



## BRIEF COMMUNICATION

## Obstetrics

# ABO blood group and COVID-19 in pregnant women: A case-control study

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In some countries, coronavirus disease 2019 (COVID-19) is the leading cause of death in pregnant women.<sup>1</sup> The risk factors for severe COVID-19 are similar to those identified for the general population. The effects of ABO blood groups and COVID-19 are unclear. Among pregnant women, this association has been identified in the United Kingdom, with women with blood group A showing a higher risk of developing COVID-19.<sup>2</sup>

A retrospective case-control study was performed. The population included all pregnant women who attended the emergency department for respiratory symptoms (suspected cases of COVID-19) at a single center between May 14, 2020, and October 9, 2021. The cases were pregnant women with positive polymerase chain reaction results for severe acute respiratory syndrome coronavirus (SARS-CoV-2) (designated COVID-19+), and controls were women with negative polymerase chain reaction results for SARS-CoV-2 (designated COVID-19-) in a 1:1 ratio. The blood group was determined by the column agglutination method. Pearson  $\chi^2$  test was used to analyze the association between the blood group and the probability of having COVID-19.

Two hundred patients who met the selection criteria were included. The Table 1 shows the characteristics of both groups of patients. The blood group did not influence susceptibility to COVID-19 ( $P = 0.754$ ). A difference was observed in age and susceptibility to COVID-19 ( $P = 0.034$ ). The mortality rate was higher in the COVID-19+ group than in the COVID-19- group (4% vs. 0%,

respectively;  $P = 0.043$ ), but the blood group did not influence mortality ( $P = 0.059$ ). COVID-19 was a risk factor for maternal mortality (odds ratio [OR], 2.04; 95% confidence interval [CI], 1.77–2.35). In pregnant women with COVID-19, the infection had a median of 29 gestational weeks. Moderate-severe COVID-19 was observed in 74 (74%) patients and occurred mainly in the third trimester (44 of 74). No differences were observed between the ABO blood group and disease severity ( $P = 0.965$ ).

The four pregnant women who died had blood group O, three patients who died had a history of obesity, and three had advanced maternal ages (older than 35 years). The frequencies of the blood groups depend on the geographical regions. In Turkey, a country with a high prevalence of blood group A, this blood group increased the susceptibility to COVID-19 (OR, 2.1; 95% CI, 1.5–2.9).<sup>6</sup> Pregnant asymptomatic women were not included. However, it has been described that up to two-thirds of pregnant women with COVID-19 are asymptomatic.<sup>7</sup>

This study found no association between blood group and COVID-19 susceptibility, severity, or death in pregnant women. Similar to other research, two risk factors were identified in pregnant women with COVID-19: age and obesity.

**AUTHORS CONTRIBUTIONS**

The authors assume responsibility for conducting the trial and ensuring data integrity, analysis, and protocol adherence. C.G.T.A.:

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TABLE 1 Characteristics of pregnant women by study group (COVID-19+ and COVID-19-), n = 200

Characteristics	All N = 200	COVID-19+ n = 100	COVID-19- n = 100	P value
<b>Age group, year</b>				
≤29	47.5% (95)	55.0% (55)	40% (40)	0.034
>30	52.5% (105)	45.0% (45)	60% (60)	
<b>Blood group</b>				
A	20.5% (41)	21% (21)	20% (20)	0.754
B	4.5% (9)	5% (5)	4% (4)	
AB	0.5% (1)	1% (1)	0% (0)	
O	74.5% (149)	73% (73)	76% (76)	
<b>Patient group</b>				
A	21% (42)	22% (22)	20% (20)	0.298
No A	79% (158)	78% (78)	80% (80)	
B	5% (10)	6% (6)	4% (4)	0.643
No B	95% (190)	94% (94)	96% (96)	
O	74.5% (149)	73% (73)	76% (76)	0.237
No O	25.5% (51)	27% (27)	24% (24)	
<b>Rhesus factor</b>				
Positive	98.5% (197)	98% (98)	99% (99)	0.803
Negative	1.5% (3)	2% (2)	1% (1)	
<b>Outcome at the end of pregnancy</b>				
Live	98% (196)	96% (96)	100% (100)	0.043
Deceased	2% (4)	4% (4)	0% (0)	
<b>Obstetric outcome</b>				
Term birth	57.0% (114)	64% (64)	50% (50)	<0.001
Preterm birth	14.5% (29)	29% (29)	0% (0)	
Second-trimester abortion	0.5% (1)	0% (0)	1% (1)	
First-trimester abortion	28.0% (56)	7% (7)	49% (49)	

Abbreviation: COVID-19, coronavirus disease 2019.

designed the protocol and drafted the original manuscript. O.D.C.G. and C.S.L.: acquisition of data. C.S.L.: preparation of Tables. C.G.T.A.: analysis or interpretation of data. R.M.A.: substantively revised the manuscript. All authors contributed to the critical review of the paper and approved the final version of the manuscript.

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#### CONFLICT OF INTEREST


The authors have no conflicts of interest.

#### DATA AVAILABILITY STATEMENT


Data available on request due to privacy/ethical restrictions.

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