



Demographic and Clinical Characteristics Associated with COVID-19 Infection in Hormozgan Province, Iran Between January 24 to June 10, 2020

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Abstract

Background: Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has been widespread.

Objectives: We aim to investigate the demographic and clinical characteristics associated with COVID-19 infection between January 24 to June 10, 2020.

Methods: All data related to tested patients (positive and negative cases) were extracted from the integrated health information system (IHIS) between January 24 to June 10, 2020. Statistical analyses were performed using data related to the anamnesis of all patients, odds ratios (OR) of COVID-19 infection in defined subgroups including contact history, partial pressure of oxygen (PO₂) higher than 93 mmHg, the muscle-pain symptom, the cough symptom, and the fever symptom.

Results: The COVID-19 infection was significantly associated with contact history (OR 5.25, [95% CI 4.35 to 6.34], P-value < 0.0001); PO₂ higher than 93 mmHg (OR 1.74 [95% CI 1.44 to 2.22], P-value < 0.0001); muscle-pain symptom (OR 1.89 [95% CI 1.58 to 2.26], P-value < 0.0001); cough symptom (OR 1.32 [95% CI 1.14 to 1.53], P-value < 0.0001); and fever symptom (OR 1.29 [95% CI 1.11 to 1.49], P-value = 0.0004).

Conclusions: The results of our study indicated that contact with patients or suspicious individuals can be considered as the most important symptoms of COVID-19 disease. Furthermore, the high pressure of oxygen, muscle-pain, cough, and fever symptoms were identified as considerable symptoms of COVID-19 disease.

Keywords: COVID-19 Infection, 2019-nCoV, Demographic and Clinical Characteristics, Hormozgan, Iran

1. Background

A type of pneumonia caused by SARS-CoV-2 was sparked in Wuhan City (Hubei Province), China, on December 31, 2019 (1). The 2019 novel coronavirus disease (COVID-19) is an acute resolved disease that the WHO announced as a global health emergency (pandemic) on March 11, 2020 (2, 3) and has been reported in 211 countries with 1,347,235 positive cases on April 06, 2020 (4).

Initial studies suggested that COVID-19 may be less severe than Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) (5, 6). However,

COVID-19 spreads rapidly among the human population, thereby suggesting that it is more contagious than both MERS-CoV and SARS-CoV (3, 7-9).

Coronaviruses (CoV) infect humans and many animal species such as bats, cattle, camels, and cats (10). Studies indicated that SARS-CoV and MERS-CoV were transmitted from civet cats and dromedary camels to humans, respectively (10).

Since the onset of the disease in China in December 2019, community health concerns have increased in Iran due to high commercial transactions between Iran and China. The first positive cases of COVID-19 were confirmed

in the city of Qom on February 19, 2020 (11). Afterward, COVID-19 spread very rapidly in the other provinces near Qom, including Tehran, Semnan, Isfahan, and Markazi provinces (12).

The first positive case of COVID-19 was confirmed in Qeshm Island in Hormozgan Province on February 23, 2020, and other positive cases of the disease were quickly reported in the other cities of the Hormozgan Province.

2. Objectives

In the current study, it was attempted to investigate some demographic and clinical characteristics of COVID-19 infection in Hormozgan Province.

3. Methods

3.1. Study Design

The present study was descriptive of all cases of COVID-19 diagnosed in Hormozgan Province in Iran between January 24 to June 10, 2020. A cross-sectional study approach was used, following the reporting of observational studies in epidemiology (STROBE) guideline (13). In addition, an analytic study design was established considering clinical variables related to the outbreak of the COVID-19 infections.

3.2. Data Sources

We obtained medical records for hospitalized patients with a positive laboratory test for COVID-19 in Hormozgan Province. All medical records were approved by the Hormozgan University of Medical Sciences (HUMS) and the Ministry of Health and Medical Education (MOHME) between February 14, 2020, to June 10, 2020.

COVID-19 infection was diagnosed according to the WHO guidance (14) by real-time reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay of pharyngeal swab and nasal samples (3, 15). Acute respiratory cases were diagnosed based on American Thoracic Society guidelines for community-acquired pneumonia (16).

Laboratory findings, including negative and positive results of all acute respiratory hospitalization cases; clinical symptoms: partial pressure of oxygen (PO_2), muscle-pain, cough and fever symptoms; and demographic: contact history were statistically analyzed. During the extraction and processing of the data, expert staff of hospitals were contacted in the case of missing or incorrect data. All tested patients (positive and negative cases) were included in our analysis, and other cases such as suspected cases and cases that have not received laboratory testing were excluded.

3.3. Study Definitions

In this study, residence status was defined as patients living permanently in the Hormozgan Province, and passenger cases defined patients traveling into Hormozgan Province for recreation, business, etc. Total patient cases included both positive and negative confirmed cases; positive cases were acute respiratory cases with positive laboratory findings.

3.4. Statistical Analysis

According to their distribution, variables were expressed as frequency and percentages, while continuous variables were expressed as mean and standard deviation. Statistical analysis was done with SPSS 21.0 software (IBM-SPSS Inc, Chicago, IL).

The incidence of COVID-19 infection was calculated as the number of positive cases divided by the total population, expressed as per 100,000 individuals. Furthermore, COVID-19 infection, according to demographic and clinical symptoms, was assessed using estimating odds ratios (OR) and 95% confidence intervals (CI). The ORs and 95% CIs were calculated for both demographic (contact history) and clinical characteristics ($PO_2 > 93$ mmHg, muscle-pain, cough, and fever). A P-value < 0.05 was considered as statistically significant.

4. Results

4.1. Demographic Characteristics

The positive cases of COVID-19 infection were 1216 in Hormozgan Province. The positive cases of COVID-19 infection in females and males based on their age groups are depicted in Figure 1. The highest number of positive cases was observed in the 31 - 40 years age groups for both females ($n = 144$) (Figure 1A) and males ($n = 155$) (Figure 1B). In addition, the number of positive cases in males ($n = 625$, 51.31%) was higher than females ($n = 591$, 48.60%) (Appendix 1 in Supplementary File). The COVID-19 infection was significantly associated with contact history (OR 5.25, [95% CI 4.35 to 6.34], P-value < 0.0001) (Table 1).

4.2. Clinical Characteristics

The COVID-19 infection was significantly associated with PO_2 higher than 93 mmHg (OR 1.74 [95% CI 1.44 to 2.22], P-value < 0.0001) showed significant association with the incidence of COVID-19. The COVID-19 infection was also significantly associated with muscle-pain symptom (OR 1.89 [95% CI 1.58 to 2.26], P-value < 0.0001), and cough symptom (OR 1.32 [95% CI 1.14 to 1.53], P-value < 0.0001). Moreover, our results showed that COVID-19 infection was significantly associated with fever symptom (OR 1.29 [95% CI 1.11 to 1.49], P-value = 0.0004) (Table 1).

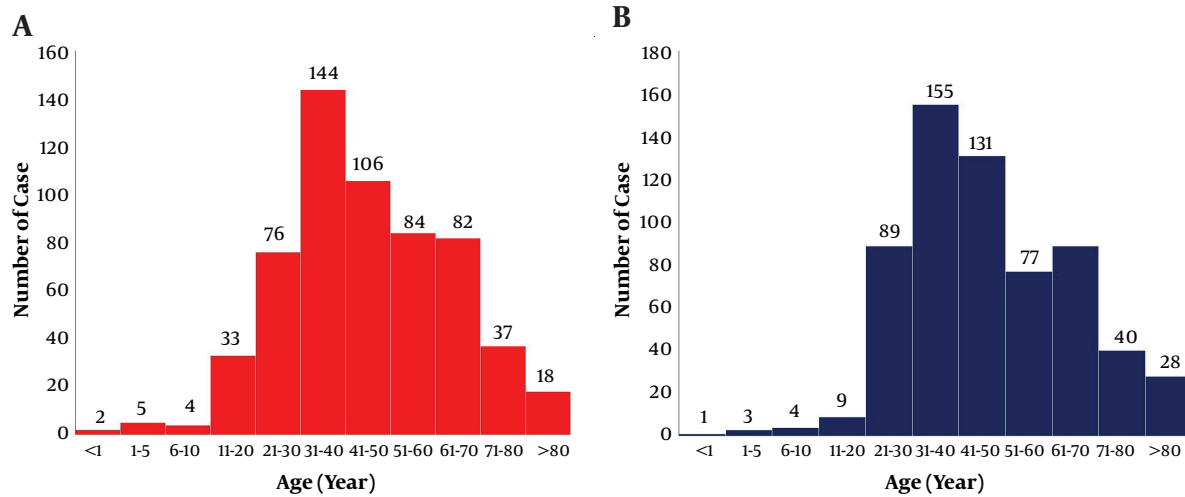


Figure 1. Distribution number of COVID-19 positive cases based on range of age in the female (A) and male (B) residents in Hormozgan Province.

Table 1. The COVID-19 Infection Based on Demographic and Clinical Characteristics in Hormozgan Province

Demographic and Clinical Characteristics	Proportion		ORs, 95%CI	P-Value
	Yes	No		
Contact history			5.25, (4.35 - 6.34)	< 0.0001
Positive cases	439	210		
Negative cases	777	1954		
PO₂ > 93 mmHg			1.78, (1.44 - 2.22)	< 0.0001
Positive cases	1084	132		
Negative cases	1777	387		
Muscle-pain			1.89, (1.58 - 2.26)	< 0.0001
Positive cases	306	910		
Negative cases	326	1838		
Cough			1.32, (1.14 - 1.53)	< 0.0001
Positive cases	661	502		
Negative cases	1024	1140		
Fever			1.29, (1.11 - 1.49)	0.0004
Positive cases	573	643		
Negative cases	883	1281		

5. Discussion

It was first reported in Wuhan city, China, by the Chinese Center for Disease Control and Prevention (CDC), then the clinical and epidemiological features of COVID-19 patients have been reported in different countries (17-20). However, there is a scarcity of data on clinical, demographical features, and prognostic factors of COVID-19 in Iran. The majority of studies on COVID-19 in Iran have commonly been restricted to the description of the preliminary es-

timation of COVID-19 cases, in silico design, case reports, and prediction of COVID-19 spreading profiles (21-24). In particular, PO₂ levels higher than 93 mmHg, and higher contact history, muscle-pain, cough, and fever symptoms were associated with higher odds of in-hospital death. Several studies have also reported that the main feature of patients with severe COVID-19 is the ARDS development (25-27). However, as indicated in previous reports, common symptoms of COVID-19 are cough, shortness of breath, and

fever, while the less common symptoms were sore throat, malaise, myalgia, and diarrhea (18, 19, 28, 29). Additionally, the highest positives cases of COVID-19 were observed in males aged from 31 to 40. This is in accordance with the data from five countries (France, China, Germany, Italy, and South Korea) that provided data broken down by gender for both deaths and confirmed cases (30-33).

However, there are no significant differences in COVID-19 infection between males and females. In accordance with our result, an approximately 1:1 ratio of male and female patients (50.7%) in 140 hospitalized patients with COVID-19 illness was reported (34). Another study also pointed out a similar susceptible ratio to SARS-CoV-2 between females and males in 1019 surviving patients collected from a case series of 43 hospitalized patients in China (31).

5.1. Conclusions

We found that contact history was the most important finding for COVID-19 infection. Furthermore, PO₂ higher than 93 mmHg, muscle-pain, cough, and fever were considerable symptoms of COVID-19 infection.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnotes

Authors' Contribution: Yadolah Fakhri did design and management of study, analysis of data, and writing methodology of article. Ali Mouseli did collection of data and analysis of data, and writing the discussion of article. Mehdi Hassani Azad did collection of data, analysis of data, and clinical counselor. Zahra Mastaneh did collection of data, analysis of data, and writing the discussion of article; Mansour Sarafraz did analysis of data and writing the introduction of the article. Maryam Dadar did design of study and writing discussion of article.

Conflict of Interests: We declare no competing interests.

Ethical Approval: The ethical approval code was IR.HUMS.REC.1398.471.

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