Coronavirus Disease 2019 Risk Factors in Karun, Iran: A Case-Control Study

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Abstract

The infection of the Sars-coV-2 virus (Covid-19) is now regarded as a pandemic. However, a globally inclusive examination concerning this infection is not accounted for. As a result, this study attempted to investigate the disease's risk factors to improve control and prevention. The illness risk variables were assessed in this case-control study, which included 721 patients diagnosed with COVID-19 and 2083 people in the control group. Logistic regression was used to assess all of the data statistically. COVID-19 was linked to cardiovascular disease ($P = 0$, OR = 4.9), hypertension ($P = 0$, OR = 6.4), diabetes ($P = 0$, OR = 7.1), occupational health and treatment ($P = 0$, OR = 92), and contact with COVID-19 patients ($P = 0$, OR = 438), according to the results of logistic regression. Underlying illnesses linked to Covid-19, such as hypertension, a history of cardiac disease, diabetes, occupational health, and direct contact with a Covid-19 patient, were found to have a link to our findings in this study.

Keywords: Case-control, COVID-19, Karun, Risk factors

INTRODUCTION

A doctor in Wuhan, China, uncovered an unusual instance of pneumonia on December 29, 2019. Conversely, the first case of this abnormal infection was detected on December 12. The illness was induced by the Huanan Seafood Wholesale Market in Wuhan, Hubei Province, China, according to additional research. Later, on December 31, an unanticipated case of pneumonia was reported to the World Health Organization (WHO). The declared market was promptly shut down and sterilized on January 1, 2020.

The novel Covid-19 agent was described in the Wall Street Journal by the Center for Disease Control and Prevention (CDC) China, displacing prevailing assumptions about the infection causative agent [1, 2]. Presently, the WHO declared the infection as a pandemic in March 2020 due to the widespread of the infection worldwide [3].

This infection is caused by a virus that can be passed from one individual to another [4]. The amount of people that became infected continues to rise, with cases rising from 1 million on April 2, 2020, to over 1.5 million the following week in 184 nations [5, 6]. The pharyngeal specimen is used for diagnosis of the infection, which is conducted by polymerase chain reaction (PCR) [7, 8]. Furthermore, the patients who display symptoms such as fever, cough, myalgia, fatigue, headache, hemoptysis, and abnormal CT scan are considered to be tested due to the limited capacity [9]. The disease mortality rate is 3.4-11% and patients with critical signs are assigned to the Intensive Care Unit (ICU) and usually oblige to have artificial respiration [10].

This case-control study assesses the correlation between this infection and various risk factors such as age, gender, occupational health, direct contact with Covid-19 patients cardiovascular diseases, hypertension, diabetes, asthma, and obstructive pulmonary diseases was conducted on 721 positive cases of COVID-19.

MATERIALS AND METHODS

In February-June 2020, in Karun, Khuzestan Province, Iran, case-control research was carried out. The study included a total of 721 positive COVID-19 patients, both hospitalized and non-hospitalized, who were sent to the city's hospitals and 16-hour health facilities. Individuals with a fever, sore throat, cough, or shortness of breath, as well as laboratory findings and positive PCR results, were considered definite patients. The control group (N = 2083) consisted of infection-

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free people, with three controls picked at random for each infected case.

Information was gathered with a new Coronavirus case report form filled out by healthcare professionals for suspicious individuals. The following form consists of 12 parts:
1. Information of the person filling out the form
2. The patient demographic information
3. Patient clinical information
4. Clinical symptoms
5. Background disease history
6. Therapy circumstance
7. Epidemiologic data
8. History of Contacts
9. Laboratory information & Sampling
10. The results of the tests
11. Disease side-effects
12. The outcome of the disease

According to the CDC description regarding contact between Covid-19 patient and healthcare professionals are 2 meters or 6 ft and the presence of Healthcare providers in a close unit for a while without PPE, as well as data on age, gender, cardiac disease, diabetes, hypertension, asthma, occupational health, were gathered from above-mentioned form. The full data were analyzed using SPSS software version 20, and logistic regression was performed to determine the relationship between the infection and the independent factors. A P-value < 0.05 was evaluated as statistically insignificant.

Results and Discussion

The case and control groups' demographic and clinical characteristics are shown in **Table 1**. The results of the study were based on 721 confirmed patients, with 56 percent of them being men. 9 percent had cardiovascular disease, 15% had hypertension, 18% had diabetes, 1% had asthma, 2% had COPD, 53% had immediate tangency with a positive patient of covid-19, and 4% had occupational health.

According to the logistic regression results, COVID-19 is linked to a history of cardiovascular disease (P = 0, OR = 4.9), hypertension (P = 0, OR = 6.4), diabetes (P = 0, OR = 7.1), occupational health and treatment (P = 0, OR = 92), and contact with COVID-19 patients (P = 0, OR = 438). Other factors such as gender, age, and a history of asthma were not found to have a significant relationship with the occurrence of disease **(Table 2)**.

Table 1. Frequency and percentage of risk factors in the cases and controls

Variable	Case (N)	%	Control (N)	%
Male	405	56	1147	55
Female	316	44	936	45
With a history of cardiac disease	66	9	5	0.2
Without a history of cardiac disease	652	91	2078	98.8
With a history of blood hypertension	111	15	12	0.5
Without a history of blood hypertension	610	85	2071	99.5
With a history of diabetes	129	18	18	1
Without a history of diabetes	592	82	2065	99
With a history of asthma	6	1	4	0.2
Without a history of asthma	715	99	2079	98.8
With a history of chronic obstructive pulmonary disease	13	2	0	0
Without a history of chronic obstructive pulmonary disease	708	98	2083	100
With health occupation	27	4	1	0.04
Without health occupation	600	96	2082	99.96
With a history of COVID-19 patient contact	383	53	7	0.3
With a history of COVID-19 patient contact	338	47	2076	99.7

Table 2. Shows the findings of logistic regression on the link between risk variables and disease.

Variable	P-value	OR	CI: 95%
Gender Male Female	0.77	0.95	0.7-1.3 1
History of cardiac disease Yes No	0	4.9	1.5-15.9 1
History of blood hypertension Yes No	0	6.4	2.9- 14.5 1
History of asthma Yes No	**0.27**	**3.3**	**0.37-29.7 1**
History of chronic obstructive pulmonary disease	0.99		
Age	0.9	0.95	0.94-0.96
Health occupation Yes No	0	92	11.3-748.8 1

The majority of COVID-19 surveys conducted around the world have been evaluated and have revealed risk factors for hospitalization, diagnosis, infection severity, and mortality rate among hospitalized patients. The current study compared all positive COVID-19 cases, both non-hospitalized and hospitalized, in a case-control study.

Our conclusions show that age has an insignificant correlation with COVID-19. Nevertheless, Verity *et al*. the mortality rate and hospitalization were considered lower in young individuals than in old [11]. The independent risk factors for Covid-19 were indicated to be current analysis revealed such as cardiovascular disease, hypertension, and

diabetes. A series of samples surveyed in China, the United States, and Europe yielded these results [12-14].

Furthermore, the findings of Knapp *et al.*, Joshi *et al.*, and Yang *et al.* show that people with diabetes are more susceptible to infections and death [15-17]. COVID-19 patients had a higher risk of health and treatment occupation than healthy people, according to our findings. On the other hand, there are no comprehensive studies conducted regarding this throughout the world. As a result, we discovered that previous contact with a COVID-19 patient increased infection susceptibility in the people at risk or health professionals. The contemporary analysis exhibited that asthma and COPD have an insignificant correlation with COVID-19 manifestation. Guan *et al.* in a case-series study outlined COPD occurrence as low among the hospitalized COVID-19 patients [18]. In contrast, Alqahtani *et al.* found in a meta-analysis that COPD patients have a higher risk of dying from COVID-19 [19]. the reports showed that male sex were more commonly infected, which may be due to a higher probability of occupational exposure [20-25].

CONCLUSION

COVID-19 has a significant link with a history of cardiovascular illness, diabetes, hypertension, contact with an infected patient, or during occupational health and treatment, according to the findings of the current study. These findings provide a valuable indulgent advantage for emphasizing COVID-19 precaution and prevention in those with chronic conditions, those who are susceptible, and those who work in particular industries.

REFERENCES

1. Wilson ME, Chen LH. Travellers give wings to novel coronavirus (2019-nCoV). JTM. 2020. doi:10.1093/jtm/taaa015
2. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med. 2020;382:727-33. doi:10.1056/NEJMoa2001017
3. Ghebreyesus TA. WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020; 2020.
4. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020;395(10223):514-23. doi:10.1016/S0140-6736(20)30154-9
5. John Hopkins University. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). 2020. Available from: https://coronavirus.jhu.edu/map.html. Accessed 14 Apr 2020.
6. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis. 2020;20(5):533-4. doi:10.1016/S1473-3099(20)30120-1
7. Corman VM, Landt O, Kaiser M, Molenkamp R, Meijer A, Chu DK, et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. Euro surveill. 2020;25(3):2000045. doi:10.2807/1560-7917.ES.2020.25.3.2000045
8. Li X, Geng M, Peng Y, Meng L, Lu S. Molecular immune pathogenesis and diagnosis of COVID-19. J Pharm Anal. 2020. doi:10.1016/j.jpha.2020.03.001
9. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506. doi:10.1016/S0140-6736(20)30183-5
10. Rajgor DD, Lee MH, Archuleta S, Bagdasarian N, Quek SC. The many estimates of the COVID-19 case fatality rate. Lancet Infect Dis. 2020;20(7):776-7. doi:10.1016/S1473-3099(20)30244-9
11. Verity R, Okell LC, Dorigatti I, Winskill P, Whittaker C, Imai N, et al. Estimates of the severity of coronavirus disease 2019: a model-based analysis. Lancet Infect Dis. 2020;20(6):669-77. doi:10.1016/S1473-3099(20)30243-7
12. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020. doi:10.1056/NEJMoa2002032
13. China CDC Weekly. The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) — China, 2020. Available from: http://weekly.chinacdc.cn/fileCCDCW/journal/article/ccdcw/2020/8/PDF/COVID-19.pdf (accessed on May 8, 2020).
14. Goyal P, Choi JJ, Pinheiro LC, Schenck EJ, Chen R, Jabri A, et al. Clinical Characteristics of Covid-19 in New York City. N Engl J Med. 2020. doi:10.1056/NEJMc2010419
15. Knapp S. Diabetes and infection: Is there a link?-A mini-review. Gerontology. 2013;59(2):99-104.
16. Joshi N, Caputo GM, Weitekamp MR, Karchmer AW. Infections in patients with diabetes mellitus. N Engl J Med. 1999;341(25):1906-12.
17. Yang JK, Feng Y, Yuan MY, Yuan SY, Fu HJ, Wu BY, et al. Plasma glucose levels and diabetes are independent predictors for mortality and morbidity in patients with SARS. Diabet Med. 2006;23(6):623-8.
18. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM, et al. Comorbidity and its impact on 1590 patients with Covid-19 in China: A Nationwide Analysis. Eur Respir J. 2020:2000547. doi:10.1183/13993003.00547-2020
19. Alqahtani JS, Oyelade T, Aldhahir AM, Alghamdi SM, Almehmadi M, Alqahtani AS, et al. Prevalence, severity and mortality associated with COPD and smoking in patients with COVID-19: a rapid systematic review and meta-analysis. PloS one. 2020;15(5):e0233147.
20. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. Jama. 2020;323(11):1061-9.
21. Ruan Q, Yang K, Wang W, Jiang L, Song J. Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan, China. Intensive Care Med. 2020;368(2):641-3.
22. Kattan MW. Judging new markers by their ability to improve predictive accuracy. J Natl Cancer Inst. 2003;95(9):634-5.
23. Liang W, Guan W, Chen R, Wang W, Li J, Xu K, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. Lancet Oncol. 2020;21(3):335-7.
24. World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance. Jan 28, 2020. Available from: https://www.who.int/docs/default-source/coronaviruse/clinicalmanagement-of-novel-cov.pdf?sfvrsn¼bc7da517_6&download¼true.
25. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506.