

# Control of COVID-19 in Rural Area: An Evidence-based Strategy

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## Abstract

**Background:** COVID-19 has become a global problem. In this case study, the experiences gained from disease control in rural areas are reported.

**Methods:** An observational study was done in 2020 in Sistan and Balochestan, the largest province with most rural areas in the southeast of Iran.

**Results:** After identification of the first patient of Covid-19 in a rural area, three measures were taken including: 1. Diagnosis, screening and treatment of the disease (Incident command post was established and the village was completely quarantined, etc.); 2. Intersectoral coordination for epidemiological management (limiting traffic for people and any gathering); and 3. Identification of any Covid-19 positive cases. The results of these measures showed that after quarantining the village and performing the mentioned actions, the number of patients decreased, and the disease was controlled.

**Conclusion:** Quarantine of the contaminated rural area and people's traffic routes is one of the most important measures in controlling Covid-19.

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## Introduction

COVID-19 emerged in late 2019 in China, and its growing level of spread and severity between and within other countries and different continents became a global emergency.<sup>1-3</sup> According to the report from the World Health Organization (WHO), COVID-19 nearly affected more than 216 countries with more than 218,580,734 cases internationally in both urban and rural areas until September 2021.<sup>4</sup> The COVID-19 outbreak is spreading very fast every day and more than 4 million people have been actively infected by this virus. Thus, its daily increasing cases and deaths led to worldwide lockdown, quarantine, and some restrictions.<sup>5</sup> The following are the experiences of Covid-19 epidemic in a rural area in Iran and the measures taken to control the disease.

Village A with a population of 3388 people, 716 Iranian families, and 928 non-Iranian immigrants is located in Khash, one of the central cities of Sistan

and Baluchestan Province, southeast of Iran.<sup>6</sup> The residents of this village are engaged in activities such as agriculture, and animal husbandry.

At present, the demographic context of the rural area generally consists of two parts:

A: The local people in the region, who have extensive family and social ties, have generally nuclear families, with an average family size of more than four persons. Continuous family visits, extensive participation in social events such as funerals, and wedding ceremonies are among the cultural characteristics of this population group. Also, when a member of this community falls ill, extensive and crowded visits are done as a social norm.

B: The non-Iranian populations, who are generally immigrants without a residence permit from Afghanistan and have chosen to live in the area as they can find a job in the neighborhood farms and gardens.

This population, like the first group, has extensive inter-family connections, nuclear families, and then relatively large households.

Health services in this rural, based on the health network system in Iran, are provided by one comprehensive rural health services center and six health houses. At present, all Iranian and non-Iranian populations in the region benefit from primary health care (PHC) and active care by forming an electronic health record.

## Methods

An observational study was carried out in 2020 in Sistan and Balochestan, the largest province with most rural areas in the southeast of Iran.<sup>7</sup> Data were collected from health centers and we followed up the patients. Data related to events that occurred for the cases were collected and recorded by following them and reviewing their medical records, including tests, hospitalization, etc., through hospitals and health centers. A 60-year-old woman was the first patient identified in the village (index case) on April 6, 2020. This index case on March 22, 2020, had symptoms such as fever, cough, sore throat, and shortness of breath and had referred to a hospital after six days. This person was reported to the health center on April 6, 2020, as a confirmed case. She died two days after the report of her positive test in the city hospital and was buried according to public health protocols. The results revealed that the patient, along with Ms. B and one of their close relatives, Mr. A had participated in three funerals in Zahedan, and after returning to the village, Mr. A developed kidney problems and some respiratory symptoms, including shortness of breath and cough. Mr. A along with a number of other relatives, including Ms. B sister-in-law, traveled to Zahedan for treatment and stayed at his sister's home. Ms. B, who was a neighbor of Mr. A, was accompanying Mr. A during his residence in Zahedan. Finally, Mr. A died in Zahedan at his sister's house and

was transferred to the village for funeral. Since Mr. A had been identified as a suspected case of COVID-19, his funeral ceremony was carried out according to public health protocols; however, his mourning ceremony lasted for three days at Ms. B's house. Ms. B also attended the ceremony along with a large number of residents of the village. For data analysis, we used SPSS version 21 and descriptive statistics. In all stages of this study, we tried to consider ethical issues; the patients' identity was completely confidential.

## Results

Findings from COVID-19 tests in the rural area are shown in Table 1. According to the findings, 22 days after the first positive identification in the region, 72 positive cases were identified based on laboratory findings.

The highest number of patients was identified 14 days after the diagnosis of the first case. Once the first positive case was detected, active case finding, contact tracing and home isolation of both suspected and confirmed cases of COVID-19 were carried out under strict supervision of healthcare workers, and the physicians attended the rural comprehensive health services center.

After these measures, the number of patients decreased significantly. As part of the contact tracing guideline, a total of 328 samples were taken from the patients' household members, of which 12 (3.7%) positive cases were identified.

In order to prevent and control the disease, we took the following measures by the health network and the crisis headquarters of the Zahedan University of Medical Sciences (ZAUMS):

A) Diagnosis, screening, and treatment of the disease:

1- Establishing Incident Command System (ICS) in the comprehensive health service center with the aim of making realistic decisions, monitoring the

**Table 1:** Demographic characteristics of the laboratory confirmed cases of Covid-19 in rural areas of Khash district, southeastern of Iran in 2020

| Variables          | Dimensions          | Frequency | Percent |
|--------------------|---------------------|-----------|---------|
| Gender             | Male                | 32        | 44      |
|                    | Female              | 40        | 56      |
| Age                | <15                 | 4         | 5       |
|                    | 16-45               | 41        | 57      |
|                    | 46-60               | 15        | 21      |
|                    | >60                 | 12        | 17      |
| Underlying disease | Cardiovascular      | 3         | 14      |
|                    | Respiratory         | 4         | 19      |
|                    | Diabetes Mellitus   | 6         | 29      |
|                    | High Blood pressure | 5         | 24      |
|                    | Hypothyroidism      | 1         | 5       |
|                    | Pregnancy           | 2         | 9       |
| Type of referral   | Outpatient          | 44        | 61      |
|                    | Inpatient           | 28        | 39      |

proper implementation of care programs, preventing, treating and rehabilitating the patients and quick response to the epidemic process.

2- Strengthening the specialized human resources in the comprehensive health services center.

3-Increasing the number of services in the comprehensive health service center and turning this center into a 16-hour screening setting (8:00 am to midnight every day). The services included physician visit, diagnosis, screening, and oropharyngeal sampling for coronavirus disease.

4- Deploying an ambulance to transport critically ill patients who needed hospital care and increasing technical equipment for individual protection.

5- Carrying out 251 outpatient visits, performing 182 oropharyngeal sampling, and referring six critically ill patients to hospital during the disease epidemic (22 days period).

6- Providing necessary training to patients and their families and also delivering personal protective equipment.

7- Deploying environmental and occupational health teams in the rural area.

8- Increasing disease control teams in the rural area

B- Intersectoral coordination for epidemiological management:

1- Establishing a corona crisis center to use all capacities of the people and government in order to the rural quarantine

2- Holding meetings for coordination, justification, and training for managers, village heads, and other related people to prevent the spread of coronavirus epidemics

3- Performing complete lockdown of the village using people's volunteers force and law enforcement

4- Limiting any people gathering, whether religious or family, such as daily congregational prayers and Friday prayers, funerals, mourning, weddings, parties, etc.

5- Monitoring the complete closure of schools and collective activities in the area.

6- Distributing food packages in the village with the cooperation and coordination of support and relief organizations, including Imam Khomeini Relief Committee, Sistan and Baluchestan Welfare Organization, and the Islamic Revolutionary Guard Corps to reduce the movement of people.

C- The most important steps taken after identifying any Covid-19 positive cases:

1- The field visit by of the Rapid Response Teams in the village to review and carry out environmental measures and completion of the form

2- Completion of the individual epidemiological

investigation form

3- Environmental visits of the patients' home and people who lived with them

4- Provision of training to village residents who were in contact with patients about home isolation, hand hygiene and respiratory hygiene, importance of disinfection, etc.

5- Completion of rapid environmental health assessment form for the patient's residence

## Discussion

The results of these measures showed that after the lockdown of the village and performing the mentioned actions, the number of patients decreased, and the disease was controlled. In this regard, Sardar found that lockdown would be effective in those locations where a higher percentage of symptomatic infection existed in the population.<sup>8</sup> Moreover, Atalan's reports offered initial evidence that the COVID-19 pandemic could be suppressed by lockdown.<sup>5</sup> Moreover, lockdowns have been used by most European countries in response to the COVID-19 pandemic.<sup>9</sup> On the other hand, other studies have confirmed the findings of this study.<sup>10, 11</sup> However, it should be noted that quarantine can have negative psychological, environmental, economic, and happiness effects on population(5). It was determined that stress (8.0%) and depression (16.0–28.0%) were psychological reactions during the COVID-19 pandemic.<sup>5, 12</sup>

The experience of this study showed that the spread of Covid-19 virus in rural and developing regions was much higher than the urban areas due to the high level of family communication and close contact of the households. This study offers initial evidence that the COVID-19 pandemic can be suppressed by fast and appropriate lockdown. It is suggested that the healthcare systems should carry out measures related to the identification of disease in a comprehensive manner through investigation and intervention teams and jihadi groups. In addition, other parameters such as demographic features of the population, density of populations, demographic diversity and the parameters of economy, and infrastructure of healthcare systems could be considered in future studies as effective factors on Covid-19 pandemic.

## Conclusion

Quarantine of contaminated rural areas and people's traffic routes is one of the most important measures in controlling Covid-19. It is suggested tohat we should pay more attention to the principle of inter-sectoral coordination in controlling the epidemic of diseases and it is the best comprehensive strategy. It is recommended that the authorities should use all local capacities and sources to control epidemics in rural areas.

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## Authorship Contributions

All authors have contributed to all stages of the manuscript preparation.

**Conflicts of interest:** None declared.

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