



# Journal of Acute Disease

## Review Article



doi: 10.4103/2221-6189.355309

jadweb.org

## Challenges of COVID–19 prevention and control: A narrative review

Abdel–Hady El–Gilany<sup>1</sup>✉, Eman Sameh<sup>2</sup>, Hala S. Abou–ElWafa<sup>3</sup>

<sup>1</sup>Public Health & Preventive Medicine, Mansoura University, Egypt

<sup>2</sup>Public Health & Preventive Medicine, Minia University, Egypt

<sup>3</sup>Industrial Medicine and Occupational Health, Mansoura University, Egypt

### ABSTRACT

This narrative review aims to highlight some of the factors contributing to challenges faced by many countries in controlling the spread of COVID-19 pandemic that continues to rage around the world, especially after stoppage of official prevention and control activities. A literature search was conducted on PubMed, and Google using search terms “COVID-19”, “challenges”, “prevention”, and “control” in different combinations. COVID-19 prevention and control challenges are related to health-system, vaccines, administration, and society culture. Controlling the spread of COVID-19 necessitates cooperation between community leaders, healthcare professionals, religious leaders, and the public.

**KEYWORDS:** COVID19; Challenges; Prevention; Control; Vaccine; Health system; Administration; Social; Culture

### 1. Introduction

On March 11, 2020, the World Health Organization announced COVID-19 a pandemic[1]. This pandemic is still a potential public health threat worldwide. It disrupted health care systems and affected human health so it is essential to protect the most affected by COVID-19[2,3].

The pandemic has spread at an exceptional rate later afflicting the entire world. This could reflect preparedness levels and the control plans locally applied in different countries[4]. Egypt is among the most populous countries in Africa[5], still at a higher risk of future spread of coronavirus that exhausts the available health services.

Different countries had implemented various prevention and control strategies for COVID-19 pandemic such as quarantine measures, social distancing, isolation, and lockdown[6,7]. Policies and actions taken by governments differ for many reasons, including preparedness of the health systems, demographics, population

density, testing capacity, and cultural, social, and political dynamics. Sixteen vaccines were approved by international and local regulatory authorities for use by the public: six inactivated vaccines (Covaxin, CoronaVac, CoviVac, WIBP-CorV, Minhai Kangtai BBIBP-CorV, and QazVac); five viral vector vaccines (Oxford–AstraZeneca, Johnson & Johnson, Sputnik Light, Sputnik V, and Convidecia), two RNA vaccines (Pfizer–BioNTech and Moderna), and two protein subunit vaccines (RBD-Dimer and EpiVacCorona)[8].

### 2. Methods

This is a narrative literature review by searching for articles on PubMed, and Google using keywords such as: “COVID-19”, “challenges”, “prevention”, and “control” in different combinations. All articles and books published in English language that addressed the topic were included.

### 3. Challenges of COVID–19 prevention and control

#### 3.1. Health–system–related challenges

✉To whom correspondence may be addressed. E-mail: ahgilany@gmail.com

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**How to cite this article:** El-Gilany AH, Sameh E, Abou-ElWafa HS. Challenges of COVID-19 prevention and control: A narrative review. J Acute Dis 2022; 11(4): 127-132.

Article history: May 21, 2022; Revision June 20, 2022; Accepted July 18, 2022; Available online 7 September, 2022

### 3.1.1. Imbalanced and weakened healthcare systems

The most disturbing issue is the weak health system infrastructure unable to respond to COVID-19. The present pandemic paralyzed the current health systems at the expense of primary and essential health care requirements. The capacity to respond to the increasing demands placed difficulty on people with morbidities who require intensive care. There is a substantial lack or shortage of personal protective equipment (PPE) for front healthcare providers together with panic purchasing as well as stockpiling of PPE. The availability of PPE is limited in many regions which could ultimately hinder control of pandemic's rapid spread[9].

### 3.1.2. Shortage in both medical facilities and health staff

Low and middle-income countries have inadequate intensive care beds and quarantine facilities. Ventilators keep the most seriously ill coronavirus patients alive, but they are expensive. Doctors are on the frontline fighting the coronavirus threat, but many developing countries do not have enough numbers. Overburdened health staff cannot handle all the disease cases[10].

### 3.1.3. Challenges of epidemiological research during the COVID-19 pandemic

There was an increase in observational and descriptive research with a few fields and interventional studies due to social restrictions as most researchers are working at home to limit face-to-face contact[11].

### 3.1.4. Health inequalities during COVID-19

There are health inequities between different groups of people between and within countries[12]. This led to unfair and catastrophic consequences in deaths among ethnic minorities, vulnerable groups such as asylum seekers, refugees, and those with socioeconomic disadvantages[13].

Health disparities during pandemics aggravated by multiple risk factors and morbidities unfavorably amplify the disease load. This has been described as a coinciding pandemic for the more poor communities. Existing priorities and decisions in social and political organizations and international financial forces, across cultures, permitted the pandemic to discriminate against underprivileged peoples[14].

## 3.2. Vaccine-related challenges

### 3.2.1. COVID-19 vaccine development challenges

The urgent need to develop vaccines for COVID 19 led to tight timetables that shortened the typical development timeline of vaccines[15]. Timelines for carrying out clinical research – usually requiring many years – are being reduced into efficacy, safety, and dosing trials running instantaneously over a few months, compromising safety guarantee[16]. The urgency of developing a vaccine for COVID 19 may be associated with an increased failure

rate and risk of supplying an effective and safe vaccine[17].

Furthermore, research is hindered by physical and social distancing as well as closing of research laboratories[18]. Vaccines must proceed through multiple phases of clinical trials to assure effectiveness, safety, dose levels, immunogenicity, and adverse effects[19]. Vaccine developers devote resources to finding enough subjects to participate in phases II and III clinical trials as the virus is a "moving target" of varying transmission rates within and across nations[20].

### 3.2.2. Vaccine acceptability

Vaccine hesitancy is defined as a “*delay in acceptance or refusal of vaccination despite availability of vaccination services*”[21]. The acceptability of vaccines is affected by confidence, complacency, and convenience[22,23]. Confidence includes trust in the vaccine’s effectiveness and safety, vaccine delivery within the health care system, and the politicians[24]. Most people have worries about safety of vaccines which is considered a great challenge to be solved by healthcare workers, policymakers, and community leaders to increase vaccine acceptance. Complacency is related to a low appreciated risk of the vaccine-preventable disease and results in further negative attitudes towards the vaccines. Moreover, convenience is the physical availability, accessibility, and affordability of the vaccines[25,26].

### 3.2.3. Vaccine efficacy

Some vaccines induce strong immunity for months or years, while other vaccines require a booster dose. Protein-based vaccines use adjuvants to improve efficacy and minimize the amount of antigen and the cost[27,28]. Some COVID-19 vaccines, *e.g.* Pfizer and Moderna, utilize encapsulated lipid nanoparticles. A short-duration immunity might be enough to interrupt the chain of transmission[29]. Most COVID-19 vaccines are not efficacious for a longer duration and require boosters for the same strain of the virus. Furthermore, many COVID-19 strains mutations have emerged. This necessitates re-manufacturing of the vaccines to protect from these mutations. Experts recommend a booster vaccine based on pieces of evidence from animal studies[30].

### 3.2.4. Labeling vaccines based on the country of origin

Scientists are searching for effective vaccines and remedies irrespective of country from which the virus originated. Researchers are racing from time to time to discover an effective therapy and vaccine. Drug development, production, and provision during a pandemic should be carried out regardless of religion, race, and political membership[31].

## 3.3. Administrative challenges

### 3.3.1. Economic challenge

COVID-19 exerted great economic concerns on the affected nations. The pandemic adversely affected income due to early

mortality, work absenteeism, and low productivity, with slowing down of manufacturing activity due to worldwide supply chain disruptions and closings of factories[32].

The pandemic led to a 1.1% decrease in Egypt's Gross Domestic Product during the last quarter of the 2019/20 fiscal year, compared to the same quarter in the previous year. The services sector and industry failed by 10.9% and 8.3%, respectively[33].

### 3.3.2. *Transparency and communication*

Clear communication is crucial to an active response to COVID-19 pandemic. The level of communication is suboptimal in many countries due to ethnical, cultural, and religious variations, as well as non-comprehensive governments and humanitarian emergencies. Two hurdles for clear communication and collaboration, involve religion and ethnic variation and conflicts. Moreover, governments are not sufficiently transparent with their people because of religious and political prioritization and hierarchies[34].

### 3.3.3. *Lack of official reliable epidemiological and clinical data*

The importance of quality, open, timely, and disaggregated statistics has never been as obvious as during COVID-19 pandemic. Such data are crucial in understanding, managing, and mitigating the social and economic impacts of the pandemic. They are prerequisites for applying short-term responses and actions to place nations back on track. The shortage of basic social, health, and economic data are the basic challenges encountered during COVID-19 responses[35].

### 3.3.4. *Religious mass crowds inflict risk of great spread of the virus*

Religious crowds or gatherings have proven to be hotbeds for outbreaks. This is since some communities especially in developing countries believe religion is the coronavirus cure. In some localities, lockdown and social distancing rules have been ignored by religious groups who perform religious festivals regardless of the threat[36]. Pilgrims focused on religious rituals, are in close contact with worshipers with inadequate protective measures, and therefore intensify the probability of transmission and excess spread of COVID-19. Authorities should communicate actively with religious scholars and leaders to assist in decision-making and policy implementation[37].

### 3.3.5. *Difficulties in implementing lockdown*

Lockdown is a term used to describe “mass quarantine”, based on “stay-at-home” or “shelter-in-place” imposed by authority[38]. Lockdown is mostly applicable as a measure in controlling an outbreak and requires the population to remain indoors except for the sectors carrying out essential activities such as health and security. With the speedy spread of COVID-19, most countries have adopted the lockdown approach as a major solution to break the chain of

transmission. This “stay-at-home” method has been recognized as effective in containing the COVID-19 outbreak in developed countries[38].

On the other hand, in low-income countries, this approach has not seemed to be fruitful due to setbacks in its effective implementation. In most low-income countries, the lockdown was announced abruptly and so the supply chains are not working which means people relying on subsidized food services from the state no longer have access[12].

In low-income countries, most of the population makes a living in the informal economy. Most low-income countries receive no unemployment benefits. A greater proportion of the population earns their living on daily basis. Those in the informal sector will therefore have to decide to either respect the lockdown measure and endure hunger and starvation or defy the measure in search of daily bread[12].

## 3.4. *Social/cultural challenges*

### 3.4.1. *Infodemics*

An infodemic is an excessive misleading or wrong information in physical and digital environment during an outbreak. It harms health because it causes confusion and promotes risk-taking activities. It leads to suspicion in health care authorities and weakens public health activities[39]. The COVID-19 pandemic has resulted in various rumors regarding its origin, spread, and prevention. This misinformation promotes practices that increase the spread of the disease. Some of this misinformation has been generally accepted by the population[40].

### 3.4.2. *Stigmatization and social hostility*

Stigmatization of a disease leads to disease concealment and isolation by patients to avoid discrimination which reduces the possibility of seeking medical care. This makes the disease harder to treat, diagnose and contain. Stigmatization is a potential threat to the success of disease control as in some cases can lead to suicide. A greater proportion of the population avoids going for testing for fear of stigmatization. Social stigma can lead to social hostility involving a negative attitude of the population towards the person concerned[41].

### 3.4.3. *Myths, perceptions, and beliefs*

The pandemic has created myths and conspiracy concepts that are believed even by educated persons. These beliefs predict risky behavior related to health, e.g. rejecting social and physical distancing, forcing gatherings for demonstrations, and declining future vaccination. A particular myth about COVID-19 is that Africa's climate will slow the virus. Researchers have found such beliefs as limited and inconclusive as seasonality is difficult to predict[40].

#### 3.4.4. Challenges faced by persons living in camps and slums

In informal settlements, refugees, and camps, many challenges are faced by people which make preventive measures difficult to be followed including slum settlements, refugees, and internally displaced people. Most of them live in densely populated and overcrowded camps, making difficulties in physical distancing and/or isolation. Residents of these settlements usually live in big multigenerational extended families, in constrained badly ventilated homes, sharing foods and sleeping places. Moreover, water is insufficient, and shared water points and toilets are located outside homes, which makes physical distancing unfeasible[42].

#### 3.4.5. Demographic structure

A considerable number of elderly live in some countries where restricted health care services are unable to provide adequate care for elderly people during the pandemic. Consequently, the risk of COVID-19 is more devastating and suitable preventive measures cannot be applied promptly. Social distancing policies should take into consideration the socioeconomic and living conditions of people in a community[42].

#### 3.4.6. Peltzman's effect

The Peltzman effect describes the concept of 'risk compensation' which is a theory suggesting that people adapt their behavior in response to their perceived levels of risk. It proposes that people are extra careful on perceiving higher risk and lesser cautious upon feeling more protected[43].

An analysis of Peltzman effect of COVID-19 vaccination revealed many factors contributing to risk compensation during the current pandemic. To increase risky behavior, a measurable vaccine benefit must be noticeable. This is evidenced by lowering the number of infections among the vaccinated. Risk compensation occurs if people are motivated to take on risky behavior and the risk is within their control. During the pandemic, these two factors have displayed as 'pandemic fatigue' with less adherence to risk mitigation activities. The last factor is the increasingly recognized overall effectiveness of the vaccine. This is exceptionally desirable to increase vaccine-acquired herd immunity. However, according to the Peltzman effect, this high effectiveness decreases adherence to other safety important precautions[44].

### 4. How to face these challenges?

- (1) Mass media channels need to create a means to regulate or filter fake rumors concerning the pandemic;
- (2) Awareness campaigns need to be carried out to educate people about effective health practices and to help the survivors deal with life after the disease;
- (3) Low-income countries need to invest more in health care facilities or supplies and seek foreign aid;

- (4) Commitment to equitable access to vaccines by supporting global efforts and preparing national plans for targeting high-risk groups first;
- (5) Encouragement by community figures and personalities. Many of them have declared that they received vaccination and encouraged others to be vaccinated. This partly counteracts vaccine hesitancy and refusal;
- (6) Improving the ability to identify mild or asymptomatic and pre-symptomatic individuals as early as possible is the key point in the current stage of the pandemic. Retaining a safe distance, adequate material supplies, isolation measures, and advanced telemedicine are essential measures to control the pandemic;
- (7) Establishing an electronic COVID-19 registry as surveillance to monitor trends in incidence over time.

### 5. Conclusion

The major challenges facing control of this pandemic include health-related, administrative, and social challenges. These are interconnected and together determine the response to the pandemic. There is no simple single solution but to power the communication and collaboration amongst political leaders, religious scholars, health care authorities, and the public behavior taking into consideration compacting barriers that hinder proper behavior among the public. Immediate attempts should be dedicated to raising economic penalties and finishing violence and struggle. Finally, countries should unify and guarantee loyalty from all parties to contain the pandemic.

### Conflict of interest statement

The authors report no conflict of interest.

### Funding

This study received no extramural funding.

### Authors' contributions

E.S.: writing, drafting, and revising the manuscript; A.H.El-G.: conception of the research idea, drafting of the manuscript, and revising it for intellectual content; H.S.A.ElW.: drafting and revising the manuscript. All authors read and approved the contents of the manuscript before submission.

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