




# Experiences from the management of COVID-19 pandemic in a nursing home in Iran (March–April, 2020)

Shervan Shoaee<sup>1,2,3</sup> · Farshid Rezaie<sup>4</sup> · Moloud Payab<sup>1,5</sup> · Fariborz Bakhtiari<sup>6</sup> · Mohammad-Hossein Heydari<sup>2,7</sup> 

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## Abstract

As the first outbreak of COVID-19 in Wuhan, China, the elder population and those with comorbidities were at higher risk of COVID-19 infection. The mortality rate was also higher in this population. Hence, the management and prevention of this novel disease in nursing homes was of utmost importance. The health management team in Kahrizak Charity Foundation (KCF), a nursing home in Iran with more than 1400 elder or comorbid resident, have tackled the COVID-19 outbreak with a novel approach towards this problem. This commentary aims at sharing the insights and lessons learned in the management of COVID-19 in KCF.

**Keywords** COVID-19 · SARS-COV-2 · Long-term care · Nursing homes · Management

## Introduction

The novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) pandemic has presented the world with a global crisis. On 30 January 2020, World Health

Organization (WHO) announced that the COVID-19 pandemic has become a global public health emergency. According to WHO's latest report, there are more than 370 million confirmed cases of Covid-19 and the global death surpassed 5.6 million [1].

As prevention is the first approach against spread of this disease and elder people are at higher risk of infection with mortality rate of 15%, managing this crisis inside nursing homes is of greater importance [2, 3]. At the end of March, 2020 Italy and China declared 96.5% and 80.8% of all deaths were among the elderlies, respectively [4, 5]. Such being the case, prevention appears as the preferable strategy to protect the most vulnerable older population. Particular precautions and protocols should be incorporated by long-term care facilities and nursing homes in order to tackle this rising crisis [6–8]. In this regard, rapid identification, isolation and care of suspected and confirmed patients with COVID-19 is of utmost importance. Here we present the lessons learned from our management approach and solutions towards this problem in Kahrizak Charity Foundation (KCF). KCF is a nursing home in south of Tehran, Iran for old or disabled people including different ethnic groups, established to secure health care issues for the most vulnerable groups in society. It is currently running by approximately 800 staff members. Some 888 elder people along with 600 patients with physical or cognitive disability reside in this nursing home.

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✉ Mohammad-Hossein Heydari  
mhheydari@sbm.ac.ir

- <sup>1</sup> Elderly Health Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran
- <sup>2</sup> Non-communicable Diseases Research Center, Endocrinology and Metabolism Population Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran
- <sup>3</sup> Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran
- <sup>4</sup> Education and Health Promotion Department, Ministry of Health and Education, Tehran, Iran
- <sup>5</sup> Metabolomics and Genomics Research Center, Endocrinology and Metabolism Molecular- Cellular Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran
- <sup>6</sup> Kahrizak Nursing Home of Disabled and Elderly, University of Applied Science and Technology, Tehran, Iran
- <sup>7</sup> School of Dentistry, Shahid Beheshti University of Medical Sciences, Shahid Chamran Highway, Velenjak St, Tehran, Iran

## During the onset of the pandemic in KCF

During the first week after identification of this disease (March 2020) in KCF, the situation became known as an outbreak, according to the reports of the Ministry of Health and Medical Education (MOHME). Our initial response was to establish our headquarter for crisis management. After the onset of the disease and at the end of the first week, members of the health network of that sub-province attended KCF. Our request for manpower and assistance was sent to the Ministry at the end of the first week, especially for the nursing staff (Tables 1 and 2).

During the following weeks the quarantine was intensified. Families, visitors, and friends of the residents were not allowed to enter KCF and only the KCF's staff were allowed to enter and leave under careful supervision. Also, a supervisor and advocate from ministry of health was sent for evaluation of the situation, training of our staff, and supervision. During the following weeks, our efforts included;

1. Intensification of our infection control protocols
2. Monitoring patients and residents along with data entry
3. Receiving treatment drugs according to the protocol and defining the treatment protocol
4. Revising the structure of our nursing office
5. Quarantining our staff for 14 days
6. Preparing and revising standard operative procedures (SOPs); according to the latest guidelines, instructions and our expert panels, these SOPs were prepared and revised. In the course of disease progression, the up to date and cutting-edge knowledge on infection control and disease management were made available our staff
7. Scientific training and workshops for KCF's staff; expert groups, nurses, physicians, and environmental-health workers of both the nursing home and of Ministry of health were in charge of holding these workshops and training sessions. Also, daily and weekly workshops were set up for the wards' supervisors and health care workers, individually or in groups, in accordance with the practical or theoretical knowledge that was to be provided on that session. Training sessions also included

**Table 1** Management Timeline of COVID-19 Pandemic in KCF

March 7, 2020	First positive case
March 14, 2020	Quarantine and increase entry and exit restrictions
March 15–20, 2020	Scientific board meeting, risk assessment based National COVID-19 Guidelines
March 15–20, 2020	Receiving treatment drugs according to the protocol and defining the treatment protocol
March 15–20, 2020	Increasing the test numbers per day/week
March 21–28, 2020	Identify infection risk of those working at frontline (such as, health care workers)
March 21–28, 2020	Intensification of infection control (PPE, management actions and process improvement)
March 21–28, 2020	Preparing and updating SOPs
March 21–28, 2020	Scientific training and extensive workshops
March 29–April 5, 2020	Establishing a monitoring and care system along with data entry and correction

**Table 2** Treatment

First line therapy	Second line Therapy
1. Oxygen therapy for patients with O <sub>2</sub> Sat <93%	1. Oseltamivir (Tamiflu) based on the national agenda at the beginning of the outbreak
2. Serum therapy for clients who did not have enough nutrition or fluid intake	
3. For elder patients with high-risk underlying disease, chloroquine was prescribed for 5 to 10 days (with ECG control)	
4. Antibiotic therapy: Azithromycin or levofloxacin in the early weeks	
5. In patients with severe respiratory distress: ceftriaxone + clindamycin (if needed) and then other broad-spectrum antibiotics	2. Coltra or atazanavir (most commonly prescribed) for severe respiratory distress, debilitating underlying diseases, or failure to respond to first-line therapy
6. In the process of changing information about the complications of the disease, for the majority anticoagulants: enoxaparin in low dose (40) and in the middle weeks onwards	
7. Examining and treating the underlying diseases of each of the clients according to the previous records and current conditions	
8. Prohibition of smoking	

our non-healthcare workers (staff members in the food and nutrition provision section, laundry, security, administrative office and transportation facilities). New members were trained separately and intensively to get acquainted with the general principles of care and infection control.

## Diagnosis

Due to the cognitive impairment and dementia of a number of our residents, communication and reporting of their symptoms were confronted with difficulty. Therefore, our staff had to be more alert in case of suspicious cases among residents. The diagnostic procedures were as followed:

1. Daily general thermometry
2. Vital signs control
3. Laboratory tests for suspected patients; polymerase chain reaction (PCR) test, complete blood count (CBC) [especially for detecting leukocytosis, leukopenia and lymphopenia], C-reactive Protein (CRP) for all, O<sub>2</sub> saturation level for all, Chest X-ray for all, and Computed Tomography (CT) imaging

For diagnosed case we performed:

1. Lactate dehydrogenase (LDH)
2. D-Dimer/ Prothrombin time (PT) / Partial thromboplastin time (PTT)
3. Blood urea nitrogen (BUN) / Creatinine / Liver Function Tests

Serology test (IgG and IgM): These tests have been available since the end of May. Diagnostically it could not have been definitive, however for suspected people whose PCR test was negative but clinical signs were suggesting infection, we performed these tests as an auxiliary method (for residents who wanted to return to the nursing home, and residents who had a previous contact with an infected person).

## Management of wards and rooms

With the onset of the COVID-19 crisis, different rooms were allocated as the special infection control unit, yellow rooms, and red ward and we defined them as follows:

- **White Room:** A room where all the residents are healthy and show no clinical signs and symptoms.
- **Yellow Room:** A room where at least one infected person has resided recently.
- **Red Ward:** A ward separated for residing the infected people (residents or staff members)

- **Special Infection Control Unit:** A room with at least one resident presenting clinical symptoms (whether the test result is positive or negative)

The state of these rooms was dynamic. An ordinary room could become a special infection control unit then yellow and after resolving the issue would become a white room again.

We also labeled our residents in our disease monitoring system. All residents and staff members with COVID-19 infection were labeled as red and their roommates as yellow. All data, including the names of infected residents and staff members, and those labeled as yellow regions were entered into the system. Cases of definite and probable death were also recorded. One person, assigned by the disease management counsel, were in charge of monitoring the infected wards. The infected person is then transferred to the red ward and people who were in close contact with the patient are transferred to the yellow room.

As illustrated above, we prepared and updated SOPs for different sections. The complete SOPs are available in Appendix 1.

## Nutrition

Regarding nutrition, we attempted to improve the diet of all residents and health care workers. Most importantly, we increased intake of fluid, as well as the consumption of fruits and vegetables, as well as natural juices. Consumption of at least two units per day of fruit for all residents and staff members was considered. For those who found it difficult to eat raw fruit, boiled or canned fruit were available. From mid-June, when the situation of COVID-19 was significantly controlled, raw vegetables were provided for everyone. Fluid intake also increased. The emphasis was on consuming more water during the day, along with liquids such as milk, buttermilk, and fruit juices and vegetables. Protein intake was at least 30% of a person's daily energy intake. Therefore, the consumption of eggs was increased from three to four during the week and also the consumption of white meat and red meat was increased.

## Waste disposal

Nursing homes produce infectious waste. Thus, waste disposal should be done according to protocols and prior to disposal they should be separated in different categories. Safe waste disposal was managed according to current perspective and protocols of safe waste disposal [9].

## Laundry

Clothing and linen of infected people should be washed separately. Dirty clothes and soiled linen are collected in a clear container or bag after carefully removing any particle and then be washed in a washing machine with hot water at 60 to 90 °C with detergent. Finally, the washing machine is rinsed with clean water and the clothes and soiled linen are dried in the sunlight or through ironing.

## Conclusion

Nursing homes play an important role as major clustering hotspots of the epidemic, and this is repeatedly reported by various media sources worldwide [10, 11]. Although published official data regarding nursing homes are only partially available in European countries, according to the report of the London School of Economics, snapshot data from varying official sources shows that nearly half of all COVID-19 deaths (ranging from 42 to 57%) appear to be happening in nursing homes, and at least in multiple European countries (e.g., Italy, Spain, France, Ireland, and Belgium) [12].

The number of people residing in nursing homes is usually much less than the approximate 1450 residents and staff workers. The medical facilities in KCF and its patients with severe comorbidities made it such a hard task to manage. In London, the sum of people residing in seven nursing homes (patients and staff) was 718 according to one study and the same goes for USA [13, 14].

The total mortality due to the COVID-19 pandemic in KCF was estimated to be 200 residents. Due the preventive and isolation protocols, designed by the team in charge, only 24 residents passed away and the damage was reduced to about 20% of the initial estimation. The results for the effectiveness of the preventive protocols will be published in another article. We believe the following notes can summarize the reasons for our success:

1. Fast and timely management guidelines for the home care sector; in the early stages of the COVID-19 outbreak, the first guidelines for disease prevention and control were developed. Simultaneously, all visits were suspended.
2. Timely provision of personal protective equipment (mask, gowns, shield, test) to doctors, nurses, and healthcare workers
3. Scientific training and extensive workshops

4. Identifying risk of infection in our frontline healthcare workers
5. Preparing and updating SOPs

We believe the educational part of our management program was as much crucial as other interventions, such as disinfection and distancing. The full result and trend of the disease in KCF will be published in another article.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s40200-022-01005-3>.

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## Declarations

**Consent to participate** None.

**Consent for publication** All authors have consented for the publication of this article.

**Conflicts of interest/Competing interests** None.

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