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# Age Distribution of Clinical Symptoms, Isolation, Co-morbidities and Case Fatality Rate of COVID-19 Cases in Najaf City, Iraq

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## ABSTRACT

**Introduction:** The first case of coronavirus disease 2019 (COVID-19) in holy Najaf city in February 22, 2020. The outbreak then rose up all over Iraq from 519 cases and 20 deaths in June 2, 2020 to 3484 cases and 72 deaths per day in August 10, 2020 per 24 hours. **Aim:** The aim of the study is to describe the distribution of confirmed cases by age, demographic factors, isolation, comorbidities and case fatality rate. **Methods:** Prospectively collected and analyzed data on patients with laboratory-confirmed 2019-nCoV infection by real-time RT-PCR and next-generation sequencing. The demographic and clinical outcomes data of 1153 diagnosed patients were collected from consecutive patients, analyzed, and described. About two third of cases 789 (68.4%) acquired infection through contact with positive patients. **Results:** The reported cases were 743 (64.4%) males and 410 (35.6%) females with large number among age range 21 to 50 years. The most frequent presenting symptoms were fever, sore throat and dyspnea or cough, most of patients; 868 (75%) patients were isolated at home versus 285 (24.72) patients required hospitalization which represented the intermediate and sever cases. The overall case fatality rate was 2.4%. **Conclusion:** Most of COVID-19 cases in this locality were male from urban areas. The common onset symptoms were the fever, sore throat and dyspnea or cough. Majority of cases were isolated and treated at home. The estimated case fatality rate was within the global range (2.4%).

**Keywords:** COVID-19, coronavirus, symptoms, outbreak.

## 1. INTRODUCTION

The first case of coronavirus disease - COVID-19 in Iraq was reported in Najaf city, a holy city, in Iranian student studying religion in February 22, 2020. The outbreak started to involve all other governorates especially Baghdad, rising up to reach one thousand at 5th day of April. Incubation period greatly varies among patients with range of 2-14 days, which may extend to 27 days (1). For a person in a given age group, the risk of dying if infected with COVID-19 increases with older age. Several studies revealed that the severity of the disease positively correlates with advancing age of the patients. Frequency of symptomatic COVID19 was reported in male higher than female (2-4). About 75% of people who were admitted to the intensive care unit (ICU) were on average older and had underlining health problems. Novel coronavirus infective pneumonia is the only complication specifically linked to COVID-19 (5).

The disease presented in a wide range of symptoms rather than the dramatic fever, cough and shortness of breath. The patient with COVID-19 may show no symptom or might show common dramatic symptoms which are; shortness of breath, cough that gets more severe over time, a low-grade fever that gradually increases in temperature and fatigue (6). Less common symptoms that be reported include; chills, repeated, shaking with chills, sore throat, headache, muscle aches and pains, loss of taste and loss of smell (7). The clinical stat may become more sever and the patient needs calling emergency care when getting any of the following symptoms; trouble breathing, blue lips or face, persistent pain or pressure in the chest, confusion and excessive drowsiness (8, 9). This study hypothesizes that demographic factors and symptomatology of COVID-19 cases might associate the frequency of severe cases and case fatality rate.

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## 2. AIM

The aim of the study was to describe the distribution of confirmed cases by age, demographic factors, isolation, comorbidities and case fatality rate.

## 3. PATIENTS AND METHODS

This study was cross sectional study of consecutive diagnosed patients with COVID-19 enrolled at Al Amal and Al Hakeem Hospital; in Najaf city from June 20, 2020, to August 3, 2020. The final date of follow-up was August 10, 2020, these major nationally organized hospitals only providing medical care for diagnosed patients with COVID-19 in Najaf holly city. All cases with COVID-19 enrolled in this study was diagnosed on the basis of World Health Organization by RT-PCR (Real Time Polymerase Chain Reaction). All patients presented with symptoms.

The diagnostic and treatment guideline for COVID-19 issued by the Ministry of Health (MOH) and update protocol supported by World Health organization (WHO) (10, 11). Verbal informed consent was obtained from patients or their surrogates for the urgent need to collect data. Reviewing of clinical charts, nursing records, laboratory findings, and chest x-rays for all patients with laboratory-confirmed COVID-19 infection who were reported by the coronavirus diagnostic laboratory. The admission data of these patients was from June 2, 2020, to August 10, 2020.

Epidemiological, clinical, laboratory, and CT scan of lungs and outcomes data were obtained. A sample of 1153 consecutive referred patients were interviewed and followed for data collection. Direct individual interview and available medical records obtained the demographic and clinical data including age group, gender, occupation and residency. The clinical symptoms, laboratory results, as well as the complications, treatment, and outcomes during hospitalization were collected from the patients' medical records. The underlying comorbidities were reported according to international Classification of Diseases, Revision 10. The data included house and hospital isolation, in addition to mortality outcome.

### Statistical analysis

The descriptive statistics of categorical variables were presented by counts and percentage. The association between age groups, place of isolation, underlying co morbidity, clinical symptoms and severity of disease was analyzed by application of chi square ( $\chi^2$ ) test was used as appropriate at level of significance  $\alpha = 0.05$ . All statistical analyses were applied using SPSS 26.0 for Windows (SPSS, online free trial).

## 4. RESULTS

A total of 1153 confirmed cases of COVID-19 in holly Najaf city were studied; 743(64.4%) males and 410 (35.6%) females. The maximum positive cases were reported in age 20-50 years, two third of patients 767(66.52%) resident in urban areas. The occupation of the patients revealed high proportion of infection among; earners 24.9%, housewives 23.8% and students 10.7%, officers 9.5%, police 6.3% and retired people 5.6%,

Demographic and personal characteristics	All patients N=1153	Percent
Age group (Years)		
0-10	35	3.0
11-20	64	5.6
21-30	382	33.1
31-40	222	19.3
41-50	237	20.6
51-60	61	5.3
61-70	75	6.5
> 70	77	6.6
Gender		
Male	743	64.4
Female	410	35.6
Residency		
Urban	767	66.5
Rural	386	33.5
Occupation		
physician	9	0.8
Dentist	2	0.2
pharmacist	6	0.5
biologist	16	1.4
nurse	69	6.0
Other care providers	17	1.4
officer	109	9.5
student	123	10.7
housewife	274	23.8
Earner	287	24.9
Soldier	69	6.0
police man	73	6.3
child	35	3.0
retired	64	5.5
Source of infection		
Public gathering	364	31.6
Contacts with positive cases	789	68.4

**Table 1. Demographic and personal characteristics of confirmed COVID-19 cases in holly Najaf city, Iraq**

see Table (1). Most frequent cases were age ranged between 21 to 50 years. The main source of infection was the contact with positive cases (Table 1). About 71% of patients presented with sore throat and 53% with fever followed by shortness of breath (SOB) 44.4 %, weakness 43.4%, headache 39.2% and 18.9% presented with diarrhea. Fever and weakness were more frequent complaints in age group 11-20 years (Table 2). Shortness of breath, cough, fever, sore throat, headache and weakness were more frequent symptoms among adults of age 21-50 years. While diarrhea, headache, fever and SOB were more, frequent among elderly (> 70 years) patients (Table 2). Table 3 revealed that 868 (75%) patients were isolated at home versus 285 (24.72) patients required hospitalization which represented the intermediate and sever cases. There were 221 (19.2 %) of cases had diabetes mellitus, and 313 (27.2%) experienced hypertension. These co-morbidities were found in higher proportions

Symptoms	All patients N=1153 n (%)	Age groups (years)							
		0-10 n=35 n (%)	11-20 n=64 n (%)	21-30 n=382 n (%)	31-40 n=222 n (%)	41-50 n=237 n (%)	51-60 n=61 n (%)	61-70 n=75 n (%)	> 70 n=77 n (%)
Fever	615(53.3)	5(12.3)	60(93.8)	171(44.8)	103(46.4)	165(69.6)	31(50.8)	25(33.3)	55(71.4)
Weakness	500(43.4)	7(20.0)	62(96.9)	123(32.2)	126(56.8)	104(43.9)	12(19.7)	37(49.3)	29(37.7)
Shortness of breath / Cough	512(44.4)	2(5.7)	32(50.0)	195(51.0)	73(32.9)	89(37.6)	42(68.9)	35(46.7)	44(57.1)
Diarrhea	212(18.4)	1(2.9)	12(18.8)	83(21.7)	29(13.1)	47(19.8)	9(14.8)	14(18.7)	23(29.9)
Headache	452(39.2)	2(5.7)	33(51.6)	176(46.1)	89(40.1)	55(23.2)	22(36.1)	28(37.3)	47(61.0)
Sore throat	821(71.2)	27(77.1)	49(76.6)	287(75.1)	198(89.2)	136(57.4)	34(55.7)	47(62.7)	43(55.8)
Abdominal colic	46(4.0)	2(5.7)	1(1.6)	12(3.1)	12(5.4)	4(1.7)	3(4.9)	7(9.3)	5(6.5)
Disturbed consciousness	23(2.0)	0(0)	0(0)	2(0.5)	3(1.4)	3(1.3)	6(9.8)	4(5.3)	5(6.5)
Vomiting	126(10.9)	8(22.9)	3(4.7)	50(13.1)	18(8.1)	31(13.1)	8(13.1)	4(5.3)	4(5.2)

Table 2. Distribution of COVID-19 confirmed cases by symptoms and age group

Characteristics	All patients N=1153 n (%)	Age group (years)								P value
		0-10 n=35 n (%)	11-20 n=64 n (%)	21-30 n=382 n (%)	31-40 n=222 n (%)	41-50 n=237 n (%)	51-60 n=61 n (%)	61-70 n=75 n (%)	> 70 n=77 n (%)	
Isolation place										
Home	868(75.3)	33(94.3)	55(85.9)	301(78.8)	193(86.9)	147(62.0)	42(68.9)	55(73.3)	42(54.5)	0.0001
Hospital	285(24.7)	2(5.7)	9(14.1)	81(21.8)	29(13.1)	90(38.0)	19(31.1)	20(26.7)	35(45.5)	
Co-morbidity										
Y pretension	313(27.1)	0(0)	0(0)	1(0.3)	78(35.1)	126(53.2)	33(54.1)	44(58.7)	31(40.2)	0.0001
Diabetes	221(19.2)	0(0)	1(1.7)	3(0.8)	55(24.8)	108(45.6)	13(21.3)	12(16.0)	29(37.7)	
Others	619(53.7)	35(100)	63(98.4)	378(98.9)	89(40.1)	3(1.2)	15(24.6)	19(25.3)	17(22.1)	
Severity of disease										
Sever	254(22.0)	2(5.7)	11(17.2)	82(21.5)	67(30.2)	91(38.4)	29(47.5)	18(24.0)	28(36.4)	0.00001
Mild and moderate	899(78.0)	33(94.3)	53(82.8)	300(78.5)	155(69.8)	146(61.6)	32(52.5)	57(76.0)	49(63.6)	
Case fatality rate	28(2.4)	0(0)	1(1.7)	1(0.3)	4(1.8)	8(3.4)	7(11.5)	6(8.0)	1(1.3)	

Table 3. Isolation place, co-morbidity and deaths of COVID-19 cases by age group in Najaf, Iraq

among age groups from 31 years to elderly patients. The case fatality rate overall confirmed COVID-19 cases were 2.4% in Holy Najaf city per time. The higher rate of mortality occurred among patients of age groups from 41 to 70 years. There was significant difference in severity of disease, isolation place and co morbidity by age groups  $P=0.000$  (Table 3).

#### Added value of this study

This study reported the epidemiological, clinical, laboratory, and clinical outcomes and deaths of 1153 laboratory-confirmed cases infected with COVID-19 had a history of direct exposure to the infected individuals. Two thirds of the patients were males. The median age group (40-50 years) and 534 (46.3%) patients had diabetes mellitus and hypertension. Most of patients had symptoms started with sore throat and fever, and 28 (2.4%) died.

## 5. DISCUSSION

This study described the epidemiological, clinical, laboratory, clinical outcomes and deaths of 1153 laboratory-confirmed cases infected with COVID-19 had a history of direct exposure to the infected individuals.

The current study found that two thirds of the patients were males. A Chinese data verified a clear gender difference in incidence with 0.31 (male) vs. 0.27 (female) per 100,000 populations. The median age group was (40-50 years) and 534 (46.3%) patients had diabetes mellitus and hypertension. All patients had symptoms started with sore throat and fever, and 28 (2.4%) died. Clinical findings in this study included sore throat, fever and shortness of breath in high proportions. The most common symptoms of COVID-19 were fever, dry cough, and tiredness. Other symptoms which were less common and might affect some patients include aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell or a rash on skin or discoloration of fingers or toes. These symptoms are usually mild and begin gradually. Some people become infected but only have very mild symptoms. Most people (about 80%) recovered from the disease without hospital treatment. Around 1 out of every 5 people who gets COVID-19 becomes seriously ill and develops difficulty breathing (12, 13). Older people, and those with underlying medical problems like high blood pressure, heart and lung problems, diabetes, or cancer, are at higher risk

of developing serious illness. However, anyone could catch COVID-19 and become seriously ill (14). People of all ages who experienced fever and/or cough associated with difficult breathing/shortness of breath, chest pain/pressure, or loss of speech or movement should seek medical attention immediately (15). If possible, it is recommended to call the health care provider or facility first, so the patient can be directed to the right clinic (16).

During current study, the national curve of cases rapidly raised up from 519 cases and 20 deaths in June 2, 2020 to 3484 cases and 72 deaths per day in August 10, 2020 per 24 hours. In Najaf, only two cases of children under 10 years of age developed severe symptoms with no death. Published papers indicated that children and adolescents were just as likely to become infected as any other age group and can spread the disease (16, 17). Evidence to date suggests that children and young adults are less likely to get severe disease, but severe cases can still happen in these age groups (17). This study reported 35 cases of children below 10 years of age with only two children admitted to hospital with no death. Yang from China reported four infected children in a sample of 8866 cases (18). Children and adults should follow the same guidance on self-quarantine and self-isolation if there is a risk they have been exposed or are showing symptoms. It is particularly important that children avoid contact with older people and others who are at risk of more severe disease (19). The infected persons represented higher proportion among housewives (25%), earners (24%) and students (11%). Nurses showed higher proportion of infection with COVID-19 among medical and health care providers in this locality, more than two third of the cases reported contact with laboratory diagnosed positive patients and majority of the patients recalled contact with symptomatic individuals.

The majority of cases were non health care providers which were consistent with Wuhan study which reported 8.2% of COVID-19 cases as health care workers, 12.2% as family members of health care workers versus 79.5% as non-health care workers or their family members (20). Regarding symptoms of the reported cases in holly Najaf city, the symptoms significantly related to age groups. High frequency of cases was reported among young adults (21-50 years). A good number of studies verified the importance of age in COVID-19 infection (21). This age category included high frequency of symptomatic patients. The fever, weakness and shortness of breath or cough were the most frequent symptoms presented overall age groups in this locality. That means the virus attacks the young adults more frequently while sever cases and case fatality rate were higher among those with older age (more than 60 years of age) with concomitant co morbidities like diabetes and hypertension. Cases started with cough and dyspnea was found more frequent among hospitalized patients reported in epidemiological collected data (22). Three quarters of confirmed cases were isolated at home versus one quarter admitted to hospital for receiving the protocol of treatment. The hospital-isolated patients

were more frequent among age groups of forty years and above. The proportion of hospital isolation was significantly increasing with age of the patients. The 2019-nCoV adversely affected the elderly male subpopulation more than any other subpopulations similar to the severe acute respiratory syndrome coronavirus (SARS-CoV) and the Middle East Respiratory Syndrome coronavirus (MERS-CoV), the 2019-nCoV adversely affected the elderly male subpopulation more than any other subpopulations (21, 22-25). The co-morbidities including diabetes mellitus and hypertension were associated with cases of older age more than 40 years influencing risk of complication and severity of the disease. The estimated the overall adjusted CFR to be 2.4% for the COVID-19, which is lower than those of SARS-CoV (9.2%) and MERS-CoV (34.4%) (23). The analyses were restricted to patients with symptoms onset 10 days and more before data collection to reduce bias from uncured final clinical findings. As more than half of patients of age 50-70 years had hypertension comorbidities, the case fatality rate in this age group was estimated 8% -9% in this locality of Iraq which might be associated with thousands of visitors came to this holy city.

## 6. CONCLUSION

Most COVID-19 cases in this locality were male from urban areas. The common onset symptoms were the fever, sore throat and dyspnea or cough. Majority of cases were isolated and treated at home. The estimated case fatality rate was within the global range 2.43% which might rise up fourfold in elderly.

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