Effect of smoking on infection with COVID-19

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ABSTRACT

The appearance of the pandemic (COVID-19) encourage researchers to carry out a lot of studies to study the effect of different factors on the severity of the infection; among them are smoking, chronic diseases, age, gender. The aim of the current study was to study the significance of smoking, chronic disease, gender and age factors with the severity of infection with Coronavirus and the need to ICU. The study was carried out in Imam Hussein Teaching Hospital in Karbala, Iraq on both genders, from January to April 2021. The collected information from patients included gender, age, smoking, chronic diseases (high blood pressure, diabetes, other diseases) and the needs for ICU. The result was presented in five tables; the significance between the factors were considered important at $p < 0.001$. In conclusion, several important points were the outcomes of the current study: smokers are highly risked with Coronavirus; no significant correlation was found between gender and medication with the risk of COVID-19; a significant correlation was observed between the duration of smoking and severity with COVID-19.

Keywords: Smoking, Chronic diseases, COVID-19, Iraqi patients.
Article type: Research Article.

INTRODUCTION

Tobacco, and as depicted by most of the studies, is considered as a main reason that leads to death all over the world, because smoking has a direct effect on the health, particularly on the respiratory system causing infection (Arcavi & Benowitz 2004). The correlation between COVID-19 and smoking attracts a lot of researchers, and studies were carried out to find out this association. The finding of the most of these studies reported that smokers are at high risk of a very severe infection that may require urgent hospitalizing in intensive care units (ICU) (Alqahtani et al. 2020; Vardavas & Nikitara 2020). However, the rate of infected smokers with COVID-19 that required hospitalization is very low compared to the population of smokers (Farsalinos et al. 2020). This finding was firstly observed in China and its series of cases, although similar results were noticed in places around the world. As for SARS-COV-2, it was reported that smoking might lower the risk and the susceptibility of infection (Rossato et al. 2020, Docherty et al. 2020). In 2020, a study was carried out (Farsalinos et al. 2020), and according to the clinical trials, it was found that the severe cases of COVID-19 can be referred and connected to the cholinergic in the pathway of the anti-inflammation system. While another study (Patanavanich & Glantz 2020) found that smoking may cause depression in the function of the lungs and considered it as a high risk factor for infection, their study was presented as a meta-analysis to find the correlation between infection with COVID-19 and smoking. They found that the odds of infection and disease progression are higher in smokers than people who do not smoke. However, it is very important to differentiate between nicotine and smoking because some researchers found that nicotine can play a role and work against infection with COVID-19 (Dhillon et al. 2020). There are many studies about COVID-19 around the world (Bendaif et al. 2020; Maliki et al. 2021; Khadom et al. 2021; Sulandjari et al. 2022; Jaber et al. 2022)

In the current study, we focused on the association between COVID-19 and smoking as well as the severity of infection in smokers compared to control in Iraqi patients. Chronic diseases were also studied as a risk factor in the infection.

MATERIALS AND METHODS
Data were collected from patients admitted to Imam Hussein Teaching Hospital in Karbala, Iraq including both genders. A form was organized to collect information from patients, which included the patient's name, gender, age, smoking, chronic diseases (hypertension, diabetes, other diseases) and do the patients need intensive care unit or not.

RESULTS AND DISCUSSION
The collected data were presented in five tables.

Table 1. Effect of gender and the incidence of chronic diseases among smokers infected with the Coronavirus.

Gender	Number and percentage	No chronic diseases	Hypertension	Diabetes	Hypertension and Diabetes	Total
	Number	71	4	11	4	90
Males	Horizontal percentage	78.9%	4.4%	12.2%	4.4%	100.0%
	Vertical percentage	97.3%	100.0%	78.6%	66.7%	92.8%
	Number	2	0	3	2	7
Females	Horizontal percentage	28.6%	0.0%	42.9%	28.6%	100.0%
	Vertical percentage	2.7%	0.0%	21.4%	23.3%	7.2%
	Number	73	4	14	6	97
Total	Horizontal percentage	75.3%	4.1%	14.4%	8.2%	100.0%
	Vertical percentage	100.0%	100.0%	100.0%	100.0%	100.0%
Significance		12.83				
The moral significance		Significant level = 0.01				

According to Table 1, the prevalence (%) of the COVID-19 patients diagnosed with chronic diseases such as HB, Diabetes and both (HB & Diabetes) were 4.1%, 14.4% and 8.2%, respectively. The prevalence of patients with no chronic disease was 75.3%, indicating that there is no significant association between smoking and chronic diseases. However, it can urge smokers to reduce smoking. This finding matches with a study carried out by (Hu *et al.* 2021). The correlation between smoking and diabetes has not been understood as depicted by (Chang 2012), while (Paola *et al.* 2001) reported that there is a significant correlation between hypertension and smoking. In general, smokers were highly risked with Coronavirus, and it exhibited no correlation with chronic diseases.

Table 2. Effect of gender and drug use on smokers infected with the Coronavirus.

Gender	Number and percentage	Do not take medication	Take medication	Total
	Number	51	39	90
Males	Horizontal percentage	56.7%	43.3%	100.0%
	Vertical percentage	92.7%	92.9%	92.8%
	Number	4	3	7
Females	Horizontal percentage	57.1%	42.9%	100.0%
	Vertical percentage	7.3%	7.1%	7.2%
	Number	55	42	97
Total	Horizontal percentage	56.7%	43.3%	100.0%
	Vertical percentage	100.0%	100.0%	100.0%
Significance		1.00		
The moral significance		0.98 (Not significant)		

Table 2 shows that there is no significant correlation between gender (male or female), and medication with the risk of COVID-19. This finding matches with a study carried out in China (Jin *et al.* 2020). They found that there is no correlation between gender and Coronavirus. Another study (Geng *et al.* 2021) indicated that the chronic diseases patients are at high risk of infection with Coronavirus diseases.

Table 3. Effects of gender and the severity of infection with Coronavirus among smokers.

Gender	Number and percentage	Severe infection	Moderate infection	Weak infection	Total
	Number	6	29	55	90
Males	Horizontal percentage	6.7%	32.2%	61.1%	100.0%
	Vertical percentage	100%	90.6%	93.2%	92.8%
	Number	0	3	4	7
Females	Horizontal percentage	0.0%	42.9%	57.1%	100.0%
	Vertical percentage	0.0%	9.4%	6.8%	7.2%
	Number	6	32	59	97
Total	Horizontal percentage	6.2%	33.0%	60.8%	100.0%
	Vertical percentage	100.0%	100.0%	100.0%	100.0%
Significance		0.71			
The moral significance		0.71 (Not significant)			

The findings in Table 3 depict the association between gender and the severity of infections with coronavirus exhibiting no important association between them. This finding is not similar to a study carried out by (Hiroki *et al.* 2020) who reported that males are at high risk of severe infection with coronavirus.

Table 4. Effect of gender and the need for intensive care unit (ICU) among smokers infected with the Coronavirus.

Gender	Number and percentage	Do not need ICU	Need ICU	Total
	Number	88	2	90
Males	Horizontal percentage	97.8%	2.2%	100.0%
	Vertical percentage	92.6%	100.0%	92.8%
	Number	7	0	7
Females	Horizontal percentage	100.0%	0.0%	100.0%
	Vertical percentage	7.4%	50.0%	7.2%
	Number	95	2	97
Total	Horizontal percentage	97.9%	2.1%	100.0%
	Vertical percentage	100.0%	100.0%	100.0%
Significance		0.16		
The moral significance		0.69 (Not significant)		

As shown in Table 4, the data indicates no significant correlation between gender and the needs for intensive care units (ICU) for the infected patients; this finding is not similar to that of (Hiroki *et al.* 2020).

Table 5. Effect of smoking duration and number of cigarettes on the severity of infection with the coronavirus.

Variable	Gender	Number	Mean ± SD	P-Value
Age	Male	90	11.67 ± 33.38	0.000
	Female	7	18.64 ± 58.86	
Smoking duration	Male	90	10.63 ± 11.94	0.001
	Female	7	17.91 ± 26.43	
Number of cigarettes	Male	90	13.01 ± 20.48	0.533
	Female	7	15.54 ± 23.71	
Infection severity	Male	90	8.01 ± 12.70	0.896
	Female	7	8.86 ± 12.29	
There is a moral significance				

Table 5 depicts a significant correlation between the duration of smoking and severity with COVID-19. This is a novel finding in Iraqi patients. Eventually, it is important to mention that in all the recent studies, since the COVID-19 pandemic, there was a growing up focus on the association between smoking and respiratory infections. The findings of most of these studies give evidence that the outcomes of the smokers are worse when they are infected (Simons *et al.* 2020; Luk *et al.* 2020). In addition, smoking and tobacco can cause the suppressed immune system, which ultimately increase the risk of infection with coronavirus, and also, as it is well known, smoking affect lungs and cause damages and destroyed them, increasing the chance of infection due to a long time exposure to the air. In addition, smokers are unable to get full oxygen and full air like non-smokers, reducing the oxygen rate (%) in the bloodstream and leading to damages in the other organs of the body (Changeux *et al.* 2020; Guan *et al.* 2020). Future studies are required to gather information about the consumption of nicotine to find out the interaction between smoking and the respiratory system and the risk of infection with COVID-19, as

well as the association between electronic cigarette and nicotine with the risk of infection severity and their need to ICU. These studies can gather data and find therapeutic pathways.

CONCLUSION

There was no significant association between smoking and chronic diseases; smokers were highly risked with coronavirus. There was no significant correlation between gender and medication with the risk of COVID-19, No significant association was observed between gender and the severity of infections with Coronavirus and also no significant correlation between gender and the needs for (ICU). There was a significant correlation between the duration of smoking and severity with COVID-19.

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