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# Holistic strategies to mitigate the economic, societal, and health burden of the Coronavirus disease-2019 pandemic

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## 6.1 Introduction

Pandemics are not the unique features of modern civilization; epidemics/pandemics can be traced back to ancient civilization. History is replete with such pandemics (Huremović, 2019). Coronavirus first originated in Hubei province, China, in November 2019 and then manifested in Wuhan (Mas-Coma et al., 2020) but within a very short span of time it has spread like wildfire all over the world and its impact has been multifaceted. It is indeed an indication of the fact that we live in a truly globalized world. Due to the outbreak of Coronavirus disease-2019 (COVID-19), people lost their lives but due to the consequent lockdown, people lost their livelihood, and the economy is shattered (Nicola et al., 2020). Global GDP and trade experienced a huge contraction during the period of pandemic and the improvements to date are not worth mentioning. Actually, pandemic acts like a serial killer and its aftermath is devastating on human lives and the global economy (Clark, 2016).

While the infection has affected both wealthy and impoverished individuals, the implications of this pandemic are far from comparable. To control the virus's spread, several governments

have instituted house quarantines and lockdowns. Individuals' activity is naturally limited and regulated, and they are restricted to their residences. The consequences of these policies disproportionately harm women and children, daily wage laborers, and the homeless. It is the first time in decades that a pandemic has affected more than 200 countries. Although previous outbreaks such as Ebola and Zika have revealed highly gender-based effects, COVID-19 is no different (Ghoshal, 2020). As a negative societal impact of the lockdown established in reaction to the COVID-19 pandemic, a new public health crisis, specifically domestic violence, has evolved. Domestic violence is on the rise in many COVID-19 countries, including Germany, Italy, Brazil, China, the United States, and the United Kingdom. Several cases of domestic violence were reported in India during the lockdown period (Das et al., 2020).

With continuation to economic and societal impact, COVID-19 is a major public health calamity that has impacted millions of people worldwide. Severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) is responsible for the COVID-19 pandemic. The SARS-CoV-2 is a single-strand RNA virus with animal origin. The human form of the virus shows 96% genomic similarity to the bat Coronavirus (Zhou, Yu, et al., 2020) (Gorbalenya et al., 2020). SARS-CoV-2 affected over 5 million individuals and caused 337,000 deaths worldwide thus indicating its pathogenicity and lethality (Akande & Akande, 2020). According to World Health Organization (WHO) till August 2021 more than 200 million people have been infected by the virus killing more than 4 million worldwide. In India alone, more than 31 million cases and 0.4 million deaths have been reported. These numbers are always on the rise as the pandemic continues throughout the world. Though the virus is believed to have zoonotic origin currently human to human transmission is the primary mode of transmission mainly through droplets and fomites, through fecal shedding (limited number of cases) or may be transmitted through air, while aerosol-generating procedures are conducted in healthcare settings (Akande & Akande, 2020). There have been reports for asymptomatic as well as symptomatic transmission with a median period of 20 and a maximum period of 37 days for viral shedding (Zhou, Yang, et al., 2020). The average incubation period of the virus is 2–7 days up to 14 days (Akande & Akande, 2020). Each person has been found to be consistently sensitive to getting an infection from another affected person, regardless of sociodemographic parameters (Park et al., 2020). The disease impact is so great that it has affected every healthcare system around the world, from developed countries like Western Europe and the United States to developing countries. The COVID-19 pandemic has also impacted health services in Southeast Asia, Africa, and South America, especially in low- and middle-income nations (Di Gennaro et al., 2020). The multifaceted nature of the COVID-19 pandemic is unique, particularly with special reference to the economic, societal, and health burden.

## 6.2 Multifaceted effects of Coronavirus disease-2019 on global economy and cushioning strategies

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### 6.2.1 Global economy and Coronavirus disease-2019

Researchers around the globe are continuously working toward gauging the economic impact of the current pandemic situation and possible future consequences that the

world economy is going to face in the years ahead. Previous experiences of the pandemic situation and the mitigating strategies implemented are also being evaluated by the researchers and policymakers to absorb the shocks thrown by the deadly virus and to move forward by combating its devastating power. In the context of today's integrated world, the economic impact of COVID-19 on different sectors is interrelated and the problems are globally interconnected. The main economic impact of the deadly virus is primarily threefold. Firstly, lockdown in different areas of the world has reduced production to a huge extent. Secondly, the global slowdown in economic activity and restrictions on product movement hinders the supply chain resulting in market disruption, and thirdly, the fearful and uncertain economic environment made potential investment very risky putting monumental pressure on firms and financial markets (Bachman, 2020). On the agricultural front, because of global trade disturbances, farmers across the world are facing a shortage of seeds, fertilizers, and other agricultural inputs. Due to travel restrictions, the availability of agricultural laborers dropped significantly. All these are posing serious threats to the food distribution and food security of nations across the world. Apart from crops, other primary sectors like livestock, fishery, etc., also faced harsh economic consequences by the pandemic situation. Migrant, seasonal, and informal agricultural laborers are deprived of jobs which considerably reduced the demand for food and other articles (Poudel et al., 2020). Another important area of the primary sector is the oil and gas sector. The negative demand wave, due to economic crisis and disruption in the global supply chain, made oil price negative (US\$ 36.98) on April 20, 2020 for the first time in the history of the world. The recovery in oil prices started from May 2020 but the prepandemic period price level has not been reached to date. Consequently, a strong negative impact on the economy of oil-exporting countries like Russia, Saudi Arabia, Nigeria, etc., has been noticed (Padhan & Prabheesh, 2021; Vidya & Prabheesh, 2020). These countries faced a severe reduction in oil revenue, stock market crashes, and volatility in the financial market (Padhan & Prabheesh, 2021). However, looking at the brighter side, crude oil being the key ingredient of different industries, fall in oil prices may reduce production costs and increase economic growth (Filis, 2010). Thus, falling oil prices are beneficial for net-oil importing countries and detrimental for net-oil exporting countries. Based on field analysis it was found that pandemic greatly affected the manufacturing industry also by creating problems in acquiring raw materials and thereby a stoppage in production. Unstable prices of inputs triggered the problem in product pricing. The sales declined drastically resulting from the significantly reduced purchasing power of the consumers. The magnitude of the problem is so grave that even the sustainability of many manufacturing industries has been challenged (Sulistiyan & Riyanto, 2020). The common belief about a boom in the pharmaceutical industry due to the rapid outbreak of the disease was also denied in research works and it was found that the pandemic posed considerable challenges to the health sector, including the pharmaceutical sector (Ayati et al., 2020). Among different sectors, the service sector is the worst hit, with few exceptions, from the catastrophic effects of the virus. Different industries belonging to this sector like tourism, airlines, public services, education, to name a few, have faced hard set back due to lockdown situations and panic created by the pandemic. Companies belonging to these sectors are facing vital challenges for their survival throughout the world. However information technology sector,

now being considered a rescuer in many situations, has different experiences in some cases and it can play a pivotal role in the sustainability and growth of the firms belonging to the service sector (Xiang et al., 2021). If we look toward the financial market, it has been observed that COVID-19 has augmented global financial risk and hence global financial market got adversely affected (Al-Awadhi et al., 2020). Empirical research showed that during the initial phase of the COVID-19 trauma, due to high uncertainty in the economic environment, investors preferred funds where risks related to environmental, social, and governance (ESG) are low (Ferriani & Natoli, 2020). The pandemic situation negatively affected the returns in the stock market worldwide due to uncertainty and hence hindered investment, project funding and also created a liquidity crisis. Empirical evidence clearly indicated that the COVID-19 pandemic affected stock market performance negatively (Harjoto et al., 2020; Padhan & Prabheesh, 2021). This pandemic has a definite and significant impact on costs of capital for the survival of firms and potential investments, pension planning and insurance for common people, the Government's role in protecting the financial system, etc., (Goodell, 2020) which have also exerted significant pressure on the global economy. COVID-19 is the reminder of the catastrophic times of World War II because ever since then we have witnessed the magnitude of economic crises we are experiencing now. Researchers have also been alarmed at the present economic stalemate which has plunged the economies the world over, into a deep abyss. COVID-19 has led to disruption in entrepreneurship and has thrown different unprecedented challenges to the economy. However, its absolute impact is still unclear, and hence in-depth longitudinal studies are needed to investigate and analyze the issue in a better way (Meahjohn & Persad, 2020). From the foregoing section of the discussion, it is quite clear that COVID-19 effects are multifaceted on the global economy. It has created obstacles in agricultural and industrial production and considerably restricted the operations of service sector industries. All these phenomena significantly reduced the GDP of different countries all over the world. Problems in the oil and gas sector have created instability in the world economy. People are gradually losing jobs and their purchasing power is declining continuously. The level of poverty in many countries is alarming. Passengers for air travel both at an international and domestic level reduced drastically and its catastrophic effects on earnings of airlines industries are challenging even for the survival of many companies belonging to this industry. Lockdown situations and panic among people have thrown an unprecedented challenge before the tourism industry and its associated sectors. Stock markets across the world have witnessed severe crises worldwide. Though some stock market indices are flashing intermittently with upswings, showing signs of recovery, fundamental correction in global indices will take place only with improvement in the conditions of basic sectors of the economy. To tackle all these problems appropriate economic strategies must be adopted by governments of different countries.

### 6.3 The policy supports across the globe

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Economists all over the world are providing policy suggestions and their suggestions are multidimensional and multifaceted. The policies to be adopted must be inclusive, resilient,

and flexible. Different agencies like IMF, ILO, World Bank, OECD, etc., and organizations like McKinsey, Deloitte, etc., are also working through their advisory support to different countries and through their own publications. Different economic policies like monetary policy, fiscal policy, macroprudential regulations, etc., have their own strengths and weaknesses. So a SWOC (strength, weakness, opportunities, and challenges) analysis must be done before adopting any particular or combination of strategies. An empirical examination of the impact of social distancing policies on economic activities and stock market indices revealed fiscal policy spending had a positive impact on the level of economic activities. Fiscal policy spending appeared to be more effective than monetary policy. Most of the countries especially the advanced ones have started to implement bail-out packages, combining with the different fiscal and monetary measures to bail out their economies. Obviously, that leads to a sudden upsurge in countries' fiscal deficit as well as a debt-GDP ratio (Lacalle, 2021). Liberal monetary policies adopted by central banks of different countries may aggravate inflationary pressures which may worsen macroeconomic stability in the short term (Ozili & Arun, 2020). It has been observed that developed countries have announced larger fiscal support than developing countries. During the pandemic, the country's credit rating has turned out as most important determinant of its power to fiscal spending (Benmelech & Tzur-Ilan, 2020). The government's fiscal and monetary support should be combined with proper measures for increasing supply. Reallocation of spending with tax exemptions and tax deferrals can also help significantly in this crisis. Thus to speed up the recovery process from the gloomy effect of the pandemic a combination of demand and supply-side measures will be more effective (Lacalle, 2021).

## 6.4 Reflection of the crisis

In this context, if we analyze and compare the GDP growth rate, fiscal deficit, and public debt burden of different countries before the COVID-19 period and after the COVID-19 period, we shall be able to make some recommendations to tackle and address the issues of global economic problems. Almost all the governments came up with stimulus packages in terms of different fiscal and monetary support to mitigate the unprecedented detrimental impact of the COVID-19 crisis on societies and economics. On the one hand, the government's revenues have come down drastically and on the other hand, a huge upsurge in government expenditure suddenly has resulted in an increasing fiscal deficit. Contraction in the GDP of almost all the countries is the repercussions of the inertia in the economic sphere that accompanied the upsurge in the debt-GDP ratio. Here, we have tried to analyze the data of the general government fiscal balance from 2016 to 2026. We can see that the worldwide fiscal deficit was more or less the same from 2016 to 2019 but it has increased thrice from 2019 to 2020. In the case of advanced economies also, four times increase in fiscal balance took place from 2019 to 2020. As the advanced economies allotted huge funds to revive the economy immediately after the COVID-19 crises, the fiscal deficit is much higher in comparison to emerging market economies and lower-income developing countries. An exceptional trend is also noticed in the graphical presentation for oil-producing countries as these countries faced the hardest setback in their economic activities. In Fig. 6.1, we have plotted actual data of 2016–20 and the projected data from 2021 to 2026, and the graph

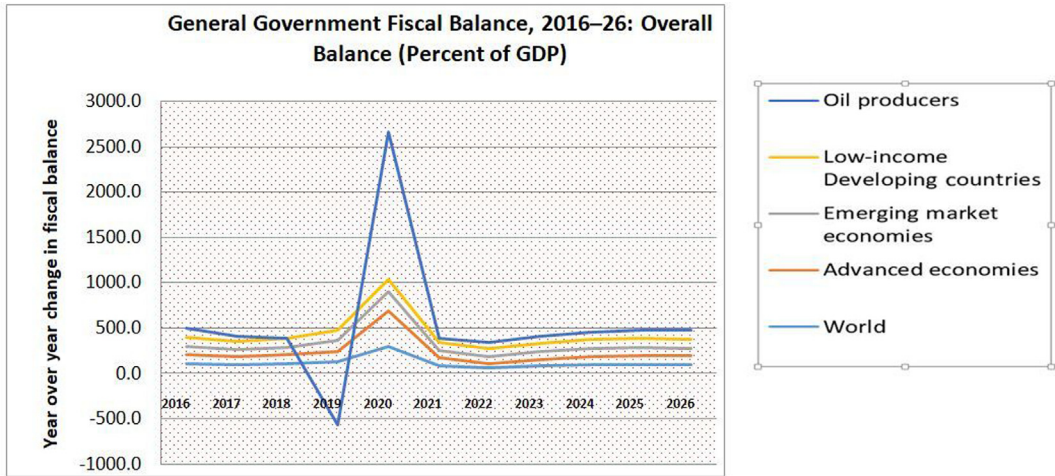


FIGURE 6.1 Fiscal crisis and Coronavirus disease-2019: Global reflection. Source: Data from IMF staff estimates and projections.

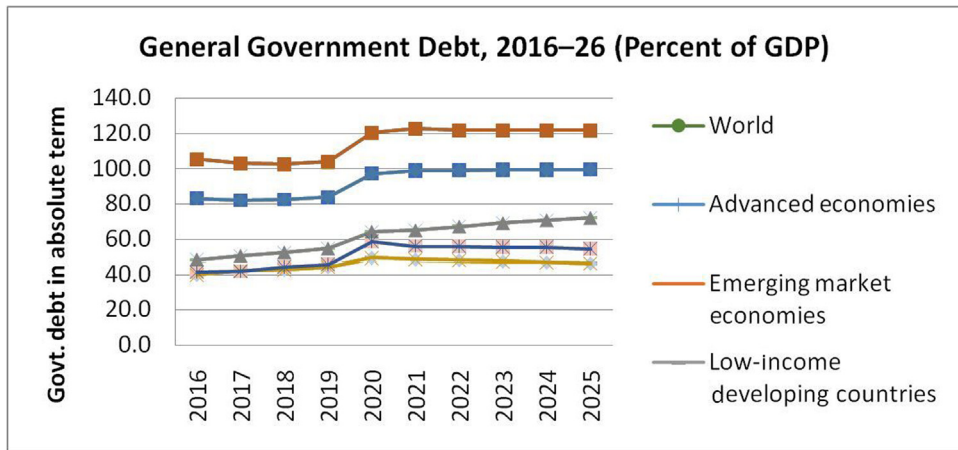


FIGURE 6.2 Burden of public debt on the wake of Coronavirus disease-2019: Comparisons and projections. Source: Data from: IMF staff estimates and projections.

clearly depicts that despite the different measures taken by the government to bring back the economy on track still it will take time to bounce back and additional measures should be taken.

Fig. 6.2 also depicts those conditions of less developed and net oil-importing countries are worse than advanced countries. However, the possibility of getting caught in a debt trap for all the countries is evident.

## 6.5 Ways to survive, strive, and thrive

Based on our study and analysis, we think the following measures will be very helpful for a steady recovery of the global economy and these measures will also help to absorb future shocks. Here at first, we shall make some sector-specific recommendations, and then we shall make some general recommendations for the global economy. At the outset for the primary sector, the agricultural subsidy should be increased and the minimum support price of the products should be ensured at least in the coming five years to augment the purchasing power and to incentivize agricultural production. Here the problems of agricultural laborers can be given some relief by cash transfer to the deprived and training should be provided for alternative employment opportunities (Singh et al., 2020). Oil and Gas exporting countries, being the main beneficiary of this sector, should have better coordination and cooperation among them to frame appropriate policies to recover from the situation. Considering the situations of the secondary sector it may be suggested that more Infrastructural support should be provided to remove the hindrances in the supply chain for raw materials and laborers. For that purpose road tax, toll tax, etc., may be waived temporarily. Traveling allowance should be given to industrial workers so that they can come back to their workplace. Subsidized Bank loans, tax holidays, subsidies in electricity, etc., should be provided to increase production. Steps should be taken to improve the distribution network of the final products also. Corporate houses should cut dividends and should spend the money for developing the production system and building up other preventive facilities. Problems of the power sector should be mitigated on an emergency basis and this calls for a liberal government policy toward this sector. For tertiary sector firms, the government should provide technology-based support to these industries so that their service remains uninterrupted even in a pandemic situation. In fact, adequate steps should be taken to strengthen technology-based infrastructure (Aguinis & Burgi-Tian, 2021). To facilitate a speedy recovery greater emphasis on sectors that generate greater employment potential and which have to bear on the growth of other sectors like tourism and hospitality, aviation industry, etc., should be placed. As general recommendations, it may be said that more coordination between Central Banks and Finance Departments of governments is required at the time of framing macroeconomic policies. Creating an inclusive economy that will take into cognizance the role of private along with the public sector to broaden employment opportunities, giving the economy a broader footing with solidarity amongst different sectors of society. Fiscal and industrial policies should be framed to ensure further growth of equity and stability. Advanced countries should lend a helping hand to developing countries to overcome the repercussions in the form of fiscal deficit resulting out of bail-out packages (Dean et al., 2021; Makin & Layton, 2021). More emphasis should be placed on innovations and inventions to generate steady growth of production and employment. Government should make stringent laws so that retrenchment does not take place during the pandemic. This will also increase the purchasing power of the economy. Quality education should be supported during this crisis situation. Special emphasis should be given to skill-based education which can generate employment and tap the favorable demographic profile of countries, like India. For this purpose, there is a need for training, career guidance, apprenticeship,



up-skilling, reskilling, and other labor market policies and partnerships that facilitate successful labor market transitions and reduce skill mismatches gaps and shortages including for the low skilled and the long-term unemployed. In developing countries, the digital divide between the rich and poor and the urban and rural have been very badly exposed during the pandemic. This must be cured through sufficient budgetary allocation by the governments to have inclusive growth (Gupta et al., 2021). Finally, it may be said that combination and coordination among different policies are required to get rid of the devastating effects of the pandemic. Coordination of economic policies and cooperation among different countries is the need of the hour.

## 6.6 Societal impact and diminution strategies to mitigate Coronavirus disease-2019 pandemic burdens

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### 6.6.1 Understanding of the societal impact of the Coronavirus disease-2019 pandemic with special reference to domestic violence

Research groups are continually assessing the societal impact of the COVID-19 as well as the potential future implications that society may face in the coming years. The COVID-19 is a huge public health threat since it restricts food access, educational options, health-care access, and local business opportunities, all of which can lead to increased stress and discontent among people. The outbreak of COVID-19 has major social implications (Lee et al., 2021). COVID-19 global pandemic has had a one-of-a-kind impact on many aspects of human life. Many sectors have been impacted by the recent social and economic downturn, and millions of people have been displaced globally. With almost 1.52 billion children at residence and nearly 60.2 million teachers absent because of the pandemic, schooling is amongst the most impacted sectors of the education system. During the isolation situation, millions of schools and institutions have transferred their physical classrooms online to ensure that students' "learning is never interrupted" (Ali et al., 2021; Sokolovskaya, 2020). Domestic violence was a worldwide problem before 2020, and measures enacted by governments around the world to combat the COVID-19 virus, such as lockdowns and stay-at-home restrictions, may have aggravated the situation (Porter et al., 2021).

Since the onset of COVID-19, the latest figures and reports from people on the front lines suggest that all sorts of violence against women and girls, notably domestic violence, has escalated. Domestic violence is defined as threatening and using physical, psychological, or emotional animosity against another person in order to damage them or exert authority and control over them. The victim's intimate partner, husband, previous intimate partner, family member, friend, or acquaintance from the victim's "home environment" is the offender. Those who maintain friendly touch with the victim and meet her in a home environment are considered family friends or acquaintances. Domestic violence is defined by the closeness of the offender's relationship with the abused victim, regardless of whether the victim lives in the same household as the perpetrator. The most common type of domestic abuse is gender-based violence (Flury et al., 2010).

## 6.7 Causes of increasing domestic violence in lockdown phase

Many victims of violence against women (domestic violence and child abuse) appear to be in the midst of a “worst-case” scenario in which they are locked in their homes with a violent perpetrator for an extended period of time with little or no access to the outside world. Domestic violence perpetrators typically isolate their victims as a form of dominance or to decrease the chance of abuse disclosure, and present societal conditions are likely to amplify the impact of such behaviors. Victims’ ability to seek aid electronically may be hampered by perpetrator-imposed restrictions and constant monitoring of social networking sites, the online world, and smartphones (Campbell, 2020). Stress levels that are elevated as a consequence of restrictions, unemployment, financial troubles, an increase in related to substance use, exacerbation of preexisting depressive disorders, and the onset of new mental disorders could all lead to such violence. Lockdowns also heighten tension and boredom, leading to many turning to drink to cope. However, in those with personality problems, this may exacerbate anxiety, depressive symptoms, and violence. Women who live in rural locations are more likely to be abused by their intimate partners. Factors other than a low education level, younger person, present unemployment, particularly among daily wage workers, increased commitments owing to children staying at home due to school closing, and higher family problems may increase vulnerability to husband abuse (Joseph et al., 2020).

### 6.7.1 Domestic violence reports have increased during the Coronavirus disease-2019 pandemic

According to news sources, domestic violence is growing more widespread around the world. As a result of China’s shelter-in-place policy, domestic violence is claimed to have escalated. In addition, domestic violence reports in France have grown by 30%, while Brazil expects a 40%–50% increase, and Italy has seen an increase in domestic violence reports. A tragic domestic violence-related killing has been recorded in Spain, continuing a trend that, sadly, is expected to continue around the world as stress levels rise and shelter-in-place procedures are increased. According to numerous organizations, domestic violence is also on the rise in the United States. Victims suffer a high risk of emotional and physical discomfort, as well as bodily harm. Domestic abusers in the United States have been accused of using COVID-19 as a weapon against their victims, refusing to wash their hands to instill terror in the victim, and threatening to reject medical treatment if the victim got the virus (Campbell, 2020). According to a new Peruvian study based on administrative information on phone calls to a domestic violence helpline, domestic violence against women increased by 48% between April and July 2020. According to the findings, the implementation of the COVID-19 stay-at-home restrictions has resulted in an increase in physical domestic violence in Peru by 8.3% of the sample. Peru is also a country with a historically high rate of intimate relationship and family violence, according to pre-pandemic data. Peru was placed 22nd out of 154 nations for lifetime experiences of intimate partner violence among women aged 15–49 in global research done by the WHO (Porter et al., 2021). According to numbers released by the National Commission for Women

(NCW), India in early April 2020, there was a 100% increase in complaints related to violence against women during the statewide lockdown in March 2020 (Vora et al., 2020). In April and May, domestic violence accounted for 47.2% of all occurrences reported to the National Commission on Women, while other natural sexual offenses were reduced (Joseph et al., 2020). In the first week of the pan-India lockdown, the NCW in India received 58 complaints, more than doubling the number of complaints received on a weekly basis. Punjab had the highest recorded incidence of domestic violence during COVID-19, according to the NCW chairperson. However, because the Chairperson received all 58 complaints via email, she is concerned that the true number, which includes women who do not have access to email and are unable to utilize the postal system owing to the lockdown, may be significantly higher (Ghoshal, 2020). Domestic abuse affected 4249 women and 456 children in 27 of Bangladesh's 64 districts in April 2020, according to a recent Manusher Jonno Foundation (MJF) report. The victims included 1672 women and 424 children, many of whom were witnessing violence for the first time. The loss of work as a result of the COVID-19 lockout has dissatisfied men. To vent their rage, some men may attempt to humiliate their wives. As part of the study, the MJF questioned roughly 53,340 moms and children in May 2020. According to the data, 2085 women have been physically assaulted, 4947 have been mentally tortured, 404 have been sexually abused, and 3589 have been exposed to financial restraints imposed by their spouses. According to another survey, 107 women were murdered by their spouses between January and June 2020, but only 74 complaints were made. The husband's family murdered 30 women, while their own family murdered another 26. Only 33 cases were filed (Sifat, 2020).

## 6.8 Strategies to mitigate Coronavirus disease-2019 related societal problems

Financial independence is required for domestic violence prevention. Financial entanglements with abusive relationships are too difficult for many domestic abuse victims to break free from without a backup source of income. As a result, economic self-sufficiency is vital. During the pandemic, there may be additional impediments to reporting domestic violence. Some precincts require in-person visits, while others offer online services. Individual trial courts can also choose how restraining orders are filed. People may be hesitant to seek legal help if there is no acceptable and consistent process for reporting abuse. As a result, the reporting system must be as straightforward as possible, and it will be carried out both online and offline. If abuse is revealed, the doctor and patient can use telemedicine consultations to set up signals to detect the presence of an abusive partner. A raised fist during a video conference or prerecorded phrases during an audio dialog are examples of such signals. Clinicians can review safety practices like deleting Internet browsing history or texts and emails, saving hotline information under other listings like a grocery shop or pharmacy, and creating a new, confidential email account for receiving resource information or communicating with clinicians when it is safe to discuss domestic violence (Evans et al., 2020).

In the darkest of times, it's a shoulder, a hand, or an emotional response that needs to be acknowledged and cared for. Where face-to-face individual sessions are not possible in

the current situation, these services must be provided to vulnerable and needy populations via telephone, online, or other virtual methods, for which necessary pamphlets or leaflets for mental health promotion and human rights protection could be prepared and distributed via social media. Nongovernmental organizations and civil society will also play a crucial role in giving assistance. Domestic violence prevention can be promoted by the government as an “important service,” raising the stakes. The COVID-19 outbreak may provide another opportunity to rethink and review the holes in our domestic violence prevention and treatment before it’s too late (Nair & Banerjee, 2020).

## 6.9 The health burden of Coronavirus disease-2019 pandemic and amelioration strategies

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### 6.9.1 Disease burden of Coronavirus disease-2019

Every individual irrespective of their sociodemographic factors have been found to be equally susceptible to contracting the disease from another infected individual (Park et al., 2020). The disease burden is so high that it has affected every healthcare system all across the globe from developed nations like Western Europe and the United States to developing nations like India and countries of Southeast Asia and less-developed parts like African nations. Every nation faced a shortage of medical equipment, inadequate hospital bed spaces, ICUs, respiratory ventilators, personal protective gears like gloves, masks, and PPE kits, and above all inadequately trained healthcare workers (Armocida et al., 2020; Odone et al., 2020; Moatti, 2020; Hunter, 2020; Ranney et al., 2020). Patients had to be prioritized for ICU beds and ventilators based on their survival chances when adequate equipment became insufficient. During the second wave of the pandemic, India faced inadequate oxygen supply to hospitals leading to increased mortality among diseased individuals. The COVID-19 pandemic has also affected health services especially low- and middle-income nations of southeast Asia, Africa, and South American countries. HIV, TB, and malaria programs have been badly affected (Di Gennaro et al., 2020). While services for noncommunicable diseases like hypertension, cardiovascular disease, diabetes, and related complication, cancer have also been disrupted. While maternal health, infant mortality, and child health-associated mortalities have also increased due to a lack of fund allocation to maternal and child health services as a result of the pandemic (Roberton et al., 2020).

## 6.10 Post-Coronavirus disease complications

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Although most people recover from COVID within a week or two some individuals experience post-COVID complications which may also impact the health burden of the individual (Carfi et al., 2020; Menges et al., 2021). These complications listed below can vary among individuals:

1. shortness of breath;
2. fatigue;

3. symptoms that get worse after physical or mental activities;
4. difficulty concentrating also referred to as brain fog;
5. cough;
6. chest or stomach pain;
7. headache;
8. palpitations;
9. joint or muscle pain;
10. pins-and-needles feeling;
11. diarrhea;
12. irregular sleep cycle;
13. occasional fever;
14. lightheadedness;
15. rash;
16. mood changes include a feeling of anxiety and restlessness;
17. change in smell or taste;
18. menstrual changes;
19. individuals suffering from severe illness may experience autoimmune conditions affecting multiple organ systems;
20. some individuals may also experience multisystem inflammatory syndrome where different parts of the body of the individual get inflamed after COVID infection; and
21. individuals requiring prolonged hospitalization may suffer from postintensive care syndrome (PICS) due to prolonged stay in ICU. PICS include severe weakness, inability to concentrate and think properly, and posttraumatic stress disorder as a reaction to a stressful event.

### 6.11 Coronavirus disease-2019 and mental health

SARS-CoV-2 not only impacts the respiratory system, but its effect may extend to the central nervous system of the infected individual. Several factors may associate COVID-19 and neuropsychiatric changes, which include fear of the disease, adverse effects of treatments, financial stress, and social isolation (Raony et al., 2020). Olfactory nerve damage by SARS-CoV-2 may be responsible for anosmia or loss of smell one of the characteristic features seen in the early stage of COVID-19 (Lee et al., 2020). The global spread of SARS-CoV-2 may impact the pathogenesis of neurodegenerative disorders. Peripheral Immune response against the virus can result in excessive inflammation including cytokine storm which may impact the progression of neuroinflammatory neurodegenerative changes, especially in the elderly who are again more prone to SARS-CoV-2 infection and its severe outcomes (Heneka et al., 2020). SARS-CoV-2 like other Coronaviruses is likely to show peripheral immune response while its infection to the peripheral and central nervous system may determine its effects on impaired mental health. With the continuation of the pandemic, its spectrum of neurologic manifestations is likely to broaden.

## 6.12 Mitigation strategies to ameliorate the Coronavirus disease-2019 health burden

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Currently, vaccination against the virus is believed to be the primary means to prevent the spread of the disease. However, due to the low availability of vaccines and lack of adequate facility and manpower for mass vaccination nonpharmacological measures are being employed to prevent the spread of the virus. The primary measures include wearing a mask, hand sanitization, and maintaining physical distancing. The virus not being airborne, physical distancing is believed to be one of the most effective ways of preventing its spread from one individual to the other. It involves keeping at least 6 feet distance among individuals and avoiding social gatherings and crowded places (Zhang et al., 2020). Since the virus can also spread from asymptomatic undiagnosed infected individuals physical distancing becomes a very effective way of preventing the spread of the disease and the magnitude of the pandemic peak (Sanche et al., 2020; Prem et al., 2020). COVID-19 is primarily transmitted when contaminated hands come in contact with the mucosa of the eye, nose, and mouth thus maintaining hand hygiene as a major way of preventing transmission. Washing of hands with soap for more than 20 seconds and use of hand sanitizers (70% alcohol) upon unavailability of soap and water is the most effective practice to prevent oneself from getting infected by the virus. Proper and mandatory use of masks has successfully reduced the spread of the virus in most countries (Golin et al., 2020). Masks worn incorrectly and being constantly touched from outside increases the chances of infection for individuals (Kenyon, 2020). While robust testing facilities also form an important component for the diagnosis of diseased individuals. The WHO has clear guidelines for monitoring the spread of the disease, identifying new cases, and recording epidemiological evidence. They are also responsible for providing case definitions, methods for laboratory testing, and formats for reporting test results that could be used for surveillance. These guidelines formed the basis of COVID-19 testing and surveillance programs for different countries throughout the world (Akande & Akande, 2020). One way of preventing the spread of the disease is by quarantining the infected individuals. It is the process of isolation, allowing limited activity of asymptomatic or symptomatic diseased individuals who might have been exposed to the virus. It is also a measure to monitor the diseased individual and serves as one of the early disease detection methods. Timeliness and proportion of quarantine in a certain population can effectively contain the spread of infection (Koo et al., 2020). However, the extent to which a large population can be quarantined depends on various socioeconomic, cultural, and infrastructural factors. To prevent the spread of the disease different strategies are being implemented globally primarily based on the health system capable of that particular region. Already existing healthcare structures play a major role in determining the feasibility of such measures. Nations, where the majority of citizens can afford a good standard of living have equal access to health care systems like teleconsulting, emergency ambulance services, transportation from home, which could be safely isolated at their homes and was found to be an efficient option in containing the spread of the disease. However, countries or regions lacking these facilities had to depend on a

TABLE 6.1 Potential therapeutic interventions against severe acute respiratory syndrome Coronavirus-2.

Drug class	Name
Antiviral	Remdesivir, Lopinavir/ritonavir, Favipiravir, Oseltamivir
Antiprotozoal drugs	Hydroxychloroquine, chloroquine, nitazoxanide
Immunoglobulin therapies and immunostimulants	Convalescent plasma, BCG vaccine, Levamisole/Isoprinosine
Vaccines in use	Covishield, Moderna mRNA-1273, Sinovac, Sputnik-v, Janssen Ad26Cov2S, Covaxine
Biologicals	Tocilizumab, Canakinumab, Siltuximab, Lenzilumab, Ravulizumab, Sarilumab
Kinase inhibitors	Imatinib, Baricitinib, Ruxolitinib
Antibacterial drugs	Azithromycin, Amoxicillin/Clavulanate
Cardiovascular drugs	Telmisartan, Sildenafil citrate, Losartan, Simvastatin, Enoxaparin, Aspirin, Nafamostat mesilate
Other agents	Naproxen, Colchicine, Isotretinoin, Levamisole, Ivermectin, Almitrine Anakinra Tacrolimus, Deferoxamine, Famotidine
Herbal remedies	Turmeric, Neem, Giloy, Tulsi, Chirata

Note: Presently marketed vaccines and drugs under trial are listed in the table.

Source: Adapted and modified from Keni, R., Alexander, A., Nayak, P.G., Mudgal, J., & Nandakumar, K. (2020). COVID-19: Emergence, spread, possible treatments, and global burden. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.00216>.

centralized system that pulled resources to designated centers for the treatment of moderate to severe cases (Akande & Akande, 2020). Currently, mass vaccination programs have been initiated in most countries and various drugs are also being tried on COVID-19 infected individuals or are under clinical trial (Keni et al., 2020). Some of the currently marketed vaccines and drugs under trial are listed in Table 6.1.

### 6.13 Futuristic approaches and conclusion

In the history of mankind, human civilization witnessed several epidemics and pandemics like the Athenian plague (430 BCE), Antonine Plague (165), Black Death (1334), the Spanish Flu (1918), SARS (2003), Ebola (2014), etc. (Huremović, 2019). These epidemics made a huge impact on human lives and livelihood. Fortunately, each time human civilization successfully overcome these tough times through proper strategies. We hope COVID-19 will also not be an exception. COVID-19 is an eye-opener. It points to the fact that we are not well prepared socially, economically, and medically to meet such exigencies of the pandemic which may resurface in the future too due to environmental degradation and loss of biodiversity. Early prediction of future pandemics will help us get prepared better. Microsoft Premonition is such a tool for monitoring the environment to detect impending disease threats using robotics and genomics. It helps in identifying the

virus, bacteria, and other organisms in the environment to determine transmission patterns and the possible spread of diseases ahead of time.

To tackle the pandemic situations in the future proper coordination between fiscal policy and monetary policy are required to absorb the financial shocks on different sectors of the economy. Policymakers should stress proper macroprudential policy and legislation to safeguard the whole financial system. 21st century Financial technology (Fintech) which integrates different technologies like AI, Blockchain, etc., should be utilized more extensively for safeguarding and faster growth of different sectors of the economy. Special emphasis should be given to skill-based education to generate employment in a relatively short period of time especially in countries, like India. In developing countries, the digital divide between the rich and poor and the urban and rural was apparent, and hence budgetary allocations to bridge this gap become essential. The COVID-19 outbreak provided us the opportunity to rethink and review the policies in our domestic violence prevention and treatment. Appropriate use of digital technology can solve domestic violence and other societal burdens during pandemics. While the coordination of economic policies and cooperation among different countries is the need of the hour.

Greater budgetary allocation in the healthcare sector leading to affordable healthcare for all and increased government spending in social services will help us overcome the financial needs of individuals at the time of the pandemic. It is evident that every individual member of society needs to come forward, contribute and cooperate with the system to overcome the immense social, economic, and healthcare challenges of the COVID-19 pandemic.

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