Research Paper:
Demographic Characteristics, Clinical Symptoms, and Radiological Features in Patients With COVID-19 in Iran

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A B S T R A C T

Background: Considering the new Coronavirus outbreak and limited data about this pandemic in Iran, this study aimed at assessing the demographic characteristics, clinical symptoms, paraclinical findings, and radiological features of hospitalized patients with COVID-19 according to their hospital records.

Methods: In this descriptive-cross-sectional study, the required data were collected from the Health Information System (HIS) and the records of the patients who had been hospitalized following positive COVID-19 Polymerase Chain Reaction (PCR) and lung Computed Tomography (CT) scans, in some hospitals of Markazi Province, Iran from February 20, 2020, to April 20, 2020. The selected hospitals were affiliated with the Iranian Social Security Organization. Clinical follow-up was continued until April 26, 2020. During this period, 260 records were assessed. The collected data included demographic characteristics, clinical symptoms, as well as the paraclinical findings and radiological features of the patients. The obtained data were analyzed by SPSS.

Results: Among 260 confirmed cases of COVID-19, 161 (61.9%) cases were men and 99 (38.1%) were women. The Mean±SD age of the explored patients was 58.78±16.44 years. Besides, 221 (85%) patients were hospitalized in the general ward and 39 (15%) cases in the Intensive Care Unit (ICU). Hypertension and diabetes were the most prevalent medical histories (comorbidities). Fever, fatigue, cough, anorexia, myalgia, dyspnea, oliguria, taste impairment, and smell deficiency were the most frequent clinical symptoms. Neutrophilia, lymphopenia, low blood glucose level, and increased BUN, ALP, CRP, and ESR were among the critical laboratory findings. Almost 30% of the studied patients presented acidosis in arterial blood gases analysis and 55% had normal blood gasses. Decreased PaO2 was observed in 80% of the investigated patients. Most of the patients had received oxygen therapy, lopinavir, and hydroxychloroquine. Additionally, 11.2% of the patients were under invasive mechanical ventilators. Concerning the lung CT scan, 42.7% of the patients had ≥5 involved lobes. In terms of density, 51.9% of the subjects had mixed opacity. Most lung damages (41.5%) were in the central part of the lungs. In 55.8% of cases, these damages were patchy lesions, and 40% had an air-bronchogram. According to the Chi-squared test data, there was a significant relationship between the location of the lesions and the patient's need for suction (P<0.001). Besides, patients with central lung lesions required the highest percentage of suction (26%). In this study, 15% of the explored patients were hospitalized in the ICU, 84% were discharged by April 26, and 8.07% died.

Conclusion: The current research results provide the health team with beneficial information about the assessment and care of patients with COVID-19 and the prediction of treatment outcomes.

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Highlights

● Fever, fatigue, cough, anorexia, myalgia, dyspnea, oliguria, taste impairment, and smell deficiency were among the most frequent symptoms in the studied patients.

● Hypertension and diabetes were the most prevalent comorbidities in the explored patients.

● Respecting lung CT scan, 42.7% of the studied patients had ≥5 involved lobes.

● There was a significant relationship between the location of lung lesions and the patient's need for suction.

● Fifteen percent of the patients were hospitalized in the ICU, 84% were discharged, and 8.07% died.

● There was a significant difference between the average Creatinine (Cr) level of the patients who survived and those who died (P<0.05).

Plain Language Summary

The current study assessed the demographic characteristics, clinical signs, and symptoms, as well as radiological features of hospitalized patients with COVID-19 in Markazi Province, Iran. With the collected information, a better view of the care and treatment of this disease was provided. The present study results suggested that men were more likely to be infected than women; however, there was no association between gender and the odds of COVID-19 infection. Fever, fatigue, cough, anorexia, myalgia, dyspnea, oliguria, taste impairment, and smell damage were the most common symptoms in the studied patients. Hypertension and diabetes were the most prevalent concurrent diseases in the explored patients. In addition to respiratory symptoms, attention to gastrointestinal and neurological disorders is essential for the diagnosis and treatment of this disease.

1. Introduction

COVID-19 disease, caused by Coronavirus-2019 (2019-nCoV), appeared and reported in late 2019-early 2020 and rapidly spread throughout the world (Lu et al., 2020; Li 2020; Gorbalenya et al., 2020; Chen et al., 2020; Huang et al., 2020; Wang et al., 2020; Holshue et al., 2020; Wang et al., 2020).

In Iran, this virus was first appeared in Qom Province on February 19, 2020, and has gradually spread throughout the country. It is believed that Coronavirus 2019 is originated from snakes, bats, and pangolins (anteaters with scales) in the wet markets of Wuhan (Ji et al., 2020). This virus can spread quickly and has caused numerous deaths since its appearance (Wang et al., 2020). On March 11, 2020, the World Health Organization (WHO) has declared the disease as a pandemic (global epidemic) (World Health Organization, 2020).

This disease usually appears as viral pneumonia and its major symptoms are fever, dry cough, and fatigue. The incubation period of the disease is reported to be 1-14 days; however, the symptoms usually appear between 3-7 days (Lu et al., 2020).

This disease is mostly transmitted by respiratory droplets and close contact; some evidence suggests that it can be transmitted through the oral-fecal route (Zhang et al., 2020).

Numerous studies have been conducted in China, the USA, and all around the world. The prognosis of COVID-19 patients depends on a wide range of factors. Accordingly, and considering the novelty of this disease, we decided to analyze the clinical symptoms, laboratory findings, and imaging manifestations in these patients. Therefore, the current study aimed to assess the demographic characteristics, clinical symptoms, paraclinical findings, and radiological features of patients with COVID-19 hospitalized in the hospitals of Markazi Province, Iran according to their hospital records.

In this study, we attempted to investigate the association between age, gender, laboratory and clinical findings, and underlying diseases in these patients, as well as their clinical and imaging manifestations.

This study was conducted in Markazi Province, i.e. the closest province to the primary center of Coronavirus outbreak in Iran (Qom).

2. Materials and Methods

This descriptive cross-sectional study was conducted in three hospitals affiliated with the Iranian Social Security Organization following the approval received from the relevant Deputy of Treatment.

Iranian Social Security Organization is a non-governmental public insurance institution. This public non-governmental organization is responsible for the compulsory insurance of workers and employers as well as the optional insurance of business owners, self-employed individuals, and freelancers. It is the oldest and largest non-governmental social security and medical insurance organization in Iran (www.tamin.ir/2020).

For all the patients who entered the study, COVID-19 infection was confirmed by Polymerase Chain Reaction (PCR) test and lung CT scan. All of the studied patients were hospitalized in Social Security Organization hospitals in Markazi Province, Iran.

The records of the 260 patients who had been hospitalized from February 20, 2020, to April 20, 2020, were assessed in this research. The medical records were collected and analyzed by the research team. Demographic characteristics, clinical and laboratory findings, and radiological features were collected using data collection forms, which have been generated through the information provided on the Hospital Information System (HIS) and field studies. To assess laboratory and radiology findings, the HIS (network connected to all parts of the hospital, including pharmacy, radiology, & laboratory) was used; this is because, in this system, patients' data are recorded from the moment of admission to discharge. This system was used in addition to the patients' clinical records. To investigate disease progression and the treatment effect, blood tests and biochemical parameters had been measured daily.

The recorded data included demographic characteristics, medical history, a history of contact with COVID-19 patients, the signs and symptoms of the disease, laboratory tests, Computed Tomography (CT) scans, treatment and medication records, arterial blood gases, and so on. The required data were documented by the cooperation of a physician, a nurse, a radiologist, and a laboratory expert.

The disease onset was considered from the beginning of the initial symptoms. Laboratory and imaging values, as well as clinical signs and symptoms, were measured and recorded during hospitalization. The diagnosis of diabetes, hypertension, and other co-morbidities in the medical records was confirmed by a physician. The incidence of Acute Respiratory Distress Syndrome (ARDS), and acute renal and cardiac disorders was also recorded according to the laboratory values and the approval of specialists.

For all investigated patients, a chest CT scan was performed. Images were taken with a slice thickness of 1 to 1.5 mm. All imaging features were evaluated by a radiologist and a physician. These CT scan features included Ground Glass Opacity (GGO), mixed GGO, and consolidation. Additionally, the number of involved lobes and segments, lesion location, form, and other radiological patterns, including air-bronchogram, centrilobular nodules, tree-in-bud, reticular pattern, sub-pleural linear opacity, bronchial dilatation, cystic change, lymphadenopathy, and pleural effusion were checked in each CT scan image.

The number of involved lobes and segments were counted. If the lesion was located in the one-third outer part of the lung, it was considered to be in the outer part of the lung; otherwise, it was considered to be in the central part of the lung.

The Kolmogorov-Smirnov test was used to evaluate the normal distribution of the data. Normally distributed variables were reported as Mean±SD values. Continuous variables were analyzed by parametric tests [Independent Samples t-test, one-way Analysis of Variance (ANOVA), Tukey posthoc test & Pearson correlation coefficient]; qualitative variables were tested by the Chi-squared (χ^2) test or Fisher's Exact test, as appropriate. The collected data were analyzed by SPSS.

3. Results

This study was conducted using the records of 260 COVID-19 confirmed cases. Among the explored patients, 161 (61.9%) and 99 (38.1%) were male and female, respectively. The Mean±SD age of the studied patients was 58.78±16.44 years. Among them, 23.8% were in the age range of 50-59 years. The minimum and the maximum age of the explored patients were 16 and 91 years, respectively. A total of 157 (60.4%) patients were married; 229 (88.1%) were living in town; 221 (85%) were hospitalized in the general ward, and 39 (15%) in the Intensive Care Unit (ICU). The demographic and clinical information of the studied patients is presented in Table 1.

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Table 1. Demographic characteristics of the COVID-19 hospitalized patients (N=260)

Demographic Variables		Total
Age (y)	29 <	8
	30-39	24
	40-49	48
	50-59	62
	60-69	41
	70 >	77
Mean±SD		58.78±16.44
Demographic Variables		**No. (%)**
Gender	Male	161 (61.9)
	Female	99 (381)
Comorbidities	Hypertension	52 (20)
	Diabetes	48 (18.5)
	Cardiovascular disease	17 (6.5)
	Malignancy	12 (4.6)
	COPD	32 (12.3)
	Liver disease	14 (5.4)
	Kidney disease	16 (6.2)
	Pregnant	10 (3.8)
	Breastfeeding	4 (1.5)
	NO	55 (21.2)
Job	Health Care	7 (2.7)
	Non Health Care	253 (97.3)
Educational level	illiterate	96 (36.9)
	Primary	76 (29.2)
	Secondary school	39 (15)
	Diploma	33 (12.7)
	University degree	16 (6.2)
Marital status	Married	157 (60.4)
	Single	103 (39.6)
Allergy	Yes	33 (12.7)
	No	227 (87.3)
Residency	City	229 (88.1)
	Village	31 (11.9)

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Table 2. Signs and symptoms at admission and treatment and the clinical outcomes in the studied COVID-19 hospitalized patients

Signs and Symptoms		No (%)
Fever		227 (87.3)
Fatigue		221 (85)
Cough		183 (70.4)
Anorexia		219 (84.2)
Myalgia		222 (85.4)
Dyspnea		227 (87.3)
Expectoration		84 (32.3)
Pharyngalgia		79 (30.4)
Diarrhea		140 (53.8)
Nausea		69 (26.5)
Vomiting		61 (23.5)
Dizziness		103 (36.9)
Headache		127 (48.8)
Abdominal Pain		27 (10.4)
Taste Impairment		192 (73.8)
Smell Impairment		187 (71.9)
Oliguria		178 (68.5)
Loss of consciousness		50 (19.2)
ARDS		64 (24.6)
Duration of hospitalization, d (Mean±SD)		6.51±2.0
Treatment	Oxygen therapy	182 (70)
	ICU	39 (15)
	Intubation & invasive mechanical ventilation	29 (11.2)
	Respiratory suction	42 (16.2)
	Hydroxychloroquine	237 (91.2)
Antibiotic treatment	Azithromycin	93 (35.8)
	Ceftriaxone	44 (16.9)
	Levofloxacin	10 (3.8)
	Combine	61 (23.5)
	NO	52 (20.0)
Antifungal treatment		1 (0.4)
Antiviral treatment (Kaletra)		254 (97.7)
Interferon administration		7 (2.7)
Glucocorticoids		19 (7.3)
Immunoglobulin therapy		2 (0.8)
Clinical Outcome	Discharged	239 (91.93)
	Died	21 (8.07)

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Table 3. Laboratory findings of COVID-19 hospitalized patients

	Blood Routine	Normal Range	Mean±SD	Pattern	No. (%)
	Red blood cell count, ×106/μL	4.2-6.2	4.86±0.65	Increased	4 (1.5)
				Decreased	25 (9.6)
	White blood cell count, ×103/μL	4-10.1	6.81±3.6	Increased	17 (6.5)
				Decreased	26 (10)
	Neutrophil, ×103/μL	47-76	68.11±14.49	Increased	79 (30.4)
				Decreased	22 (8.5)
	Lymphocyte, ×103/μL	25-45	23.18±10.37	Increased	4 (1.5)
				Decreased	155 (59.6)
	Monocyte, ×103/μL	2-8	4.45±4.9	Increased	32 (12.3)
				Decreased	44 (16.9)
	Hemoglobin g/dL	12-16	13.78±2.4	Increased	17 (6.5)
				Decreased	38 (14.6)
	Hematocrit %	32-48	42.09±6.98	Increased	18 (6.9)
				Decreased	10 (3.8)
	Platelet (×109/L)	150 - 450	226.26±86.67	Increased	3 (1.2)
				Decreased	39 (15)
Blood biochemistry	Blood Sugar, mg/dL	70-130	116.8±52.07	Increased	46 (18.7)
				Decreased	214 (82.3)
	NA, mg/dL	135-145	137.23±4.07	Increased	6 (2.3)
				Decreased	93 (35.3)
	K, mg/d	3.5-5.5	3.95±0.61	Increased	3 (1.2)
				Decreased	33 (12.7)
	BUN	5-20	21.60±10.14	Increased	132 (50.8)
				Decreased	0
	Creatinine	0.7-1.4	1.15±0.52	Increased	49 (18.8)
				Decreased	27 (10.4)
	ALT (IU/L) alanine aminotransferase	41<	32.64±23.79	Increased	212 (81.5)
	AST (IU/L) aspartate transaminase	42<	34.25±13.26	Increased	69 (26.5)
	ALP	100-290	479.20±165.01	Increased	253 (97.3)
				Decreased	4 (1.5)
	Total bilirubin (μmol/L)	0.2-1.2	0.83±0.5	Increased	232 (89.2)
	LDH (U/L) lactate dehydrogenase	480<	493.51±159.57	Increased	122 (49.6)
	CK (mmol/L) creatine kinase	40–200	140.75±32.3	Increased	27 (10.4)
	Troponin	1: Positive			15 (5.8)
		2: Negative (normal)			245 (94.2)
Infection-associated	ESR	0-20	26.78±20.98		159 (61.2)
	C-reactive protein (mg/L)	(0.0-6.0)	23.14±18.79		181 (69.4)

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	Blood Routine	Normal Range	Mean±SD	Pattern	No. (%)
Blood coagulation	Prothrombin time (s)	10-13	13.93±1.15	Increased	65 (25)
	Active partial thrombin time (s)	30-45	39.64±4.91	Increased	47 (18.1)
				Decreased	4 (1.5)
Atrial Blood Gas	PH	7.35-7.45	7.38±0.6	Increased	39 (15)
				Decreased	78 (30)
	PaO_2 mm Hg	80-100	71.19±10.7	Decreased	209 (80.4)
	$PaCo_2$ mm Hg	35-45	41.53±6.7	Increased	83 (31.9)
				Decreased	39 (15)
	HCO_3	22-26	23.41±3.7	Increased	65 (25)
				Decreased	71 (27.3)

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Hypertension with 52 (20%) cases and diabetes with 48 (18.5%) cases were the most prevalent medical histories (comorbidity) in these patients. Among the patients, 164 (63.1%) were literate, 253 (97.3%) were non-healthcare members, 7 (2.7%) were healthcare personnel, and 33 (12.7%) cases had allergies.

Signs and symptoms during hospitalization, the received treatment, the time of hospitalization, and the patients' therapeutic outcomes are summarized in Table 2. The most frequent symptoms in 227 (87.3%) patients were fever, 221 (85%): Fatigue, 183 (70.4%): Cough, 219 (84.2%): Anorexia, 222 (85.4%): Myalgia, 227 (87.3%): Dyspnea, 178 (68.5%): Oliguria, 192 (73.8%): Taste impairment, and 187 (71.9%): Smell deficiency. Less common symptoms included 84 (32.3%) cases of expectoration, 79 (30.4%) pharyngalgia cases, 140 (53.8%) diarrhea records, 69 (26.5%) nausea reports, 61 (23.5%) vomiting cases, 27 (10.4%) abdominal pain reports, and 64 (24.6%) cases of ARDS. All the patients showed a decrease in SaO2 level. Complications, such as septic shock, acute renal failure, and acute lung injury were not observed in this study.

Laboratory findings are listed in Table 3. The relevant results indicated that RBC was low in 9.6% of the explored cases and it was normal in 88.8% of them. WBC was low and high in 10% and 6.5% of the studied cases, respectively. Among the investigated patients, 8.5% had neutropenia, 30.4% experienced increased neutrophils, 59.6% had lymphopenia, and 1.5% encountered increased lymphocytes. Regarding the biochemical laboratory test data, blood glucose level was low in 82.3% of the cases, Blood Urea Nitrogen (BUN) was high in 50.8% of the cases, and Alkaline Phosphatase (ALP) was high in 97.3% of cases.

Furthermore, 69.6% of the studied patients presented abnormal C-Reactive Protein (CRP) and 61.2% had high Erythrocyte Sedimentation Rate (ESR). Besides, 87 (30%) of the study cases presented acidosis in arterial blood gases analysis and 55% had normal blood gasses; however, decreased PaO2 was observed in 209 (80.4%) cases. The Independent Samples t-test data suggested no significant gender-wise difference in the average pH (P>0.05). However, the same test indicated a significant difference between the average Creatinine (Cr) level of the patients who survived and those who died (P<0.05). Most of the investigated patients had received oxygen therapy (182 cases, 70%). Lactate Dehydrogenase (LDH) level also increased in 122 (49.6%) cases.

Respecting medication, 254 (97.7%) cases received antiviral and lopinavir (ritonavir), and 237 (91.2%) patients received hydroxychloroquine. The most used antibiotics were azithromycin in 93 (35.8%), ceftriaxone in 44 (16.9%), and levofloxacin in 10 (3.8%) cases. In 61 (23.5%) patients, a combination of antibiotics was prescribed. Only for one (0.4%) patients, antifungal was used. Interferon was prescribed for 7 (2.7%), glucocorticoids for 19 (7.3%), and immunoglobulin for 2 (0.8%) patients. Among the explored patients, 29 (11.2%) were under invasive mechanical ventilator, and 39 (15%) were hospitalized in the ICU. Furthermore, 42 (16.2%) patients were suctioned during the treatment process, 91.93% were discharged by April 26, and 8.07% died. In this study, the death rate was higher in men than women; however, there was no relationship between gender and mortality rate (P=0.206).

The Mean±SD number of involved lobes of the lung in the CT scans were 4.1±1.03 and the involved Mean±SD segments were 2.28±6.25. Among the investigated patients, 42.7% had ≥5 involved lobes. In terms of density,

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Table 4. Radiological data of COVID-19 hospitalized patients

Variables		Patterns	Mean (total)
Lobes involved		Mean (total)	4 (6)
Segments involved		Mean (total)	6 (14)
Density		GGO	60 (23.1)
		mixed	135 (51.9)
		consolidation	65 (25)
Location		Peripheral	64 (24.6)
		central	108 (41.5)
		both	88 (33.8)
Form		Patchy	145 (55.8)
		Oval	115 (44.2)
Other Radiological patterns	Air bronchogram	Yes	104 (40)
		No	156 (60)
	Centrilobular nodules	Yes	69 (26.5)
		No	191 (73.5)
	Tree-in-Bud	Yes	43 (16.5)
		No	217 (83.5)
	Reticular pattern	Yes	37 (14.)
		No	223 (85.5)
	Sub pleural linear opacity	Yes	44 (16.9)
		No	216 (83.1)
	Bronchial dilatation	Yes	25 (9.6)
		No	235 (90.4)
	Cystic change	Yes	21 (8.1)
		No	239 (91.9)
	Lymphadenopathy	Yes	26 (10)
		No	234 (90)
Pleural effusion		Yes	35 (13.5)
		No	225 (86.5)

Ground-Glass Opacity (GGO) was observed in 23.1% of segments; there was mixed opacity in 59.1% of the segments and consolidation in 25% of the segments. Most lung lesions (41.5%) were situated in the central part of the lung, and 33.8% were in both central and lateral parts. In 55.8% of cases, these damages were patchy lesions, and the rest were oval. Moreover, 40% presented an air-bronchogram view, and the other pulmonary patterns were scarcely observed (Table 4).

In this study, no statistically significant relationship was observed between radiological variables, demographic characteristics, and clinical findings (P>0.05). However, according to the Chi-squared test, there was a significant relationship between the location of lesions and the pa-

tient's need for suction (P<0.001); accordingly, the patients with central lung lesions required the highest percentage of suction (26%). Similarly, the Chi-squared test data indicated a significant relationship between Pleural Effusion (PE) and performing suction (P=0.032); 29% of patients with PE needed suction, while 14% of patients without PE required suction.

4. Discussion

This study investigated demographic data, clinical and laboratory findings, and radiological features, i.e. available in the records of the patients infected with Coronavirus 2019 in Iran. Moreover, the treatment process and its outcomes were evaluated. According to the find-

ings, the Mean±SD age of the explored patients was 58.78±16.44 years. The average age of COVID-19 patients in the USA (Richardson et al., 2020) is 63 years, and the same in China (Yang et al., 2020) was reported to be 45 and 56 years in two different studies. The majority of our studied patients were men, i.e. congruent with the results of studies conducted in Zhejiang, China (Yang et al., 2020), and New York, USA (Richardson et al., 2020). However, another study by Wang et al. in Wuhan, China revealed no significant gender-wise difference in this disease (Wang et al., 2020).

In the present study, 85% of the explored patients were hospitalized in the general ward and 15% in the ICU. In a study by Yang et al. (2020), among 149 patients, none were transferred to the ICU (Yang et al., 2020). The majority of our studied patients lived in town, which could be relevant to more travel and contact with the virus in the urban community.

In accordance with investigations in the USA (Richardson et al., 2020) and China (Zhou et al., 2020), the majority of patients in our study reported a history of diabetes and hypertension. In this study, the most frequent clinical symptoms of Coronavirus 2019 were fever, fatigue, cough, anorexia, myalgia, dyspnea, oliguria, taste impairment, and smell deficiency; this finding is similar to that of a study by Wang and associates (2020). In another study, fever, cough, and expectoration were among the most prevalent clinical symptoms of COVID-19 (Yang et al., 2020). However, there was no data about taste and smell impairment in these two studies. In our study, digestive symptoms, such as abdominal pain, diarrhea, nausea, and vomiting have also been observed. According to recent studies, it may indicate the oral-fecal transmission of the virus (Zhang et al., 2020). Hospitalization time in our study was about 6-7 days; in the study by Wang et al., it was 10 days (Wang et al., 2020), and in another study, it was 4-6 days (Richardson et al., 2020).

The most critical laboratory changes in this study included increased neutrophil, decreased lymphocyte, low blood glucose level, as well as increased BUN, LDH, and ALP. Increased CRP and ESR levels following the inflammation phase were among other laboratory findings, i.e. in accordance with the results of another study (Wang et al., 2020). These laboratory changes could be related to the inflammatory phase in the body and secretion of immunological factors. Being infected with COVID-19 is associated with reduced cellular immunity, and damage to kidneys, heart, and liver. These alternations are similar to those of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (Wang et al., 2020).

In total, 30% of the studied patients presented acidosis in arterial blood gases analysis and 55% had normal blood gasses; however, a decrease in PaO2 was found in 209 patients (80. 4%). This finding is consistent with a study by Ottestad and Søvik (2020). The pathoanatomical and pathophysiological basis for respiratory failure in COVID-19 remains undetermined; however, diffuse alveolar damage with interstitial thickening leading to compromised gas exchange is a plausible mechanism (Ottestad & Søvik 2020). Considering lung involvement and reduction in alveolar ventilation, acidosis, and decreased PaO2 can be justified.

No effective treatment is suggested for COVID-19, and all treatments are currently supportive (Zhu et al., 2019). Using personal protective equipment, the isolation of patients, and supportive treatments are among the approaches in managing Coronavirus 2019. Most investigated patients received oxygen therapy, lopinavir, and hydroxychloroquine. Antibiotics, including azithromycin, ceftriaxone, and levofloxacin were also prescribed. Antifungals, interferons, glucocorticoids, and immunoglobulin were rarely used. Wang et al. argued that using antibiotic provides no effect on this infection, and like SARS and MERS, no appropriate antiviral has been found for this virus; however, in their study, all the patients had received antibiotics, 90% received antiviral, and 45% used methylprednisolone (Wang et al., 2020). In our study, lopinavir has been used as antiviral. In a similar study, oseltamivir was used as an antiviral (Wang et al., 2020). It should be mentioned that in Iran, at first, oseltamivir was used, instead of Kaletra. However, with the greater effectiveness of lopinavir, the use of oseltamivir was restricted.

In this study, the death rate was reported as 8.07%. In a study by Wang et al. (2020) in China, the death rate was reported as 4.3%; in another study by Richardson et al. (2020) in the USA, it was reported as 88.1% for the patients under mechanical ventilation, and for those in the age range of 18-65 years or older, the death rate was equal to 19.8% to 26.6%. In our study, the calculated death rate was only related to hospitalized patients.

In our study, lung involvement and the pattern of its changes were determined by the lung CT scans of 260 patients. Similar to previous studies (Yang et al., 2020; Song et al., 2020; Chung et al., 2020), GGO, consolidation, and the combination of both was observed on one side or both sides of the lung of our patients, as well as the presence of the central lesions. In the study by Yang et al.

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(2020) most lesions were lateral, while in our study, the majority of lesions were central. Additionally, the number of involved lobes and segments in our study was higher, compared to their study (Yang et al., 2020). This finding can indicate the higher involvement of the lungs in this province of Iran, compared to China. The diagnosis of COVID-19 by CT scan alone, and without paying attention to clinical symptoms and PCR test is not accurate; this is because in the early stages of COVID-19, lung involvement and lung CT scan, cannot reflect the disease. Therefore, it is necessary for the healthcare team to comprehensively evaluate clinical symptoms, including fever, fatigue, olfactory, and taste impairments, along with a PCR test and lung CT scan; then make the right decisions.

The present research limitation was the impossibility to assess the incubation period of the disease (the duration of infection until the onset of clinical and laboratory symptoms). In this study, patients with both positive PCR test and positive lung CT scan in terms of COVID-19-related changes were investigated. However, individuals with positive PCR test, and no COVID-19-related clinical symptoms were not assessed. The kits used to measure laboratory values and the type of blood pressure monitors were beyond the control of the researchers. Moreover, the evaluation and follow-up of patients after discharge were not conducted. It is suggested that further studies be conducted on the confirmed cases of COVID-19 who are being treated at home.

5. Conclusion

This study was conducted on 260 COVID-19 patients in the Markazi Province of Iran. In addition to fever, fatigue, and cough, patients presented olfactory and taste impairments, and abdominal symptoms, which indicate nervous and gastrointestinal involvement. Among the patients,15% were hospitalized in the ICU, and 8.03% of total patients died. Based on the obtained results, it is recommended that the medical staff and physicians pay attention to the gastrointestinal and neurological symptoms of the disease, as the symptoms of Coronavirus, and not only to the respiratory symptoms.

Ethical Considerations

Compliance with ethical guidelines

Permission of the Deputy of Treatment of Social Security Organization of Markazi Province and the related hospitals were obtained for conducting this research. Anonymity was considered in the assessment of the patients' records.

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