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Surveying the Association Between Blood Type and COVID-19 Infection

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ABSTRACT

The COVID-19 spreads rapidly around the world which has brought a global health crisis. Virus infectivity is mediated by the binding of Spike transmembrane glycoprotein to specific protein receptors present on cell host surface. Studies have noted that some ABO blood types are more susceptible to COVID-19 virus infection. The present survey-based study aimed to further confirm the relationship between different blood groups and COVID-19 infection. The survey is carried out in the area of Gautam Budh Nagar, located in Western part of Uttar Pradesh. The present study was started in the month of September, 2000 and finished in the month of January, 2021.

Keywords : ABO blood system, COVID-19

I. INTRODUCTION

The novel coronavirus disease (COVID-19) is caused by enveloped RNA viruses (SARS-CoV-2). SARS-CoV-2 viruses (order Nidovirales, family Coronaviridae, and subfamily Orthocoronavirinae) are mostly spherical, given electron microscopic morphology, although some are polygonal. The virus is approximately 125 nm in diameter and is enveloped with spikes (glycoproteins) that are nearly 9 to 12 nm, creating the virus's coronal form. The virus morphology is compatible with others in the coronavirus family, particularly SARS-CoV and MERS-CoV [1,2]. The target cell receptor is the key to determining how the virus reaches the cell and which tissues are targeted. The spike glycoproteins engage the viral envelope with the targeted cell cytomembrane. Current research studies showed that angiotensin-converting enzyme 2 (ACE2) is expected to be the COVID-19 cell receptor [3]. The COVID-19 virus causes a severe respiratory infection associated with a considerable mortality rate. This rapidly

spreading viral infection was proclaimed a pandemic by the World Health Organization (WHO) in March 2020 [4].

Individuals with particular ABO blood groups are more prone to various types of infections [5]. For example, blood types A and AB predispose subjects to aggravated malaria, while type O causes resistance to several protozoal infections. Furthermore, this blood grouping system exhibit direct or indirect association with some cardiovascular conditions [6]. Recently, Groot et al. reported that people with A, B, and AB blood types are more susceptible to thrombosis and myocardial infarction, while those bearing the O blood group are more prone to hypertension [7]. In addition, individuals having the A antigen are also predisposed to a higher risk of metabolic disorders, such as hyperlipidemia and diabetes mellitus [8]. After the outbreak of the COVID-19 infection, the likelihood of association between ABO blood groups and the susceptibility to COVID-19 exposure has been reported in patients from three hospitals in Wuhan, Shenzhen, and China. The study results showed that individuals with blood group A had a markedly greater risk of COVID-19 exposure, whereas those with blood group O had a significantly reduced risk of COVID-19 infection.

However, the researchers recommended more studies to confirm the association between the ABO blood grouping and COVID-19 viral infection [9]. In a meta-analysis of two different case-control cohorts, type A blood was reported to confer a greater risk of aggravated COVID-19, while type O blood may offer protection against COVID-19 infection [10]. In the face of this challenging pandemic, the current retrospective cross-sectional study aimed at surveying the influence of ABO blood grouping type on the vulnerability to COVID-19 infection.

II. METHODS AND MATERIAL

Study Protocol

This was a retrospective cross-sectional study conducted on participants from Gautam Budh Nagar, Uttar Pradesh India. Gautam Buddh Nagar is a largely suburban district of Uttar Pradesh. It is part of the National Capital Region (India). It is divided into 3 sub-divisions: Noida Sadar, Dadri and Jewar. The survey was carried out over five months, from the September, 2000 and finished in the month of January, 2021. Google form questionnaires were designed for the COVID-19-recovered patients (COVID-19 group), and the other one for the healthy people (Control group). The questionnaires were distributed via social media (mainly Facebook and WhatsApp). Communication between the researchers and the participants was conducted by electronic mail when needed. The COVID-19 questionnaire comprised of questions such as age group, gender, nationality, blood group, and Rhesus factor (Rh). All participants were allowed to terminate the survey at any time. All measures were taken to keep the confidentiality of the data. In this study, 82 subjects completed the COVID-19 questionnaire.

III. RESULTS AND DISCUSSION

The study was conducted by comparing the blood group distribution in 82 confirmed patients with COVID-19 . The ABO blood group in 82 patients infected with COVID- 19 infection, showed a distribution of 47.36 %,55.26% %, 14.28 %, and 25·7 % for A, B, AB and O, respectively. The results showed that blood group B is associated with a higher risk for acquiring COVID-19 compared to other blood groups, whereas blood group AB and O was associated with a lower risk for the infection.

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