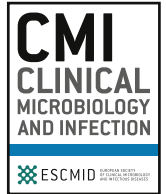




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Letter to the Editor

Seroprevalence of SARS-CoV-2 antibodies in 2115 blood donors from Romania

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To the Editor,

Recent studies suggest that serology should be considered to confirm a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and to evaluate its seroprevalence by investigating the presence of specific antibodies [1].

Romania (19.4 million inhabitants), is among the most affected countries in Europe, with 551 900 cases (of which 21 993 were in Timis County), 11 886 hospitalized patients (of which 1288 in intensive care units) and 13 264 deaths reported as of 12 December 2020 [2].

The SARS-CoV-2 seroprevalence in blood donors varies widely around the globe [3]. Herein, we describe the prevalence of SARS-CoV-2 antibodies among 2115 consecutive volunteer healthy blood donors residing in Timis County (705 113 inhabitants) between 8 July 2020 and 1 September 2020. This study took place at the Regional Blood Transfusion Centre in Timisoara in a period

when Timis County reported an increase in cases, from 555 new cases on the first day of the studied period to 1053 on the last day [2]. All blood donors had to comply with the donation eligibility criteria set by the Romanian Ministry of Health [4]. Individuals underwent a health screening procedure and in case of forehead temperature $>37.3^{\circ}\text{C}$ on the day of donation, flu-like symptoms or close contact with suspected or confirmed coronavirus disease 2019 (COVID-19) cases 14 days before donation, they were excluded. All study participants provided a written informed consent. They were grouped into three age categories: 18–29, 30–49 and 50–65 years.

Serological tests for identifying the presence of the total antibody against SARS-CoV-2 (IgA, IgM, IgG) were performed at the Clinical Laboratory of the Municipal Clinical Emergency Hospital in Timisoara, a reference laboratory for COVID-19 testing in Romania. We used Elecsys anti-SARS-CoV-2 electrochemiluminescence immunoassay test kits designed for Cobas e analysers (Roche Diagnostics GmbH, Mannheim, Germany; 99.81% specificity and 100% sensitivity for past infection in patients at ≥ 14 days after PCR confirmation) [5] according to the manufacturer's instructions, including the quality control. Interpretation of results was based on manufacturer's criteria: non-reactive/negative if the cut-off index was <1.0 and reactive/positive if cut-off index was ≥ 1.0 [5].

This study was approved by the Ethics Committee of the Municipal Clinical Emergency Hospital in Timisoara, Romania.

Of the 2115 volunteer blood donors aged 18–65 years (mean \pm SD, 36.72 ± 10.21 years) 1400 (66.19%, 95% CI 64.15%–68.18%) were males and 1345 (63.59%, 95% CI 61.52%–65.62%) were residents of the urban area. The overall seroprevalence of SARS-CoV-2 antibodies was 1.51% (32/2115, 95% CI 1.07%–2.13%). No association was found between seroprevalence and gender, area of residence, Rhesus blood groups or ABO blood types (Table 1).

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Table 1
Seroprevalence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) antibodies in Romanian blood donors by gender, area of residence, age, Rhesus blood groups and ABO blood type

Variables		No. positive/No. tested (%)	p value ^a
Gender	Male	22/1400 (1.57)	0.852
	Female	10/715 (1.40)	
Area of residence	Urban	22/1345 (1.64)	0.584
	Rural	10/770 (1.30)	
Age groups (years)	18–29	12/570 (2.11)	0.026
	30–49	12/1261 (0.95)	
	50–65	8/284 (2.82)	
Rhesus blood groups	Rh positive	26/1794 (1.45)	0.616
	Rh negative	6/321 (1.87)	
ABO blood type	AB	3/166 (1.81)	0.927
	O	12/716 (1.68)	
	A	13/902 (1.44)	
	B	4/331 (1.21)	

^a A probability level of $p < 0.05$ was considered to indicate statistical significance. Statistical analyses were conducted with EPI INFO version 7.2 (CDC, Atlanta, GA, USA) and STATA 16.1 (Statacorp, College Station, TX, USA). Chi-squared tests or Fisher's exact test, as appropriate, were used to evaluate the differences between SARS-CoV-2-positive and SARS-CoV-2-negative blood donors with respect to different characteristics.

Comparison of frequency distributions by age groups between SARS-CoV-2-positive and SARS-CoV-2-negative blood donors showed a statistically significant difference (p 0.026) (Table 1). SARS-CoV-2 seroprevalence was significantly higher in blood donors aged 50–65 years (2.82%, 8/284) compared with those aged 30–49 years (0.95%, 12/1261) (p 0.019). SARS-CoV-2 antibodies were demonstrated in 2.11% of the blood donors aged 18–29 years and in 0.95% of the blood donors aged 30–49 years (p 0.07).

This is the first study on SARS COV-2 seroprevalence in healthy blood donors from Romania. The overall seroprevalence in Romanian healthy blood donors was lower than the seroprevalence reported in Wuhan, the Netherlands, Italy, France and Pakistan [3], and higher than the seroprevalence reported in Shijiazhuang, Shenzhen [3] and Germany [6]. The difference in seroprevalence may be attributable to health infrastructure, implementation of prevention/control measures and their effectiveness, differences in sensitivity and specificity between the methods used for the evaluation of the presence of SARS CoV-2 antibodies [1], or different times when studies were conducted.

Blood donors are apparently healthy individuals. Moreover, in infected persons, specific anti-SARS-CoV-2 antibodies are not detectable in the very early days of infection [6] and this may explain the relatively low prevalence rates of SARS-CoV-2 infection in this group of the population.

Similar SARS-CoV-2 seroprevalence between urban and rural areas observed in our study could be interpreted that virus circulation does not take into account the area of residence, affecting the urban or rural population to the same extent.

Our results, suggesting that gender, Rhesus blood groups and ABO blood types are not associated with SARS-CoV-2 infection, are consistent with previous reports [3,6].

Similar with our findings, high infection rates were observed in blood donors under the age of 30 years and over 60 years [7]. Young blood donors, even under social distancing restrictions, are more likely to move around, exposing themselves to the infection and this may explain the higher rates in this age group [7]. Increased susceptibility of older individuals to SARS-CoV-2 infection may be attributed to age-related changes in many cellular and molecular elements of both the innate and adaptive immune systems, leaving older adults particularly vulnerable to SARS-CoV-2 [8]. Difference in seroprevalence between age groups might be due to different social interaction, due to work or family life.

Despite the limitations of our study group (healthy blood donors), our results suggest that we are still far away from achieving a natural immunization against SARS-CoV-2 in the Romanian general population. Our data also indicate that during the studied period, SARS-CoV-2 infection occurred with a similar incidence regardless of gender, area of residence or blood type.

Author contributions

TRO designed the study. TRO and RL supervised the study. TRO and MAL wrote the manuscript. TRO, AAP and MAL conducted the literature search. RL, ACC and AAP collected and processed the samples. SU, MAL and TRO conducted statistical analysis and interpretation of data. All authors discussed the results, provided critical feedback and contributed to the final draft of the manuscript.

Transparency declaration

The authors declare that they have no conflicts of interest. The Elecsys Anti-SARS-CoV-2 immunoassay kits were donated by Roche Diagnostics Romania.

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