Iranian healthcare system against COVID-19

Milad Dodangeh^{1,*}, Masoud Dodangeh²

Viruses are one of the major causes of morbidity and mortality worldwide.¹ The Wuhan Municipal Health Commission reported an unknown pathogen is a cause of the outbreak of viral pneumonia that produced an influenza-like syndrome in Wuhan City, Hubei Province of China in December 2019.² This pathogen was an enveloped, positive-sense, single-stranded RNA virus, a coronavirus that was named 2019-nCoV initially then severe acute respiratory syndrome-related coronavirus-2 (SARS-CoV-2), leading to the disease called COVID-19. This virus belongs to the family *Coronaviridae* in the order *Nidovirales*.³

The clinical presentation of COVID-19 can range from mild to severe symptoms, specifically from fever and dry cough to complications such as severe acute respiratory distress syndrome and sepsis. The consequences of COVID-19 infection patients can be lethal, particularly in patients with underlying diseases, such as cardiac failure, hypertension, diabetes, asthma, and chronic lung disease.⁴ At the moment, the reproduction number of 2019-nCoV is thought to be 2.68 (95%CI 2.47–2.86), while the reproduction number of seasonal influenza is 1.28.⁵ So COVID-19 is more contagious than seasonal influenza. At the moment, the mortality of COVID-19 in the world is 6.82% and in Iran it is 6.22%,⁶ while the mortality rate of SARS-CoV-1 and Middle East respiratory syndrome

coronavirus (MERS-CoV) was reported by WHO to be 9.6% and 34.4%.⁷

On 19 February 2020, the first case was reported in Iran.⁸ The patient was found in Kamkar-Arabnia Hospital of Qom, a city located near Tehran. The government didn't quarantine any cities. And after a while, Iran became a global epicenter of COVID-19. Currently, Tehran, Qom, and Mazandaran have the highest number of patients in Iran, and the cities are in critical condition.⁹ As of 20 April 2020, there were 2,314,621 confirmed cases of COVID-19 infection, including 157,847 deaths, reported in the world.⁶ Iran has the highest number of confirmed patients (82,211) and deaths (5,118) due to SARS-CoV-2 in the Eastern Mediterranean Region as of 20 April 2020.⁶ The Iranian healthcare system is one of the most well-developed systems globally. It has always had an admirable performance in various challenges such as floods and earthquakes and epidemic diseases and communicable diseases, such as polio, tuberculosis, malaria, HIV/AIDS, influenza, cholera, etc. Despite this, the recent SARS-CoV-2 outbreak in Iran showed that Iran is unprepared to cope with the SARS-CoV-2 pandemic.

One of the challenges of Iran's health system in the coronavirus pandemic is the lack of personal protective equipment (PPE). Despite various sanctions that Iran has been struggling with for years, it is difficult to provide PPE. In this way, the frontline medical personnel become infected with the coronavirus and are quarantined or hospitalized. As of 18 April 2020, 1,710 medical personnel were confirmed with COVID-19, including 116 deaths, reported in Iran.¹⁰ Golestan, Tehran, and Esfahan had most medical personnel with COVID-19 in Iran. Medical personnel with COVID-19 infection with mild symptoms will be quarantined at home for 14 days. However, if there are severe symptoms, they will be hospitalized in the intensive care unit. This shortage of PPE and

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¹MD, MPH, Student Research Committee, Iran University of Medical Sciences, Shahid Hemmat Highway, Tehran 1449614535, Iran; ²Independent researcher, Tehran, Iran.

*Corresponding author: Milad Dodangeh, dodangeh.m@iums.ac.ir; milad_dodangeh@yahoo.com

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experienced medical staff has meant that less experienced physicians and residents have been recruited for medical care. With all these interpretations, Iran has mobilized all its facilities and equipment to detect, monitor and control COVID-19. The main strengths of the health system in Iran include public and private medical universities, primary, secondary and higher care centers, and public and private laboratories, all of which are distributed as a network across the country. The Iranian Ministry of Health, in collaboration with the Pasteur Institute of Iran, is responsible for the laboratory diagnosis of COVID-19. At the moment, in Iran, more than 50 laboratories are providing diagnostic services with a testing capacity of more than 7,000 cases per day,¹⁰ and most of them are public laboratories.

The Deputy of Health and government prepared 750 hospitals with more than 9000 beds (hospital beds per 1000 population: 1.72, population/physician ratio: 900) for COVID-19 patients. According to the steady trend in the number of COVID-19 patients, as well as the good triage of patients in hospitals and the quarantine at the home of patients with mild symptoms, hospital beds still are not filled. The Primary Health Care Network (PHC) is the largest healthcare network in Iran and provides access to primary healthcare in the most remote areas. Iran has more than 5000 rural and urban health centers on the PHC network that are involved in screening, tracking and contact tracking activities. Also, 32,000 volunteer teams formed by the community and NGOs to help healthcare services and government officials against COVID-19. Most of the Iranian physicians, clinicians, nurses, basic medical scientists, most of whom have been instrumental in providing primary, secondary, and excellent laboratories and medical centers to respond to the COVID-19 pandemic had been trained in 67 Iranian Public Medical Universities.¹⁰

After the detection of the first patient with COVID-19 in Iran, the government announces statistics for each city separately. However, due to differences in the diagnostic system and its accuracy in different provinces, sometimes the statistics are not equal. Although Iran is known

as one of the epidemic sites in the world, the number of patients is slowly increasing.

Due to the tourism industry, trade, and migration between countries, COVID-19 is a global problem, and all countries in the world for the eradication of the disease, need to help each other to provide PPE, hospital equipment, medicines and manpower such as physicians and nurses.

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