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EFFECT OF AGE AND GENDER ON THE FREQUENCY DISTRIBUTION OF COVID -19 INFECTION IN KARBALA PROVINCE

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Article Info.

Article history:

Received 25 October 2022

Revised 15 November 2022

Accepted 12 December 2022

Keywords:

Age, Gender, COVID -19, frequency distribution.

How to cite:

Fatima Mutasher Swadi, Fatin Hasim Al.Mosawi, Zainab A.AL-Ali, Ali Mansoor Al Ameri. Effect of age and gender on the frequency distribution of covid -19 infection in Karbala province. Aca. Int. J. Med. Upd. 2022;1(2):01-05. <https://doi.org/10.56981/MU000121>

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ABSTRACT

Background: The worldwide infection with COVID -19 represents an extraordinary threat to global populations health due to fast distribution and life-threatening complications. Despite the fact that COVID-19 affects all ages and both genders, it is now known that the pandemic affects certain age groups, namely the adults, more severely than children. Meanwhile, gender might have a further impact on the distribution of the disease. The most suitable explanation of this variation in the disease distribution among different ages and genders is the variable immune status of these different demographic phases of life. In addition, there are other possible mechanisms that represent a rich area of research and investigation. Collectively, the effect of both age and gender on the epidemiology of COVID-19 needs to be further studied and analyzed on a wider scale of sample size and standardized conditions.

Aim of the study: to evaluate and analyse the effect of age and gender on the frequency distribution of COVID-19 infection.

Method: A cross-sectional survey study was done during the period from June 2020 through August 2021. Individual and institutional consent was taken prior to the study. Records of the centers of COVID-19- specialized hospitals in Karbala, Iraq, were considered and analyzed using the SPSS statistic app. The study included a total of 2369 patients infected with COVID -19 were selected randomly. They were diagnosed by a specialist physician according to the current standard guidelines. The age range of the patients varies from two years to upto107 years)

Results: Data of the current study revealed that 1479 patients of the total number were males while only 890 were females. There was a significant difference in the disease distribution between males and females, p-value < 0.05, where males are more frequently affected than females in almost all age groups. Analysis of age effect on the distribution of the infection using the f test has shown that adults are more significantly affected than children. Additionally, the age groups (35-44 yrs) are more prone to infection

than other age groups for males. While the number of infections among females peaks at age intervals (45-54 yrs), p-value < 0.05.

Conclusion: It was concluded that the male gender has significantly more predilection for the infection with COVID -19 than the female gender. Secondly, young and middle-aged adults males are more prone to infection than other age groups. While the number of infections among females peaks at a little bit older age. Finally, adults are affected more frequently than children less than 18 years old.

INTRODUCTION

The World Health Organization announced that, until 7:54 pm CET, 25th January 2022, there have been 352,796,704 confirmed cases of COVID -19, including 5,600,434 deaths, all over the world. Also, until 24th January 2022, a total of 9,620,105,525 vaccine shots have been given in various countries[1]. The global pandemic of COVID -19 infection represents the single most threatening public health dilemma contributing to considerable morbidity and mortality rates affecting the world population[2]. A considerable challenge of the COVID-19 pandemic arises from unusually variable signs and symptoms and unexpected severe complications that, in some instances independent on patient's age or underlying health condition[3]. However, observations reveal an effect of age on both presentation and disease course. A direct relation between age and the number of deaths due to COVID-19 infection was reported by Center for disease control (CDC) [4]. The effect of gender on disease occurrence, presentation and outcome was also studied[5,6]. It was found that male gender is associated with more mortality rate due to COVID-19 infection than female gender[7]. A recent study suggested that clinical trials regarding COVID-19 should include gender as a marker of standardization[8].

PATIENTS AND METHOD

This cross-sectional study was performed in Karbala, Iraq, from June 2020 through August 2021. Here in, 2369 patients aged between 2-107 years old were selected randomly. Results were collected, and statistical analysis was done for each reading. Standard package of social science (spss) Version 23 was implemented. Readings were represented as mean plus/ minus the standard deviation of the mean. The level of significance was set at p-value of less than 0.05. To compare the frequency distribution of COVID -19 infection in different age groups and in both genders, we use F distribution test and calculate the level of significance accordingly.

RESULTS

It was found that the gender distribution in COVID -19 patients is 1479 males and 890 females. In addition, the age groups 35-44 years for males and 45-54 years for females, were shown to have the highest frequency distribution of COVID-19, p-value <0.05. The difference in disease distribution for both genders and age effect were statistically significant, as shown in table1 and figure 1.

Table (1): show the frequency distribution of COVID -19 in both genders and in different age groups.

age	Female	Male	female%	male%		
0-17	43	51	0.048315	0.034483		
18-24	82	89	0.092135	0.060176		
25-29	83	178	0.093258	0.120352		
30-34	73	178	0.082022	0.120352		
35-39	74	208	0.083146	0.140636		
40-44	71	199	0.079775	0.13455		
45-49	115	148	0.129213	0.100068		
50-54	96	150	0.107865	0.10142		
55-59	70	86	0.078652	0.058147		
60-64	81	62	0.091011	0.04192		
65-69	39	63	0.04382	0.042596		
70-74	38	31	0.042697	0.02096		
75-79	14	16	0.01573	0.010818		
80-84	4	11	0.004494	0.007437		
85-89	6	4	0.006742	0.002705		
90-100	1	5	0.001124	0.003381		
	890	1479			2369	total
	f dist=0.0002	0.0001				
	f test + 0.007					

Figure (1): show the 3D chart representing the frequency distribution of COVID -19 in both genders and in different age groups.

DISCUSSION

Results of the current study reveal a significant positive correlation between increasing age and the occurrence of COVID-19 infection. The reason for this correlation can be due to differences in immune modality in different age groups. In addition, more frequent encounter with the virus in certain age groups could be another cause. This finding is concomitant with most of studies pertaining to age and frequency distribution of infection with COVID-19.

Data from the centers for Disease Control and Prevention Provisional COVID -19 Deaths by Week, Sex, and Age reveals an increasing death rate parallel to the increase in age of the affected patients, (CDC). At the same aspect, a Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID -19) and World Health Organization revealed that mortality rate from COVID -19 infection increases with increasing age of the patients, and that male gender is associated with higher mortality[9,10]. Another study found that COVID -19 much more fatal for men, especially taking age into account[11,12,19].

Regarding the gender effect, the current study reveals a significant positive correlation between male gender and the frequency distribution of COVID -19 infection. This could be attributed to gender differences in immune response and cardiovascular comorbidities associated with higher infection rate and higher mortality of COVID -19 in males[13]. Similarly, an immunological study revealed that sex hormones determine the nature of immune response against pathogens, including COVID -19 viral agents [14]. Several other studies found that male gender is a predictor of higher mortality in hospitalized adults with COVID -19 [7,15,16,17]. This correlation was found to be reinforced, especially when taking age into account[11,12]. Furthermore, a global COVID -19 meta-analysis identified male sex as a risk factor for death and admission to the intensive care unit[18].

In conclusion, male gender and increasing age have a significant effect on the frequency distribution of infection with COVID -19, and the effect is strengthening when the two markers come into effect

together.

Conflict of interest

No conflict of interest was disclaimed by any of the authors.

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