

## CORRELATION BETWEEN BLOOD GROUP, AGE & GENDER WITH COVID-19 INFECTION

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**Background.** Covid-19, conjointly referred to as severe acute metabolism syndrome appeared in December 2019 by a new Corona virus. The virus originated from Wuhan, the capital of China's Hubei Province and unfold everywhere the globe and have become a worldwide pandemic due to lack of cure.

**Aim:** To study the association of ABO Blood Group, Rh, Age and gender with and COVID-19 infection.

**Material and methods.** This retrospective study was conducted after the approval college research committee of Teerthanker Mahaveer medical college and research center. The study period of this study is from 12 March 2021 to 12 March 2022. The current research included 3000 Covid-19 patients confirmed by RTPCR test and admitted in the Teerthanker Mahaveer University Hospital, Moradabad. Covid -19 positive patient's age, gender, ABO blood group, Rh factor and personal data was collected from the medical record department.

**Results.** The most common blood group affected was B+ (1,119, 37.3%) followed by O+ (729, 24.3%), A+ (653, 21.8%), AB+ (330, 11.0%), B- (77, 2.6%), O- (36, 1.2%), A-(36, 1.2%) and AB- (20, 0.7%). Among study population, 69 (2.3%) belonged to 1-10 years, 157 (5.2%) belonged to 11-20 years, 727 (24.2%) belonged to 21-30 years, 479 (16.0%) belonged to 31-40 years, 455 (15.2%) belonged to 41-50 years, 584 (19.5%) belonged to 51-60 years, 377 (12.6%) belonged to 61-70 years, 114 (3.8%) belonged to 71-80 years and 38 (1.3%) belonged to above 80 years. The study population consisted of 1,811 (60.4%) males and 1,189 (39.6%) females.

**Conclusions.** The findings of this study are In our study we found that age group that was most vulnerable was 21-30 years. We also observed that Males were affected more as compared to females and the blood group that was affected most was B positive and least numbers of patients affected are of AB negative blood group.

**Key words:** ABO blood group, coronavirus disease, Rh factor.

**Background.** The number of cases increased as a result of human-to-human transmission, overseas travelers and direct contact with infected people made up the majority of cases [1]. 4,800,875 people have died so far from the corona virus as of 01, October 2021 in 206 nations, regions or territories [4]. According to the World health Organization the virus primarily spreads between people through close contact. This COVID-19 virus is a metastatic type that can be transferred from on infected person to a healthy one through droplet infection. This virus can be spread by inhaling or just chatting [2, 3].

This virus has different type of affects on different people:

Usual indication:- High temperature, dizziness, breathlessness, cough, fatigue and

anosmia. Less ordinary indication:- Coughing, migraine, joint pain, nausea, dermatitis on skin, browning of fingers or toes, reddish or angry eyes. Consequential indication:- Breathing difficulties or dyspnea or chest pain are all possible symptoms. People who are already normal and have mild indication should manage their problems at private. It means the average of 5-6 days for symptoms usually appear once a person has been exposed to the virus. It may, however, need 14 days [4]. As a precautionary measure against the Corona virus, India's government imposed a 21-day nationwide lockdown on March 24, 2020. As the first lockdown's expiration date approached, state governments and other advisory groups requested that the lockdown be extended because it had slowed the Pandemic's development rate.

Preventive measures including social distancing, quarantine and isolation procedures had been implemented. When adequate pharmacological drugs failed to treat, these preventive strategies were found to be successful [5, 6].

Scientists worked to understand several corona virus variants circulating in India.

The World Health Organization has observed four variations of concern: B.1.17, B.1.351 P2, and B.1.617. Alpha, Beta, Gamma and Delta will be their public labels. SARS-CoV-2 has a sub-lineage that was discovered in India and is now known as «Kappa» [7].

The state has been ravaged by a second wave of COVID-19. On 9/5/2021, our country had approximately 4lakh communicable diseases. Several recent investigations have connected genetic differences in angiotensin-converting 1 enzyme and glutathione S-transferase T1 to corona virus contamination or fatality [8].

The variable production of ACE-2 in the airway is one of many molecular level theories postulated for the differing occurrence of the disease or sensitivity to serious disease. The ABO carbohydrate moieties of Landsteiner were transmitted biologically but prior study has revealed the link among ABO blood type, cardiac disease and cancer but also classification or vulnerability toward certain viruses like the severe acute respiratory syndrome corona virus [9].

Previous research has found that a person's ABO blood group affect their genetic vulnerability to viral infections like influenza, Ebola or severe acute syndromes of respiratory system affected by corona virus 2 [10, 11].

The ABO blood group system given by K.Landsteiner in 1901, many scientists since then have given various possibilities and linkage of the blood group to diseases and viruses [12].

On a large percentage of individuals both types of allergens (A and B) were found on the surface of red blood corpuscles. These antigens are responsible for the majority of blood transfusion reactions. Due to the manner in which agglutinogens are transferred from one generation to another, people may neither have any of these agglutinogens or they may have one or both on these cells [12].

When transfusion of blood takes place from one individual to another, the presence and lack of these 2 agglutinogens is typically used to classify donors and recipients into four primary ABO grouping systems [12].

The ABO blood grouping system has been connected to a variety of human ailments, particularly cardiac, oncological, infectious or non-infectious issues, according to numerous researches [13, 14].

Corona virus disease and ABO blood group have been linked in a few studies. The A, B and AB blood types are all risk factors for transmission; however the O blood group is linked to a decrease incidence in the majority of populations analyzed [9, 15]. When compared to ABO, Rh (D) phenotypes are linked to a small number of illnesses. Rh has a role in type compatibility and immunological response, just like ABO [16].

The study's goal was to determine whether there was an association between ABO and Rh blood group phenotypes with COVID-19 infection.

## MATERIALS AND METHODS

Study design: Retrospective study

Study period: 12 March 2021- 12 March 2022

Inclusion Criteria: Patients admitted with COVID-19 infection confirmed by RT-PCR test [16].

Exclusion Criteria: Any history of smoking.

The current research included 3000 patients with Covid-19 who were admitted to the Teerthanker Mahaveer University Hospital in Moradabad and were confirmed by RTPCR test. Covid -19 positive patient's age, gender, ABO blood group, Rh factor and personal data were acquired from the medical record department after clearance by the College Research Committee and the medical superintendant of TMU Hospital. After that the data was analyzed.

## STATISTICAL ANALYSIS

SPSS and MedCalc Software were used for the data analysis.

**RESULTS**

Table 1  
Distribution of the patients on the basis of blood group and Rh (n=3,000)

Blood Group/Rh factor	Frequency	Percent
A-	36	1.2%
A+	653	21.8%
AB-	20	0.7%
AB+	330	11.0%
B-	77	2.6%
B+	1,119	37.3%
O-	36	1.2%
O+	729	24.3%

The most common blood group affected was B+ (1,119, 37.3%) followed by O+ (729, 24.3%), A+ (653, 21.8%), AB+ (330, 11.0%), B- (77, 2.6%), O- (36, 1.2%), A- (36, 1.2%) and AB- (20, 0.7%).

Table 2  
Distribution of the patients on the basis of age (n=3,000)

Age groups	Frequency	Percent
1-10 years	69	2.3%
11-20 years	157	5.2%
21-30 years	727	24.2%
31-40 years	479	16.0%
41-50 years	455	15.2%
51-60 years	584	19.5%
61-70 years	377	12.6%
71-80 years	114	3.8%
Above 80 years	38	1.3%

Among study population, 69 (2.3%) belonged to 1-10 years, 157 (5.2%) belonged to 11-20 years, 727 (24.2%) belonged to 21-30 years, 479 (16.0%) belonged to 31-40 years, 455 (15.2%) belonged to 41-50 years, 584 (19.5%) belonged to 51-60 years, 377 (12.6%) belonged to 61-70 years, 114 (3.8%) belonged to 71-80 years and 38 (1.3%) belonged to above 80 years.

Table 3  
Distribution of the patients on the basis of gender (n=3,000)

Gender	Frequency	Percent
Male	1,811	60.4%
Female	1,189	39.6%
Total	3,000	100.0%

The study population consisted of 1,811 (60.4%) males and 1,189 (39.6%) females.

## DISCUSSION

According to Singh HP et al in 2020 it was observed that elderly people of the Indian population are more susceptible for severe acute respiratory corona virus 2 transmissions [17].

COVID-19 infection is more common in people aged 21 to 30 years old, according to our findings.

Dr. Sanjay Rai, «See how the population's age groups are distributed. They explain why the proportion of Covid-19 infection data in young people is higher. In India, the proportion of young people is higher than that of the elderly» [18].

On comparison, Garg I et al suggested that individuals had a greater disease incidence than females [19].

In our present study we found that males are more susceptible for COVID-19 infection as compare to females.

Several findings suggest that men have greater concentration of Angiotensin-converting enzyme 2, a macromolecule that virions bind in order to enter and affected human cells. Angiotensin-converting enzyme 2 is identified not only from the lungs as well as in the tissues filling blood vessels, kidney and heart but also in the testes that further clarify how men are far more prone to serious disease than women. That explanation could clarify why males have a greater ratio of COVID-19 instances [19, 20].

Zhao J colleagues discovered in a study published in 2020 that blood group A had a heightened incidence of severe acute respiratory illness, while blood groups O had a reduced risk [21].

According to Fan Q et al in 2021, blood group A individuals diagnosed with Severe acute respiratory had a greater mortality rate than normal participants [22].

The interface among spike proteins and Angiotensin converting enzyme 2 receptors was normally inhibited by antibody type A, which indicates that type O blood group, is shielded towards infections and death rates from COVID 19. The function of ABO antibody just on interface between both the corona spike proteins as well as the Angiotensin converting enzyme 2 receptor remains unknown. The spikes of protein of the

viral genome transmit A, B, AB glycan antigen, which is dependent on the blood type of the vector for virus replication and infection transmission to new hosts. As the O type of blood group has both type of antibodies (A and B) so there are less chances for the infections with A, B and AB antigens.<sup>22</sup> The ABO antibody titers also have a preventive role. Those disparities in data on the correlation among blood types and corona infection might attribute to strains of SARS-CoV-2 having varied pathogenesis and differences in the studied population [23].

Study done by Ravuri S et al, suggested that individual who had B blood group, they were more infected with the corona virus as compared to rest of all blood groups [24].

Research done in 2020 by Almadhi MA et al, they observed that blood group B had more chance of corona illness than blood group AB [25].

In the present research, we found that people with blood group B was more at risk to COVID-19 illness, whereas subject with blood group AB was the least sensitive for the infection.

The source of connection and higher frequency of covid-19 disease in people with Blood Group B is unclear [24, 26].

## CONCLUSION

In our study we found that age group that was most vulnerable was 21-30 years. We also observed that Males were affected more as compared to females and the blood group that was affected most was B positive and least numbers of patients affected are of AB negative blood group.

Limitation in the present clinical study is that there is a likelihood that different pre-existing sickness could have increase severity of corona virus infection we did not exclude the pre-existing sickness in corona virus patients.

**Conflict of interest.** The authors of this manuscript claim that there is no conflict of interest during the research and writing of the manuscript.

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### КОРЕЛЯЦІЯ МІЖ ГРУПОЮ КРОВІ, ВІКОМ І СТАТЬЮ ТА ІНФЕКЦІЄЮ COVID-19

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**Актуальність.** Covid-19, який разом називають важким синдромом гострого метаболізму, з'явився в грудні 2019 року через новий вірус Согона. Вірус походить з міста Ухань, столиці китайської провінції Хубей, поширюється по всьому світу та став всесвітньою пандемією через відсутність ліків.

**Ціль:** Вивчити зв'язок групи крові, резус-фактора, віку та статі АВО з інфекцією COVID-19.

**Матеріал і методи.** Це ретроспективне дослідження було проведено після схвалення дослідницького комітету коледжу медичного коледжу та дослідницького центру Teerthanker Mahaveer. Період дослідження в цьому дослідженні – з 12 березня 2021 року по 12 березня 2022 року. Поточне дослідження включало 3000 пацієнтів з Covid-19, підтверджених тестом RTPCR і госпіталізованих в університетську лікарню Teerthanker Mahaveer, Морадабад. Вік, стать, група крові АВО, резус-фактор та персональні дані пацієнта з позитивним результатом на COVID-19 були зібрані з відділу медичної документації.

**Результати.** Найбільш поширеною групою крові була В+ (1119, 37,3%), потім О+ (729, 24,3%), А+ (653, 21,8%), АВ+ (330, 11,0%), В- (77, 2,6%), О - (36, 1,2%), А-(36, 1,2%) і АВ- (20, 0,7%). Серед досліджуваної популяції 69 (2,3%) належали до 1-10 років, 157 (5,2%) належали до 11-20 років, 727 (24,2%) належали до 21-30 років, 479 (16,0%) належали до 31-40 років. років, 455 (15,2%) належали до 41-50 років, 584 (19,5%) належали до 51-60 років, 377 (12,6%) належали до 61-70 років, 114 (3,8%) належали до 71-80 років і 38 (1,3%) належали до осіб старше 80 років. Досліджена популяція складалася з 1811 (60,4%) чоловіків і 1189 (39,6%) жінок.

**Висновки.** Результати цього дослідження: У нашому дослідженні ми виявили, що найбільш вразливою є вікова група 21-30 років. Ми також помітили, що чоловіки страждали більше, ніж жінки, і група крові, яка найбільше постраждала, була В-позитивною, а найменше постраждалих пацієнтів мають АВ-негативну групу крові.

**Ключові слова:** група крові АВО, коронавірусна хвороба, резус-фактор.