

Original Article

A Study of Demographic Characteristics, Clinical Manifestations, Radiologic and Lab Findings of Patients Hospitalized with COVID-19 in the South of Iran

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Abstract

Background & Objective: Coronavirus (COVID-19) is a life-threatening factor all around the world. Identifying the features of the infected population contributes to detecting risk factors and determining more effective treatment goals. The purpose of this study was to investigate demographic features, clinical symptoms, and radiologic findings of hospitalized patients infected with Coronavirus (COVID-19) in Vali-Asr hospital affiliated to Fasa Medical University, located in south of Iran.

Materials & Methods: In this cross-sectional study that was conducted in one of Iran southeast hospitals, 50 patients hospitalized in COVID-19 ward were selected through consensus sampling. The study's instrument included a researcher-made checklist. Then, the collected data were analyzed using SPSS software version 22 and statistical descriptive (distribution of frequency and Mean±SD) and analytical methods (t-test).

Results: The mean and standard deviation of patients' age was 52.88±19.04. The majority of the most common clinical symptom was fever and the most common CTs finding was the GGO (Ground-Glass Opacity) engagement of both lungs. There was no meaningful difference between age, gender, and infection with coronavirus, respectively (P=0.87 and P=0.79). Among the underlying diseases, there was a significant relationship between Chronic Obstructive Pulmonary Disease (COPD) and coronavirus infection (P=0.003).

Conclusion: Old age and background diseases (diabetes, chronic obstructive pulmonary disease) are factors that endanger people to COVID-19 more. It is suggested to carry out more studies to investigate the effect of the characteristics of different communities on the infection with COVID-19.

Keywords: COVID-19, Diagnostic imaging, Population characteristics, Patients

Introduction

The new-emergent diseases term introduces diseases that emerge due to new infectious factors or recognized infectious factors that have

spread geographically or have become resistant to treatments, or are spreading because of the outbreak (1). The new-emergent diseases are illnesses whose causative factor has been diagnosed through recent 2-3 decades (2). One of the noteworthy characteristics of the 21st century is facing emergent and re-emergent diseases. We can claim that COVID-19, with the highest

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pathogenic potential, is the newest infectious disease on the earth (3).

On December 29th, 2019, doctors in Wuhan China noticed unusual cases of patients with Pneumonia. However, the first case of this disease was observed on 12th December 2019. More examinations revealed that the source of this disease was in alive seafood and poultry market situated in the city of Wuhan in Hubei province in central China. After the unusual outbreak of pneumonia, it was reported to the WHO (World Health Organization) on December 31st. After wide and various speculations about the root sources of this disease, finally, the Chinese Center for Disease Control and Prevention (CDC) confirmed the report published by the Wall Street Journal and declared the new coronavirus named as COVID-19 was the causative agent of this disease on the 9th of January 2020(4,5). Nowadays, COVID-19 disease has become a threat to lives and an international concern all around the world. As a result of the virus expansion, more than 150 countries have been infected and this virus pandemic has changed to a global emergency (3).

The center for disease control and prevention points out since the nature of the new-emergent virus infections has an unknown structure, it is difficult to find a specific vaccine or treatment for most of them, so the epidemic leads to increased cases of infection as well as death toll and treatment expenses in vast geographical areas(6). Early symptoms of this disease are like those of influenza but gradually develop and engage heart, breathing, and renal systems. The patients refer to healthcare centers often with symptoms like dyspnea, tachypnea, and respiratory failure, but there is no vaccine or treatment for coronavirus (COVID-19) yet and the patients receive palliative care by caregivers (7).

The review of literature showed that mild fever, cough, sore throat and myalgia have been seen in the patients with COVID-19. Meanwhile, failure in some organs function, acute respiratory distress, pulmonary edema and pneumonia have been reported in some studies.(8-12) An investigation conducted in the U.S., reported the following problems: fever, cough and dyspnea, lack of gustatory and olfactory senses, hypotension, hyponatremia, high level of CRP, lactate dehydrogenase and aminotransferase, and cardiac diseases.(12). Based on radiological findings in recent research, the most common

manifestation included bilateral pulmonary parenchymal ground glass and consolidative pulmonary opacities. The second one has been seen with rounded morphology in some cases. (13,14)

There are three factors causing death by COVID-19: male gender, age above 60 years old, and having background diseases like diabetes, hypertension, chronic respiratory diseases, cancer, and cardiovascular disease (15).

The results of conducted studies in North of Iran have showed that fever, shortness of breath, cough, CRP and ESR elevation, lymphocytopenia were the most prevalent clinical manifestations respectively (13,14). However, the results of a study conducted in the South of Iran have demonstrated that fatigue, cough, fever and lymphocytopenia were the most prevalent clinical manifestations respectively. In addition, the most reported manifestation in CT Scan was Good Glass Opacity. (16) It seems that there is an inconsistency in the clinical manifestations of COVID-19 patients in Iran so that most of them are non-specific. (17).

There may be varieties in the causing factors in different communities. The severity of COVID-19 can be affected by specific demographic features and then lead to increased vulnerability of the individual to the virus (9). (18).

Detecting differences rooted in demographic features of communities contribute to recognizing risk factors for determining more effective treatment goals. Since no study had been done about the characteristics of hospitalized patients with or suspected of COVID-19 in Fasa, the researchers carried out the present study to investigate the demographic features, clinical symptoms, and radiologic findings of patients with COVID-19 hospitalized in Fasa Vali-Asr hospital.

Materials & Methods

The present study was a cross-sectional descriptive study that was conducted from February to April 2020 in Vali-Asr healthcare center affiliated to Fasa University of Medical Sciences, in the south of Iran. The sampling method used in this study was census and all the hospitalized patients with COVID-19 participated in the investigation. The inclusion criteria were as follows: Definite diagnosis of Corona infection by a solo infectious physician was the first inclusion criterion. Then, CT Scan

findings were assessed by a trained radiologist who did not have any information about patients' clinical manifestations. Finally, the result was confirmed by a solo infectious physician. The exclusion criteria were also as follows: The patients' charts with incomplete information were excluded from the study.

The researcher gathered demographic data, clinical symptoms, and radiologic and lab findings of hospitalized patients with COVID-19 after receiving ethics code and permission from hospital administration. For this purpose, the researchers prepared a checklist containing demographic information of patients, their clinical symptoms and, radiologic and lab findings with or suspected of COVID-19. The extracted information from the patients' medical files was recorded in the checklist. The study's instrument included a researcher-made checklist. It was made based on review of access literature with regard to COVID-19 disease (7-9) Then, its face and content validities were revised by 8 solo infectious physician and 6 PhD nursing scholars with clinical experience working in Tehran and Shiraz Universities Of Medical Sciences. In addition, a specialist in literature revised the findings.

After reviewing and confirming the content of the checklist with respect to its relevance, clarification and the right position of every statement in its proper order, its ratio and content reliability index was measured, (0.75 and 0.8 respectively). Inter-rater method was used in order to determine its reliability.

This was done through extracting the information of 10 patients' charts by the researcher and a nurse (out of research team) who were trained based on the study's goals. Then, Pearson correlation coefficient was measured by researcher and the mentioned nurse (98.0) (19).

The achieved data were analyzed by SPSS 22 and through descriptive statistics (distribution and frequency percentage, mean and standard deviation) and T-test. The significance level was considered $P < 0.05$.

Results

The total of 50 patients with COVID-19 or suspected to be infected with this virus were selected 24(48%) male and 26 (52%) female. The mean and standard deviation of patients' age was 52.88 ± 19.04 among whom the youngest was 15 and the oldest was 93 years old. Two (4%) of them were hospitalized in ICU and received

Table 1. Clinical manifestations, infected with background diseases, and some biochemical indexes of patents with COVID-19

Variable		N(%)	Variable		N(%)
Background diseases	Diabetes mellitus	14(28)	Clinical manifestation	Cough	22(44)
	Ischemic heart disease	7(14)		Fever	30(60)
	Hypertension	5(10)		Chills	19(38)
	Hypothyroidism	3(6)		Chocking(sever dyspnea)	16(32)
	Chronic renal failure	5(10)		Vomiting	11(22)
	Asthma	3(6)		Diarrhea	7(14)
	Ischemic cerebral vascular disease	2(4)		Headache	4(8)[n
	COPD	2(4)		Body pain	7(14)
	Cigarette smoking	2(4)		CRP+	13(26)
Biochemical markers	Addiction(opium)	3(6)	CRP++	19(38)	

mechanical ventilation. Both patients died and 48 people (96%) were discharged.

The information about background diseases, clinical symptoms, and some of the biochemical findings of patients are depicted in table1. The result of the Polymerase Chain Reaction (PCR) tests of ten (20%) patients was negative while they had clinical symptoms and lung engagement. PCR test of 40 (80%) patients was positive.

The frequency distribution of patients with positive corona test and patients with the negative test is provided based on age in table 2.

Erythrocyte Sedimentation Rate (ESR) of all the patients was above the normal range. The mean and standard deviation of ESR was 38.25 ± 21.06 , mean and standard deviation of

White Blood Cells (WBCs) was 7.13 ± 4.64 , mean and standard deviation of lymphocytes was 22.89 ± 10.33 , mean and standard deviation of leukocytes was 7.13 ± 4.64 , and mean and standard deviation of arterial oxygen was 90.85 ± 4.22 .

The radiologic findings of patients revealed that none of them had crazy paved pattern. Five patients (10%) had consolidation in one lung and 10 people (20%) had consolidation in their both lungs. There was GGO (grand glossy opacity) in one lung of 9 patients (18%) and 30 patients (60%) had GGO in both lungs. (Figures 1,2)

The results of the independent test showed that there was no meaningful difference between age and gender variables with corona patients ($P=0.79$ and $P=0.87$ respectively). Also, the

Table 2. Frequency distribution of people with positive corona test and people with negative test result based on age groups

Age	people with positive corona test result N(%)	People with negative corona test result N(%)
<19	1(2)	0
20-29	3(6)	2(4)
30-39	5(10)	1(2)
40-49	8(16)	2(4)
50-59	7(14)	2(4)
>60	16(32)	3(6)



Figure 1. This is the CT of a 36-year-old woman whose corona test result is positive. The symptoms are dyspnea, severe coughs, and 39-degree fever. WBC: 9.4, CRP++, ESR: 27, O2 Saturation:0.89

results of this independent test revealed that among all the background variables, there was only a meaningful difference between infection

with COPD and infection with the coronavirus (P=0.003). (Table 3).

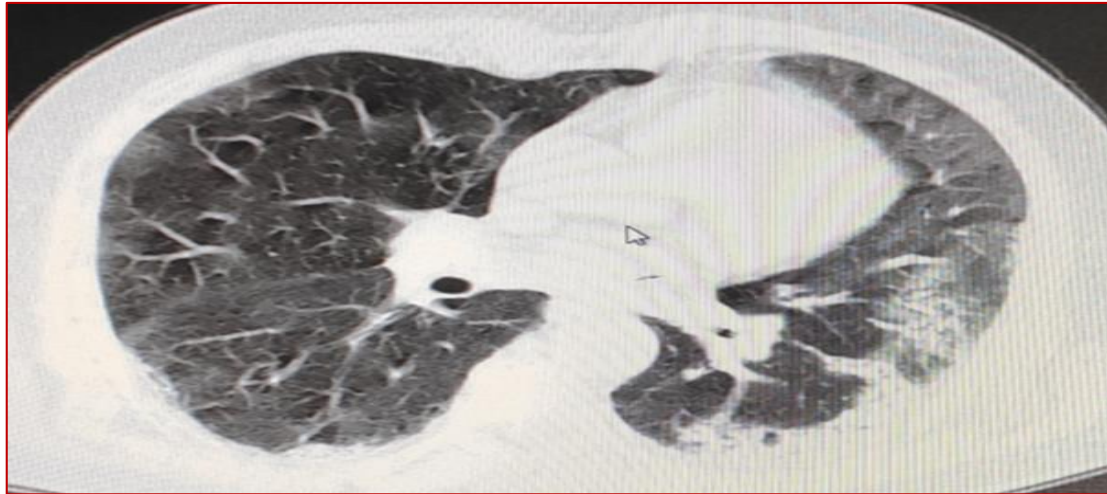


Figure 2. This is the CT of a 70-year-old patient with alimentary symptoms (vomiting, anorexia, and diarrhea), who referred to the healthcare center and his final test result for the coronavirus was positive. In the CT of his lung, we can see that both lungs are engaged GGO (grand glossy opacity). Also, the result of the PCR test was positive. The patient did not have any breathing symptom and the most observed symptoms were digestive.

WBC: 12.70, CRP: ++ ESR: 28 Neutrophil: 74/4 O2 Saturation:0.89

Table3. Relationship between demographic characteristics and underlying diseases in Covid-19 patients

Variables	F	t	df	P value
Sex	.024	-.139	48	.790
Age	0.131	0.181	48	0.87
Diabetes	.124	.180	48	.858
CVA	2.252	-.711	48	.481
COPD	68.267	3.098	48	.003
Asthma	3.687	-.882	48	.382
Cardiac	1.296	.601	48	.550
Smoking	4.543	1.073	48	.288
Addiction	1.312	.586	48	.561
Allergy	3.687	-.882	48	.382
HTN	.000	.000	48	.۲۵۷
HLP	.118	-.167	48	.868
Hypothyroidism	3.687	-.882	48	.382

Discussion

The results of this study showed that (%48) of patients with COVID-19 were male and %52 were female. Most of the patients were above 60 years old and had background diseases like diabetes and most of the radiologic findings of the patients manifested Ground-Glass Opacity (GGO) of both lungs.

The results of the present study showed that most of the patients were females and older than 60. Moreover, most of the patients were diabetic. Nevertheless, significant difference between COPD and Corona infection was the only significant relation among background diseases.

Most of the radiologic findings of the patients manifested Ground-Glass Opacity (GGO) of both lungs. The outcomes of the preliminary examinations for SARS-CoV-2 showed that men get infected with coronavirus SARS-CoV-2 more than women (9). In another study in Italy, the death toll among men and in those who were above 60 years old was more 1.3 to 4.6 (20). The studies show that adults (with an average age of 55) are more prone to COVID-19 (18). It was recognized in a study that in a 30-69 age group %77.8 were male, %51.4 were farmers, and %22 were apprentice laborers, also the age group above 80 years old experienced the highest rate of death. The death toll of men (%2.8) was more than women (%1.7) (21).

The results of a study conducted in China showed that the mean age of patients was 47 years old and 41.9 percent of them were females (11). The mean age of patients was reported 56.5 years old and most of them were males in an investigation carried out in the United States (12). A systematic review study illustrated that the mean age of patients was 48 years old (22).

In a study by Yuan et al, %12 of males and %15 of females with an average age of 60 years old were hospitalized. In another study, 1482 patients with COVID-19 (%74.5) were more than 50 years old and %54.4 were male (21). Immune-related genes on chromosome X and sex hormones that affect inborn and acquired immune responses may justify men's more potentiality to this infection (23,24). The probability of higher exposure to this virus due to job-related risks can be considered as another incentive factor for this issue.

The results of the present study revealed that most of the people who got infected with COVID-19 had background diseases like

diabetes; moreover, the most clinical symptoms of the patients in the present investigation were fever, and then coughs. The study by Huang et al that was conducted on 41 confirmed cases with the new coronavirus hospitalized in a hospital in Wuhan revealed that fever (%98), cough (%76), shortness of breath (%55), and muscle pain and fatigue (%44) were the most common clinical symptoms respectively (18). These findings were confirmed in another study that was carried out in China (10). Despite patients with typical infections of coronavirus, symptoms of the upper respiratory tract like sore throat and runny nose are observed less in patients with the new coronavirus. Also, unlike the SARS coronavirus, digestive symptoms like diarrhea are rarely seen in patients with coronavirus SARS-CoV-2 (7, 18).

A research result showed that the majority of patients with severe COVID-19 had background disease like chronic lung disease, cardiovascular disease, or diabetes mellitus (25). In another study, 128 people (%12) of the patients were adults, had background diseases where the most common case was hypertension (%49.7), obesity (%48.3), chronic lung disease (%34.6), diabetes (%28.3), and cardiovascular disease (%27.8). These findings show that the older adults and those with background has had more hospitalization rate due to COVID-19 (21).

Because of similarities between SARS corona virus and SARS-COV-2, there are speculations that there is viremia (virus presence in blood) and engagement of some organs other than respiratory system in this infection. However, there is not enough information available on this issue (26).

The first examinations have revealed that people with background diseases are more prone to side effects and death caused by COVID-19. Almost, 59 percent of the hospitalized patients suspected of being infected with the new coronavirus suffer from other chronic diseases as well, and 40 percent of the hospitalized patients whose test for infection with the new SARS-CoV-2 has been confirmed suffer from cardiovascular or cerebral diseases (27).

These findings highlight the importance of taking preventive measures like social distancing, breathing hygiene, and wearing a mask in public places, particularly in places where social distancing is hard to be kept. All

these measures must be considered to protect older adults, people with background diseases, and common people. Moreover, the older adults and people with background diseases should avoid close contact with ill people, and if they have symptoms similar to those of COVID-19, they should refer to healthcare providers immediately (28).

The findings of the present study showed that most of the patients with coronavirus had GGO (Ground-Glass Opacity) in both lungs.

A review study showed Ground- Glass Opacity (GGO) in CT Scan images and bilateral involvement of both lungs (22). GGO in CT Scan and consolidation was reported in an investigation conducted in Iran (17).

Several recent studies revealed that the CT results of patients with COVID-19 suffer from severe pneumonia that remarks the presence of (predominant ground-glass opacities (GGO (%67), consolidations (%30), a combination of axial and environmental distribution (%74), environmental (%26), both lungs engaged, and the lower edges of the lungs (%96); only consolidations, axial distribution, pleural effusion, and lymphadenopathy are rather rare (28-30). Also, other studies showed both lung engagement in 114 patients (%81) out of 140 patients with coronavirus infection. Serum ferritin levels and human reactive protein C (CRP) have increased %63 and %86 respectively in patients with the new coronavirus. Since the clinical manifestations of COVID-19 are nonspecific, then pulmonary CT is a key diagnostic approach for patients suspected of COVID-19 in the initial stages (13). Also, in the initial stage of the infection, chest radiography is not sensitive enough to determine the lesions precisely (31, 32).

In a study by Pan et al, it was identified that the fast increase in ground glass opacity consolidation and plural effusion of lungs was a sign of the disease progression (33). In the COVID-19 disease, its pathologic changes often engage both lungs and lead to published injury, edema, and forming a clear membrane of the lungs after the virus attack that shows changes caused by cellular inflammatory infiltration through monocular macrophage, lymphocytes leakage, and alveolar epithelial damage. Thus, constant evaluation of patient using chest CT not only examines patients' condition, but it can be a good guide to a proper treatment (34).

Study Strength:

The present study provided useful information with regard to personal characteristics, clinical manifestations, radiological and laboratory findings of Covid-19 patients in Fasa city (an Iranian southern city). Since finding the source of infection and recognition of Covid-19 is necessary for understanding this outbreak, conducting further studies in different regions of Iran is recommended. (25).

Limitations

One of the limitations of this study was its small sample size and gathering data in only one healthcare center. Therefore, the generalization of the findings decreases. Besides, the information of non-hospitalized patients was not gathered. Thus, we could not compare hospitalized patients with non-hospitalized patients within terms of demographic characteristics and background diseases. Also, the researcher did not investigate the effect of the difference in biomarkers caused by age and gender on the emergence of COVID-19 in the present study. Hence, it is recommended that multi-central studies be conducted with a larger sample size. Moreover, the effect of the difference in biomarkers caused by age and gender on the emergence of COVID-19 should be investigated.

Conclusion

The results of the studies show the potential effect of gender, old age, and background diseases in the emergence of COVID-19 disease. Taking preventive measures like social distancing, preserving personal hygiene, and wearing a mask in public places, particularly weak people are of high significance. The results of this study contribute to health and hygiene managers in developing plans and prioritizing the resources of the healthcare system.

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Conflict of Interests

The authors reports no conflicts of interest in this work.

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مقاله پژوهشی

بررسی ویژگی های فردی، علائم بالینی، یافته های رادیولوژی و آزمایشگاهی در بیماران بستری با کرونا ویروس (کووید ۱۹) در جنوب ایرانیوسف غلامپور^۱، بنفشه تهرانی نشاط^۲، حجت الله نجفی^۳، مجتبی فرجام^۱، زهرا رحیمی^۴، مصطفی بیژنی^{*۴}

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چکیده

زمینه و هدف: کرونا ویروس (کووید-۱۹) یک عامل تهدیدکننده زندگی در سراسر دنیاست. شناسایی ویژگی های جمعیت مبتلا، به تشخیص عوامل خطر زا و تعیین اهداف درمانی موثرتر کمک میکند، لذا مطالعه حاضر با هدف بررسی خصوصیات دموگرافیک، علائم بالینی و یافته های رادیولوژیک و آزمایشگاهی بیماران بستری به علت کرونا ویروس (کووید-۱۹) در بیمارستان ولی عصر فسا در جنوب ایران انجام شده است.

مواد و روش ها: مطالعه حاضر یک مطالعه توصیفی مقطعی میباشد که بر روی ۵۰ بیمار بستری در بخش مراقبت از بیماران کرونا به روش سر شماری انجام شده است. جهت جمع آوری داده ها از یک چک لیست پژوهشگر ساخته استفاده گردید. داده ها با استفاده از آزمونهای آماری توصیفی (توزیع فراوانی، میانگین و انحراف معیار) و استنباطی (تی تست) و به وسیله نرم افزار SPSS-22 تحلیل شدند.

نتایج: میانگین و انحراف معیار سن بیماران $52/88 \pm 19/04$ سال بود. بیشترین علامت بالینی تب و بیشترین یافته رادیولوژیک GGO (Ground Glass Opacity) در هر دو ریه بود. بین سن و جنس با ابتلا به کرونا اختلاف معنی داری وجود نداشت ($P=0/79$ و $P=0/87$). از بین بیماریهای زمینه ای فقط بین ابتلا به بیماریهای مزمن انسدادی ریه و ابتلا به کرونا ویروس اختلاف معنی دار آماری مشاهده گردید ($P=0/03$).

نتیجه گیری: سن بالا و داشتن بیماریهای زمینه ای (دیابت و بیماری مزمن انسداد ریه) افراد را در معرض خطر بیشتری برای ابتلا به کووید ۱۹ قرار می دهد. مطالعات بیشتری به منظور بررسی تاثیر ویژگی های جمعیت های مختلف بر بیماری کووید ۱۹ پیشنهاد می شود.

کلمات کلیدی: کووید-۱۹، تصویر برداری تشخیصی، مشخصات جمعیتی، بیماران***نویسنده مسئول:** مصطفی بیژنی، گروه پرستاری داخلی- جراحی، دانشگاه علوم پزشکی فسا، فسا، ایران.Email: Bizhani_mostafa@yahoo.com
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