

Review and Assessment of Iran's Neighborhood-Based Plan to Control COVID-19

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Abstract

Aim: Management of COVID-19 is an issue of concern around the world. Several factors and strategies influence COVID-19 crisis management in every country. This study aimed at assessing the status, the trend of incidence rate changes, and the factors affecting it during 4 months. **Materials and Methods:** This assessment was carried out simultaneously in three fields – care, monitoring, and managerial support. The method of implementing the plan in the cities was in the form of segmenting the city based on neighborhood, district, region, and city. Interventions were assessed by collecting information from the other two sections and citing valid information about the intended consequences, including death, hospitalization, infection, and other outputs. The information of the identified patients was extracted by census based on the patient care records in the cities of the province and analyzed using SPSS 16. **Results:** The mean and standard deviation of the death age was 69.12 ± 19.91 years. 60.8 of the deaths (15105) were in males and the rest were in females. In Iran, the trend of the corona epidemic increased until October 2020 and included about 500 deaths/day but with the implementation of this plan, the mortality rate decreased. **Conclusion:** Considering the effectiveness of this plan, it is hoped that by strengthening the disease care system and more supervision in implementing the strategy and having an effective relationship with private section physicians to comply with the national protocol, an effective step was taken to control this disease and finally eliminate it.

Keywords: Control, COVID-19, Iran, neighborhood-based prevention approach

INTRODUCTION

The COVID-19 pandemic incurs overwhelming burdens and challenges on governments around the world. In some cases, a rapidly increased rate of infection led to a breakdown of national health systems. Therefore, the management and control of the COVID-19 epidemic in the form of the neighborhood base was designed and implemented. Despite the suppression of the spread of the virus within a couple of weeks, the lockdown caused irreparable damage to national economies and increased the rate of unemployment.^[1-3]

Any relaxation of the lockdown results in the risk of a second outbreak. There is a need for developing strategies to keep the outbreak within limits. These strategies should not incapacitate

health systems, but at the same time allow the largest possible level of social and economic activity. The interventions need to be targeted in a way that hospitals can cope with the number of severe cases, especially in terms of intensive care unit beds.

Some Asian countries such as Singapore, Taiwan, and South Korea^[4] successfully and effectively contained the COVID-19 pandemic using digital surveillance methods and contact tracing.^[5] In Europe, contact tracing apps are discussed controversially.^[6,7]

The Islamic Republic of Iran is the second country after China to be identified as a country infected with the

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coronavirus on February 18, 2020, after identifying two cases.^[8] It is still one of the countries with the highest morbidity and mortality.^[9] Certainly, the management of this disease, which is a global epidemic, requires a special strategy that is different in each country due to different factors.^[10] Since “health is a political issue” that has long been agreed on,^[7] the ability of countries to manage COVID-19 is strongly influenced by their politico-economic issues.^[11] These conditions can be both an advantage and a threat. Health is important not only biologically but also politically, socially, culturally, and economically.^[12] In Iran, it was decided to implement a joint national plan (under the name of Shahid Soleimani) to cut the coronavirus transmission chain in the country. This plan was a concrete example of attracting people’s participation, intersectoral coordination, planning based on the needs of neighborhoods, bottom-up planning, and optimal use of the potential of the country’s health-care network system. Undoubtedly, for this plan to be successful, the focus should be on preventing the spread of virus rather than on the hospital and providing active- and family-based services instead of inactive services. Therefore, the joint management and control plan for the COVID-19 epidemic was designed and implemented in a neighborhood and family-based form by the Ministry of Health and Medical Education and the mobilization (Basij) of the oppressed group and other organizations, including the Red Crescent.

Regarding the global (pandemic) status of COVID-19 disease, which affects and in other words paralyzes almost all important economic, political, social, and even military aspects of the countries around the world,^[13] determining the effectiveness of each intervention performed in epidemic management requires systematic assessment with the appropriate scientific methodology to distinguish the role of interventions from other measures. For this purpose, this project requires the final assessment of the plan interventions utilizing the information that is obtained through continuous monitoring and assessment of all provinces of the country. The results of this study provide both the necessary documents to the country’s officials and credible scientific documents of this local plan at the international level.

Since the use of global experiences in times of crisis is one of the best mechanisms for crisis management,^[14] This study shows the effects of social support, health care by grassroots organizations, and senior management on disease control in the country and if it is effective, it can be a model for other countries.

Reducing the number of patients with corona disease and the number of hospitalized patients was one of the goals of the project. In this regard, this study aimed to assess the effectiveness of the most important epidemic consequences such as incidence rate, hospitalization, and death caused by corona during the implementation of the plan of Martyr Soleimani.

MATERIALS AND METHODS

This study was performed as a longitudinal study in all provinces of the country. The study population included all citizens of the provinces in the period.

This assessment was carried out simultaneously in three fields of care, monitoring, and managerial support that the first phase of the project at the end of the 4th month was completed.

The method of implementing the program in the cities of the country was done as follows: 1st: Segmentation of the city based on neighborhood, district, region, and city, 2nd: Determining the person responsible for each area and establishing relations with local health centers, 3rd: Defining and specifying families (defined population) and places in segmentations and registering family information in each family’s file, 4th: preparing a map of the area and identifying health-care facilities and high-risk and crowded places, 5th: Identifying health facilities, including local health centers, health-care centers, and comprehensive health centers, 6th: Identifying the quantitative shortcomings of local health and healthcare centers in segmentation and creating the required new bases, and 7th: In case of shortage of health-care units in the region (especially in metropolitan areas), according to the instructions of the Ministry of Health Network Management Center, the capacity of other organizations (with the priority of health spaces) should be used to quickly set up a health center or comprehensive health service center exclusive to COVID-19.

The collection of monitoring information was done by completing the relevant forms and the required information that was sent by the heads of the medical community in the provinces. To monitor and ensure the quality of the results, a specialist periodically visited each province. Interventions were assessed by collecting information from the other two sections and citing valid information about the intended consequences, including death, hospitalization, infection, and other outputs.

In this study, during performing the plan steps, information about health centers and disease status in each of the provinces was collected. The research teams completed a predesigned checklist for monitoring and supervising the project provided to them, and received the population statistics covered by each province separately from the provincial health center, and entered them into the checklist. They also received the statistics of patients and their families from the list of hospitals and medical centers in each city and entered them into the checklist. After each health center in each city collected information about itself, including the covered population, disease and health status, and personnel working in each center, this information was provided to the city health centers to be entered in a comprehensive form and to be sent to the health center of each province. Finally, the information was received by the project leadership team and its scientific and executive committee and prepared for analysis. Data were analyzed

using SPSS16 software (IBM SPSS Statistics for Windows, Version 16.0. Armonk, NY: IBM corp). The population base for calculating the incidence was the population and housing census data and according to the Statistics Center, it was 100,000.

When this manuscript was written, available case data do not have good quality. As mentioned before, county-level case numbers must be separated using population data. Other issues were low testing rates, large time spans between the infection and the day a case was reported, and an initially inefficient coronavirus hotline. Overall, the situation entailed decision-making under severe uncertainty.

Preliminary explanations

The 4030 system was used for this purpose. This system is responsible for informing people and answering their questions about the disease and methods of control and prevention.

Verbal screening

As soon as the health worker and health-care provider are informed that the COVID-19 test of one of the people under their monitor is positive (through the electronic health record system), they should contact the person and ensure that separation and home quarantine are observed, provide the necessary training, and care for people in close contact with the patient through contact tracing-computed tomography. Furthermore, by performing rapid tests, the symptomatic people in close contact with the patient are taken care of and prevented from traveling around the city.

RESULTS

This study was conducted from October 29, 2020, to December 1, 2020. A total of 23 provinces of the country registered their statistics, and on some days, statistics from 1 to 18 provinces have been used. The mean and standard deviation of the death age was 69.12 ± 19.91 years. 60.8 of the deaths (15105) were in males and the rest were in females. In our plan, there were also 7 infants.

Table 1 shows the mean and standard deviation of input–output of supportive and regulatory interventions on coronavirus control in the country. The mean and standard deviation of the total number of teams was 272.45 ± 127.35 teams.

In this study, we expected that as the number of inputs increases, the number of outputs decrease. In the present study, with increasing the number of elderly people, the amount of oxygen therapy, hospitalization, number of emergency missions, and the number of hospitalizations per day also increased. Also, with increasing the number of patients with underlying diseases, the amount of oxygen therapy increased [Table 2].

Regression analysis showed that the clinical symptoms of patients, as well as the number of polymerase chain reaction (PCR) + in this plan, are affected by items such as health ambassador, number of physicians, number of health workers, number of hospital stays, number of health

services, number of underlying diseases, and number of elderly [Table 3].

Figures 1 and 2 show that the incidence of PCR + increased with a mild slope, then with the peak of the disease, the incidence increased sharply over a period of 10 days and reached a mild slope again by controlling the disease.

With the implementation of this plan, the incidence of mortality also began to decrease [Figure 3]. In Iran, the corona epidemic trend increased until October 2020 and included about 500 deaths/day.

DISCUSSION

The COVID-19 epidemic management and control plan are neighborhood and family based, and the operational committees of the plan were formed as care, support, and monitoring teams in different parts of the country and worked within the defined tasks. In this plan, the most recipients of services were the elderly with underlying diseases. This study also indicates and confirms that most patients with underlying diseases and the elderly are infected with COVID-19.^[15] Furthermore, the increase in oxygen therapy and hospitalization and the number of hospitalization days^[16-18] was higher in the elderly group.

Statistical findings related to the mortality of the elderly with COVID-19 indicate that the association of underlying diseases leads to an increase in mortality in the elderly population so that the highest mortality in the elderly with COVID-19 is related to the elderly with hypertension, cardiovascular disease, diabetes, and chronic obstructive pulmonary disease (COPD).^[19] Perhaps one of the reasons for the success of this plan in reducing the death rate in Iran was the control of this disease at this stage in the elderly population because the immune system responses in the elderly are slower and less effective. Therefore, the elderly are more at risk of COVID-19 than other groups. Besides, age-related diseases such as diabetes, cardiovascular disease, COPD, and hypertension can increase the risk of infection, and if an elderly infected, it leads to severe disease and risk of death for the person. Preventive measures for this group of people will help reduce the care burden of the treatment team, reduce treatment costs

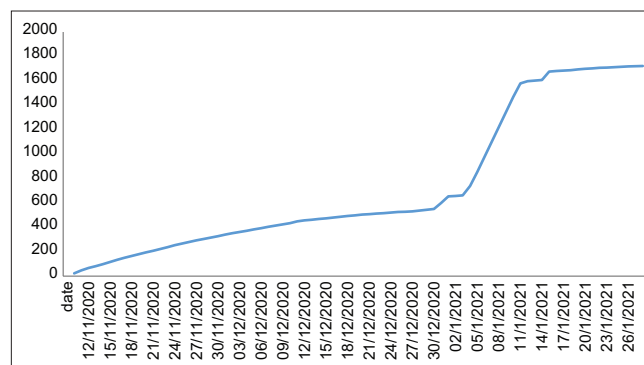


Figure 1: Cumulative frequency of positive PCR status in Iran. PCR: Polymerase chain reaction

Table 1: Mean and standard deviation of support, monitor and care teams and procedures performed for corona disease patients in the studied provinces

Variable	Number of observations	Minimum	Maximum	Mean±SD
Observation teams (n)	42	21	52	38±7
Health ambassador teams (n)	42	20	462	198±133
Care teams (n)	42	4	16	8±4
Support teams (n)	42	19	58	35±10
Monitoring teams (n)	42	6	21	12±3
Total number of teams (n)	42	77	496	272±127
Health-care centers (n)	42	16	26	20±3
Nurses (n)	42	11	35	20±5
Physicians (n)	42	2	12	6±2
Health workers (n)	42	34	73	48±7
Volunteer forces (basiji) (n)	42	97	251	192±44
Hospitals (n)	42	0.213	0.819	0.37950±0.147
Number of discharges (days)	42	0.694	4	2±0.725
Deaths (n)	42	0.082	0.394	0.203±0.092
Clinical symptoms (n)	80	5	80	35±18
PCR positive (n)	80	1	23	8±5
PCR negative (n)	80	11	52	26±11
Oxygen therapy (n)	49	0.100	5	2±2
Refer to hospital (n)	80	0.086	4	2±1
Emergency missions (n)	75	0.089	8	2±2
Intubation per day (n)	80	0.374	20	3±4
Hospitalizations (n)	80	0.585	14	6±3
Suspicious cases (n)	80	0.059	13	3±4
Health services (n)	80	1	2080	296±571
Livelihood support services (n)	49	9	828	224±267
Home quarantine (n)	80	0.36	204	29±56.54
Existence of underlying disease	80	1048	9009	2592±1603

SD: Standard deviation, PCR: Polymerase chain reaction

Table 2: Multiple linear regression analysis for clinical symptoms based on support, monitor and care teams and procedures performed for corona disease patients in the studied provinces

Covariates	Unstandardized coefficients		t	Significance
	B	SE		
Health ambassador teams (n)	0.032	0.011	2.871	0.007
Physicians (n)	-3.679	0.817	-4.501	0.000
Health workers (n)	0.616	0.129	4.783	0.000
Hospitalizations (n)	2.694	0.775	3.477	0.001
Health services (n)	0.021	0.010	2.109	0.042
Existence of underlying disease	0.003	0.001	3.529	0.001
Home quarantine (n)	-0.237	0.104	-2.281	0.029

SE: Standard error

and improve the health of the elderly, and help the treatment team fight the virus more effectively.^[20]

By regression analysis, it was found that the clinical symptoms of patients and positive tests in this plan are affected by items such as health ambassador, number of physicians, number of health workers, number of hospital stays per day, number of health services, and number of underlying diseases. This is similar to

Japan’s plan to control the epidemic by identifying suspected carriers based on medical information and conducting necessary tests, using private and local institutions to strengthen and coordinate the PCR testing system, and continuing to produce kits for rapid diagnosis, leading to a decrease in the number of deaths to 2.25 deaths per million in 125.51 population (in millions) until April 27, 2020.^[21-23] Vietnam also had effective strategies for controlling the COVID-19 pandemic, including contact tracking, prevention and infection control in health centers, and a daily review by a “community team” of local health workers and officials.^[24] In New Zealand, transparency and decisive leadership, extensive testing, and tracking during periods of national constraint and closure (7 weeks) were also key issues.^[25] In epidemics, the need for integrated responses is more than diverse and separate strategies. Effective communication must be established at the highest political level. It is necessary to test the responsiveness and tolerance of the health system and make the necessary changes and reforms based on the results obtained. Intelligent support for families affected by the coronavirus, tracking family members and colleagues of suspected coronavirus carriers, increasing commuting and intercity travel restrictions, increasing diagnostic tests, and using the capacity of private clinics and laboratories led to better implementation of the plan which aimed at controlling COVID-19, disruption of the disease

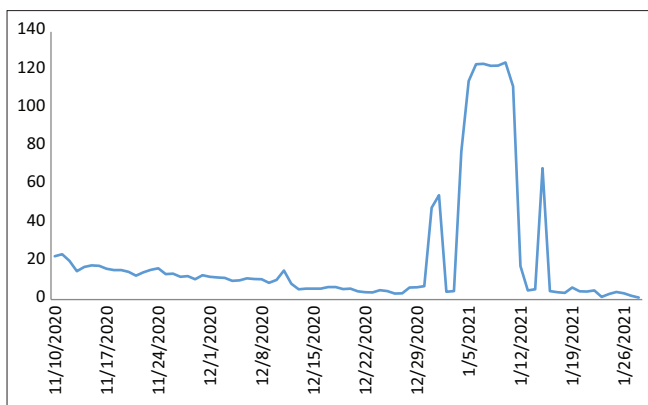


Figure 2: Incidence of COVID-19 positive cases during the implementation of the plan in Iran

Table 3: Multiple linear regression analysis for polymerase chain reaction positive status based on support, monitor, and care teams and procedures performed for corona disease patients in the studied provinces

Covariate	Unstandardized coefficients		t	Significance
	B	SE		
Health-care centers (n)	0.170	0.064	2.679	0.011
Physicians (n)	-0.582	0.138	-4.228	0.000
Health workers (n)	0.058	0.023	2.475	0.018
Hospitalizations (n)	1.242	0.126	9.858	0.000
Health services (n)	0.004	0.002	2.766	0.009
Elderly population	0.000	0.000	-2.883	0.007
Home quarantine (n)	-0.030	0.016	-1.878	0.069

SE: Standard error

transmission chain, reduction of death due to COVID disease, and supportive coverage of people at risk.

Preventive measures in this plan helped to reduce the care burden of the treatment team, reduce treatment costs and promote the health of the elderly. In the above national plan, the issue was the active care system, which improved the prevalence status of coronavirus in the country. Furthermore, earlier identification of patients has decreased the burden on hospitals, which has played an important role in reducing morbidity and mortality.

CONCLUSION

The above plan for managing the coronavirus crisis in the country was an attempt to move toward improving the observance of health guidelines and its most important axis, i.e., prevention. Before the plan, the main focus was on the field of treatment, but with the consensus of the country’s capable scientific forces, an attempt was made to change the approach to concentrate on reducing the risk of disease transmission in the country.

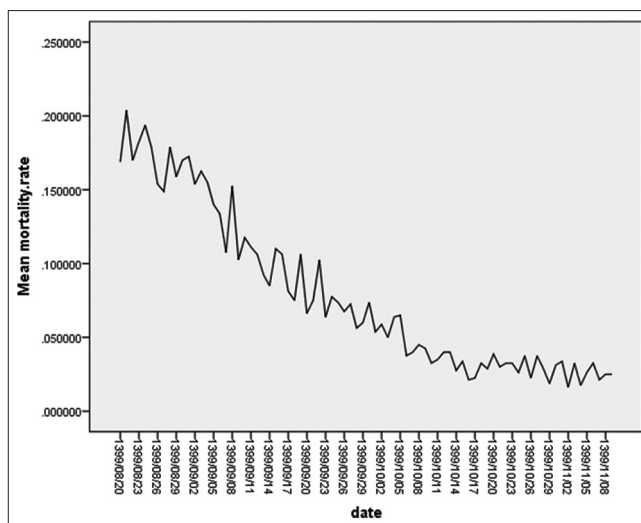


Figure 3: The trend of mortality due to COVID-19 during the implementation of the plan

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Conflicts of interest

There are no conflicts of interest.

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