



# Ethical Issues in COVID-19 Pandemic

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## Abstract

The coronavirus SARS-CoV-2 disease (COVID-19) is the most current life-threatening disease that affect health and economic sectors in the world. This pandemic raises weighty and urgent ethical issues that affected patients, health care provider and health care systems. Based on medical ethics textbooks, there are four fundamental ethical principles: The principle of respect for autonomy, the principle of beneficence, the principle of non-maleficence, and the principle of justice. Medical ethics scientists have well explained these principles before with full accuracy and detail. In this review article, we discussed the ethical issues raised during the COVID-19 pandemic. Health inequity and inequality, health care rationing/triage, contact tracing technologies and data privacy, movement restriction and exit strategies, and finally COVID-19 research ethics especially clinical trials and vaccine studies could cause ethical problems during Covid-19 pandemic. In this review article, we discuss about these issues and provide some ethical solutions to these issues.

**Keywords:** COVID-19, Ethics, Health Inequity, Triage, Resource Allocation, Vaccines

## 1. Introduction

The coronavirus SARS-CoV-2 disease (COVID-19) is the most current life-threatening disease that has affected the health and economic sectors in the world.<sup>1</sup> World's countries have been affected by the COVID-19 pandemic since December 2019.<sup>2,3</sup> Unfortunately, there is no approved curative treatment available and no vaccine to immunize the population against the virus.<sup>4</sup> Since World Health Organization designated COVID-19 pandemic as a Public Health Emergency of International Concern on 30 January 2020,<sup>3,5</sup> the virus has spread across countries, regions, and communities, despite repeated warnings and advice from WHO about controlling and dealing with this infectious disease.<sup>6</sup> The impact of this pandemic continues to rise, affecting more individuals every second, with deaths estimated to reach 40 million if untreated.<sup>1</sup> However, the accurate global number of those infected or dead from the disease is yet to be estimated or accurately counted.<sup>6</sup>

The COVID-19 pandemic has worsened health and social inequities with a greater impact on vulnerable and disadvantaged populations.<sup>3,7-22</sup> Because of the rapid spread of infection, health systems in many countries have been overwhelmed.<sup>7,9,13,16,19</sup> This challenge has led health care systems to consider health care rationing due to scarce resources and crisis capacity.<sup>5,8,10-16,18-35</sup> Unfortunately, poor planning, preparation, organization, and leadership

from some governments and health systems, including the failure to provide needed medical supplies, such as personal protective equipment (PPE) for nurses and others, expert human capital shortage and lack of crisis standards of care and ethical guidelines have worsened COVID-19 pandemic management.<sup>3,5,6,8,10-19,21,22,24-27,30-33,36,37</sup>

Many countries have employed various methods to control the spread of COVID-19, including travel restrictions,<sup>3,7,10,15,19,38</sup> immunity passport,<sup>7,9,38</sup> contact tracing,<sup>1,7,39,40</sup> quarantine,<sup>7,15,19,39</sup> and, at the extreme, lockdowns of cities, regions, and whole countries.<sup>1,3,5,7,9,15,39,40</sup>

Due to the lack of any effective vaccine or drug, there is a great and urgent need for research in all aspects of the COVID-19 pandemic, including understanding the virus, its treatment, vaccines, and other interventions such as population-level interventions and research into its socioeconomic impact.<sup>3,4,7,10,19,20,22,27,32,41,42</sup> Despite the speed of work, the majority of scientific studies have been rigorously performed, although some studies have been faulty and confusing.<sup>7,42</sup>

This review article aimed to explain ethical issues regarding five different areas: Health Inequity, Health Care Rationing/Triage, Contact Tracing Technologies, Data Privacy, Movement Restriction, Exit Strategies, and Research Ethics. Currently, we do not know how the pandemic will end because many countries especially low-

and middle-income countries are in the second or even third stage of the epidemic wave although there is great hope for the vaccine development. However, the net date of vaccine distribution is not clear. Also, the diversity and complexity of these ethical issues have led to increased uncertainty in all aspects of our lives.

## 2. Health Inequity

Health outcomes have always been distributed unequally in the wealthiest and the poorest of nations although COVID-19 has been suggested as a great equalizer.<sup>7</sup> This issue may be right because COVID-19 impacts poor and wealthy alike, however, we are to explain this issue in this section.

Unfortunately, the distribution of power, money, and resources systematically has a negative impact on some individuals and groups. This issue leads to avoidable differences in health outcomes, referred to as health inequity, within countries but also between countries.<sup>7,16</sup> Certain groups such as migrants, refugees, the unemployed, the homeless, those with limited access to basic health care, vulnerable population, and minority populations experience greater health inequities because they are exposed to multiple levels of disadvantages which place them at the greater risk of experiencing poorer health outcomes.<sup>3,5,7,8,10-13,16,21,22,25,29,32,35,37-39,42</sup>

During the COVID-19 pandemic, such groups are significantly more vulnerable as a result of the social determinants of health they are exposed to and the inter-related nature of their effects.<sup>7</sup> For example, the most basic and effective public health measures to reduce the spread of disease, social distancing, and hand hygiene may be impossible for millions.<sup>2,3,7,9,15,20,27,34,38,40,42</sup> A low level of life standards worsens health outcomes due to overcrowding and reduced access to sanitation and water which, during a pandemic, leaves millions exposed.<sup>7,15,20</sup> For example, COVID-19 clusters have been identified in relation to migrant workers living in crowded dormitories in Singapore. Due to this issue, the spread of the virus amongst these migrant workers has proven hard to control. Thus, the significant health and economic consequences of structural injustice have even threatened Singapore in control of the COVID-19 pandemic.<sup>7</sup>

Earlier on the COVID-19 pandemic, the urgent need to accelerate social distancing measures was inevitable. This issue leads to an accelerated rate of employment. Consequently, wealthy nations temporally provided some financial relief to reduce the negative effects of social distancing. Wealthy nations and citizens believe that social disadvantage has little to do with structural injustice; rather, it is the consequence of individual failure, inactivity, and unwillingness to contribute to society productively. However, we share in the continuation of this structural injustice. The embarrassment, loss of dignity, and stigma associated with receiving welfare are now being felt by people who could have never imagined the meaning of reliance on other people for survival.<sup>7</sup>

It has already been noticed that health inequities result in poor physical and mental health outcomes.<sup>7,12,16</sup> The incidence rate of African Americans with COVID-19 is disproportionately higher per population.<sup>7,12</sup> This issue is likely due to comorbidities recognized as risk factors for COVID-19 complications. For example, 56.25% of deaths in Louisiana were related to African Americans and only 34.34% of deaths were related to White Americans, while the African Americans comprise 32.7% of the population and White Americans comprise 62.9%.<sup>7</sup> In Chicago, 72% of those who have died of COVID-19 were African Americans, while only one-third of the population were African-Americans.<sup>12</sup> While black residents were about 23% of the residents of Cook County, Illinois, they account for about 70% of COVID-19 deaths.<sup>16</sup> In addition, this group was also at increased risk of exposure to the virus because they continue to work in high-risk frontline jobs and live in overcrowded places, contributing to the spread of COVID-19.<sup>7,12</sup>

Inequities affected children in the COVID-19 pandemic. In the current crisis, schooling is continuing remotely via the Internet in many countries. Schools play a key role in providing nutritious food. For instance, in the United States, many children receive free and reduced-cost breakfasts and lunches at school. In this crisis, these food supplies are not available. Consequently, disadvantaged children are at a further risk since they miss out on the one nutritious meal they used to have per day before the COVID-19 pandemic.<sup>7,26</sup>

Job and financial insecurity may be a barrier to seek timely medical assistance in cases where workers experience early symptoms of COVID-19. In countries, where universal health coverage was provided and where health insurance is accessible only via employment, seeking medical assistance may be diminished in many disadvantaged populations.<sup>7</sup> Also, immigrants and the undocumented populations seek medical assistance with delay due to fear of discrimination or deportation.<sup>16</sup>

The elderly are at particular risk in the COVID-19 pandemic. They may be under pressure of service to watch grandchildren in the wake of school closures, which leads to increased risk of exposure. In the disabled population, exacerbation of existing conditions may occur due to mobility issues, the inability of health aides to come to work, the inability to obtain life-giving supplies, and even the loss of face-to-face contact for those with mental challenges.<sup>6</sup>

There is an urgency to acknowledge and then address health inequities in the face of COVID-19, which affects millions of people's lives as they play out differently for different groups. Government commitment to decreasing health inequities is as important as improving the economic situation of the people after the COVID-19 pandemic. Also, addressing health inequities will lead to more robust economies, greater productivity, and greater social welfare.<sup>16</sup>

Unfortunately, the false dichotomy between public health

and the economy is a critical issue. In this situation, proper restructure and open up economies will be impossible. It is very important to understand that the health of populations and the economy of nations are intertwined and interdependent; a nation's health can collapse the most robust economies, as COVID-19 has highlighted, and the shutdown of economies can worsen health inequity and also ruin previously advantaged population' lives.<sup>7</sup>

### 3. Health Care Rationing/Triage

One of the most important and challenging issues during COVID-19 is numerous patients need intensive care which overwhelms even efficient health systems. In this situation, decision making is so difficult due to the allocation of scarce medical resources: Who should be admitted to intensive care unit (ICU)? Which patient should be intubated and need to be mechanically ventilated and so on.<sup>2,5,7,8,10,12-16,18-22,24,26-31,33-38</sup>

Resource allocation decisions during the COVID-19 pandemic are beyond the decisions related directly to patient care. Health officials have to make decisions about the allocation of PPE for healthcare workers. Also, hospital administrators should decide on the allocation of limited staff, especially as they are affected by the COVID-19 themselves. Allocation decisions should be considered in later stages of the pandemic or in stages of easing movement restrictions. For example, it has been proposed to perform serological tests in order to prove immunity to COVID-19 and allow people to return to work. If the capacity of testing is limited, a policy-maker should decide who undergoes such testing first. However, decisions about patient triage and other resource allocation that directly relate to lifesaving patient care, are possibly the most ethical decisions.<sup>5-7,10,11,13-18,21,24,26,27,29-37,43</sup>

There are clinical facts and indicators for making such difficult decisions. However, they alone could not resolve ethical dilemmas during the COVID-19 pandemic. During triage, we may decide to allocate a scarce medical resource, such as ICU beds, ventilators, drugs, or other treatment modalities to patients for whom using those resources has been confirmed. To make a right and consistent decision, we need guidelines. Some guidelines are available and there have been various attempts to develop these guidelines.<sup>5-7,10,12,13,16,21,22,24-29,31-33,35-37</sup>

It is necessary to recognize that these guidelines should consider ethical values and related conflicts. Many guidelines consider utility and equity under different labels. Utility means that we try to maximize the number of lives saved, while equity means that every patient should get an equal chance of receiving the life-saving care that they require. However, there is a challenging conflict between honoring these two values. For example, to maximize utility, we have to discriminate against patients with pre-existing medical conditions and older patients because these people have lower chances of recovery. Meanwhile, to consider equity perfectly, such discriminations were condemned and everyone should be given equal attention

regardless of pre-existing conditions and demographic features.<sup>5,7,10,12,13,18,21,22,24-26,29,34,35,37</sup>

There are resource allocation/triage guidelines, ethical framework, and other methods to overcome this dilemma in the COVID-19 pandemic.<sup>5,8,10,12,13,16,21,22,24,26,29,32-35</sup> For example, Jöbges and colleagues provided a comparative analysis of triage recommendations from selected national and international professional societies, including Australia/New Zealand, Belgium, Canada, Germany, the United Kingdom, Italy, Pakistan, South Africa, Switzerland, United States of America, and the International Society of Critical Care Medicine.<sup>22</sup> These issues have been considered as core principles including the importance of prognosis, patient's will, transparency of the decision-making process, and psychosocial support for staff, the role of justice, and benefit maximization. Other issues with a disagreement between guidelines were the role of survival versus outcome, long-term versus short-term prognosis, the use of age and comorbidities as triage criteria, priority groups, and potential tiebreakers such as 'lottery' or 'first come, first served'.<sup>22</sup> Despite these guidelines and ethical frameworks, however, adopting the right triage model is a difficult decision because no perfect model is available.

### 4. Contact Tracing Technologies and Data Privacy

Surveillance systems for infectious diseases could be responsible if adequate supports and structures are available. This can also be extended to protecting people's private information where practicable or limiting the share of private information is based on a 'need-to-know' strategy. COVID-19 pandemic due to being more urgent and devastating than previous outbreaks may lead to intruding into personal privacy via surveillance; however, this issue is limited by good governance and data protection protocols.<sup>7</sup>

One of the most effective ways to control the spread of the COVID-19 pandemic is tracing the primary and secondary contacts of confirmed COVID-19 cases using contact tracing technology and devices. This issue has prompted some countries and companies to develop contact tracing smartphone applications. These applications use location-based (GPS) or Bluetooth technology to trace the movements of individuals and could identify proximate contacts of infected individuals who might otherwise have gone unnoticed.<sup>1,2,7,39</sup>

These applications could benefit both the user (by helping pre-emptively identify personal COVID-19 risk) and society (by more efficiently identifying individuals who should be isolated). Extensive use of contact tracing apps could also help speed recovery from COVID-19, as part of a multilateral approach to 'open up' societies and economies while mitigating the risk of disease resurgence. This would require not only app-assisted contact tracing but also vigorous and widely utilized testing, with a rapid and coordinated response by public health officials to new cases.<sup>2,7</sup>

Other applications such as characteristic tracking apps

collect self-reported signs and symptoms to evaluate severity or the probability of COVID-19 infection. These tools may also be helpful when integrated into the contact-tracing process. Meanwhile, Singapore developed a mobile-based application called “Trace Together” to help responsible healthcare professionals to trace and identify infected individuals as well as those who have been in contact with them.<sup>1,2</sup>

While the contact tracing technologies during the COVID-19 pandemic could be beneficial in controlling the spread of infection, ethical and legal risks and considerations are discussed. These technologies and tools might result in getting access to other personal information and violate human rights, personal privacy, and informed consent. Public health authorities might perform intrusive public health interventions. The data breach is an important issue because of GPS and/or Bluetooth data generation and storage. Thus, these contact tracing apps must be established under conditions of trustworthy governance such as lawfulness, necessity, and proportionality in data processing that would prevent such violations and intrusions.<sup>1,2,7,39</sup>

For example, some people are concerned that national and local authorities could utilize these data with law enforcement to monitor purported contacts between those suspected of crimes. Also, they could track the activities of political dissidents in order to suppress any opposition. The private sector could use these data for commercial purposes and sell wellness products to individuals exposed to those diagnosed with COVID-19, or more generally develop consumer profiles and inform market analytics using location data.<sup>7,39</sup>

The uses of contact tracing apps are controversial due to several reasons. Firstly, using the data for other purposes destroys the reasonable expectations of those who download the contact tracing app in order to protect themselves and others around them from COVID-19. Apps’ terms of service that permit secondary uses of the data do not provide sufficient authorization of those uses because most users do not read those terms carefully. Secondly, secondary uses of these data could not be justified by population health promotion. Finally, those secondary uses are likely asymmetric. Privacy risks from contact tracing apps may be acceptable due to the great potential public benefits from their use, but other uses with less substantial benefit are more disputable.<sup>7</sup>

Efficient contact tracing in a time of COVID-19 pandemic has substantial social value and plays a critical justificatory role in the promotion of contact tracing apps. On the other hand, other uses such as criminal contact identification or even marketing could be valuable, however, this issue is substantially more limited than the value of contact tracing during the COVID-19 pandemic. Thus, dual use of these technologies during a pandemic will likely result in their failure. Furthermore, the general population may be afraid of sliding into a ‘surveillance state’ during a crisis such as the COVID-19 pandemic. Specific guidelines may eliminate

fears about illegal privacy-violating uses by national and local authorities but, essentially, trust or lack thereof will be an important factor for using these technologies and apps.<sup>1,2,7,39</sup>

### 5. Movement Restriction and Exit Strategies

Many countries have employed various methods to control the spread of COVID-19, including travel restrictions,<sup>3,7,10,15,19,38</sup> immunity passport,<sup>7,9,38</sup> quarantine,<sup>7,15,19,39</sup> and, at the extreme, lockdowns of cities, regions, and whole countries.<sup>1,3,5,7,9,15,39,40</sup>

Such strategies may negatively affect the wellbeing of individuals and population health during the COVID-19 pandemic. For example, the suicide rate may be increased; these strategies result in a negative impact on the economy, increasing social isolation, and decreasing access to support networks. Also, it has been proposed that these strategies may increase the risk of domestic violence, physical inactivity, internet and gaming addiction, and alcohol consumption. Although, these strategies are substantially beneficial to tackle the COVID-19 pandemic, decisions about when and how such strategies lift, need to consider both their benefits in reducing the spread of COVID-19 and their negative impacts on the economy and individual’s wellbeing as well as other strategies that could reduce negative impacts on individual’s wellbeing.<sup>3,7,9,10,15,19,38,40</sup>

How to return people to work or travel safely, is an important subject especially when performing lockdown in countries and cities. There has been discussion about the possibility of providing “immunity passports” for patients who have recovered from COVID-19 as well as —those who will be vaccinated in the future. The first country that tried to establish this issue is Chile. However, there is substantial uncertainty around immunity to COVID-19 worldwide. The duration of immunity after COVID-19 infection is unknown and may not be permanent like other coronavirus infections. At this time, serology tests result in various characteristics due to a substantial rate of false-positive and -negative results.<sup>7,9,38</sup>

Due to the uncertainty of immunity and reliability of serology tests, we must consider ethical issues in order to establish immunity passports. Unfortunately, the spread of COVID-19 probably continues for months, and our efforts to benefit society and our economies lead to another equity in the community due to the limited availability of tests especially for disadvantaged people. These vulnerable people who need to do more work than others have limited access to health services and must be supported.<sup>7,38</sup>

The development of a vaccine could be considered as a reliable exit strategy for the COVID-19 pandemic. As vaccine has a critical role in the COVID-19 recovery worldwide, intensive efforts have been made by various research teams. While there are currently several vaccine candidates in various stages of development, there has never been any authenticated coronavirus vaccine available. Also, immunity to COVID-19 may be naturally acquired and this issue leads to uncertainty that an effective long-

lasting vaccine will not be available at this time.<sup>4,7,27</sup>

Even if an effective and safe vaccine is successfully developed, there are some ethical considerations due to its scarcity at the beginning of its distribution. We need to decide how to prioritize its access. It has been revealed that high-risk groups such as the elderly and individuals with conditions such as asthma, diabetes mellitus, emphysema, or coronary heart disease are usually prioritized during regular influenza vaccination periods. This priority is based on relevant factors (e.g., greater exposure or vulnerability). Also, we need to consider frontline workers such as healthcare staff and first responders to get top priority in order to be able to continue servicing communities.<sup>7,12,16,20,24,35,38</sup>

Globally, wealthier nations benefit from the vaccine prior to poor nations and this issue may also result in inequitable distribution. Unfortunately, poorer nations need to protect a large population and have limited ability to fight the virus because they suffer from weakly developed health systems, poor living standards, and severe poverty.<sup>5,7,8</sup>

## 6. Research Ethics

There is a great and urgent need for research in all aspects of the COVID-19 pandemic, including understanding the virus, its treatment, vaccines, and other interventions such as population-level interventions and research into its socioeconomic impact.<sup>3,4,7,10,19,20,22,27,32,41,42</sup> Due to the global impact of COVID-19, interventions in the treatment and prevention of COVID-19 are widely supported. Biomedical research is an essential component of recovery from the COVID-19 pandemic. If an efficient vaccine was developed, we could prevent COVID-19 spread and save the lives of the worldwide population. In addition, we could decrease the need for movement restriction strategies which have had substantial negative impacts on the world economy and population health. Consequently, COVID-19 research has significant social value and justifying resource allocation to this area such as financial and human capital due to this critical situation and access to great social value is very crucial.<sup>4,7,27,42</sup>

It has been discussed whether we could establish the principles of research ethics a little easier. However, the basic principles of research ethics, including “Beneficence and Nonmaleficence”, “Fidelity and Responsibility”, “Justice”, and “Respect for People’s Rights and Dignity” should be carefully considered even in COVID-19 pandemic.<sup>3,4,7,20,22,27,32,41,42</sup>

To be adapted publicly to declared emergencies such as the COVID-19 pandemic, there are several methods. It has been recommended that it is necessary to develop preparedness plans for emergency research ethics review prior to the emergence of the crisis. This issue is crucially important, hence ethical judgments and logistics issues must be considered properly. In the absence of a preparedness plan for emergency research ethics review, one of the right regulations is to accelerate the ethics review of COVID-19 related research studies and protocols. Nonetheless,

despite time constraints during such emergencies, we must maintain the quality of ethics reviews. To accomplish this important issue, it may be necessary to train urgently institutional review board (IRB) members about the specific ethical issues raised in the context of pandemic research, to request an external expert to contribute to a coherent manner, or faculty members take executive actions where appropriate. Thus, the ethics committee may need more time, effort, and additional meetings in order to respond well to this accelerated review process. We should consider the usual appropriate ethics review. However, the approval process should be accelerated even at greater speed during an emergency if the level of risk to potential participants is low. Maintaining the independence during such emergencies is necessary; however, IRB members could receive support. One important function of regulatory stewardship of research is to provide mutual support, especially in times of crisis by stakeholders such as regulators and institutions.<sup>3,7,10,41</sup>

The global nature of the COVID-19 pandemic may modify the study design. The level of international collaboration and cooperation has been substantially increased in research and development. For example, WHO has suggested several vaccine candidates be tested in a single coordinated clinical trial called the ‘Solidarity Vaccine Trial’. This issue reflects the perspective that we are all affected by the COVID-19 pandemic and therefore we have to work in harmony to eliminate it.<sup>7</sup>

The COVID-19 pandemic may expose research participants to higher risks compared to normal conditions due to crisis adaptation. As is obvious to any researcher, clinical trials have four stages: phases I, II, III, and IV. Each phase has different requirements and objectives. Also, the sample size of each phase is different. Although some COVID-19 drugs are only effective in vitro, their safety has not yet been proven. Thus, the safety and efficacy of drugs or vaccines should be confirmed in phase I. Notably, the sample size of phase I is usually less than 100. In phase II, drugs or vaccines side effects are further investigated. Of course, the immune system response, proper dose determination, and consumption sequence should also be considered. In phase III, the effectiveness of drugs or vaccines is investigated. This staging could result in the protection of participants. Unfortunately, in the COVID-19 pandemic animal testing is not being performed completely because animal models of COVID-19 have not yet been revealed. The problem is to find an animal that reflects not only important dimensions of COVID-19 pathology but also a comparable immune response to the vaccine candidate. For example, it has been reported that in the United States, a phase I safety trial for a candidate vaccine has begun before animal models had been completed. In addition, the biosafety level of the laboratory should be carefully considered, which may lead to virus leakage. The COVID-19 pandemic has spread more rapidly than other pandemics such as Ebola and SARS and its mortality rate has also increased significantly. This critical situation may be considered as a reason to

tolerate higher risks for participants in order to accelerate drugs and vaccine developments. The most important issue is to study carefully the safety and efficacy of any drugs and vaccines in order to ensure the actual worthiness of any interventions offered on a large scale.<sup>4,7,27,41,42</sup>

An important potential problem that needs to be considered by IRB members is over-recruitment in public health emergency research. There are several concerns that research studies recruit more subjects than are needed to achieve a study's scientific aims. Because many researchers are eager to promote experimental treatments as widely as possible while gathering valuable research data. First, this issue may unnecessarily postpone the accomplishment of a study and the timely release of the information on an intervention's effectiveness or safety. Second, these research participants are exposed to serious and potentially risky research tests. Finally, this issue may worsen the weak supply chain of experimental drugs. Further restrictions on the supply of drugs used in clinical trials become a concern when the drug has already been approved for the treatment of other conditions and makes it difficult for patients to access these treatments. Supply restrictions may also violate the voluntariness of participation because participants agree to research interventions in order to get access to a hopeful intervention. IRB members have to evaluate carefully the accuracy of sample size estimation in order to promote ethical consideration.<sup>7</sup>

It has been recommended that IRB members consider adverse drug effects and the use of placebo in clinical trials. Researchers recommended that the higher the risk of death due to the virus, the lower the ethical concern about risks of adverse effects. Certainly, no vaccine is 100% effective and this issue is a challenging one. For example, the CDC reported efficacy for influenza vaccine between 19% and 60%. Thus, deliberate infection of individuals is another challenge due to the lack of approved drug or antibody therapy for COVID-19. Furthermore, if a drug is effective for COVID-19 patients, then randomization of patients to the control group, may violate the right to timely treatment. Even if the clinical trial is successful, it will lead to the loss of participants' benefits and even their lives. The main task of a physician is to cure patients as soon as possible, and it is not acceptable in terms of humanity to give blank or placebo treatment when there is no approved effective conventional treatment for critically ill patients. This issue increases the psychological burden of patients and the fear of disease, and also exacerbates the uncertainty of treatment. The experiment of the treatment group and the control group should be performed on the basis of routine treatment.<sup>4,7,41</sup>

Due to the urgent need to disseminate COVID-19 related studies as soon as possible, there is a significant release of pre-print or working papers without peer review process completion. Although pre-print papers benefit from the fast release of relevant findings during the COVID-19 pandemic, these findings may be prone to errors and mistakes that could be resolved by peer-review

## Review Highlights

### What Is Already Known?

There are four fundamental ethical principles: The principle of respect for autonomy, the principle of beneficence, the principle of nonmaleficence, and the principle of justice. These ethical principles have well been explained before. In this review article, we discussed the ethical issues raised during the COVID-19 pandemic.

### What This Study Adds?

COVID-19 pandemic is the most current life-threatening disease that affects health and economic sectors in the world. The ethical issues during the COVID-19 pandemic were raised due to the following: health inequity, health care rationing/triage, contact tracing technologies, data privacy, movement restriction, exit strategies, and finally COVID-19 research ethics.

process. Retraction Watch presents retracted articles as COVID-19 papers or pre-prints. Despite the speed of the work, the majority of scientific studies have been rigorously performed although some studies have been faulty and confusing.<sup>7,42</sup>

There is a significant political pressure to accelerate therapeutics drugs or vaccines due to public interest. This pressure is evident worldwide, especially in the USA. Although political pressure may also arise in a delicate manner, IRB members and researchers need to be careful and conscious and should apply their experiences of previous epidemics. To promote fairness and respect for people's rights and dignity in research projects during the COVID-19 pandemic, one of the most appropriate strategies is to systematically organize strong community participation in order to have a significant effect on study design and research practice.<sup>3,7,27,41</sup>

## 7. Conclusion

In this review article, we have tried to discuss ethical issues raised during the COVID-19 pandemic. It is necessary to provide clear and persuasive ethical justifications. The uncertainty we are facing now will be ended with updated ethical commitments.

We have to fight against health inequities and improve the economy in any case. We will remember any people especially health care providers who sacrificed their lives in this way (Health-Defending Martyrs) who could not be saved despite our best efforts to take care of them. We will console ourselves that we made moral, fair, and well-informed decisions. We will respect the scientists and their research facilitators and celebrate live-saving advancements. However, technology in crises can play an important role in promoting public health and preserving human lives, we should consider data privacy and respect human rights. Only after the elimination of this health and economic crisis caused by the COVID-19 pandemic, we

could properly evaluate whether we have adopted the right and fair strategies.

It has become clear to everyone that fundamental differences must be put aside and coherent cooperation and collaboration must be initiated in order to agree on global issues that affect human health, well-being, and survival. Given the current state of the world, now is the time to begin another way of living with COVID-19 and prepare for future epidemics and outbreaks.

### Authors' Contributions

All authors contributed equally to this study.

### Conflict of Interest Disclosures

There was no conflict of interest in this research.

### Ethical Approval

Not applicable.

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