

## Challenges and potential solutions in the development of COVID-19 pandemic control measures

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### Abstract

The coronavirus disease 2019 pandemic has become an unprecedented and major health concern all over the world. We discuss potential solutions and feasible strategies to reduce spread of infection and to develop disease control measures.

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To the Editor,

Coronavirus disease 2019 (COVID-19) has become an unprecedented and major health concern around the world [1]. Natural immunization and protective reactions after COVID-19 could be affecting outbreak control. This feature could open up unique opportunities for disease management and induced natural immunity, if there were valid and confirmed data available about natural immunization among individuals who have recovered from COVID-19 and about the possibility of re-infection. The presence of natural immunity is important in how

to manage these patients and it has a notable impact on reducing the rapid spread of infection [2].

Several strategies and interventions have been used to control the COVID-19 pandemic. Contact tracing, social distancing, isolation and quarantine, self-protection, restriction of population mobility, disinfection, and standard precautions are some of the major efforts and actions used for controlling the outbreak [3]. However, there are no unified, confident and effective control measures, and global control of COVID-19 is challenging [4]. There are three main areas for the best control of the pandemic.

### Mass vaccination

First, a mass vaccination campaign, which is most probably an effective and safe method [5]. It requires development of materials, laboratory equipment, medical technology, and experienced personnel, as well as global collaboration and determination. The world requires an extensive commitment from nations and governments to overcome the disease pandemic [6].

### Natural and herd immunity

Second, natural and herd immunity—the resistance of a group to attack by a disease to which a sufficiently large proportion of the members of the group are immune. If a large proportion of the population is immune, then the entire population is likely to be protected, not just those who are immune, because disease spreads from one person to another in any community [7]. However, these criteria are often complex in the COVID-19 context and in real-world populations. Herd immunity requires various epidemiological and immunological factors, including a single host species, transmission that is relatively direct from one member of the host species to another, and the structure of population (random mixing).

Several studies indicate that having COVID-19 induces protective reactions or antibodies to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [8]. One study reported that 13.61% of RT-PCR tests were re-positive in individuals who had recovered from COVID-19 [9]. In contrast, very low levels of neutralized antibodies were reported from some COVID-19 patients [10,11]. A recent animal study has shown promising routes to COVID-19 protection, indicating that a history of SARS-CoV-2 infection may protect from

subsequent re-exposures [12]. However, some findings revealed that neutralizing antibody titres and the humoral immune response were not durable [13]. Therefore, the role of natural or herd immunity in the context of COVID-19 is still unclear. It requires longitudinal studies to determine whether recovered patients will develop naturalized immunity following re-exposure to the virus.

## Permanent changes in behaviour

In the absence of an effective and safe vaccine against COVID-19, making permanent changes in the health behaviour of the general population and society is an efficient strategy for pandemic control. It is time to seriously reinforce online technologies and digital tools in the timely response and control of epidemics and in public training and education, including digital surveillance systems, machine learning, telemedicine, rapid case identification and diagnosis devices, diverse apps with different control aims, public communication and hybrid models [14,15]. Responsibility and accountability of systems and societies, public health literacy and self-care, timely response to crises, and timely production and utilization of knowledge should be improved. In the current situation, systems and policy-makers should be focused on the best decisions and policies for infection control and the use of cost-effective and/or cost-benefit practices and decisions based on high-level and well-evidenced data to reduce costs and maximize control measure outcomes.

Appropriate strategies, for example developing a united and valid centre for outbreak management and obtaining accurate statistics, are required to ensure free access and improve sharing and reporting of fact-checks and high-quality news. Health education programmes are useful in the improvement of our knowledge of COVID-19 to develop appropriate control measures for the disease. Socio-economic status and psychological aspects of at-risk people and the general population, as well as improvement of protection measures for health service providers and standard precautions, should be taken into account in the development of infection control measures [16]. Likewise, the use of influential social personalities in educational programmes is paramount for maximizing the benefits of public health recommendations [17]. It is time to improve the adaptation of societies and populations to their environment to better control the infection and overcome the pandemic. Currently, more than ever, human life and survival are interdependent [18].

## Conflicts of interest

We declare no competing interests. We thank the support of "Clinical Research Development Unit, Razi Psychiatric Hospital", Tabriz University of Medical Sciences, Tabriz, Iran.

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