

RESEARCH PAPER

The Effect of Fasting and Smoking on the severity and mortality of COVID-19 patients in Basrah, Iraq

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Abstract

Background: Fasting has been shown to have an impact body systems in different manners. The influence of fasting on immune system regulation remains controversial. Immunomodulatory effect of nicotine was suggested recently. Low prevalence of smoking was observed among patients with COVID-19. **Aim:** To study fasting as an immune modulator in relation to the severity and mortality of COVID-19 patients, and to determine the effect of smoking on such patients.

Methods: This is a comparative study included all PCR-confirmed COVID-19 patients during April, May and June 2020 in Basrah. The severity of and mortality due to COVID-19 infection were studied in fasting patients in Ramadan as compared with the non-fasting months before and one month later. Current smoking in relation to the severity of infection was also studied.

Results : Significantly less severe cases and lower mortality were detected in patients with COVID-19 who were fasting as compared with non-fasting patients before and after the fasting month. Current smoking is significantly less frequently detected among severe as compared with mild to moderate cases.

Conclusion Fasting could be useful to improve immune response against infection and to reduce severity and mortality in patients with infections. Smoking benefit in preventing and ameliorating of respiratory tract infection needs to be further investigated.

Keywords: Fasting; Smoking; Immunity; COVID-19

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Introduction

Ramadan, the month of fasting in Muslim religion, can influence immune system but the studies remains controversial [1]. Fasting may affect immune responses to infections, inflammatory diseases and cancer. Interventions with diet could be used to support immune function [2]. Low protein diet, as an example, can play a role in prevention and treatment of

diseases [3]. The mechanisms are poorly understood [4].

Nutrient type and level may affect the generation, survival and function of lymphocytes [5]. Fasting had been shown to improve age expectancy and can inhibit pro-inflammatory cytokine production and also the circulating levels of leukocytes [6]. It had been demonstrated that fasting during Ramadan can have a beneficial effect on neutrophil phagocytic function [7]. Another study found that Ramadan fasting did not result in severe immunological disturbances [8].

Immunomodulatory effect of nicotine has been, recently, suggested, and low prevalence of smoking was observed among patients with COVID-19 [9]. However, smoking was, still, considered as a possible cause for the disease transmission [10].

Methods

Study population

All PCR-confirmed COVID-19 patients in Basrah during the period from the 1st of April to the 14th of July, 2020, were included. The fasting month of Ramadan started on 24th of May. The patients in the fasting month were compared with non-fasting months; one month before and one month after Ramadan. The severity of, and mortality due to COVID-19 infection were compared in all patients in relation to the month of diagnosis. Severely ill patients were indicated by tachypnea (30 or more breaths per minutes), oxygen saturation (93% or less), CT scan changes of the lung and the need for admission to the emergency room [11]. Current smokers were compared with non-smokers in relation to severity of the disease.

Questionnaires were used to gather information. Statistical analysis was carried out using SPSS computer package. Chi-squared test was used for comparison. $P < 0.05$ was considered statistically significant.

The study was approved by the Ethical Committee at the College of Medicine, University of Basrah, Iraq.

Results

There was no significant difference in the mean age of patients over the three months including the fasting month [Table 1]. There were also no significant differences in relation to gender, address or previous medical history.

Table 1 Age groups of patients with COVID-19 in relation to the month of diagnosis

Age (years)	COVID-19 patients / Month			Total No. (%)
	April No. (%)	May No. (%)	June No. (%)	
12-20	9 (4.5)	19 (3.4)	55 (3.8)	83 (3.8)
21-40	56 (27.7)	144 (26.0)	469 (32.7)	669 (30.5)
41-60	88 (43.6)	249 (44.9)	599 (41.7)	935 (42.7)
>60	49 (24.3)	142 (25.6)	313 (21.8)	504 (23.0)
Total	202 (100)	554 (100)	1436 (100)	2192 (100)

$\chi^2 = 10.5$, $df = 6$, $p = 0.1$.

Significantly less severe cases (6.1%) and lower mortality (0.5%) were detected in patients with COVID-19 in the fasting month of Ramadan, as compared with patients who were diagnosed one month before and after [Tables 2 and 3].

Table 2 Severity of COVID-19 patients in relation to the month of diagnosis

Month	Severity		Total No. (%)
	Low- Moderate No. (%)	High No. (%)	
April	164 (81.2)	38 (18.8)	202 (100)
May	520 (93.9)	34 (6.1)	554 (100)
June	1185 (82.5)	251 (17.5)	1436 (100)
Total	1869 (85.3)	323 (14.7)	2192 (100)

$\chi^2 = 43.9$, $df = 2$, $p < 0.001$.

Table 3 Mortality of COVID-19 patients in relation to the month of diagnosis

Month	Mortality		Total No. (%)
	NO No. (%)	Yes No. (%)	
April	185 (91.6)	17 (8.4)	202 (100)
May	551 (99.5)	3 (0.5)	554 (100)
June	1356 (94.4)	80 (5.6)	1436 (100)
Total	2092 (95.4)	100 (4.6)	2192 (100)

$\chi^2 = 30.8, df = 2, p < 0.001.$

Current smoking were detected in 5.3% of the patients with COVID-19. Smoking was significantly less among severe cases as compared with mild to moderate patients (1.2% versus 6%) [Table 4].

Table 4 Smoking in relation to the severity of COVID-19 patients

Severity	Current smoking		Total No. (%)
	NO No. (%)	Yes No. (%)	
Low- Moderate	1757 (94)	112 (6.0)	1869 (100)
High	319 (98.8)	4 (1.2)	323 (100)
Total	2076 (94.7)	116 (5.3)	2192 (100)

$\chi^2 = 12.4, df = 1, p < 0.001.$

Discussion

The fasting month of Ramadan started at the 24th day of April and ended at the 23rd day of May. There is an expected delay for fasting to produce its effect. For the demand of the study, I suggest that the effect of fasting starts after one week and fades away one week later. So that May was the perfect month to study such effect. This effect was compared with two months, April and June.

The non-significant difference in the age groups between fasting patients in May as compared with non-fasting patients in other months indicates that the differences in severity and mortality is not related to differences in the age groups diagnosis during the period of the study.

The low severity and mortality of patients with COVID-19 during the fasting month of Ramadan indicated the protective effect of fasting against infection. This protective effect is possibly related to the improvement in immunity. The severity of infection and mortality raised again significantly after the end of fasting month. Therefore, it is important to suggest intermittent fasting for specific periods thereafter. The fasting time in Iraq during the study was around 16 hours. The exact time for fasting and the frequency and the duration that are required thereafter need further studies.

Current smoking was significantly more detected among mild to moderate cases as compared to severe cases. This may indicate a protective role of smoking in patients of COVID-19. The age and sex effect was not significantly different between the severity groups. The overall smoking (5.3%) is still highly below what is expected in relation to previous studies. Two previous studies showed that 29–31% males and 3–4% females of Iraq population are active smokers. With the believe that the incidence is higher than the reported (12, 13).

Conclusion

Fasting month of Ramadan is probably useful to improve immune response against infection. Therefore, it is important to suggest intermittent fasting for specific periods thereafter. Smoking

benefit in preventing and ameliorating respiratory tract infection needs to be revised.

Conflict of interest: The authors declare no conflict of interest.

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