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Abstract

Background: The COVID-19 pandemic has affected blood inventory and donation worldwide. The Islamic Republic of Iran was among the first countries to report the COVID-19 pandemic and it faced a significant blood shortage during the first weeks of the pandemic.

Aims: We aimed to evaluate the impact of COVID-19 pandemic on the number, type, and safety of blood donations, comparing the periods before and during the pandemic.

Methods: This retrospective study evaluated data from all volunteers who attended the blood transfusion centres in the Islamic Republic of Iran from March to December 2020 (during the COVID-19 pandemic) and during the same period in 2019, i.e. pre-pandemic. Data on the number of blood collections, confirmed transfusion transmissible infection marker test results, and donor demographic information were collected from the Iranian Blood Transfusion Organization integrated donor database.

Results: Total blood donations decreased by 8.38%. The number of first-time, lapsed, and female blood donors increased by 4.41%, 0.17%, and 0.90% respectively. Regular blood donation decreased by 4.58%. The distribution of the 3 main blood products, red cell concentrate, frozen fresh plasma and platelets, decreased by 7.86%. All changes were statistically significant. The prevalence rates of hepatitis C virus and hepatitis B surface antigen increased significantly during the pandemic.

Conclusion: COVID-19 had a negative effect on blood safety and availability in the Islamic Republic of Iran. To improve blood supply and enhance regular blood donation, the Iranian Blood Transfusion Organization needs to reassure blood donors of the safety and hygiene measures being observed at blood collection sites.

Keywords: COVID-19, blood donation, donors, blood safety, blood transfusion, Iran

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Introduction

The World Health Organization declared a pandemic status for COVID-19 on 11 March 2020. On 19 February 2020, the Islamic Republic of Iran reported its first confirmed cases of COVID-19. As of 19 February 2021, more than 7 million confirmed coronavirus cases and almost 136 000 deaths had been reported by the Ministry of Health and Medical Education (1).

The COVID-19 pandemic caused a worldwide blood inventory shortage and a significant reduction in blood donation. In the United States of America (USA), nearly 4000 American Red

Cross blood drives were cancelled, representing approximately 130 000 fewer donations (2). A significant drop in blood donors was reported in Zhejiang Province in China, up to 67% during the first weeks of the pandemic (3). While this shortfall was less serious in countries such as Canada (30%) and Greece (36%) (4), some African countries reported up to 80% decrease in blood collection (5). Among the Eastern Mediterranean Region Member States, the reduction in blood supply in the early stages of the pandemic ranged from 10% to 75% (6). Reduced in-house collections and cancellation of blood drives as well as public fear of contracting COVID-19 contributed to the decrease in donations in this region. This gap was partly filled by a reduction in demand due to the cancellation of elective surgeries and the unwillingness of patients to be referred to hospitals because of fear of contracting COVID-19 (7). However, blood services reported that blood utilization returned almost to the same levels shortly after the critical phase of the pandemic (8).

During the first 8 weeks of the pandemic in the Islamic Republic of Iran, which has a centralized blood transfusion organization, the number of blood donations decreased by about 29.4%. By implementing emergency and precautionary measures, the number of donations gradually increased, from 23 465 to 29 665 blood units (26.4%) within the next 2 weeks. Improving the online blood donation appointment system, changes in the eligibility criteria for blood donation, interacting with hospitals to better manage blood wastage, and engaging with social media may have contributed to this increase (9).

Some studies showed that the COVID-19 pandemic may have had an impact on the type (first-time/regular) and demographic profile of blood donors as well as on blood safety (10–12). In a 2021 study, it was found that the numbers of first time and female blood donors increased in the Islamic Republic of Iran during the pandemic compared to February to April 2019 and 2020 (11). A study conducted in the USA showed an increase in the number of female and middle-aged donors during the pandemic (10).

To further assess these possible changes, we compared the numbers, types and demographic characteristics of blood donors as well as the rates of transfusion-transmissible infections (TTIs) during the 10-month pre-pandemic and pandemic periods in the Islamic Republic of Iran.

Methods

This retrospective study was conducted at the Iranian Blood Transfusion Organization (IBTO). We included all volunteers (n = 3 307 062) who attended the blood collection centres for whole blood donation. All the data collected from March to December 2020 (during the COVID-19 pandemic) along with data from the same period in 2019 (pre-COVID) were collected from the IBTO integrated donor database.

The total number of blood collections, the total extent of the distribution of the 3 main blood products (red cell concentrate, frozen fresh plasma and platelets) to hospitals and health care centres, and demographic information such as type (regular, first, lapsed) and sex of blood donors were retrieved for the study periods. A regular blood donor is one who donates at least 2 times a year; a lapsed blood donor is one who has a record of blood donation but has not made any donation in the past year.

Test results from all donations received during the 2 study periods were used to report TTI markers. Reported rates (per 100 000) included only confirmed reactive results using ELISA tests in 2019 and electrochemiluminescence and chemiluminescence tests in 2020 after a reactive screening test for human HBsAg, anti-hepatitis C virus antibody (anti-HCV Ab) and HIV antigen/antibody (HIV Ag/Ab).

Comparisons for total blood donations and distribution of total blood products were carried out for the study periods in 2019 and 2020. Chi-square testing (RStudio Team, 2020) was used to compare TTI markers for the corresponding periods in 2019 and 2020. Odds ratio (OR) and 95% confidence intervals were calculated. P-value