Novel Coronavirus Disease Risk Factors in Karun, Iran 2021: a Case-Control Study

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ABSTRACT

Objectives: Coronavirus disease 2019 (COVID-19) is now a pandemic disease. Nonetheless, there is no comprehensive analysis regarding this disease in the world. Therefore, the present study aims to investigate the risk factors of this disease for better prevention and control.

Materials and methods: This case-control study was performed on 1 407 patients diagnosed with COVID-19 and 2 898 people in the control group to evaluate the risk factors of the disease. All data were statistically analyzed by logistic regression.

Results: The results of logistic regression revealed that COVID-19 had correlations with a history of cardiac disease ($P=0$, $OR=5.7$), blood hypertension ($P=0$, $OR=7.1$), diabetes ($P=0$, $OR=7.4$), health and treatment occupation ($P=0$, $OR=89$), and contact with COVID-19 patients ($P=0$, $OR=435$).

Conclusions: The findings of the current study demonstrated that COVID-19 is correlated with a history of cardiac disease, diabetes, blood hypertension, health occupation, and contact with a COVID-19 patient.

Keywords: : case-control, COVID-19, Karun, risk factors.

INTRODUCTION

On 29 December 2019, the doctors of a hospital in Wuhan, China, found uncommon pneumonia cases. However, the first case of this unusual disease was observed on December 12. Further investigations revealed that this disease originated from Huanan seafood wholesale market, Wuhan, Hubei, China. Afterwards, the unexpected prevalence of pneumonia was reported to the World Health Organization (WHO) on December 31.

On 1 January 2020, the mentioned market was closed and disinfected.

Following extensive assumptions concerning the causative agent of this disease, the Chinese Center for Diseases Control and Prevention (CDC) reported the agent of the novel COVID-19 in the Wall Street Journal (1, 2). Currently, this disease has spread throughout the world and was categorized as a pandemic by the WHO in March 2020 (3).

The virus in this disease can transmit from human to human (4). The number of infected people is still increasing and the cases have elevated

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from one million patients on 2.04.2020 to over 1.5 million cases in the next week in 184 countries (5, 6). The disease is diagnosed by polymerase chain reaction (PCR) using a pharyngeal specimen (7, 8). Considering the limited capacity for testing, only patients with fever, cough, myalgia, fatigue, headache, hemoptysis, and abnormal computed tomography (CT) of lungs are tested (9). Patients with severe symptoms are referred to the Intensive Care Unit (ICU) and sometimes require artificial respiration (10).

This case-control study was performed on 1 407 definite cases of COVID-19 to assess the relationship of this disease with diverse risk factors. □

MATERIALS AND METHODS

This case-control study was conducted during January to May 2021 in Karun; the city is located in the South-East of Ahvaz city adjacent to the Karun River and has a population of 184 198 people (Khuzestan, Iran). A total of 1 407 hospitalized and non-hospitalized definite COVID-19 patients who were referred to the hospital and 16-h Health Centers of this city were selected for the study. The definite patients

were people with fever, sore throat, cough, dyspnea along with laboratory evidence and positive PCR result. Participants in the control group (n=2 898) were individuals without the disease and two control people were selected for each diseased case based on a random number table.

Data was collected using the case reporting form for novel Coronavirus cases completed by the health personnel for suspicious people. This form has 12 parts, including: 1) information about the person who fills the form; 2) demographic data of the patient; 3) clinical data of the patient; 4) clinical signs; 5) history of background disease; 6) treatment condition; 7) epidemiologic data; 8) contact history; 9) sampling and laboratory information; 10) test results; 11) disease side effects; and 12) disease outcome.

Data concerning age, gender, cardiac disease, diabetes, blood hypertension, asthma, occupation, and history of contact with COVID-19 patients (CDC definition: direct contact with the secretions of a patient with COVID-19 or close contact in 2 m or 6 ft in a room or a care unit for a long period without personal protective equipment) were collected from the aforementioned form. All data were analyzed using the SPSS soft-

TABLE 1. Frequency and percentage of risk factors in cases and controls

Variable	Case (N)	%	Control (N)	%
Male	786	56	1 505	51
Female	621	44	1 393	49
With a history of cardiac disease	126	9	5	0.2
Without a history of cardiac disease	1 275	91	2 893	98.8
With a history of blood hypertension	219	16	12	0.4
Without a history of blood hypertension	1 188	84	2 886	99.6
With a history of diabetes	254	18	18	.6
Without a history of diabetes	1 153	82	2 880	99.4
With a history of asthma	12	1	4	0.1
Without a history of asthma	1 395	99	2 894	99.9
With a history of chronic obstructive pulmonary disease	24	2	0	0
Without a history of chronic obstructive pulmonary disease	1 383	98	2 898	100
With health occupation	56	5	1	0
Without health occupation	1 171	95	2 082	100
With a history of contact with a COVID-19 patient	745	53	7	0.3
Without a history of contact with a COVID-19 patient	662	47	2 076	99.7

TABLE 2. Logistic regression results concerning the relationship of risk factors with disease

Variable	P-value	OR	95% CI
History of cardiac disease			
Yes	0	5.7	1.9-16.6
No			1
History of blood hypertension			
Yes	0	7.1	14.4- 3.5
No			1
History diabetes			
Yes	0	7.4	13.08-4.2
No			1
Health occupation			
Yes	0	89	11.7-683.08
No			1
History of contact	0	435	203-931
			1

ware version 20. Logistic regression was applied to assess the relationship between the disease and independent variables. P-value <0.05 was considered statistically significant. □

RESULTS

Demographic and clinical characteristics of case and control can be found in Table 1. Of 1 407 confirmed patients, 56% were men, 9% had a history of cardiac diseases, 16% had a history of blood hypertension, 18% had a history of diabetes, 1% had a history of asthma, 2% had a history of COPD, 53% had a history of contact with a covid-19 patient and 5% had an occupation in the healthcare field.

The results of logistic regression demonstrated that COVID-19 had relationships with a history of cardiac disease (P=0, OR=5.7), blood hypertension (P=0, OR=7.1), diabetes (P=0, OR=7.4), health and treatment occupation (P=0, OR=89), and contact with COVID-19 patients (P=0, OR=435). Other variables, including age, gender, and a history of asthma were not found to have a significant relationship with disease incidence (Table 2). □

DISCUSSION

Most studies in the world on COVID-19 have reviewed and addressed the risk factors of hospitalization, prognosis, disease severity, mortality in hospitalized patients. The present study was a case-control investigation on all definite both hospitalized or non-hospitalized COVID-19 cases (Figure 1).

Our findings revealed that age did not have a significant relationship with COVID-19. However, Verity *et al.* indicated that hospitalization and mortality rates were higher in old people than young individuals (11). The present investigation showed that cardiac disease, blood hypertension, and diabetes were independent risk factors for COVID-19. These results are in line with the case-series study in China, the USA, and Europe (12-14).

Moreover, the studies conducted by Knapp *et al.*, Joshi *et al.*, and Yang *et al.* concluded that diabetic patients are prone to infections and death (15-17). Our findings revealed that an occupation in the healthcare field did have a significant relationship with COVID-19 compared to healthy individuals. However, no remarkable studies have been performed in this regard

FIGURE 1. Bar diagram of the relative frequency of risk factors for COVID-19 in cases

throughout the world. Furthermore, we observed that a history of contact with a COVID-19 patient elevated the chance of being affected by this disease. According to CDC, contact with a COVID-19 patient is defined as having direct contact with the secretions of a COVID-19 patient or close contact in 2 m or 6 ft in a room or a care unit for a long period without personal protective equipment.

The present investigation showed that asthma and COPD did not have a significant relationship with COVID-19 occurrence. In a case-series study, Guan *et al.* reported COPD prevalence as too low among the hospitalized COVID-19 patients (18). On the other hand, a meta-analysis by Alqahtani *et al* revealed that the chance of

death due to COVID-19 was high in COPD patients (19). □

CONCLUSION

The results of the present study demonstrated that COVID-19 had a significant relationship with a history of cardiac disease, diabetes, blood hypertension, contact with an affected patient, and having an occupation in the healthcare field. These findings provide a valuable understanding which is beneficial for prioritizing care and prevention from COVID-19 in people with chronic diseases, vulnerable individuals, and an occupation in the healthcare field. □

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