Epidemiology of Pandemic COVID-19 and Its Association with Some Chronic Diseases in Sulaimani City, Iraq

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ABSTRACT

This investigation aims to provide epidemiological features of the COVID-19 patients that admitted to Shahid Dr Hemin Teaching Hospital in Sulaimani city, Iraq. To carry out this work, cross-sectional method was used. A convenience sampling method was applied for data collection which started from 2nd October to 31th December 2020. The current study included only 371 patients who admitted for having COVID-19. The data were collected from patient's medical record and a direct interview method was used for filling in the questionnaire forms. The collected data were statistically analysed by SPSS program with considering a p-value ≤ 0.05 as a significant interpretation. The findings show that the age of patients ranged from 19-95 years old and mean age of the participants was (63.69±12.73). The majority of patients 159 (42.9%) were between 65-79 years old and followed by 124 (33.4%) of them were between 50-64 years old. Male to female ratio was 2:1. Most of the patients were retired 119 (32.1%) in comparison to other occupations and illiterate patients 151(40.7%) were dominance over other patient's education levels. In addition, majority of patients had hypertension 278(74.9%), diabetes 132 (35.6%) and cardiovascular disease (CVD) 130 (35.0%). On the other hand, regarding to condition of patients 230 (62.0%) and 141(38.0%) of them were in severe and moderate stage of disease respectively. Also, a. significant association were observed between the age group, occupation, education level, stage of the disease and patients' outcome, while for gender, marital status

and residency there were statistically non-significant. The presence of CVD, hypertension and diabetes increase the mortality rate among the patients. In conclusion, the age of COVID-19 patients has a great impact on increasing mortality rate and the presence of comorbidities among the COVID-19patients significantly raise the mortality rate.

1. INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the causative agent for coronavirus disease 2019 (COVID-19). At the beginning, in December 2019, the first report of COVID-19 was recorded in Wuhan, China [1]. During a short time, a fast worldwide spread of COVID-19 has occurred, which has posed a global life-threatening problem. Therefore, the pandemic outbreak of COVID-19 virus has announced in March 2020 by WHO [2]. In order to control this pandemic infection, a number of preventive actions has been performed for reducing the morbidity rate of COVID-19; for instance, wearing facemasks, social distancing, and even lockdowns in and between the cities [3]. In spite of different levels of implementations in various regions; however, it has globally a very slight effect to pause COVID-19 breakout. For instance, in more than 180 countries, a high morbidity rate has been recorded, and around 3.0% of fatality rate of COVID-19 [4].

In addition to age, socio-economic conditions, and doubling risk for men compared to women, many clinical risk factors are unfavorable in their outcomes. Body transplantation, severe obesity, untreated diabetes, severe COPD, liver disorders, renal impairment, malignant hematomas and recent cancer lead to significant increases in mortality rate among COVID-19 patients (1.5 to 5 times) [5]. Furthermore, high blood pressure and distant cancer records are slightly elevated risk and only minor changes (less than 1.5 times) occur from 1 to 5 years ago for diabetes, heart disease, moderate obesity and cancer [6].

COVID-19 has a link to more than 1 million deaths in nearly a year after the first reported case in Wuhan in November 2019, and an active disease outbreak continues for spreading. Therefore, it is crucial importance to know evolving footprint of epidemiology, in addition to the real condition and the potential implications of the epidemic. It is unclear how long it will take for the entire pandemic to spread across the planet, and this is expected to differ in the different regions. Regardless, lessons learned in the first year may be helpful in improving responses to the current crisis [7]. In late September 2020, the official death toll from COVID19 has passed one million. There are large differences in the average death rates between the countries and regions. In the early October 2020, the death rate in 66 countries was less than one per 100,000 inhabitants (involving mainly 21 small countries with no record of death), but in 17 countries, the death rate was over 50 per 100,000 inhabitants. These stark disparities are often real, and represent large differences in virus transmission, a wide range of infection mortality rates (IFR), and a decrease or increase in the number of deaths across sites [8].

Therefore, the current study aims to determine epidemiological properties of admitted COVID-19 patients to Shahid Dr Hemin Teaching Hospital at Sulaimani city/ Kurdistan Region of Iraq and importantly to identify the potential effect of a number of risk factors including comorbidities among the patients on the outcome of COVID-19 infections.

2. METHODS AND MATERIALS

To performing this work, prospective cross-sectional method was used and target groups of the study includes confirmed COVID-19 patients by Real Time-Polymerase Chain Reaction (RT-PCR) tests, and they were admitted to Shahid Dr Hemin Teaching Hospital in Sulaimani

during the period from 2th October to end of December 2020, which was 371 patients. A convenience sampling method has been used to select the participated patients who were admitted to the hospital. For data collection on the epidemiological properties, a questionnaire form was used, which is involved demographic section (gender, age, certificate degree, work, and place) and in another section includes clinical characteristics such as (signs, symptoms and presence of chronic diseases). Statistical Package for the Social Sciences (SPSS) applied for statistical analysis with considering a significant interpretation as (p-value ≤ 0.05).

3. RESULTS

In the current study, 371 hospitalized patients were included with confirmed laboratory test for COVID-19. The demographic data revealed that the range of participants' age was from 19 to 95 years old (mean 64) and most of them were between 65-79 years old group 159 (42.9%) and followed by 50-64 years old group 124 (33.4%), 35-49 years old 42 (11.3%), ≥ 80 years old group 39 (10.5%), and ≤ 34 years old group 7 (1.9%). Statistical significant relationship was observed between age of patient groups and the outcome of the disease at p-value 0.0001 (Table 1).

The majority of respondent patients was male 249 (67.1%) in comparison with female 122 (32.9%). Statistically, a non-significant association was revealed between patients' gender and disease outcome (Table 4.1). According to occupation, most of the respondent patients were retired 119 (32.1%); on the contrary, the least participants were students 1 (0.3%). Furthermore, 90 (24.3%) and 48 (12.9%) of them were house wife and unemployed respectively. Additionally, the number of self-employment, office employee, military, teacher and health-worker was 38 (10.2%), 30 (8.1%), 24(6.5%), 12(3.2%) and 9 (2.4%) respectively. There was a highly significant relationship between patients' occupation and hospitalized patients outcome at p-value 0.0001 (Table 1). For educational background, the higher number of patients was illiterate 151 (40.7%) and followed by literate 74 (19.9%) then Diploma degree 65 (17.5%). While for both secondary with primary school were 31 (8.4%), 30 (8.1%) respectively and the least number of participants hold Bachelor's degree 20 (5.4%). There was a significant relationship between patient's education levels and hospitalized patient's outcome at p-value 0.013 (Table 1).

Overall, 5 (1.3%) of them were single, 246 (66.3%) were married, and the others were 120 (32.3%) were widow. Also, 242 (65.2%) of them were reside in the rural areas and 129 (34.8%) of them were live in the urban area. Statistically, there was a non-significant relationship for both patient's marital status and the residential places with the patient's outcome (Table 1). For the stage of disease, the result revealed that 230 (62.0%) and 141(38.0%) were recorded with severe and moderate condition of the disease respectively. In addition, more than half of them were recovered 220 (59.3%) and 151(40.7%) of them died (Table 1). For outcome of hospitalized COVID-19 patients, among 371 patients, 151 (40.7%) of them died and 220 (59.3%) recovered from the disease (Table 1).

Table 1: The Demographic properties of hospitalized COVID-19 patients.

Variables	Category	Frequency	Percentage %	*p*-value
Age	≤ 34	7	1.9	
	35-49	42	11.3	
	50-64	124	33.4	0.0001
	65-79	159	42.9	
	≥ 80	39	10.5	
	Male	249	67.1	0.313
Gender	Female	122	32.9	

Occupation	Retired	119	32.1	
	House wife	90	24.3	
	Unemployment	48	12.9	
	Self-employment	38	10.2	0.0001
	Office Employee	30	8.1	
	Military	24	6.5	
	Teacher	12	3.2	
	Health-worker	9	2.4	
	Student	1	0.3	
Education level	Illiterate	151	40.7	
	Literate	74	19.9	
	Institute	65	17.5	0.013
	Secondary school	31	8.4	
	Primary school	30	8.1	
	University	20	5.4	
Marital status	Single	5	1.3	
	Married	246	66.3	0.307
	Widow	120	32.3	
Residency	Urban	242	65.2	0.506
	Rural	129	34.8	
Stage of disease	Severe	230	62.0	0.0001
	Moderate	141	38.0	
Outcome	Death	151	40.7	0.045
	Recovery	220	59.3	

In the current study, the effects of the presence of some chronic diseases on the COVID-19 hospitalized patients' outcome have been studied. The results showed that among 371 of hospitalized patients, 130 (35%), 278 (74.9%) and 132 (35.6%) of them suffered from chronic cardiovascular disease (CVD), hypertension and diabetes respectively. Whereas, 241 (65%), 93 (25.1%) and 239 (64.4%) of them had no CVD, hypertension and diabetes respectively (Table 2).

Table 2: The frequency of some chronic diseases of hospitalized COVID-19 patients.

Variables	Category	Frequency	Percentage %
Cardiovascular disease	No	241	65.0
	Yes	130	35.0
Hypertension	No	93	25.1
	Yes	278	74.9
Diabetes	No	239	64.4
	Yes	132	35.6

To reveal impact of CVD on increasing mortality rate among COVID-19 hospitalized patient's outcome. The result shows among 151 death cases of the patients, 79 (52.3%) of them suffered from CVD, while 72 (47.7%) of them had no CVD. For recovery cases, among 220 recovered patients, a small number of them had CVD 51 (23.2%) suffered from CVD, whereas a high number of them 169 (76.8%) had no CVD. Statistical significant relationship was observed between the patients who suffer from cardiovascular diseases and the patients' outcome (p-value 0.0001) (Figure 1).
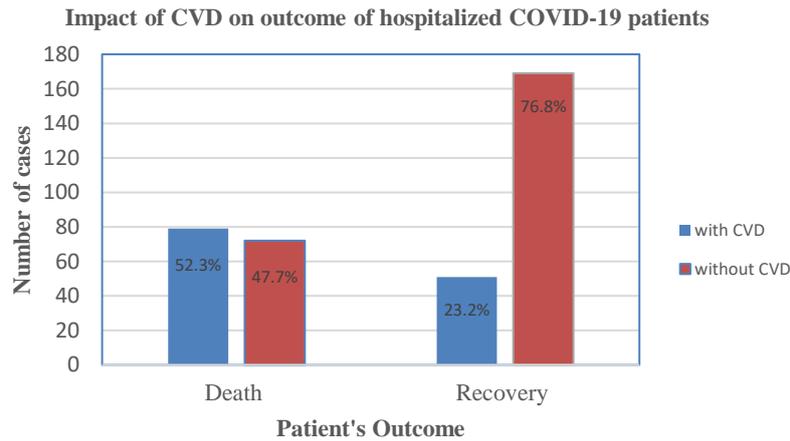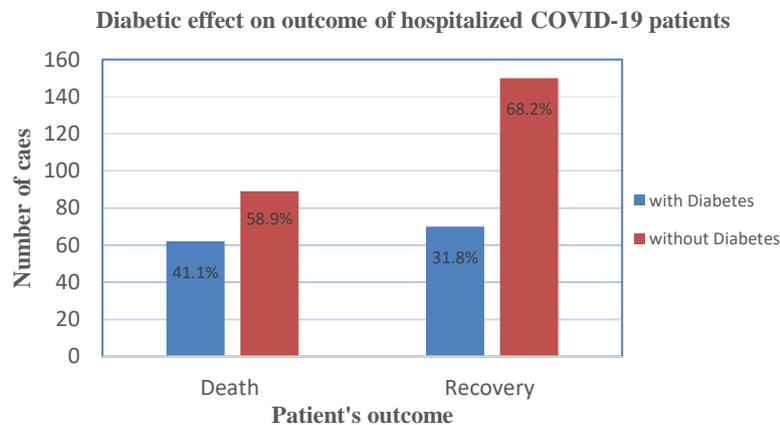

Figure 1: Effect of the presence of CVD on the outcome of COVID-19 hospitalized patients.

For hypertension, among 151 death cases of the patients, 132 (87.4%) of them had chronic hypertension, while 19 (12.6%) had no hypertension. In the recovery cases, among 220 recovered patients, a small number of them had hypertension 74 (33.6%), whereas a high number of them 146 (66.4%) had no hypertension. Statistically, it was significant (p-value 0.0001) (Figure 2). Moreover, the finding reveals diabetic effect on the outcome of hospitalized COVID-19 patients, in which 62 (41.1%) of them had diabetes and 89 (58.9%) had no diabetes. For recovery cases, 70 (31.8%) of them suffered from diabetes, whereas 150 (68.2%) of the patients was non-diabetics and it was statistically non- significant (p-value 0.078) (Figure 3).
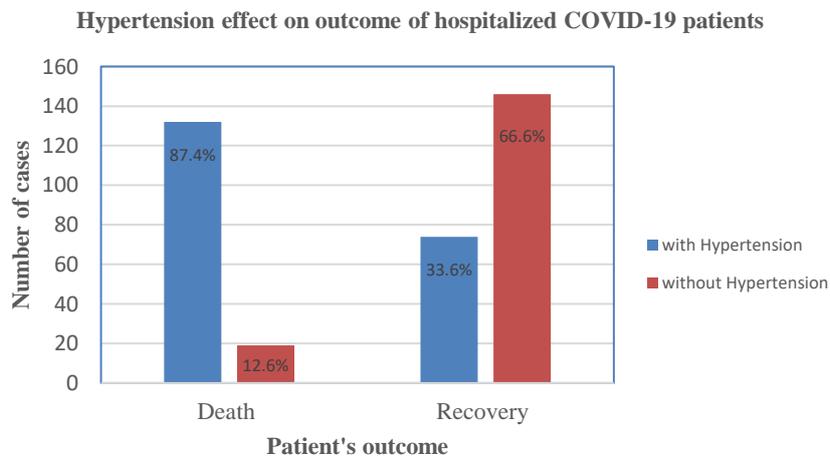
Figure 2: Effect of the presence of hypertension on the outcome of COVID-19 hospitalized patients.

Figure 3: Effect of the presence of diabetes on the outcome of hospitalized COVID-19 patients.

4. DISCUSSION

The current study's results showed that the patients between 65-79 years old age groups had the highest fatality rate than other age groups of the patients, and a significant relationship was observed between patient's age groups and COVID-19 hospitalized patient's outcome. These findings were consistent with other research data, where elderly patients were one of the most significant risk factors for increased mortality among hospitalized COVID-19 patients [9]. Also, Liu *et al* reported similar findings that elderly age groups have the significant risk factor for COVID-19 mortality [10]. Although all age groups have a risk for COVID-19 infection but aging is more likely to develop serious illness and death because of the changes of physiology that associated with aging and potential underlying health problems.

In case of gender, the results show that the male patients have a slightly higher mortality rate than the female patients; however, statistically, non-significant relationship was revealed between patients' gender and hospitalized patients' outcome. Similarly, the findings of other investigations that performed in China and Italy revealed that the gender of the patients has an impact on the hospitalized patients' outcome, in which that men had a high probability to develop a severe condition and even death than females with a non-significant relationship [11, 12]. On the contrary, Martos-Benitez's concluded that females have a higher mortality rate than males with a significant relationship [13]. This difference in the current study could be related to the number of male participants were higher (67.1%) in comparison with females were much less (31.9%). Also, there are fundamental variations in men's and women's immune systems that may affect the capacity to combat infections such as COVID-19. Women have often a higher resistance against infections in comparison to men, which may be mediated by a variety of variables; for instance, sexual hormones and increase of coronavirus receptors (ACE 2) expression in men, as well as lifestyle variables; for example, greater smoking and drinking rates in males in comparison to females. Furthermore, females have a higher responsibility than males in dealing with COVID-19 epidemic. This may have a reversible impact on the implementation of preventative parameters; for instance, frequently washing hands, face mask usage, and directives to quarantine [14].

Furthermore, retired patients showed highest death rate in comparison to other occupations and highly significant association was showed between the occupations and the patients' outcome. This result is in agreement with several studies that showed high rates of COVID-19 deaths among the retired patients [15-17]. While, a different finding was revealed with other studies, in which that registered employees had a slightly higher mortality rate than the other

occupations; however, its association was statistically non-significant [18, 19]. For the education levels, illiterate patients showed a higher mortality number with a significant association. Whereas, different findings were observed with other studies, in which other education levels such as technical diploma and secondary school degrees showed a greater mortality rate [20, 21]. In spite of high mortality rate among the married patients, there was a non-significant relationship between the marital status and the patients' outcome. However, another research work showed that single individuals are most likely to be at risk of death from the infection with a significant association [22]. These differences could be related to the number of married participants which were higher (66.3%) in comparison to other marital status.

In the current study, the patients in the urban areas have the highest number of deaths compared to those in the rural area and there was a non-significant association between patients' residency and the hospitalized patients' outcome. These results are in agreement with several studies that showed high rates of COVID-19 deaths among the urban residents but there was a non-significant relationship between the residency of the patients and the outcome of COVID-19 patients [11,16,17]. While, our results are in contrast with the previous studies showing that COVID-19 patients in the rural areas are mostly at risk of death from COVID-19 with a significant association [23, 24]. The high density of population in the urban areas is believed to be more susceptible to COVID-19 and it may has effect on the mortality rate.

For stage of disease, a high mortality rate was recorded among patients with severe condition of COVID-19 while its association was non-significant relationship. Previous study identified older age as one of several risk factors that leaded to critical and death in the hospitalized COVID-19 patients outcome [25] and other study found significant relation between stage of disease and hospitalized covid-19 patients outcome [13].

Since the outbreak of COVID-19, the effects of the presence of comorbidities with COVID-19 has broadly investigated. For instance, among COVID-19 patients, 20 – 30% of them are revealed with comorbidities, while in the COVID-19 patients with critical condition, this proportion has raised to 50 – 80% [5-7]. Furthermore, hypertension, chronic obstructive pulmonary disease (COPD), cardiovascular diseases, obesity, diabetes and cancer are considered as the most prevalent coexisting disorders of chronic diseases, in which the severity and mortality rates had several-fold greater than other population without comorbidities [5,6]. Findings of the current investigation revealed that the COVID-19 patients who suffer from chronic diseases; for instance, cardiovascular diseases, hypertension and diabetes had a severe stage of disease and with high mortality rate than the other patients who do not suffer from such comorbidities. In the case of recovery condition, the high rate of COVID-19 recovery was observed among the patients who do not suffer from chronic diseases. These finding are in agreement with another investigation that showed the independent risk factor of COPD has observed with the higher severity and mortality rates [16]. This findings reveal that presence of comorbidities have a great impact on increasing the mortality rate among hospitalized COVID-19 patients.

5. CONCLUSION

The current findings showed that the high number of COVID-19 hospitalized patients were elderly age groups and they had a higher mortality rate for COVID-19 than the other age groups with a significant relationship between age of patients and COVID-19 hospitalized patient's outcome. For the other parameters, such as gender, occupation, educational level, marital status, residency and stage of disease; there were slight differences in the mortality rate among the mentioned parameters. Also, the higher mortality rate has dramatically increased among the COVID-19 patients who suffer from chronic diseases and were in a severe stage of disease than other patients who do not have such comorbidities. In case of recovery condition, the high rate was showed among the patients who do not suffer from chronic diseases.

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