

# ABO blood system: infection risk and severity in COVID-19

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## Abstract

Association studies between ABO blood group and COVID-19 risk and severity have shown differences depending on blood group. From the serological study, carried out at CIMO in collaboration with the ULSNE, for 343 individuals the ABO phenotype was 40.2%, 5.0%, 8.6% and 46.2% for groups A, AB, B and O, respectively. No significant differences were found between blood groups and infection. These are preliminary results of a study on genetic determinants of susceptibility to SARS-CoV-2 infection.

## Objective

Several pathophysiological mechanisms have been proposed to explain the association between the ABO phenotype and SARS-CoV-2 infection (Barnkob et al., 2020; Group, 2020; Latz et al., 2020; Zietz et al., 2020). In addition to establishing the gene frequencies of these variants in the Portuguese population, which are very important in transfusion medicine, it may be clarified whether these genetic differences contribute to a greater predisposition to COVID-19. This study aims to deepen knowledge about the possible association between the ABO blood group (considering the different genotypes associated with the A and B phenotype) and the risk of infection by the new SARS-CoV-2 coronavirus and the severity of the COVID-19 disease.

## Methodology

The recruitment of health professionals took place in November 2021, with the application of a consented online questionnaire, with information such as sociodemographic data (sex, age, origin), positive test for SARS-CoV-2, symptomatology and severity of COVID-19, and the ABO blood group. In total, 427 health professionals were recruited. The analysis of the research data was performed using descriptive statistics using SPSS version 23.

## Data presentation and discussion

According to a study of the distribution of blood groups in Portugal (Duran et al., 2007), group A was the most frequent in the district of Bragança. The data obtained differ slightly from that study, however it remains to assign 84 individuals.

The number of individuals with group O and group A with a history of infection, was similar. Even without statistically significant differences between blood group and SARS-CoV-2 infection, we can observe that with group A, a set of fewer individuals compared to group B, the frequency of infection is similar and may demonstrate a certain predisposition to infection in the group A, which corroborates what has been described, but nothing can be inferred at this point in the study.



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## Results

Of the 427 individuals who participated, 343 provided information regarding their blood group. The proportions obtained for the ABO phenotype in our sample were 39.7%, 6.4%, 8.5% and 45.5% for groups A, AB, B and O, respectively (Fig.1).

No statistically significant differences were found between blood groups regarding the presence of infection ( $p=0.998$ ) in the period referring to serological screening.

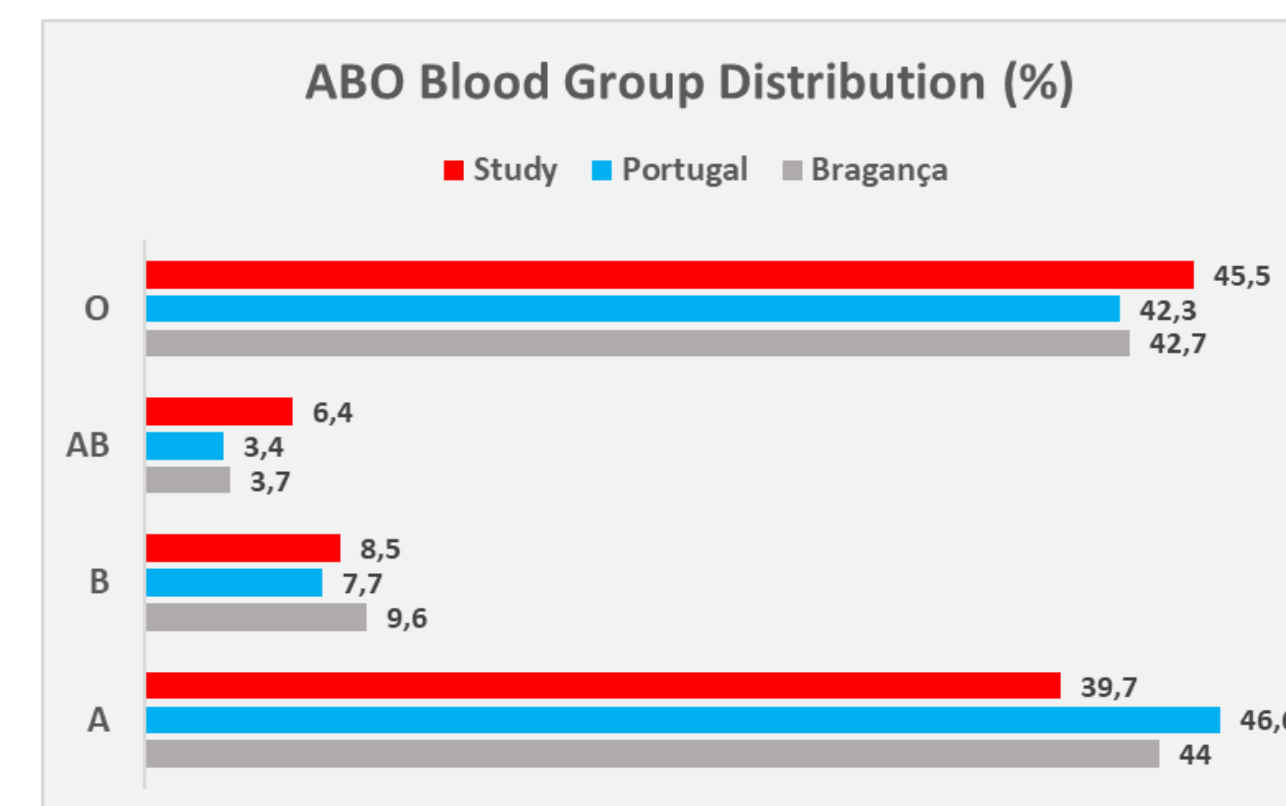


Fig.1 – Percentage of ABO blood group distribution in study compared to Duran et al., study (Duran et al., 2007).

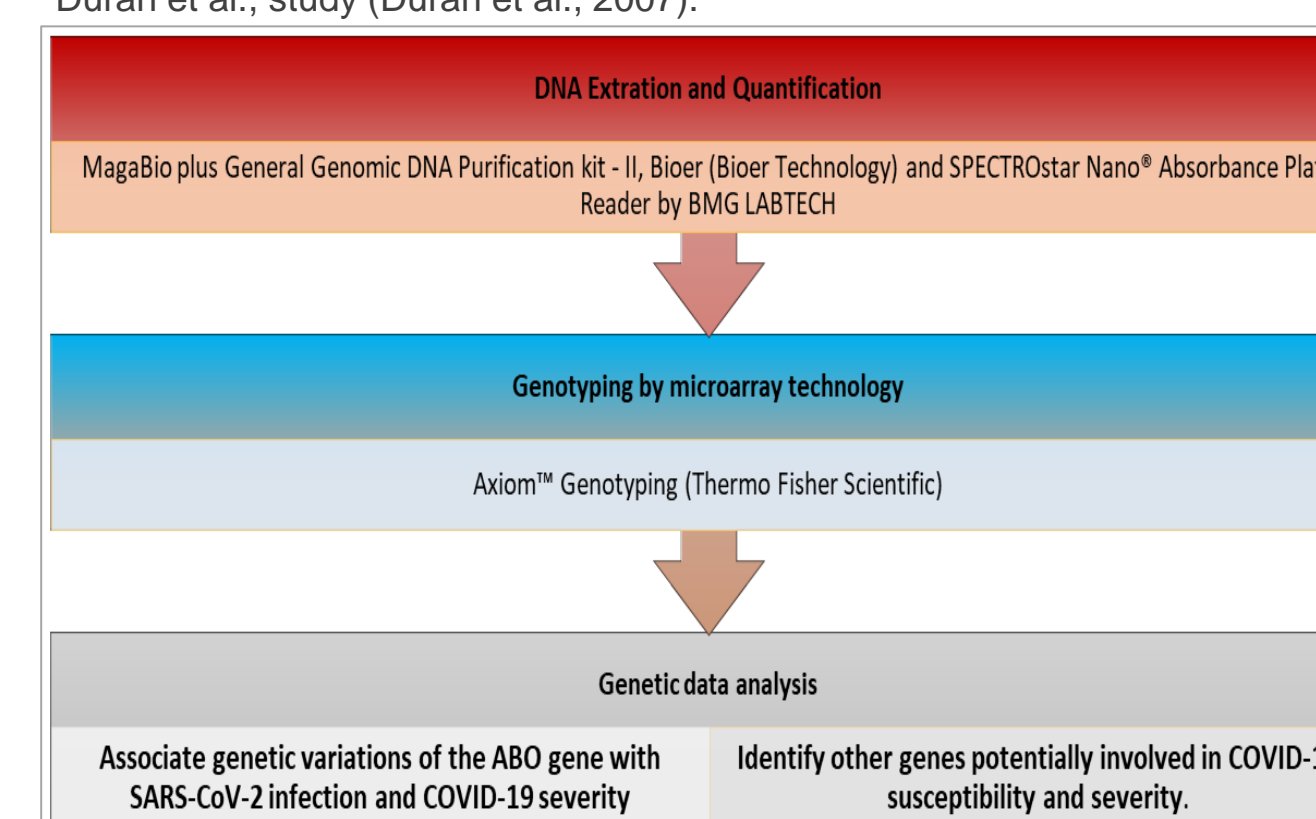


Fig.2 – Flowchart of study follow-up.

## Conclusion and future perspectives

In this study, the distribution of blood groups did not differ much from known data and the various blood groups of the ABO system did not show significant differences about SARS-CoV-2 infection, however these results are preliminary and may differ with the continuity of this study and genetic analysis.

Several epidemiological studies have been carried out with the purpose of understanding the different susceptibilities to infection by the new coronavirus. The ABO blood group has shown differences for this susceptibility to SARS-CoV-2 infection.

Following these results, it is intended to analyze the same association in relation to differences in ABO gene genotypes and the identification of other genes potentially involved in the susceptibility and severity of COVID-19, by microarray technology, Axiom™ Genotyping (Thermo Fisher Scientific) (Fig.2).

The results of this study seek to respond to the need to manage future outbreaks of SARS-CoV-2 infections and optimize prevention strategies.

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