



## ASSOCIATION BETWEEN COVID- 19 AND BLOOD GROUPS

**Dr. Javeria Afshan\***

Post graduate, Department of General Medicine, Sri Devaraj URS Medical college, Tamaka, Kolar- 563101. \*Corresponding Author

**Dr. Raveesha**

Professor and HOD, Department of General Medicine, Sri Devaraj URS Medical college, Tamaka, Kolar- 563101.

**Dr. Pujitha**

Senior resident, Department of General Medicine, Sri Devaraj URS Medical college, Tamaka, Kolar- 563101.

**ABSTRACT****Background:** Disorders like acute respiratory distress syndrome and different types of cancers were found to be associated with blood group of an individual. In this list, the COVID -19 has also joined.

However, it is a newer entity which needs an in depth analysis before arriving at a conclusion. Hence this study was conducted to assess the association between the severity of COVID-19 and different types of blood groups.

**Methods:** Cross sectional study in the Department of General Medicine Sri Devaraj URS medical college, tamaka, Kolar, a tertiary care teaching hospital during the period of April 2021 to June 2021. A total of 111 cases of COVID-19 were included in the study. Demographic details, clinical profile and treatment given were entered in a proforma. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20.**Results:** Majority of cases (35.1%) with COVID 19 belongs to the A positive blood group followed by the B positive (30.6%), O positive (24.3%), AB positive (5.4%), O negative (3.6%) and AB negative (0.9%) blood groups. Association between blood groups was found to be significantly associated with requirement of NIV and requirement of ventilator support.**Conclusion:** Blood groups play a significant role in the severity of COVID-19 and hence it is considerable to approach the cases based on their blood groups.**KEYWORDS :** COVID-19, severity, blood group, ventilator**INTRODUCTION**

World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) as pandemic, on 11 March 2020<sup>1</sup>. It is caused by one of the Beta-coronaviruses which commonly affects lower respiratory tract of humans. COVID-19 is mainly characterized by dry cough, dyspnea, fever and bilateral lung infiltrates upon imaging. The primary cause of death among the infected patients remains to be the acquired severe respiratory failure<sup>2</sup>.

There were several risk factors for mortality in COVID-19 patients, including male gender, elderly, diabetes mellitus, bronchial asthma, etc<sup>3</sup>. Few studies reported association between the ABO blood group and COVID-19 morbidity and mortality<sup>4,5</sup>. Blood group has also been reported to be related to different infectious diseases and syndromes. For example, blood group A was associated with an increased risk of acute respiratory distress syndrome in trauma and sepsis patients<sup>6</sup>, blood group B was reported as a risk factor for prostate and bladder cancer<sup>7</sup> and non-O blood groups were reported to have a higher risk of gastric cancer<sup>8</sup>.

In view of COVID-19 disease, Zhao et al<sup>9</sup> reported that blood group A was associated with an increased susceptibility to COVID-19 while the O group seemed less vulnerable. The similar pattern was noted in the same study with respect to severity of the disease. Another study connecting the A blood group with an increased risk of contracting COVID-19 was reported in United States<sup>10</sup>. Hence this study was conducted to assess the association between the severity of COVID-19 and different types of blood groups.

**METHODS**

This study was conducted as a cross sectional study in the Department of General Medicine, Sri Devaraj URS Medical College, Tamaka, Kolar- 563101, a tertiary care teaching hospital during the period of April 2021 to June 2021. Study population includes cases who were positive for COVID-19 based on Reverse transcriptase- polymerase chain reaction (RT-PCR). Cases above the age of 18 years and from both genders. A total of 111 cases of COVID-19 were included in the study.

All participants were thoroughly explained about the study and its need in their native language and informed written consent were obtained from them. Principal investigator collected the demographic details about the patients, all their blood samples were analyzed for blood grouping and all the cases were closely followed up till discharge. Severity of the disease<sup>11</sup> was assessed based on the treatment given, as mild cases who were asymptomatic, moderate cases who were symptomatic and treated symptomatically and with NIV support and severe cases who were symptomatic and treated with ventilator support<sup>11</sup>.

All details of the patients were entered in a proforma. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics and chi square tests were used, appropriately to calculate the statistical significance. P value of < 0.05 was considered as statistically significant.

**RESULTS**

Majority of the study participants belongs to age group between 18-30 years of age followed by 61-75 years, 46-60 years, 31-45 years and more than 75 years of age. Also 63.1% of participants were males (Table 1).

**Table 1: Characteristics of study participants**

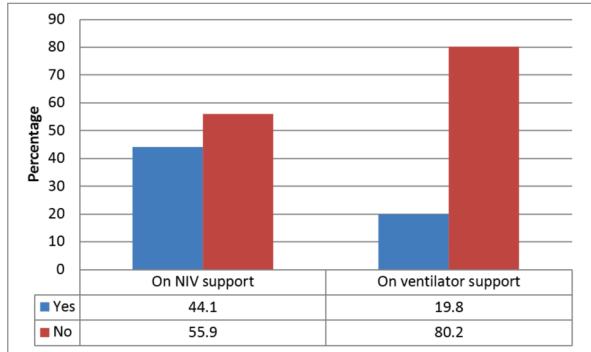
Variables	Frequency	Percentage
<b>Age group</b>		
18-30 years	44	39.6
31-45 years	10	9.0
46-60 years	22	19.8
61-75 years	29	26.1
>75 years	6	5.4
<b>Gender</b>		
Male	70	63.1
Female	41	36.9

Among the COVID- 19 infected cases, majority of them (35.1%) belongs to the A positive blood group followed by the B positive (30.6%), O positive (24.3%), AB positive (5.4%), O negative (3.6%) and AB negative (0.9%) blood groups (Table 2).

**Table 2: Blood group of study participants**

Blood group	Frequency	Percentage
A Positive	39	35.1
B Positive	34	30.6
O Positive	27	24.3
AB Positive	6	5.4
O Negative	4	3.6
AB Negative	1	0.9

In the present study, 44.1% and 19.8% of cases required Non invasive ventilator (NIV) and ventilator support, respectively (Figure 1).



**Figure 1: Proportion of cases on NIV and ventilator support**

On assessing the association between different blood groups with age groups and gender, there was no significant association found, in this study. On assessing the association between different blood groups and requirement of NIV, there was a statistically significant association found, in this study (p=0.005).

Similarly, on assessing the association between different blood groups and requirement of ventilator support, there was a statistically significant association found, in this study (p=0.007) (Table 3).

**Table 3: Association between blood group and other parameters**

Variables	A positive	B positive	O positive	AB positive	O Negative	AB Negative	P value
<b>Age group</b>							
18-30 years	15 (13.5)	11 (9.9)	16 (14.4)	2 (1.8)	0	0	0.209
31-45 years	2 (1.8)	5 (4.5)	2 (1.8)	1 (0.9)	0	0	
46-60 years	5 (4.5)	6 (5.4)	6 (5.4)	2 (1.8)	2 (1.8)	1 (0.9)	
61-75 years	14 (12.6)	10 (9)	3 (2.7)	2 (1.8)	2 (1.8)	0	
> 75 years	3 (2.7)	2 (1.8)	0	0	0	0	
<b>Gender</b>							
Male	27 (24.3)	23 (20.7)	12 (10.8)	4 (3.6)	3 (2.7)	1 (0.9)	0.324
Female	12 (10.8)	11 (9.9)	15 (13.5)	2 (1.8)	1 (0.9)	0	
<b>On NIV support</b>							
Yes	14 (12.6)	20 (18)	6 (5.4)	4 (3.6)	4 (3.6)	1 (0.9)	0.005*
No	25 (22.5)	14 (12.6)	21 (18.9)	2 (1.8)	0	0	
<b>On ventilator support</b>							
Yes	5 (4.5)	9 (8.1)	2 (1.8)	3 (2.7)	3 (2.7)	0	0.007*
No	34 (30.6)	25 (22.5)	25 (22.5)	3 (2.7)	1 (0.9)	1 (0.9)	

\*Significant

**DISCUSSION**

This study showed a significant association between blood group and severity of disease in terms of cases who required NIV and ventilator support for the management of COVID-19 disease.

Pourali et al<sup>12</sup> conducted a meta-analysis and reported that individuals with blood group A were at higher risk while those with blood group O were at lower risk of developing COVID-19 infection. Ray JG et al<sup>13</sup> performed a study and stated that O and Rh negative blood groups were found to be associated with a slightly lower risk for SARS-CoV-2 infection and severe COVID-19 illness, in their study. Hoiland et al<sup>14</sup> conducted a study and reported that significantly higher proportion of COVID-19 patients with blood group A or AB required mechanical ventilation, continuous renal replacement therapy (CRRT) and had a longer ICU stay compared with patients with blood group O or group B. also they reported that blood group A or AB also had an increased probability of requiring mechanical ventilation after adjusting for age, sex and presence of co morbidity.

Juyi Li et al<sup>15</sup> conducted a study and reported that people with blood group A had a significantly higher risk of COVID-19 infection, whereas blood group O had a significantly lower risk of COVID-19 infection. Latz et al<sup>16</sup> conducted a study and reported that there was no association between blood type and any neither of the peak inflammatory markers nor between blood type and any of the clinical outcomes of severity. After multivariable analysis, blood type was not independently associated with risk of intubation or death. Blood type A had no correlation with positive testing, blood type B was associated with higher odds of testing positive for disease, AB was also associated with higher odds of testing positive and O was associated with a lower risk of testing positive and Rh positive cases were more likely to test positive.

Fan et al<sup>17</sup> performed a study and reported that females with blood type A are susceptible to COVID-19. Kibler et al<sup>18</sup> performed a study and reported that people with blood group A blood group were more prone to develop COVID-19 and showed unfavorable outcomes. Wu BB et al<sup>19</sup> performed a meta analysis and reported that blood type A might be more susceptible to infect COVID-19 while blood type O might be less susceptible to infect COVID-19; there were no correlation between ABO blood group and severity or demise of COVID-19. Adhiah et al<sup>20</sup> conducted a study and reported that blood group AB may be a susceptibility biomarker for COVID-19, while group A may be associated with increased risk of death.

In contrast to the present study, Arac et al<sup>21</sup> conducted a study and reported that there were no significant difference between COVID-19 patients and healthy individuals in terms of ABO blood group system. However, Rh negative blood group was found to be protective and the Rh positive blood group was found to be predisposed to COVID 19 significantly.

**CONCLUSION**

Findings of this study suggest that blood groups play a significant role in worsening the COVID-19 disease and hence it is considerable to approach the cases based on their blood groups. However, the present study was limited by including only the deceased cases not the healthy individuals. In order to know the in depth of association between blood groups and COVID- 19 disease, large scale studies with control groups are needed.

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