

Relationship between the ABO Blood Group with COVID-19 Susceptibility in Pakistan

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ABSTRACT... Objective: To determine the relationship between the ABO Blood Group and susceptibility to COVID-19 infection in patients from Recep Tayyip Erdogan Hospital (RTEH), Muzaffargarh, Pakistan. **Methodology** This cross-sectional study conducted at Recep Tayyip Erdogan Hospital (RTEH), Muzaffargarh in the department of Internal Medicine. Patients were recruited using non-probability purposive sampling technique. Institutional Ethical Review Committee granted permission to conduct this study and these 228 PCR positive patients were included after taking informed consent, informing them objectives and procedures of the study. Baseline characteristics like gender and age were noted; blood sample was taken and sent to the hospital laboratory for blood grouping. All gathered information was noted in the study questionnaire. **Results:** Out of these 228 COVID-19 patients, 187 (82%) were male patients and 41 (18%) were female patients. Mean age of these patients was 41.21 ± 17.64 years (range; 4 – 80 years). Mean age of the male patients was 42.15 ± 17.52 years versus 36.93 ± 17.76 years ($p = 0.086$) while 126 (55.3%) patients were aged up to 40 years. Blood group-B was noted in 79 patients (34.6%), Blood group-O in 65 patients (28.5%), and Blood group-A in 61 patients (26.8%) and Blood group-AB was noted in 23 patients (10.1%). **Conclusion:** In our study, Blood group-B was most prevalent among COVID-19 patients followed by blood group-O, blood group-A and AB, respectively in our population. Blood groups were not significantly associated with regards to gender and age of the patients.

Keywords: ABO Blood group, Susceptibility, RTEH, COVID-19, Coronavirus,

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INTRODUCTION

CoronaVirus Disease-2019 outbreak which has become global public health issue, has badly affected the whole world, since its start in December-2019 from China in local seafood markets of Wuhan and now the disease has spread all over the world with mortality rates varying from 1 % to as high as 11 % from Italy [1,17]. Clinical presentation of COVID-19 vary with regards to patient's characteristics including asymptomatic, mild to moderate infection of upper respiratory tract to respiratory failure due to severe pneumonia which may lead to death. Mortality rates are being reported from different countries which indicate higher proportions of deaths in

patients with underlying illnesses such as diabetes, hypertension, coronary heart disease, chronic obstructive pulmonary disease (COPD), asthma, chronic lung injury, advanced age, male gender and cancers [2,3,4,18]. The study done between the association of Norwalk virus infection and ABO blood group, shows that individuals with an O phenotype were most likely to be infected with Norwalk virus. This study opened a new horizon of research [5]. Another study done to show the relationship of H.pylori infection and O phenotype also proves that Blood Group O phenotype persons are at higher risk to develop Peptic ulcers caused by H.pylori infection than other phenotypes [6]. Keeping these in view as COVID-19 is an infectious disease, the relationship needs to be

understand for betterment of human being. The Novel coronavirus SARS-CoV-2, causing the new infectious coronavirus disease-2019 (COVID-19), is currently spreading quickly in world. Diagnosis of COVID-19 is being confirmed by rRt-PCR (real-time Reverse transcriptase Polymerase Chain Reaction) done on nasal and oropharyngeal swab samples from patients [7]. Till now there is no biological marker known to predict the susceptibility to COVID-19. Landsteiner's ABO blood types are carbohydrate epitopes that are present on the surface of human cells. The antigenic determinants give us four unique combinations forming (A, B, AB and O phenotype)[8]. Here we are going to study the relationship of COVID-19 caused by SARS-CoV-2 with susceptibility with different ABO blood groups in Pakistan, as recently done in Wuhan, China[9].

Methodology

This study was done at Internal Medicine Department of Receptayyip Erdogan Hospital, Muzaffargarh from 15th March, 2020 to 15th July, 2020. Study design was cross-sectional study and sampling technique was Non-probability Purposive Sampling. Following Inclusion and Exclusion criteria were applied in selecting patients.

Inclusion Criteria: All Patients coming to RTEH Corona Triage Counter with PCR documented SARS-CoV-2 carriage in nasopharyngeal or oropharyngeal sample at admission whatever their clinical status.

Exclusion Criteria: Patients who don't want to participate in study (self-refusal).

Ethical Approval was taken from Institutional Research Committee (Indus Health Network) and IRD Global Limited.

228 PCR positive COVID-19 patients were included after taking informed consent, informing them objectives and procedures of the study. Baseline characteristics like gender and age were noted, blood sample was taken and sent to the hospital laboratory for blood grouping. All gathered information was noted in the study questionnaire.

Data were entered on SPSS – 25 version for analysis and mean (SD) was calculated for age of COVID-19 patients. Gender, age groups and

blood groups were subjected to frequency and percentage distribution. Impact of gender and age on blood grouping was ascertained by applying chi – square test. The relationship will be measured as frequency of Patients with each blood group.

Results

Out of these 228 COVID – 19 patients, 187 (82%) were male patients and 41 (18%) were female patients. Mean age of these patients was 41.21± 17.64 years (range; 4 – 80 years). Mean age of the male patients was 42.15 ± 17.52 years versus 36.93 ± 17.76 years (p = 0.086) while 126 (55.3%) patients were aged up to 40 years. Blood group B was noted in 79 patients (34.6%), Blood group O in 65 patients (28.5%), and Blood group A in 61 patients (26.8%) and Blood group AB was noted in 23 patients (10.1%).

Association of blood grouping with gender and age has been shown in table No. 1 & 2 respectively.

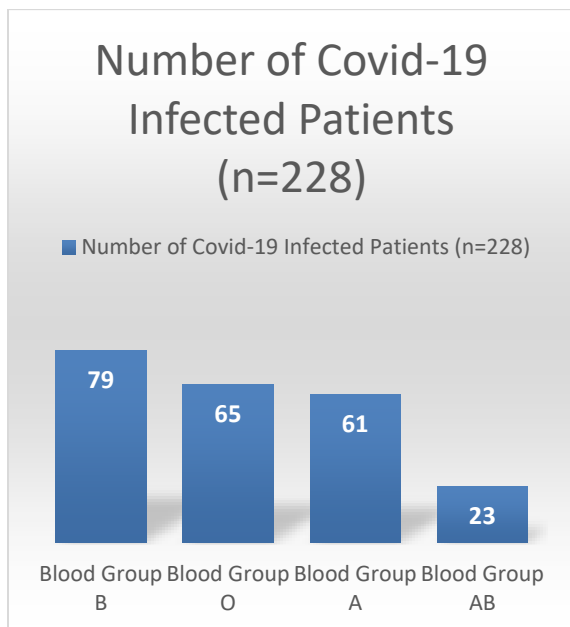
Table No. 1: Distribution of ABO blood grouping with regards to gender (n = 228)

Blood Group	Gender		P – value
	Male (n=187)	Female (n=41)	
A (n=61)	50	11	0.559
B (n=79)	62	17	
O (n=65)	54	11	
AB (n=23)	21	02	
Total	228		

Table No. 2: Distribution of ABO blood grouping with regards to Age (n = 228)

Blood Group	Age	P – value
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	Up to 40 Years (n=126)	More than 40 Years (n=102)	
A (n=61)	33	28	0.928
B (n=79)	46	33	
O (n=65)	35	30	
AB (n=23)	12	11	
Total	228		



Discussion

In humans, ABO blood grouping remains on the important grouping system that harbors 4 blood types that are named as; A, B, AB and O groups and this group is present on Chromosome number 9 (9p34.2). Different reports have demonstrated that ABO blood groups play a key role in different illnesses among humans such as; cardiovascular diseases, tumors and different infectious illnesses [10,19,20]. It has been observed that this blood group system is directly implicated in infections as it serves as receptor or co-receptor for various kinds of Bacterial pathogens (such as Helicobacter pylori), Viruses (such as HBV, SARS- COV,

MERS-COV and Norovirus) and parasites. Recently, different studies conducted in China and USA have implicated ABO blood group with that of COVID-19 infections, severity of the disease and mortalities. However these results were conflicting and inconclusive, as their results revealed different patterns [11,12].

In our study on 228 COVID – 19 patients, 187 (82%) were male patients and 41 (18%) were female patients. COVID – 19 infection has been implicated with male gender as reported from different parts of the world. A local study conducted in Rawalpindi has also reported high male gender preponderance in COVID – 19 infection with 95 % male patients [13]. However a study conducted at USA has reported different findings with 54 % female gender predominance [14]. Mean age of these patients was 41.21 ± 17.64 years (range; 4 – 80 years). In our study mean age of the male patients was 42.15 ± 17.52 years versus 36.93 ± 17.76 years ($p = 0.086$) while 126 (55.3%) patients were aged up to 40 years. A study conducted at Rawalpindi has also reported 41.18 ± 12.56 years mean age in COVID – 19 patients, ranging from 20 – 76 years, similar to our results [13]. A study conducted in USA has reported higher mean age groups in COVID – 19 patients i.e. 56.9 ± 18.6 years [14]. Another study conducted in Wuhan, China has reported 56.8 ± 18.3 years mean age of the COVID – 19 patients, higher than our results [15]. Blood group-B was noted in 79 (34.6%), blood group-O in 65 (28.5%), blood group-A in 61 (26.8%) and blood group-AB was noted in 23 (10.1%). A meta-analysis done for COVID-19 and ABO Blood Group shows that Patient with Blood Group-A are at more risk of Covid-19 infection and patients with Blood Group O are at least risk of infection, these findings doesn't match with results of our study done at our population [16]. The reason for this difference may be translated in terms of different genetic makeup of the virus in western population, genetic diversity of the population, different environmental conditions and variations in different blood group types in different population subsets.

Conclusion: In our study, Blood group-B was most prevalent among COVID-19 patients followed by Blood group-O, Blood group-A and AB,

respectively in our population tested at RecepTayyip Erdogan Hospital, Muzaffargarh. Blood groups were not significantly associated with regards to gender and age of the patients.

Limitations of study were as following:

- i. No comparison group was available.
- ii. Patients were from different areas.

Following recommendations were made after the study: i. Comparative group should be available, ii. Population group to be selected from same area.

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