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"GLOBAL PREPAREDNESS AND RESPONSE TO THE COVID-19 PANDEMIC: LESSONS LEARNED AND FUTURE RECOMMENDATIONS - A REVIEW"

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Abstract: Emerging pandemics show how human nature makes individuals vulnerable, and societies must be prepared. A coronavirus, which was first noticed towards the end of 2019, has been formally classified as a pandemic by the World Health Organisation. Different nations are reacting differently to the viral outbreak. In China and other major countries, there have been cases of delay in discovery and response, which overloaded the local health systems. However, only a very limited number of cases have been identified since the pandemic began in a number of other countries that have been effective in suppressing the virus. The most successful methods for limiting the disease's transmission have shown to be restrictive measures, such as lockdowns, social isolation, isolation of patients, contact tracing, and quarantining of exposed people. This evaluation will help the audience comprehend other countries' diverse reactions and effects. India responded to the outbreak using the lessons it had gained from these other countries' responses. Time will tell how well India has controlled the pandemic. We also make recommendations for future steps the international community should take to manage and lessen the situation.

I. INTRODUCTION

The (SARS-CoV-2)-related illness COVID-19, which is thought to have started in the Chinese province of Hubei in November 2019, is rapidly spreading throughout the world and was declared a pandemic by the World Health Organization on March 11, 2020. As of July 5, 2020, there were more than 529 000 fatalities associated with COVID-19, with an estimated 11.2 million cases worldwide. Across 213 distinct countries and territories, coronavirus cases have been confirmed. The outbreak's focal point at the time was Wuhan, and the first case in India was recorded on January 30, 2020, by a group of students traveling from Wuhan to Kerala in the south of the nation. India had around 648 300 confirmed cases as of July 5, 2020, of which approximately 235 433 (36%) were active, 394 227 (61%) recovered, and 18 655 (3%) passed away. According to Dr. RAJIB Acharya, similar incidents occurred in 627 (98%) of the 640 congressional districts and 35 (97%) of the country's states and union territories (Acharya *et al.*,2020).

Globally, the consequences of the coronavirus disease pandemic (COVID-19) on health and socioeconomic conditions show that no single health system was entirely equipped to handle this challenge, even though certain nations are suffering more severe repercussions than others. Essential health services, such as those for sexual and reproductive health, maternity and child health, infectious and noncommunicable disease, mental health, nutrition, and vaccination, have been cut off in nations of all economic levels and across all continents (Mustafa *et al.*,2022).

The World Health Organization (WHO) and the United Nations (UN) define preparedness as the capacity of governments, experts, accountable organizations, communities, and individuals to foresee, detect, and respond to potential, impending, or existing emergencies and recover from them (World Health Organization. 2020b; Kruk *et al.*, 2015). The World Health Organization defines a resilient health system as one that can anticipate, react to, and adapt to disruptive public health events while maintaining universal access to vital, high-quality health services. Planning for health emergencies must be coordinated with the overall strategy for the health sector and vice versa. Appropriate funding must also be monitored and evaluated (Mustafa *et al.*,2022).

Even though the need for resilient health systems has received considerable attention (Haldane *et al.*,2021), gaps in disease-specific efforts, emergency preparedness, and system strengthening continue to impede progress toward the two main global health goals of health security and universal health coverage (Kluge *et al.*,2018; Spicer *et al.*,2020). There is currently inadequate evidence in the COVID-19 and larger health systems discussion regarding the level of integration and resilience as a perspective in planning (Lal *et al.*, 2021; Tumusiime *et al.*, 2020).

Countries created COVID-19 Preparedness and Response Plans in response to the pandemic to aid with resource mobilization and national action. Plans for anticipating and responding to the COVID-19 situation in countries and the ensuing disruptions are provided by the WHO Strategic Preparedness and Response Plan and operational guidance for maintaining essential health services (Mustafa *et al.*,2022).

1. Containment Measures

Statistics on the spread of SARS-CoV2 indicate that if prompt, appropriate containment measures are not done, 40–70% of the population may become ill due to the lack of societal herd immunity and the virus's high contagiousness (Anderson *et al.*,2020). The WHO urged regular hand washing with soap and water or an alcohol-based hand rub, abstaining from contacting the eyes, nose, or mouth, and practising respiratory hygiene in light of historical experience with preceding epidemics and pandemics as well as current knowledge about SARS-CoV2. The WHO opposes the widespread usage of face masks, although the topic is still debatable (WHO Report on COVID-19, 2019).

Plastic surfaces are the most resistant to the coronavirus (72 hours), followed by those composed of stainless steel (48 hours), cardboard (24 hours), and copper (4 hours). Surfaces should be cleansed with 70% isopropyl alcohol, 0.5% hydrogen peroxide, or 0.1% sodium hypochlorite to prevent the virus from spreading by touch (Kampf *et al.*,2020; Van *et al.*,2020). Therefore, comprehensive cleansing of healthcare institutions and public areas is necessary. Healthcare institutions are urged to use personal protective equipment (PPE), such as triple-layered masks or N95 masks, and to instruct their staff on how to properly dispose of the equipment. It's also advisable to take respiratory precautions when producing aerosols. It is recommended to get medical attention if you have a fever, a cough, or difficulty breathing (WHO Report on COVID-19, 2019). The most crucial steps in preventing the virus from spreading within a community are case detection, isolation, and contact tracing for positive patients, followed by quarantine for those exposed. The closure of public gathering places like schools, libraries, churches, malls, and movie theatres, as well as the end of all social gatherings including athletic events, parties, and meetings, are further strategies. Temperature-checking methods are currently in place at the doors of significant public buildings (such as hospitals, banks, or courts), as well as at airports, railway stations, and bus terminals. The drawback of temperature screening is that a significant number of asymptomatic carriers are missed; this amount has been estimated to be approximately 46% (Quilty *et al.*,2020). More stringent restrictions, including travel bans, curfews, lockdowns, and reduced or cancelled domestic and international aircraft service, have been undertaken in nations with higher infection rates.

All of the aforementioned actions are intended to lessen the rate of infection transmission, which will postpone the onset of the epidemic and reduce its peak height. They enable the creation of possible innovative therapies and vaccinations on the one hand, and on the other side, they enable the medical sector to build up an effective response to the pandemic.

2. Approaches towards COVID-19 from various nations

Different strategies have been utilised internationally depending on the demographics and healthcare infrastructure of each country. China might have prevented 67% of cases, according to a model simulation by Lai Shengjie and Andrew Tatem, if control measures had been implemented one week earlier; infection rates would have fallen to 5% if implementation had begun at the beginning of January (WHO Report on COVID-19,2020). The situation in Wuhan demonstrates that municipal officials were made aware of the virus's spread at least three weeks after the initial cases were recorded, but they were given orders to keep the information a secret. For instance, they let the Baibuting district of Wuhan host its annual mass dinner

on January 18, some six weeks after the coronavirus outbreak there began. Over 28,000 of the 40,000 families in attendance contracted influenza, and over 560 died in the following weeks. More than 5 million people departed the city a few days later, just before Wuhan imposed lockdown, in anticipation of the upcoming Spring festival, spreading COVID-19 to other Chinese provinces as well as international nations. Wuhan's improved connectivity with other large foreign airports, such as those in Japan, Singapore, and Bangkok, helped the swift growth of nearby nations (Bogoch *et al*.,2020). On January 23, the entire province of Hubei, as well as certain significant cities like Beijing and Shanghai, were placed under a three-week lockdown (Tanne *et al*.,2020). Citizens were only allowed to walk outside for 30 minutes every other day, which severely restricted their ability to engage in outdoor activities (Lau *et al*.,2020). No vehicles were permitted to enter the city or leave it. Using cell phone location information from Chinese internet giant Baidu, moments and person-to-person relationships were tracked (Cyranoski *et al*.,2020). Residents in Wuhan, where the infection incidence was greatest, had to take their temperature each day and report it. The mild and asymptomatic patients were housed at the "Fangcang" hospital as well as public areas like stadiums and conference halls that had been modified for medicinal use (Chen *et al*.,2020). In under ten days, a 1,000-bed hospital was constructed to treat coronavirus sufferers.

3. **Worldwide cooperation:**

International organizations like the WHO and CDC are highly commended for their globally coordinated efforts during any pandemic or epidemic. They form the foundation of every healthcare system in existence today. The coordinated research efforts of several organizations and their crucial role in the early release of the COVID-19 vaccine was a key lifesaver. The mortality and morbidity numbers are reduced as a result of this effort.

4. Agencies Tasked with Assessing and Monitoring Vaccine Safety

4.1.WHO Global Advisory Committee on Vaccine Safety

They offer the World Health Organization (WHO) objective, dependable, and scientific opinion on vaccine safety concerns of national or international importance. The Committee examined possible safety concerns that could arise with the new vaccinations being produced and used in emergency situations in May 2020, with a focus on COVID-19 (Cole *et al.*,2022).

4.2.WHO Strategic Advisory Group of Experts

The primary advisory body to WHO on vaccination and immunization is the Strategic Advisory Group of Experts (SAGE). The Global Advisory Committee on Vaccine Safety's findings are used by the Strategic Advisory Group of Experts to make recommendations about vaccine safety (Petousis-Harris *et al.*,2020)

4.3.The Brighton Collaboration

To further vaccination safety research, the Brighton Collaboration was established in 2000. 2020 will see an unprecedented increase in the development of COVID-19 vaccines. A methodical and systematic strategy that is approachable and intelligible to a variety of stakeholders is all the more crucial given the pace and volume of development. Several DNA and RNA vaccine candidates are among the most advanced COVID-19 vaccines currently under development. In order to evaluate and communicate the benefit-risk of vaccines utilising these nucleic acid platforms, the Coalition for Epidemic Preparedness Innovations (CEPI) and other significant stakeholders will adopt a special template for nucleic acid vaccines that was developed by the Brighton Collaboration V3SWG (Kim *et al.*,2020).

5. Public health challenges of covid-19 in India

A significant obstacle facing the healthcare sector is COVID-19. In light of the COVID-19 epidemic, it is crucial to understand the elements that influence a nation's capacity to handle the spread of the virus. This topic of society's capacity to handle an acute health crisis was raised once again (Maziar *et al.*, 2022).

India will see a significant increase in COVID-19 patients, particularly during the second wave that started in early April 2021. The unanticipated rise in infections caused the healthcare system to collapse and resulted in a scarcity of hospital beds, medical supplies, and oxygen. A completely disintegrated healthcare system in INDIA comes under intense scrutiny during the COVID-19 epidemic. When the epidemic hits its apex and patients and healthcare facilities start to perish, it has been perceived as a humiliating condition for the whole healthcare system.

Life is quite unpredictable as a result of the COVID-19 pandemic. The healthcare system starts to deteriorate as the number of cases rises even though there were initially very few patients and the pandemic was prevented.

The following difficulties people encountered throughout the pandemic:

1. Fewer hospital beds are available. Even though several hospitals have added beds, it appears that no healthcare facility was ready for such a large patient load.
2. The absence of essential medicines, oxygen cylinders, and other healthcare facilities
3. Poor facilities upkeep and sanitation.
4. There are fewer medical facilities in remote locations.
5. Every country in the world had a severe oxygen shortage during the second wave of COVID-19, but because of India's large population, the scarcity of oxygen there was particularly acute. Numerous lives are lost as a result of oxygen cylinder shortages.

Giving people in need prompt attention was the main obstacle.

Vaccine availability and distribution: At first, there was a big demand for the COVID-19 vaccine since everyone wants to preserve their life, but there wasn't enough of it to go around. It was extremely difficult to guarantee that everyone had access to vaccinations.

Migrant worker crisis: During the epidemic, the country was put on lockdown, which led to employment losses and forced migrant workers to return to their hometowns. Since the transit network was shut down, they must walk back to their house. Social and economic difficulties were brought on by the unexpected influx of migrants, which also affected the region they left behind.

Economic impact: Immediately after the lockdown was implemented, business activity sharply decreased. A significant number of people have lost their employment, and many businesses have closed, which has an influence on India's economic situation.

6. Impact of COVID-19 worldwide

Since COVID-19's effects go beyond human sickness and mortality, they should be taken into consideration. Society-wide discrimination is one such issue. Healthcare workers are one such group that is becoming more and more thought of as possible virus carriers in the general population. Additionally, since the U.S. President made damaging and inaccurate claims like "China is to blame" and "COVID-19 is the Chinese virus," Asian Americans have witnessed an upsurge in violent and bigoted acts. A significant increase in employment losses has been caused by the effects of COVID on industries including entertainment, tourism, restaurants, and travel (Shah *et al*.,2020). These societal upheavals have an impact on the global economy in the form of disrupted supply chains and falling stock prices (Shah et al.,2020). It has also been observed that the prevalence of panic disorder, anxiety, depression, and other psychological issues is rising (Qui *et al.*,2020).

7. Future Directions

In order to increase social isolation and promote hygienic behaviour, public health measures will be focused on throughout the three years it will take to limit the COVID-19 pandemic. These actions will have a positive impact by delaying the start of broad community transmission, lowering peak incidence, and minimising the strain on public resources. In order to decrease the number of new cases, testing, contact tracking, isolation of infected individuals, and proactive self-isolation of contacts are required. Additionally, it is crucial that a large portion of the people comprehends and agrees with these policies (Salathé *et al.*,2020). These measures must be accompanied with a return to ordinary life and everyday activities as much as is practical until the pandemic's trajectory is reversed (Yuen *et al.*,2020). Additional transmission methods, such those involving sewage, polluted water, or air conditioning systems, are still mostly unknown. Whether persons who have recovered from SARS-CoV2 infection are resistant to reinfection is likewise uncertain; however, no evidence of this has yet been provided. Extensive antibody testing is necessary to detect who is already immune to the virus. There is a need for the results from different parts of the world. The effects of temperature, season, and humidity on COVID-19 also has an effect on the COVID-19 outbreak (Khanna *et al.*,2020). Results from the several studies being conducted to provide brand-new therapeutic choices and a vaccination to treat respiratory illness are still needed (*Zhou et al.*,2020). Additionally, it takes time for a vaccine to be developed and licensed. The elderly and other vulnerable populations should still be protected even when herd immunity eventually develops. In the future, it could be necessary to implement smart working practices and staggered shifts to reduce Covid-19 transmission. Online courses and digital didactics might go on for months. Implementing telemedicine is necessary, particularly in teleophthalmology. Along with antimicrobial resistance, infectious illnesses will likely rank among the biggest health risks in the future. Additionally, prompt detection, accurate diagnosis, quick isolation, and clinical care would continue to be at the forefront (Mattiuzzi *et al.*,2020). The second wave of the COVID-19 epidemic is one of the ultimate issues of concern. Asian countries and towns that seemed to have the coronavirus pandemic under control have quickly closed their borders and instituted stricter containment measures out of fear of more imported

diseases. Hong Kong abruptly announced a second halt of non-essential activity as new cases spiked to as many as 65 in one day. As travelers started to return to their home countries in March, cases in Japan, where infections had been mostly under control, began to increase. Additionally, fresh instances of local transmission have been found. In the identical manner, Singapore once more declared a one-month shutdown because of increasing local broadcasting. This signals a concerning possibility for the spread of the virus in a second wave when the restrictive restrictions are lifted in the United States, Europe, India, and the rest of the world (Syeda *et al.*,2021).

Upcoming advice for pandemic

- Increasing the capacity of the healthcare system.
- Spend money on education and research.
- Upgrade the testing and medical facility.
- Put an emphasis on early diagnosis and treatment.
- Spread awareness about health issues and virtue.
- Put an emphasis on early diagnosis and treatment.
- International collaboration in research and care.

8. Conclusion

Over the past two years, covid-19 has developed into a global threat to public health. another epidemic infectious disease outbreak has been added to the list, which already includes the outbreaks of bovine spongiform encephalitis in 1986, avian flu in 1997, sars in 2002, swine Flu in 2009, and Ebola in 2014. The interconnectedness of animals, social connections, and the environment in which we live must all be respected if we are to survive and thrive. All of these outbreaks serve as a reminder of this. Rapid urbanisation and human expansion into forest areas have created a new interaction between humans and wildlife. This has exposed people to strange creatures, typically including the ingestion of exotic species. Inger Anderson, the head of the UN Environment Programme, said We are now uncomfortably near to animals and plants that carry illnesses that can spread to people due to our ongoing degradation of natural space. "We can't take care of ourselves if we don't take care of nature," she remarked. The interconnectedness of all living things, including pets, cattle, and wildlife is something that nature is trying to communicate to us through COVID-19. The transdisciplinary One Health approach has been suggested to decrease new disease outbreaks. This approach involves experts from several disciplines, including medicine, veterinary science, environmental health, and social sciences (Kelly *et al.*,2017).

The global experience has shown us that aggressive contract tracing and containment tactics are needed to keep the disease under control until the whole world's population has access to a proven treatment or vaccination. Reduce the financial cost of disease and raise public understanding of its processes, health problems, emergence, and re-emergence in order to respond appropriately and quickly.

This will assist in the recognition, avertance, and care of upcoming pandemics based on our understanding of COVID-19 outbreaks.

Global One Health collaboration must be created in order to decrease the threat presented by new infections (Khanna *et al,*.2020).

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