptional circumstances, governments, policymakers, and medical professionals are likely to be confronted with several complex ethical dilemmas related to medical bioethics. Considering the large population and inadequate public health infrastructure, rationing of scarce resources to COVID-19 patients and, according to them, the best possible care based on triage can be undermined by complex socio-cultural realities. Furthermore, the rights and duties of healthcare providers need to be balanced between the conflicting demands of duty to care and to seek protection of the self. Consequently, there exists a moral imperative for practitioners of medical ethics in India to develop a framework for ethical preparedness during a pandemic. Failure to do so runs the grave risk of moral and ethical chaos from ad-hoc decision making that is deprived of ethical guidance when confronted with an unprecedented public health crisis. In this ethical narrative, we provide some of the building blocks for building a comprehensive ethical framework for decision making and shaping public health responses to pandemic situations.

**Keywords:** COVID-19; Ethical framework; Public Health; Values; India

**Background**

The COVID-19 pandemic has caused over 4716965 cases and more than 315248 deaths worldwide as of 17.5.2020 (1). The respiratory disease spread via droplet infection has an estimated case fatality rate in the range of <1%-5% with significantly higher risk among the elderly, comorbid, and those immunocompromised (2). In India, 96169 cases and 3029 deaths due to COVID-19 had been recorded until 17.5.2020. Furthermore, the disease has been reported in all states across India while hotspots and clusters have emerged in several states and union territories (3).

The unavailability of any vaccine and the lack of herd immunity would maintain a sizeable susceptible pool of individuals at risk of COVID-19, a significant proportion of whom may sometime require medical assistance for their condition (4). Furthermore, continued provision of resources is needed for maintaining continuity of care for the millions of existing patients and beneficiaries. However, India spends only 1.28% of its GDP as public health expenditure on health (5). Consequently, an increasing burden of COVID-19 can overwhelm the limited public health infrastructure of the country and undermine prior national efforts for attaining universal health coverage. Under these unprecedented circumstances, governments, policymakers, and physicians are likely to become confronted with the complicated decision-making processes for the allocation of scarce resources that involve engagement with the principles of public health and biomedical ethics. Furthermore, protecting the health needs of the uninfected from the infected populations may require illiberal measures that violate individual autonomy but uphold the sanctity of public health. However, despite these looming ethical questions of vast public health importance, the pandemic management in India has neglected venturing into any critical ethical inquiry until recently.

Ethics preparedness is defined as the public health system’s capacity towards protecting population health, and develop the ability for quick healthcare system responsiveness through an ethical framework built on trust, human dignity and equal moral worth of individuals when confronted with health emergencies (6, 7). Although India has successfully contained several epidemics in the past, including H1N1, Nipah, Avian influenza, etc., it lacks any preexisting ethical framework for guidance in strategic decision making during pandemics.

In this commentary, we delineate the steps required towards evolving an ethical framework applicable in a pandemic situation in India. Furthermore, we explore the ethical justification of key healthcare-related decisions from the perspective of stakeholders (government, administration, healthcare providers) during the management of the COVID-19 pandemic in India from a public health perspective. Subsequently, the validity of the ethical concerns generated in response to the pandemic response in India is evaluated through this framework. This ethical narrative may provide the building blocks for building a comprehensive ethical framework for decision making and shaping public health responses to pandemic situations.

**Approaching the ethical framework**: key ethical issues raised during various aspects of the strategic management of the COVID-19 pandemic situation in India were identified and explored through a value-based approach that has been theoretically previously validated in response to pandemics. Values are typically classified as substantive and procedural values; the former is realized through appropriate outcomes and the latter through appropriate processes. The substantive values include individual liberty, protection of the public from harm, proportionality, privacy, duty to provide care, reciprocity, equity, trust, solidarity, and stewardship. The procedural values include being reasonable, open and transparent, inclusive, responsive, and accountable [8]. Xafis et al. (2019) and Dawson and Jennings (2012) have previously recommended that legitimate, ethical inquiry in an ethical framework should not prioritize one value over another, and instead strive to attain a balanced outlook in advocating solutions [9, 10]. Moreover, evaluating and recommending actions based on an ethical framework engenders a complex process of negotiation wherein invariably, certain values are privileged while others are compromised, even if not violated [9]. In this regard, the principles suggested by Ushur (2002) are applied to assess the justifiability of public health interventions which include (11):

(a). No-harm: Based on the classic principle by John Stuart Mill, exercising state power to restrict the liberty of individuals is ethically justifiable only when the objective is to prevent harm to others.

(b) Least restrictive or coercive means: The state has a monopoly on the application of coercive power to achieve public health goals. Nevertheless, only the minimum coercive power required to achieve public health goals under exceptional circumstances is justified, which should be preceded by the maximum extent of persuasion through educative means.

(c) Reciprocity: Individuals and communities at the vanguard of the public health actions must be wholly facilitated for effectively discharging their duties.

(d) Transparency. The principles oblige that all legitimate stakeholders should be involved in the decision-making process, and freely provide inputs for deliberations with minimal political interference and absence of administrative or state coercion

**(1). Ethical considerations in the rationing and allocation of scarce health care resources**

Public health resources for managing the COVID-19 pandemic can be scarce in terms of testing and diagnostics (trained workforce for obtaining throat and nasal swabs, testing kits, laboratory safety, etc.), other human resources (like doctors, nurses, paramedical staff, sanitation workers), and the total hospital beds. Allocation of these resources by the government should meet the ethical criteria for justice and equitability or fairness. Although health is a state subject according to the Indian constitution, the central government has overarching powers for health-related spending, framing health policy, and issuing directives to states during outbreaks and pandemics. In this narrative, we have used the word government interchangeably for both governments unless explicitly specified.

(a). COVID-19 testing strategy protocols

(i) Principles of testing and expansion: The evolution of the COVID-19 testing protocol in India reflected a dynamic testing strategy that progressively expanded the eligibility pool for testing. Considering the 1.3 billion population of the country, initial small patient pool, and the limited availability of RT-PCR test kits, the initial strategy was restricted to testing the suspected COVID-19 patients with a history of international travel or those having contact with a confirmed case. Consequently, this limited testing strategy was reasonable and transparent, but consequent to the further spread of infection may not have been adequate in protecting the health of the people.

In-fact subsequently, there was a realization that such an approach would have failed to test hospitalized pneumonia or respiratory illness patients whose clinical presentation is very similar. Hypothetically, such undiagnosed patients having coronavirus infection could have endangered other patients, doctors, and hospital staff. Consequently, this opened up learning, where all hospitalized pneumonia and serious respiratory illness patients were later compulsorily tested for COVID-19 irrespective of their travel or contact history indicating responsiveness with delay. Furthermore, the testing protocol was scaled-up to include symptomatic healthcare workers, and then asymptomatic direct and high-risk contacts of a confirmed case (12).

(ii). Adequacy of COVID-19 testing: The number of COVID-19 tests per confirmed case (test positivity rate) in India is 24.8 (as of 17.05.2020) compared to 14.8 in Japan and 67.1 in South Korea, indicating the likely adequacy of overall testing (13). However, questions persist on the ability of certain state governments to ensure mass testing of people living in densely populated urban slums reporting positive cases and difficult contact tracing. Furthermore, rural-urban and inter-state disparities in testing have been highlighted in preliminary research findings (14). Consequently, poor performance at individual districts and states would suggest a failure of public health intervention, deprivation of justice, and an inability to protect the health of the people.

Even more significantly, at the time of writing, India had been unable to initiate large-scale antibody testing due to delayed indigenous development and delays in procurement. Furthermore, mishandling in the procurement of rapid kits by central agencies also reflects administrative and procedural lapses, particularly associated with a lack of transparency (15). The failure of timely initiation of COVID-19 seroprevalence surveys due to lack of rapid kits entails a lack of knowledge of the spread of infection, the extent of herd immunity, and subversion of planning the future steps in controlling the pandemic, thereby compromising the government and administrative claims to stewardship.

(iii). Ensuring affordability of testing: COVID-19 testing in India was initially available free of cost but limited to select government health facilities. However, to cope with the increasing number of cases, selected private laboratories were later authorized to conduct tests. Nevertheless, there were concerns over equity with the expansion of the testing protocol as government testing facilities were experiencing a high patient load, while private laboratories despite capping were charging a considerable fee. The Supreme Court of India subsequently instructed the government to make testing free in private labs without venturing into details. However, the sustainability and feasibility of implementing the order were doubtful in the absence of a viable reimbursement strategy for the private sector labs (16). To mitigate this challenge, the union government permitted coverage for COVID-19 testing and treatment for the over 500 million beneficiaries of the landmark Ayushman Bharat National Health Protection Scheme at its empaneled private hospitals and laboratories (17). The decision at-least theoretically ensured upholding major substantive values related to equity and duty towards providing care and the procedural values of responsiveness and accountability.

(b). Allocation of hospital beds and triage: During the COVID-19 pandemic, a significant proportion of patients are likely to require hospitalization and access to critical care services, especially mechanical ventilation through ventilators. In such emergencies, the number of individuals with life-threatening conditions exceeds the number that could be treated with the available resources at the same time. In that situation, the application of the principle of triage is recommended for the reasonable allocation of scarce treatment resources for attaining maximal societal benefit. This requires health professionals to conduct triage among sick patients with or without COVID-19 disease and decide who would be permitted to access the limited available lifesaving treatment, especially requiring mechanical ventilation. It is well-established that in such scenarios, doctors should enable treatment prioritization of the patients with a higher probability of survival based on specific pre-established prognostic criteria instead of the usual ‘first come first served’ approach. Nevertheless, mechanical ventilation during the COVID-19 pandemic has been considered as the ‘toughest triage’ since unlike other modes of life-saving treatment, its initiation or termination represents an absolute life or death alternative (18).

India has merely 0.55 beds per 1000 population, with some states lagging even further behind (19). Furthermore, it is estimated that even in a best-case scenario, India has only 57,000 ventilator equipped ICU beds that can be rapidly exhausted due to a surge in demand in case of community transmission of COVID-19 accompanied by an exponential increase in cases (20, 21). Some countries have recommended the constitution of triage committees to disencumber treating clinicians in the ventilator-triage related decision-making process and insulate them from criticism and misunderstanding involved in depriving individual patients of ventilators when attempting to save maximum lives (18).

However, there could be scenarios, especially in the context of countries with heterogeneous societies having limited public health infrastructures like India, where multiple COVID-19 patients with critical care requirements have both similar prognosis and life expectancy in case of recovery. Under such circumstances, the legal permissibility of triage based on the social utility or worth of the patient, depending upon their past services rendered to society, remains unanswered (22). For instance, prison populations are mostly ill-equipped in dealing with COVID-19, especially when prisoners are closeted together in overcrowded jails (23). Under these circumstances, irreconcilable differences exist in attempting to reconcile the the right to life, a fundamental and inalienable human right with a triage based on social worth.

Another factor mostly unlisted in literature is the composition of the family since the mortality of an individual member of a smaller sized family could be much more catastrophic compared to a larger sized family. Unfortunately, the lack of social trust and acceptance might make such decisions unacceptable for various individuals, communities, and religious groups. Consequently, ethical preparedness for these truly ‘life or death’ situations likely to emerge in case of an exponential increase in cases of COVID-19 would require novel approaches at the intersection of ethics, politics, and public health.

**(2). Ensuring continuity of essential health services for patients and beneficiaries.**

Universal health coverage has been one of the biggest causality at the time of the COVID-19 pandemic due to significant diversion of health resources towards containment of the disease within overwhelmed health systems. In India, millions of patients are encountering challenges accessing and fulfilling their essential healthcare needs since several tertiary and secondary care government hospitals have transformed overnight into dedicated COVID-19 hospitals.

In primary care facilities, healthcare providers are experiencing the conflicting dilemma of patient beneficence versus non-maleficence (do no harm). This is because a significant proportion of healthcare facilities in India operate in small, enclosed spaces without significant queuing or separate exits or entry spaces that diminish the possibility of effectively segregating patients with symptoms of flu-like illnesses or presumptive COVID-19 from the others (24). Moreover, there exists a significant ethical dilemma in continuing to provide health services in such facilities to NCD patients, elderly, children, and pregnant mothers as they are already at an increased risk of COVID-19 infection and its complications.

To address these challenges, state governments have attempted mitigation strategies focused on home delivery of drugs and dispensing longer than usual drug refills. Telemedicine facilities are also being promoted with limited legalistic support as a substitute for regular consultation with medical practitioners during the epidemic (25). However, such measures may be inadequate, considering the magnitude of the problem. Consequently, the inability to effectively counter the challenge of diminished healthcare access runs the risk of exposing NCD patients to medication nonadherence, burden the vulnerable with out of pocket expenses and risk the early onset of complications (26, 27). Maternal and child health services, particularly related to immunization and antenatal care, have also been subverted globally due to disruption in outpatient care services. Furthermore, the interruption of routine medical and surgical services results in a significant reduction in the existing quality of life of patients (28, 29). Failure of timely and accessible effective emergency care services runs the risk of premature mortality and prolonged morbidity. Some of these treatments also involve considerable risk to the healthcare providers themselves that raise ethical concerns regarding the appropriate timing for resumption of these services. Consequently, the failure of the administration and governments to minimize disruptions in routine care for patients requiring them indicates the failure of the duty to accord care and not to harm while failing to maintain reciprocity. In this conflict between prioritizing pandemic management versus maintaining essential health services, ethical resolutions need to strike a delicate balance between the tensions that emerge from neglecting one over the other. Evidence-based decision making can potentially resolve conflicts, but in the absence of consensus between experts, and preexisting impoverished capacity of the health system, there exists little ethical clarity towards the most ethically desirable course of action.

**(3). Enforcement of coercive measures for controlling the pandemic**

There is growing evidence that authoritarian measures in China for enforcing isolation and quarantine enabled by the communist government were successful to a large extent in controlling the pandemic in their nation (30). In Hungary, the nationalist government has imposed emergency powers that decree prison terms on violating quarantine laws (31). In India, law and order being a state subject have rendered considerable variation in the implementation of measures for control of the pandemic. Nevertheless, quarantine and isolation measures that were initially imposed voluntarily were progressively rendered more authoritarian attenuating individual liberties, albeit justified from a public health perspective for interrupting the chain of disease transmission. Privacy concerns also arise from actions like ink-stamping of home quarantine labels or the occasional disclosure of the names of patients with COVID-19 to ensure reporting by their contacts (32, 33). Some members of a large religious organization linked to an initial single-source nationwide surge in cases were also arrested on charges of non-cooperation and instigating violence against the police and authorities (34). These measures indicate a progressive expansion of the coercive powers of the state, correlating with an increasing threat of the spread of the coronavirus infection. However, the ethical legitimacy of incidents involving substantial coercion of citizens requires an in-depth analysis of individual acts and their social and health consequences to identify if the measures were essential to preserve public health or whether the coercive apparatus of the state was overzealous in exercising its power.

**(4). Healthcare professionals and their obligation to treat COVID-19 patients**

(a). An emerging ethical concern is the compulsion of HCWs in several countries affected by the COVID-19 pandemic to work without adequate personal protective equipment (PPE). Hundreds of doctors and nurses have lost their lives while battling COVID-19 pandemic globally (35). Gopichandran (2020) has alluded to this conundrum wherein the code of medical ethics make explicit reference to the duty to care while remaining silent on the protection of the self (36). Nevertheless, the failure to provide healthcare personnel tending to presumptive or confirmed COVID-19 patients with adequate PPE violates the principle of reciprocity and undermines public health justification that compels them to care.

(b). The shortage of PPE globally necessitated the formulation of PPE guidelines that were conservative and whose directives did not coincide with the safety concerns of a significant proportion of HCWs. For instance, the World Health Organization (WHO) guidelines recommend only surgical masks for healthcare workers not involved in close contact and direct management or care of COVID-19 patients (37). However, the increasing burden of COVID-19 cases at hotspots and healthcare providers being compelled to work in small and crowded health facilities creates high-risk environments. Consequently, the question arises if it is ethically unreasonable for HCWs to demand the best protection available for themselves, even if at variance with the scientific consensus? In the context of proportionality, considering the limited resources (means) and armed with the scientific mandate, such misgivings of the HCWs can be rejected due to their presumed excessiveness (38). However, in terms of responsiveness and solidarity, newer research directed towards verifying the minimum PPE requirements must continue, and evidence-driven actions must be undertaken in case of the emergence of contrary evidence.

(c). An unprecedented consequence of the COVID-19 pandemic was reports of doctors and nurses across parts of India subject to violence, harassment, and intimidation by suspected COVID-19 patients objecting to their forced hospital-based isolation and testing (39). Although precipitation of violence upon the healthcare worker by attendants and family members of patients has been occasionally reported in Indian health settings, they have usually been related to dissatisfaction with the treatment accorded or unfavorable treatment outcomes (40). Treating unwilling psychiatric patients under advance directives due to lack of insight is legally permissible, but treating reluctant patients at risk of transmitting infection during a pandemic setting has no previous precedent. In this context, the HCWs themselves act as tools of state coercion. Under these circumstances, the inability of the state to provide the highest possible safety and security to healthcare providers may completely attenuate their obligation to treat COVID-19 patients. Consequently, the union government promulgated an ordinance amending the Epidemic Diseases Act, 1897, enacting strict punishment for any person inflicting violence upon health workers, signifying responsiveness and solidarity but unable to build trust among all stakeholders (41).

**(5). The ethics of health versus economics**

Like several other countries, India is in a state of complete lockdown for 42 days since March’23 2020 for enforcing social distancing and interrupting the chain of COVID-19 disease transmission to flatten the curve. The WHO has warned against early easing of lockdown restriction as it could cause failure to flatten the curve and break the chain of transmission (42). Nevertheless, a careful scrutiny of the arguments for and against a prolonged lockdown suggest the application of utilitarian principles while predicting the least suffering and least death. Doudy and D’Souza (2020) have argued that millions of excess lives could be lost in the quest for herd immunity (43). In contrast, Cash and Patel (2020) have cautioned against the impending public health catastrophe due to imposition of lockdown in developing countries (28). Although both sides have made compelling arguments but they essentially revolve around the number of excess deaths prevented and lives saved either directly due to the unfolding COVID-19 pandemic related morbidity and mortality or indirectly from the long-term grave economic consequences translating into hunger, malnutrition, unemployment, and various poorly controlled communicable and NCDs (44). Furthermore, any ethical inquiry that visits the question of economics and health tradeoff would require assigning the economic value to every human life, which in it-self is a contentious ethical conundrum (45). Working with such meagre and uncertain evidence has meant that any critical preliminary ethical inquiry can be subject to the precautionary principle which would tend to favor inaction (lockdown) over action (opening of the economy).

**(6). Prioritization of clinical and public health research during a pandemic**

There is no effective drug treatment or preventive vaccine for COVID-19 available at the time of writing. Repurposing of older drugs like hydroxychloroquine (HCQ) is being attempted but that can have significant side effects (30). Human challenge studies involving controlled human infection can be rapidly conducted compared to vaccine field trials but they accentuate the risk of the participant individuals. Hence, these studies should be conducted only on meeting pre-established criteria, adherence to which diminish the risk involved for the participants enabling risk reduction that builds trust and solidarity (46). Consequently, this necessitates strict monitoring of clinical trials involving both drugs and vaccines and ensuring the timely and appropriate reporting of results and possible biases while maintaining complete transparency [6]. Furthermore, the accountability of scientists and researchers who have been prioritized for COVID-19 related research funding from public funds is also significantly enhanced in these exceptional circumstances.

**Conclusion and limitations**

The management of the COVID-19 pandemic generates several searching questions related to biomedical ethics, which need critical inquiry for their resolution (Table 1). Health system strengthening and capacity building to build adequate medical infrastructure is an unfulfilled ethical imperative (47). Consequently, existing approaches by the Indian government and administration in controlling the pandemic were mostly devoid of risk-taking, occasionally reactive, and largely reliant on the global experience for the adoption of best practices subject to economic and technological feasibility. These include a progressively expansive equitable testing strategy, government-funded diagnosis and treatment for COVID-19 suspected and confirmed cases, implementation of large-scale quarantine, large scale isolation, contact tracing, and implementation of a prolonged lockdown. Moreover, in the absence of decisive evidence built on expert consensus for controlling the pandemic, the Indian government adhered to the practical view of the experts to preclude any significant moral or ethical lapses in judgment.

Nevertheless, factors like inefficient contact tracing, suboptimal implementation of lockdown, inadequate relief measures for the poor and vulnerable, underreporting of cases and deaths and political undermining of press freedom could not be explored in this analysis due to the lack of adequate and verifiable data at the time of writing. Similarly, the government and administration has usually shown some degree of responsiveness to the emergent social problems and ethical concerns through specific public health interventions. However, the extent of their timeliness and adequacy can only be ascertained through evidence generated from future quantitative and qualitative research.

Nevertheless, there definitely existed a lack of policy impetus in venturing towards a systematic ethical exploration for resolving the ethical dilemmas pertaining to resource allocation and triage in a complex sociocultural environment combined with health system fragilities. Such ethical concerns, although currently dormant due to a manageable case burden, can explode in case of an exponential surge in cases during full-blown community transmission, the future possibility of which cannot be ruled out. Consequently, there exists a moral imperative for practitioners of medical ethics in India to participate in evolving a framework for developing ethical preparedness during future pandemics. Failure to do so runs the grave risk of moral and ethical chaos from ad-hoc decision making that is deprived of ethical guidance when confronted with an unprecedented public health crisis.

**Sources of support**: Nil

**Conflicts of interest**: None

**Table 1. Summary of an ethical framework for COVID-19 in India**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Ethical domain | Ethical considerations/causes | Public Health Response(s) | Values aligned | | Values threatened | |
|  |  |  | Substantial | Procedural | Substantial | Procedural |
| A. Allocation of resources  1. Testing  2. Triage | Expansion  Adequacy  Affordability  Individual prioritization  (Social worth/Family size) | Graded expansion  Integration with NHPS  Delayed seroprevalence  Dedicated COVID-19 hospitals | ?Equity  ?Trust  Protection of the public from harm | Inclusive  Responsive  Reasonable  ?Responsive  ?Proportionality | Stewardship  Stewardship  Trust  ?Equity  Duty to provide care | ?Transparent and openness  Accountability  ?Reasonable  ?Inclusive |
| B. Maintaining essential services  1. NCDs  2. Maternal and child health  3. Emergency care | Medication non-adherence, non-persistence  Missed Antenatal care and immunization services  Challenges in accessing emergency care | Longer refills  Telemedicine  -  - | ?Solidarity  **-** | ?Reasonable  ?Proportionality  - | Stewardship  Equity  Do no harm  Reciprocity  Duty to provide care  Do no harm  Duty to provide care  Trust | Inclusiveness  Responsiveness  Accountability  Reasonable  Accountability |
| C. Coercive measures | Mandatory testing of contacts  Mandatory hospitalization of suspected COVID-19  Adherence to lockdown and containment | Legal and police action | ?Stewardship  Protection of the public from harm | Responsive | Individual liberty  Privacy | ?Reasonable  ?Proportionality |
| D. HCWs obligation to treat | Inadequate PPE  Violence | Provision of PPE based on risk assessment  Enactment of punitive legislation | ?Equity  ? Solidarity  ? Reciprocity  ?Stewardship | Responsive  Responsive | ? Reciprocity  Trust  ?Trust | ? Accountability  ? Accountability |
| E. Health versus economics | Unemployment and  hunger in impoverished populations  Adequacy of relief measures for vulnerable migrant labour  Mental health problems | Direct benefit transfer food, cooking gas, transport arrangements  Helplines | ? Stewardship  Solidarity | Responsive  Responsive | ?Equity  ?Inclusiveness  - | ?Transparent and openness  Accountability  **-** |
| F. Prioritization of clinical and public health research | Challenge studies  Drug repurposing  Vaccine and drug trials | Criterion adherence  Timely reporting of positive and negative results, adverse effects | Stewardship |  | Individual liberty  Do no harm  Trust | ?Accountability |

? Indicates high degree of uncertainty to evaluate based on the current evidence.

**REFERENCES**

1. Coronavirus Resource Centre. John Hopkins University & Medicine [Internet] [Cited 18.05.2020] Available from: https://coronavirus.jhu.edu/map.html

2. Fauci AS, Lane HC, Redfield RR. Covid-19 — Navigating the Uncharted. N Engl J Med. 2020;382(13):1268–9. doi: 10.1056/NEJMe2002387

3. Government of India. Ministry of Health and Family Welfare. [Internet] [Cited 18.05.2020] Available from: https://www.mohfw.gov.in/

4. British Medical Association. COVID-19 Ethical Issues: A guidance note. 2020 [Internet] [Cited 18.05.2020] Available from: https://www.bma.org.uk/media/2226/bma-covid-19-ethics-guidance.pdf

5.Central Bureau of Health Intelligence. National Health Profile. 2019 [Internet] [Cited 18.05.2020] Available from: www.cbhidghs.nic.in/showfile.php?lid=1147

6. Mathur R. Ethics preparedness for infectious disease outbreaks research in India: A case for novel coronavirus disease 2019. Indian J Med Res 2020;151:124-31. doi: 10.4103/ijmr.IJMR\_463\_20

7. Saxena A., Horby P, Amuasi J, Aagaard N, Kohler J, Gooshki ES. et al. Ethics preparedness: facilitating ethics review during outbreaks - recommendations from an expert panel. BMC Med Ethics 20, 29 (2019). doi: 10.1186/s12910-019-0366-x

8. University of Toronto. Stand on Guard for Thee: Ethical considerations in preparedness planning for pandemic influenza. Toronto: University of Toronto’s Joint Centre for Bioethics; 2005.

9. Dawson, A., Jennings, B. The Place of Solidarity in Public Health Ethics. Public Health Rev 34, 4 (2012). doi: 10.1007/BF03391656.

10. Xafis V., Schaefer GO, Labude MK, Brassington I, Ballantyne A, Lim HY, et al. An Ethics Framework for Big Data in Health and Research. ABR. 2019;11,227:54.

11. Upshur REG. Principles for the justification of public health interventions. Can J Public Health. 2002;93:101-3.

12. Indian Council of Medical Research. Strategy of COVID19 testing in India [Internet] [Cited 17.5.2020] Available from: https://icmr.nic.in/sites/default/files/upload\_documents/Strategy\_COVID19\_testing\_India.pdf

13. Our World in Data. “Number of COVID-19 tests per confirmed case: May 16, 2020” https://ourworldindata.org/grapher/number-of-covid-19-tests-per-confirmed-case

14. Babu GR, R D, Madhusudan MD. COVID-19: What India’s Testing and Fatality Data Tells Us, In Two Charts. The Wire. [Internet] [Cited 17.5.2020] Available from: https://science.thewire.in/the-sciences/covid-19-data-test-positivity-case-fatality-india-states/

15. Indian Council of Medical Research. Advisory on rapid antibody tests. [Internet] [Cited 17.5.2020] Available from: https://www.icmr.gov.in/pdf/covid/strategy/Revised\_Advisory\_Rapid\_Anibody\_blood\_tests.pdf

16. Japnam B. Supreme Court order on free tests raise points of judicial overreach. Livemint, 9 April 2020 [Internet] [Cited 17.05.2020] Available from: www.livemint.com/news/india/supreme-court-gives-interim-order-for-free-covid-19-testing-11586353686916.html

17. Perappadan BS. COVID -19 | Testing, treatment now available for free under Ayushman Bharat Scheme. The Hindu 5 April 2020 [Internet] [Cited 17.5.2020] [Available from: www.thehindu.com/news/national/coronavirus-testing-treatment-now-available-for-free-under-ayushman-bharat-scheme/article31261580.ece]

18. Truog RD, Mitchell C, Daley GQ. The Toughest Triage - Allocating Ventilators in a Pandemic. N Engl J Med. 2020. doi: 10.1056/NEJMp2005689.

19. World Bank. Hospital beds per 1000 population. [Internet] [Cited 17.05.2020] Available from: https://data.worldbank.org/indicator/SH.MED.BEDS.ZS

20. Singh P, Shamika R, Chakraborty S. COVID-19 | "Is India’s health infrastructure equipped to handle an epidemic?" Brookings.edu [Internet] [Cited 17.05.2020] Available from: blog www.brookings.edu/blog/up-front/2020/03/24/is-indias-health-infrastructure-equipped-to-handle-an-epidemic/

21. Srinivas A. Covid-19: When will states run out of beds? [Internet] [Cited 17.05.20] Available from: www.livemint.com/news/india/which-states-would-run-out-of-hospital-beds-if-covid-19-count-rises-11585108973227.html

22. van Bogaert DK, Ogunbanjo GA. The Quandaries of the Principle of Triage, South African Family Practice, 2005;47:2:47-9

23. Burki T. Prisons are “in no way equipped” to deal with COVID-19. Lancet. 395;10234:411-2.

24. Sriram S. Availability of infrastructure and manpower for primary health centers in a district in Andhra Pradesh, India. J Family Med Prim Care. 2018;7(6):1256‐62. doi:10.4103/jfmpc.jfmpc\_194\_18

25. Telemedicine Practicine Guidelines: Enabling Registered Medical Practitioners to provide healthcare using Telemedicine. 25 Mar 2020. [Internet] [Cited 17.05.2020] Available from: https://www.mohfw.gov.in/pdf/Telemedicine.pdf

26. Basu S. Non-communicable disease management in vulnerable patients during Covid-19. Indian J Med Ethics. 2020;V(2):103-105. doi: 10.20529/IJME.2020.041.

27. Ghosal S, Sinha B, Majumder M, Misra A. Estimation of effects of nationwide lockdown for containing coronavirus infection on worsening of glycosylated haemoglobin and increase in diabetes-related complications: A simulation model using multivariate regression analysis. Diabetes Metab Syndr. 2020;14(4):319–323. doi:10.1016/j.dsx.2020.03.014.

28. Cash R, Patel V. Has COVID-19 subverted global health? Lancet. 2020 doi: 10.20529/IJME.2020.041

29. CovidSurg Collaborative, Nepogodiev D, Bhangu A. Elective surgery cancellations due to the COVID-19 pandemic: global predictive modelling to inform surgical recovery plans. Br J Surg. 2020. doi: 10.1002/bjs.11746.

30. WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). Feb 2020. [Internet] [Cited 17.05.2020] Available from: https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf

31. Tharoor I. Coronavirus kills its first democracy. Washington Post. 31 March 2020. [Internet] [Cited 17.05.2020] Available from: www.washingtonpost.com/world/2020/03/31/coronavirus-kills-its-first-democracy

32. Pandey A. Coronavirus in India: Man stamped for quarantine in Mumbai caught at Secundarabad railway station. India Today. 22.02.2020 [Internet] [Cited 17.05.2020] Available from: https://www.indiatoday.in/india/story/coronavirus-in-india-stamped-in-mumbai-youth-caught-by-authorities-at-secunderabad-railway-station-1658366-2020-03-22

33. Jaiswal PB. Privacy of COVID-19 suspects violated; names, addresses made public. The Week. 22 March 2020. [Internet] [Cited 17.05.2020] www.theweek.in/news/india/2020/03/22/privacy-of-covid-19-suspects-violated-names-addresses-made-public.html

34. Coronavirus: 30 Islamic Sect Members, Including Allahabad Professor Arrested, Says UP Police. Press Trust of India. 21 April 2020. [Internet] [Cited 17.05.2020] Available from: www.ndtv.com/allahabad-news/coronavirus-30-tablighi-jamaat-members-including-allahabad-professor-arrested-says-up-police-2215851

35. Schuklenk Udo. Health Care Professionals Are under No Ethical Obligation to Treat COVID-19 Patients. Blog. Journal of Medical Ethics. 01.04.2020 [Internet] [Cited 17.05.2020] Available from: https://blogs.bmj.com/medical-ethics/2020/04/01/health-care-professionals-are-under-no-ethical-obligation-to-treat-covid-19-patients/

36. Gopichandran V. Clinical ethics during the Covid-19 pandemic: Missing the trees for the forest. Indian J Med Ethics. DOI:10.20529/IJME.2020.053

37. World Health Organization. Advice on the use of masks in the community, during home care and in healthcare settings in the context of the novel coronavirus (COVID-19) outbreak. WHO/2019-nCoV/IPC\_Masks/2020.2

38. Hermerén G. The principle of proportionality revisited: interpretations and applications. Med Health Care Philos. 2012;15(4):373-82. doi: 10.1007/s11019-011-9360-x.

39. Hindustan Times. Jamaat members resisting testing, hospitalisation, complains Delhi hospital" April 02 2020. [Internet] [Cited 18.05.2020] Available from: www.hindustantimes.com/india-news/jamaat-members-resisting-testing-hospitalisation-complains-delhi-hospital/story-2XEDL38NHvKp2rdpAktMHP.html

40. Anand T, Grover S, Kumar R, Kumar M, Ingle GK. Workplace violence against resident doctors in a tertiary care hospital in Delhi. Natl Med J India 2016;29:344-8

41. Government of India. Promulgation of an Ordinance to amend the Epidemic Diseases Act, 1897 in the light of the pandemic situation of COVID-19" Press Information Bureau 22 April 2020. [Internet] [Cited 17.05.2020] Available from: https://pib.gov.in/newsite/PrintRelease.aspx?relid=202493

42. 'Deadly resurgence' if curbs lifted too early, WHO warns" BBC. April 10 2020 [Internet] [Cited 17.05.2020] Available from: www.bbc.com/news/world-52248516

43. Dowdy D, D'Souza G. Early Herd Immunity against COVID-19: A Dangerous Misconception. JHU: Coronavirus Resource Center. [Internet] [Cited 17.05.2020] Available from: https://coronavirus.jhu.edu/from-our-experts/early-herd-immunity-against-covid-19-a-dangerous-misconception

44. Bhattacharya J. Packalen M. Lives vs lives – the global cost of lockdown: Policies that depress the world economy put millions at risk. The Spectator [Internet] [Cited 17.05.2020] Available from: https://www.spectator.co.uk/article/lives-vs-lives-the-global-cost-of-lockdown

45. Bayles MD. The Price of Life. Ethics. 89(1):20-34.

46. WHO. Key criteria for the ethical acceptability of COVID-19 human challenge studies. [Internet] [Cited 17.05.2020] Available from: https://apps.who.int/iris/bitstream/handle/10665/331976/WHO-2019-nCoV-Ethics\_criteria-2020.1-eng.pdf?ua=1

47. Gopichandran V, Subramaniam S. Response to Covid-19: An ethical imperative to build a resilient health system in India. Indian J Med Ethics. 2020;V(2):1-4. doi: 10.20529/IJME.2020.026.