










## Clinical Presentations of Suspected and Confirmed COVID-19 Cases in Shahroud, Iran

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### ABSTRACT

**Background & Objective:** COVID-19 is a serious disease with different symptoms and risk factors infecting and killing many people around the world. This study was performed to investigate the demographic and clinical characteristics of COVID-19 suspects referred to the hospitals and coronavirus treatment centers of Shahroud, Iran.

**Materials & Methods:** Upon the outbreak of the COVID-19 epidemic in Shahroud, Shahroud University of Medical Sciences launched a project to systematically record the demographic, clinical, and medical data of all suspects referred to the Corona Center. In this study, the data of 3945 suspected people collected during 5 months were analyzed. The RT-PCR test was used as the criterion for diagnosing the disease.

**Results:** Among 3945 suspected cases, 24.4% had positive RT-PCR test. The mean age of confirmed cases was 52.16 years. Dry cough and fever in addition to anorexia were reported as the most common symptoms. The results of logistic regression analysis showed that people over 60 years with heart disease reduce the risk, while people over 60 years, diabetics, and obese people increase the risk of infection.

**Conclusion:** These results necessitate further lines of research into different symptoms and risk factors to help identify COVID-19 cases earlier and start faster treatment.

**Keywords:** COVID-19, Demographic characteristics, Clinical characteristics, RT-PCR test



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## Introduction

According to the World Health Organization, COVID-19 is a serious disease and a global health crisis (1). The rate of virus transmission from a carrier to other people and the mortality rate compared to the flu are higher and about 2.3% (2) and 3.7%, respectively (3).

Individuals affected by the disease display a wide variety of symptoms including respiratory and gastrointestinal problems, fever and chills, muscle fatigue and pain, and loss of appetite. The disease can cause respiratory distress or kidney damage (4), but fever (98%), cough (76%), shortness of breath (55%), and muscular pain and fatigue (44%), and decreased renal function were found as the most common clinical

symptoms of this infection, respectively (5-9). Unlike the cases with typical coronavirus infections, upper respiratory tract symptoms such as odynophagia, rhinorrhea, and gastrointestinal symptoms such as diarrhea have been reported less frequently in COVID-19 cases (5, 6, 10, 11).

Everyone in the community is exposed to this infection. Men, the elderly, and people with a history of heart disease, hypertension, and diabetes are more likely to develop the disease and die compared to other groups (12). Besides, the current data suggest that children and people under 20 years are less likely to develop the

infection. Most infected children have mild or no symptoms (13).

Although the main manifestations of this disease are described in previous studies, due to changes in individual and social characteristics, recognizing clinical differences leads to better diagnosis and treatment. Therefore, this study investigates the demographic and clinical characteristics of COVID-19 cases admitted to Shahroud hospitals and medical centers.

## Materials and Methods

Following the occurrence of COVID-19 in the early March 2020 in Shahroud, the Vice-Chancellor for Research and Technology of Shahroud University of Medical Sciences designed a project to register systematically and electronically all suspected cases of COVID-19 and trace the contact cases. The health workers recorded the information of all the suspects and the symptoms of people in contact with confirmed cases and followed them up for any symptom development. An electronic medical record was created for all suspected cases. The information collected in this study included demographic information such as age, sex, height and weight, place of residence, occupation, symptoms, and comorbidities. A reverse transcription polymerase chain reaction (RT-PCR) test was performed for all suspected cases in Shahroud. A confirmed case is a person with a positive RT-PCR test. In this study, demographic and

clinical variables for the suspected cases were analyzed in both positive and negative RT-PCR groups. The variables examined in this study were age, sex, occupation, years of education, obesity as body mass index (BMI) over 30, signs and symptoms, and comorbidities such as heart disease (HD), diabetes, respiratory disease, and liver and kidney diseases.

We divided the age groups into two categories of under 60 and over 60 years.

Independent samples t-test was run to compare the means of the quantitative variables and the chi-square or Fisher exact tests were used for comparing the qualitative variables among the positive and negative RT-PCR groups. Logistic regression analysis was fitted to compute the odds ratio (OR) and confidence interval of OR for the measured variables. A p-value less than 0.05 was considered statistically significant. SPSS 16 statistical software was used for data analysis.

## Results

The mean age of 3945 suspected cases was 47.81 years, ranging from 18 days to 98 years. The mean year of education was 9.01 years. Besides, 1751 patients (56.1%) were male, 204 (6.5%) were medical staff, and 9 (0.3%) were pregnant women. The most common symptoms were dry cough (38.1%), dyspnea (34%), and fever (31.8%), and the rare symptoms were convulsions, epistaxis, and loss of consciousness. (Table 1).

**Table 1. Demographic and clinical characteristics of registered cases**

	Patients (760)* N (%)	Non-patients (2359) N (%)	P-value
Age (Mean(SD))	52.16±18.99	46.41±19.74	<0.001
Education in year (Mean(SD))	8.28±5.95	9.24±5.71	<0.001
BMI (Mean(SD))	26.73±5.21	25.62±4.88	<0.001
Sex (Male)	405(53.3)	1346(57.1)	0.069
Cancer History	12(1.6)	46(1.9)	0.510
Diabetes	134(17.6)	285(12.1)	<0.001
Heart Disease	157(20.7)	469(19.9)	0.642
Respiratory Disease	5(0.7)	17(0.7)	0.857
Kindy Disease	50(6.6)	121(5.1)	0.127
Fever	359(47.2)	634(26.9)	<0.001
Odynophagia	160(21.1)	499(21.2)	0.953
Dry Cough	384(50.5)	805(34.1)	<0.001
Dyspnea	274(36.1)	786(33.3)	0.166
Rhinorrhea	41(5.4)	168(7.1)	0.098
Chills	289(38.0)	494(20.9)	<0.001
Vomiting	100(13.2)	199(8.4)	<0.001

	Patients (760)* N (%)	Non-patients (2359) N (%)	P-value
<b>Nausea</b>	176(23.2)	321(13.6)	<0.001
<b>Diarrhea</b>	106(13.9)	256(10.9)	0.021
<b>Headache</b>	280(36.8)	605(25.6)	<0.001
<b>Myalgia</b>	308(40.5)	605(25.6)	<0.001
<b>Arthralgia</b>	218(28.7)	385(16.3)	<0.001
<b>Anorexia</b>	364(47.9)	558(23.7)	<0.001
<b>Epistaxis**</b>	2(0.3)	8(0.3)	1.000
<b>Fatigue</b>	311(40.9)	550(23.3)	<0.001
<b>Convulsions</b>	4(0.5)	20(0.8)	0.378
<b>Loss of consciousness</b>	31(4.1)	85(3.6)	0.547
<b>Abdominal pain</b>	85(11.2)	233(9.9)	0.300

\*Positive RT-PCR test

\*\* Fisher exact test report

Among 3945 suspected cases, 760 (24.4%) were RT-PCR positive with a mean age of 52.16 years and the median length of hospitalization of 8 days. The most frequent confirmed cases (41.9%) were in the age group of 36-59 years. 405 (53.3%) of the cases were male, 33 (4.3%) were medical staff, and 3 (0.4%) were pregnant women. Most of the cases were housewives (30.8), had HD (20.7%), and diabetes (17.6%). Among confirmed cases, the most common symptoms were dry cough (50.5%), anorexia (47.9%), and fever (47.2%); and the rare symptoms were epistaxis (0.3%), convulsions (0.5%), and loss of consciousness (4.1%). Out of the total confirmed cases, 63 patients (14.4%) died, with the highest frequency (88%) related to the age group of over 60 years. The symptoms such as fever, dry cough, chills, vomiting, nausea, diarrhea, headache, myalgia, arthralgia,

anorexia, and fatigue were significantly higher in the confirmed cases than in the non-confirmed group, which highlights the importance of paying attention to the symptoms. The demographic and clinical characteristics of the suspected cases are shown in [Table 1](#).

#### Univariate analysis

Age, gender, diabetes, Heart Disease (HD), and obesity variables were included in the univariate logistic regression model ([Table 2](#)). The results suggested that the age over 60, diabetes, and obesity had an increasing effect on the odds of COVID-19.

The odds ratio of infection was approximately 1.5 times higher in people over 60 years, diabetic patients, and obese people.

**Table 2. Logistic regression for determining effective variables on COVID-19**

Variables	Univariate		Multivariate	
	OR(95% CI)	P-value	OR(95% CI)	P-value
Age	<60	Ref	Ref	<0.001
	>=60	1.52(1.28-1.81)	1.84(1.48-2.29)	
Sex	female	Ref	Ref	0.167
	male	0.86(0.73-1.01)	0.89(0.751-1.05)	
Diabetes	No	Ref	Ref	0.007
	Yes	1.56(1.24-1.95)	1.40(1.08-1.77)	
Heart Disease(HD)	No	Ref	Ref	0.845
	Yes	1.05(0.86-1.28)	1.04(0.72-1.50)	
Obese	No	Ref	Ref	0.002
	Yes	1.44(1.17-1.76)	1.39(1.13-1.72)	
Age × HD			0.55(0.35-0.87)	0.011

### Multivariate analysis

Multivariate regression was run to determine the simultaneous effect of variables and some interactions (Table 2). The Hosmer-Lemeshow goodness of fit test confirmed the appropriateness of the model ( $p=0.411$ ). The results were obtained as follows: The odds ratio of COVID-19 was 1.8 times higher for people over 60 (OR=1.84, 95% CI 1.48-2.29) and 1.4 times higher for diabetics (OR=1.40, 95% CI 1.08-1.77) and obese people (OR=1.04, 95% CI 0.72-1.50). The odds ratio was significant for interaction of age and HD meaning that the odds ratio varied between different ages and HD (OR= 0.55, 95% CI 0.35-0.87). Significant interaction showed that people over 60 years with HD reduce the risk.

### Discussion

This study investigated the demographic characteristics of the COVID-19 suspected cases. The mean age of the confirmed cases was 52.16 years including an 18- day- old baby (14) to a person aged 98 years. This finding is consistent with the findings of a meta-analysis in China and Australia (15). A meta-analysis in the US reported that the mean age of confirmed cases was 60 years (16) and another meta-analysis reported the mean age of confirmed cases as 41 years (17). According to the results of different studies around the world, elderly people are more susceptible to the COVID-19 disease.

In this study, men and women were approximately equally affected by the disease, as was evident in a study in China (18).

The results of this study showed that confirmed cases had a higher BMI. There are a few articles on the effect of this variable on COVID-19 and their results showed obesity is more prevalent among confirmed cases (19-25).

In this study, 10% of the confirmed cases were medical staff, supporting the results of a study in China (18).

In our study, HD and diabetic individuals were more frequent among confirmed cases as indicated in other studies (19, 26-28). Besides, the frequency of diabetes was significantly higher in the confirmed cases. In a meta-analysis (15), 14.4% and 11.9% of the confirmed cases had CHD and diabetes, respectively and another meta-analysis (16) showed that 38.9% of the confirmed cases had diabetes.

Our findings showed that the most common COVID-19 symptoms were dry cough, anorexia, and fever as confirmed in other studies (15-17, 19, 29).

The results of multivariate logistic regression suggested that old age, diabetes and obesity increase, and old age concurrent with HD reduce the risk of developing COVID-19. These results may be justifiable because the elderly with HD receive greater

care and thus are less likely to be affected. The findings from the meta-analysis showed being diabetic increases the risk of severe COVID-19 (30).

### Conclusion

This study showed that patients with COVID-19 report dry cough in addition to anorexia and fever. These results necessitate further research on different symptoms in all countries. Clinicians should pay attention the indices of suspected cases including dry cough, fever and anorexia, old age, diabetes, and obesity to help identify COVID-19 cases on time and start treatment procedures earlier.

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### Limitation:

The contradictory results may be due to sensitivity and specificity of RT-PCR test that categorizes true patients in non-confirmed cases.

### Conflict of Interest

The authors declare that there is no conflict of interest.

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