

COVID-19-related challenges in blood donation in the United Arab Emirates

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Abstract

Background: Blood donation was among the most severely disrupted service during the COVID-19 pandemic, and different measures were taken nationally and internationally to mitigate the impact of the pandemic on donation services.

Aim: To compare blood donation before, during and after the pandemic and the effectiveness of efforts to mitigate the effects of COVID-19 on donation services.

Methods: This retrospective, observational, population-based study assessed the number and locations of blood donations, number of blood and platelet units issued to hospitals, and characteristics of 82 619 blood donors at the reference blood donation facility in United Arab Emirates in 2019 and 2020. Service recovery was assessed by comparing blood donation in 2021 and 2022 with 2019. The data were analysed using SPSS version 26 and the extent of the effect of COVID-19 on the measured parameters was tested using Pearson's χ^2 test. $P \leq 0.05$ was considered statistically significant.

Results: COVID-19 significantly affected the number of donors, location of blood donations, and quantities of blood and platelets issued to hospitals. Median annual number of donors was 19 121 males and 1393 females. In 2020, male donors increased by 1.6%, while female donors decreased by 22.3%. The number of donors decrease to 18 977 in 2020 from 19 035 in 2019 and increased to 22 542 in 2021 and 22 065 in 2022. Whole blood collections decreased by 0.3% in 2020 and increased by 18.0% in 2021 and 13.6% in 2022.

Conclusion: Proactive measures, good infrastructure, flexibility, emergency planning, community awareness, good communication between stakeholders, and close coordination among national authorities are needed to effectively manage blood donation centres during crisis.

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Introduction

The COVID-19 pandemic affected the world in different ways and healthcare systems were severely affected (1, 2). The infection was first reported in China in December 2019 and within a short time, many cases were reported worldwide (3). Countries were urged to take measures to minimize the spread of this highly transmissible infection. WHO and the United States Centers for Disease Control and Prevention and other international agencies published guidelines for the prevention and treatment of COVID-19, and these were updated as more information became available about the novel virus, SARS-CoV-2 (4). In many countries, total or partial curfews were adopted to control its spread.

Limited data on the transmission of SARS-CoV-2 raised, at least initially, concerns about the safety of blood supplies (5). Blood stocks for patients in need of transfusion were affected because stricter donor selection criteria were required to ensure the safety of blood products. The lockdown measures and physical distancing restricted the ability of donors to reach blood donation centres. Many studies have described the

effect of COVID-19 on blood transfusion services, but none has been conducted in the United Arab Emirates (UAE), considering the local COVID-19 mitigation measures, guidelines and regulations published during the pandemic.

This study compared data from 2019 and 2020, to assess the effects on blood transfusion services of COVID-19 and the international and national regulations imposed for infection control. We analysed the mitigation measures taken by Sharjah Blood Transfusion and Research Center (BTRC), UAE to overcome these effects. Data from 2021 and 2022 were used to assess recovery from the COVID-19 pandemic. The study focused on the challenges that affected blood inventory, including number of collected blood units, location of blood collection, donors' characteristics and blood products issued to hospitals. We hope that the study will contribute to improvements in the management, interventions and readiness of blood donation centres during emergencies, and help in developing evidence-based best practices to manage any surges in COVID-19 cases or similar emergencies.

Methods

Study design

This was a retrospective observational study using data for 2019–2022 collected from Sharjah BTRC, which is the reference blood donation facility of Emirates Health Services. The study was approved by the Ministry of Health and Prevention Research Ethics Committee in UAE (Ref: MOHAP/DXB-REC/NNN/ No.117/2021). The Research Ethics Committee waived the requirement for informed consent because the data were anonymously collected. This was a population-based study of 82 619 donors, including 19 035 from 2019, 18 977 from 2020, 22 542 from 2021 and 22 065 from 2022.

Data were collected on the total number of whole blood units per month collected from donors; number of whole blood units collected at the blood donation centre; number of whole blood units collected in mobile facilities; total number of blood donors; numbers of male and female donors; whether donors were regular or first time; and number of packed red blood cells (RBCs) and platelets units issued to hospitals.

Descriptive findings regarding COVID-19-related changes affecting blood donation services were reported as frequencies and percentages. Quantitative measurements were calculated for 2020–2022 and compared with the baseline year of 2019. The extent of the effect of COVID-19 on the measured parameters in 2020–2022, using 2019 as the reference year, was tested using Pearson's χ^2 test, and $P \leq 0.05$ was considered to be statistically significant. Analysis was performed using SPSS version 26.

Results

The total number of whole blood units collected in 2020 decreased by 0.3% compared with 2019 ($P < 0.001$), while 2021 and 2022 showed significant increases of 18.0% and 13.6%, respectively ($P < 0.001$) (Figure 1). Blood collection was not adversely affected in January and February 2020; rather there was an increase in total units by 5.2% and 1.5%, respectively. The first decrease in collections was in March 2020 and the lowest decrease was in April 2020 when only 869 units were collected (44.5% decrease compared with 2019). In May 2020, the number of units collected increased to 1451, a 67.0% increase from April but still lower than May 2019. Whole blood collection increased by 33.8% in June 2020 compared with May 2020 to reach 2192 units. Collection increased gradually from July to December 2020, except for October. Comparing 2021 with 2019, there was an increase in whole blood collection of 17.0%, 11.4%, 20.4%, 51.7%, 30.9%, 48.7%, 18.6%, 33.7% and 37.1% for January, February, April, June, July, August, September, November and December, respectively. The recovery in numbers of units collected was maintained throughout 2021 and 2022, except for March and October 2021 and May 2022 when there was a decrease from similar months in 2019.

The distribution of monthly whole blood collections between blood donation centres and mobile facilities is

presented in Figure 2. The majority of whole blood units collected at Sharjah BTRC were from mobile facilities. In 2019, collections from mobile facilities accounted for 78.3% of the total, while in 2020, only 61.9% were collected in this way. There was complete cessation of mobile blood donation campaigns during April 2020. There was a significant improvement in 2021 and 2022 with an increase in the percentage of whole blood collection from mobile facilities to 71.8% and 75.8%, respectively.

The total number of blood donors significantly decreased during the COVID-19 pandemic, with only 18 977 reported in 2020 compared with 19 035 in 2019. The number increased to 22 542 and 22 065 in 2021 and 2022, respectively. The number of male donors increased by 1.6% ($P < 0.001$) in 2020, while the number of female donors decreased by 22.3% ($P < 0.001$). When comparing first-time donors to regular donors in 2019 and 2020, the number of regular donors increased significantly in 2020 ($P < 0.001$), while first-time donors decreased. In 2021, there was a marked increase in the number of first-time male donors. In 2022, the numbers of male and female donors were similar to those in 2019.

The numbers of packed RBC units issued to hospitals in March, April, May and October 2020 showed a significant decrease compared with the same months in 2019 ($P < 0.001$) (Figure 4). These changes mirrored those for numbers of whole blood units collected. In 2021 and 2022, the numbers of packed RBC units issued increased significantly to 19 962 and 20 636, respectively, compared with 17 274 units in 2019.

Changes in number of platelet units issued were more variable throughout 2020 compared with 2019 (Figure 5). For all months in 2021, there was a significant increase in number of platelet units issued compared with 2019 ($P < 0.001$). Total number of units issued in 2022 was also significantly higher than in 2019.

Discussion

Whole blood donation and preparation of different blood components at Sharjah BTRC were not affected in January and February 2020, despite announcement of the first case of COVID-19 in UAE on 29 January (6, 7). Rather, there was an increase in total units collected. This was because of the limited number of cases of COVID-19 reported and routine activities being carried out normally. Sharjah BTRC closely monitored the country's status and checked the local, WHO and Association for the Advancement in Blood and Biotherapies (AABB) updated recommendations for blood transfusion and implemented preventive measures of wearing face masks and maintaining 2 m physical distance (8). Donors were deferred for 28 days if they had travelled to pandemic areas, had been in contact with confirmed or suspected cases of COVID-19, or had flu-like symptoms. If any donors developed symptoms or became COVID-19 positive after they had donated blood, they had to inform the blood donation centre so that their blood could be excluded from use. In March 2020, the decrease

Figure 1. Total number of whole blood units collected. Whole blood units collected in 2020 compared with 2019 showed a decrease during the months of curfew, as well as when COVID-19 vaccination was introduced to public. (B) Whole blood units collected in 2021 compared with 2019 showed complete recovery, except for a minimal decrease in the number of units in October 2021. (C) Whole blood units collected in 2022 compared with 2019 showed complete recovery, except in May 2022.

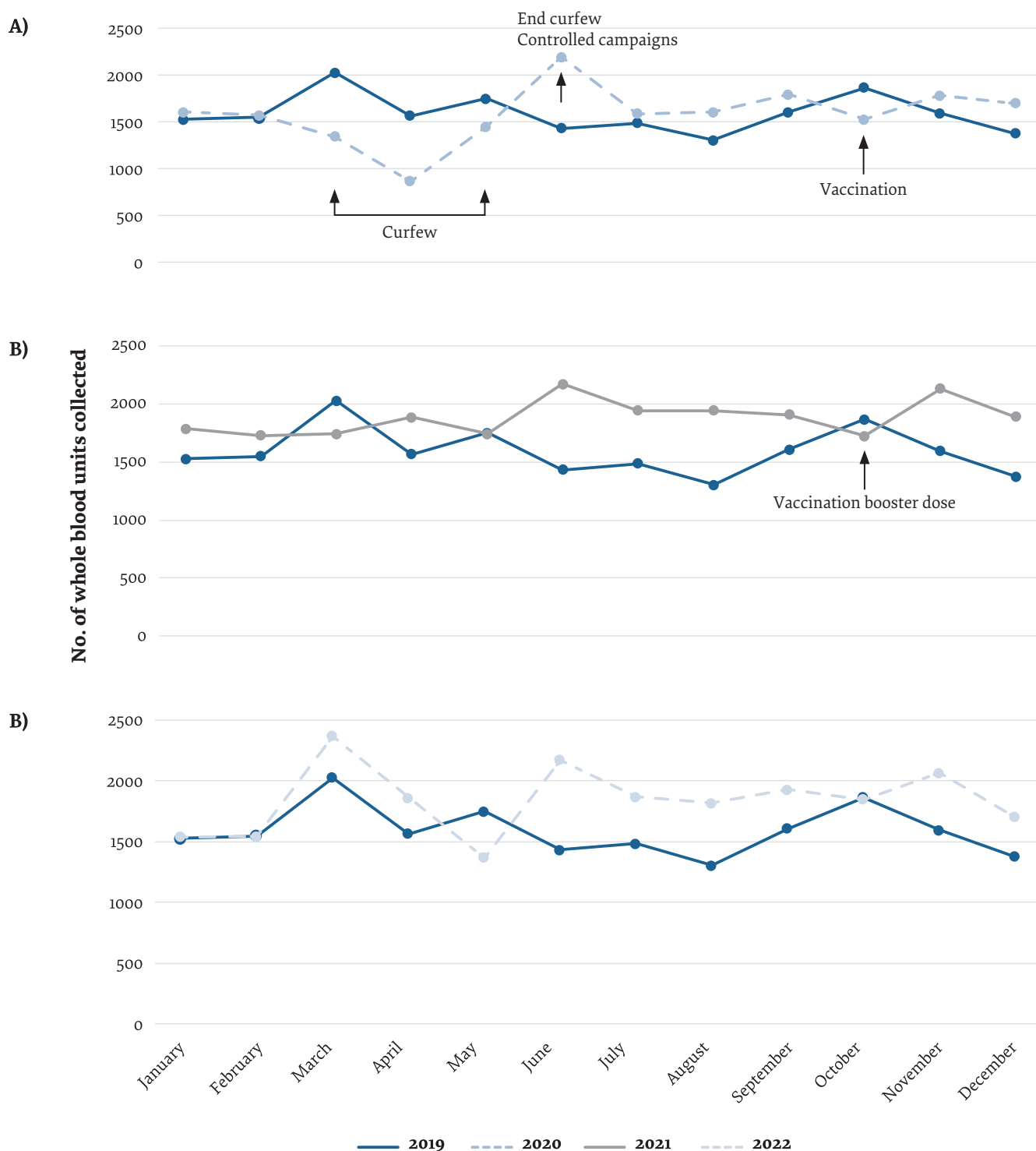


Figure 2. Whole blood collection at blood donation centre and mobile buses. (A) Most whole blood collection in 2020 was in the BDC in the first half of the year compared with 2019 ($P < 0.001$). (B) Percentage of whole blood collected through mobile buses showed a significant decrease in 2020 compared with 2019 ($P < 0.001$).

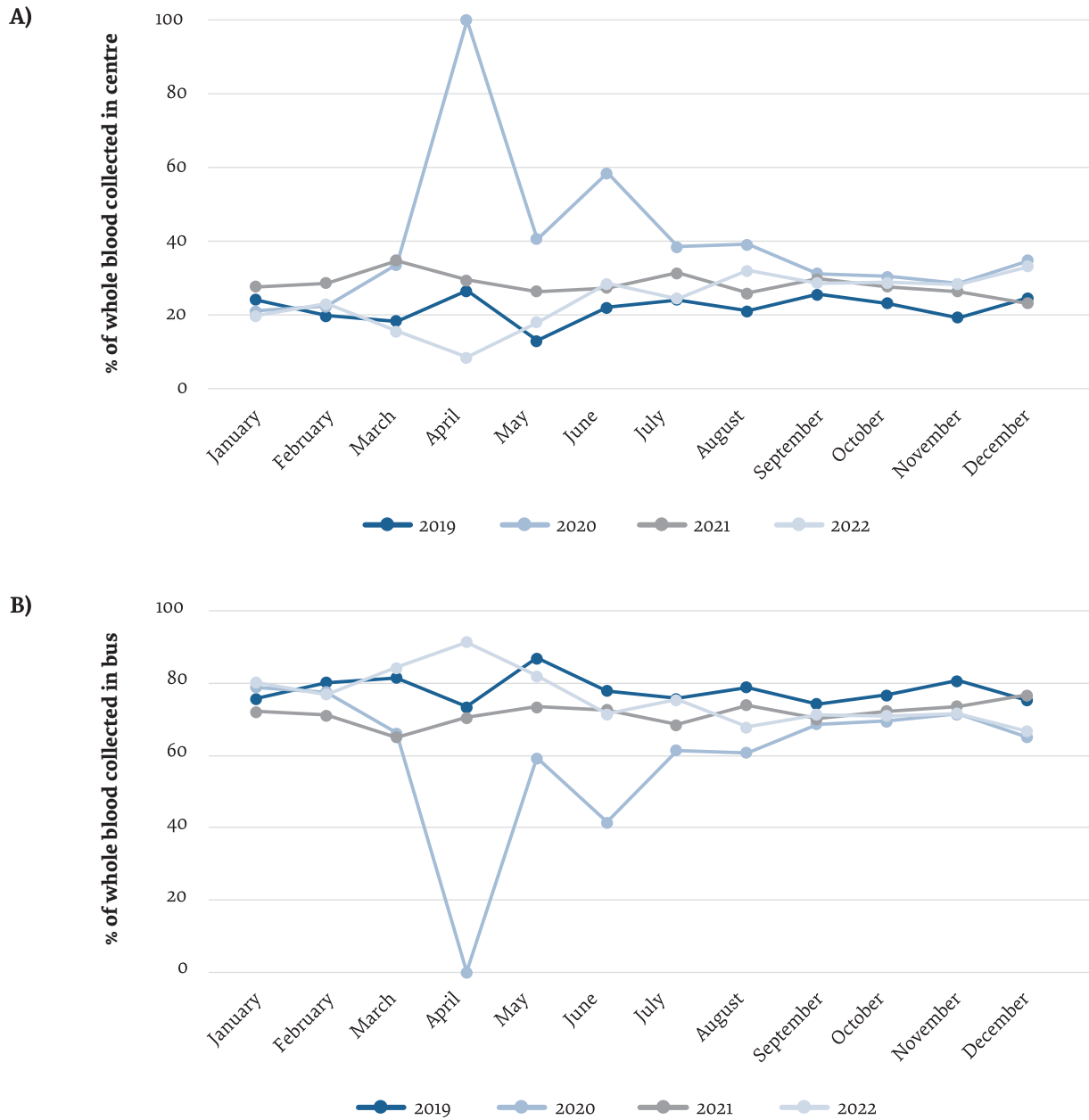


Figure 3. Sex of blood donors and regularity of donation. (A) Percentage of male donors was significantly higher in 2020–2022 than 2019 ($P < 0.001$), while female donors were significantly fewer in 2020 and 2021 than 2019 ($P < 0.001$). (B) First-time donors were significantly fewer in 2020 than 2019, but were significantly higher in 2021 and 2022 ($P < 0.001$). The percentage of regular donors showed the opposite trend in 2020 and 2021, while in 2022, the percentage of regular donors was higher. ($*P \leq 0.001$).**

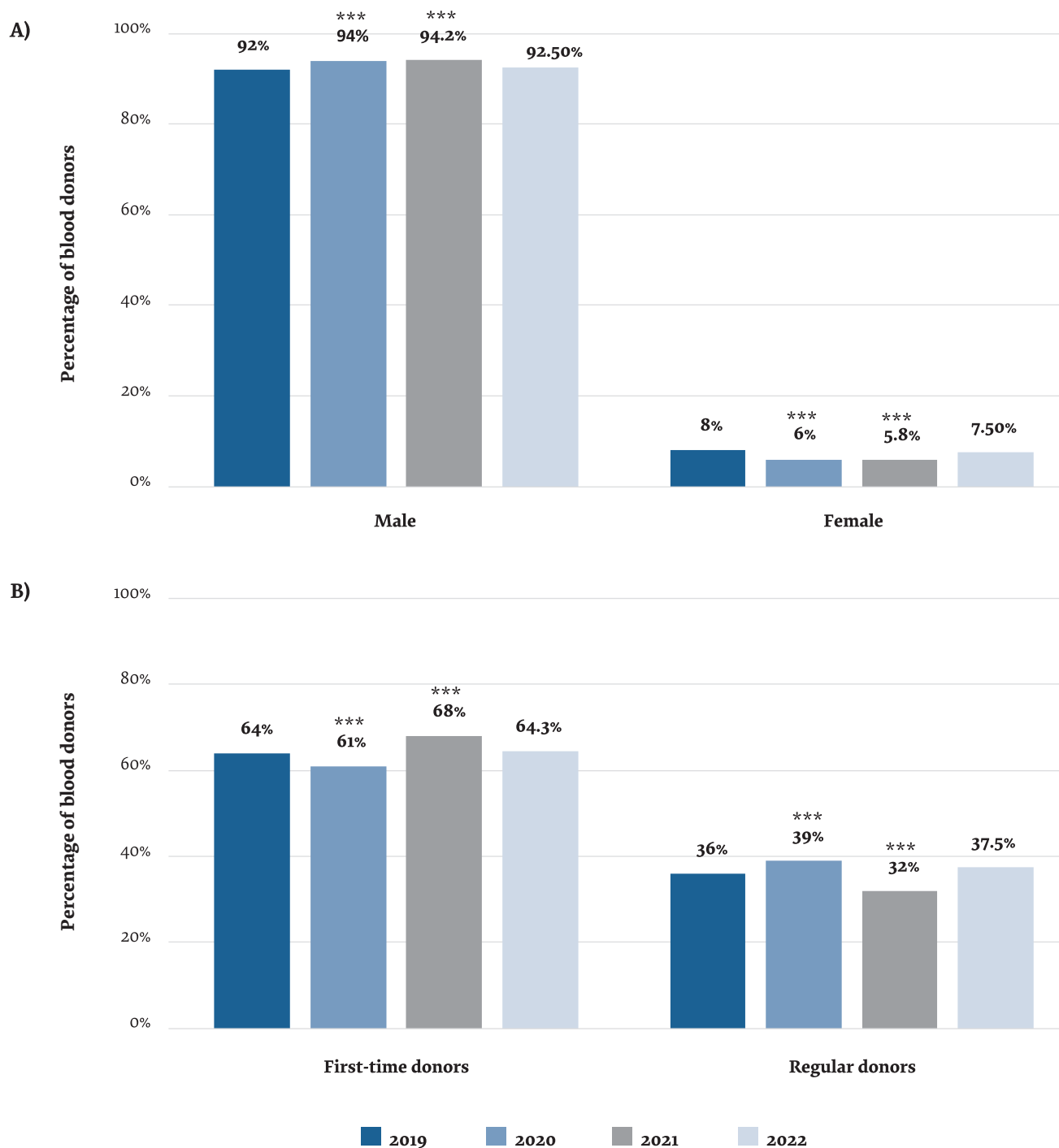


Figure 4. Number of packed red blood cell (PRBC) units issued to hospitals. PRBC units issued to hospitals were significantly lower during the months of curfew in 2020 than 2019, while 2021 showed a significant increase in the issued units, except in December 2021 when winter holidays started. A higher number of PRBC units were issued in 2022 than in 2019.

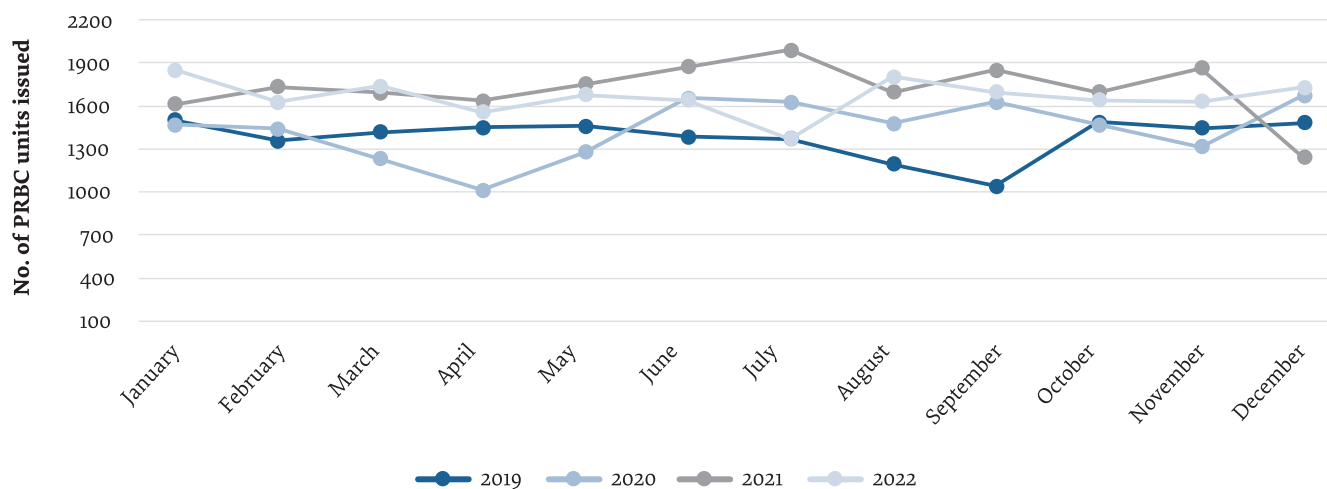
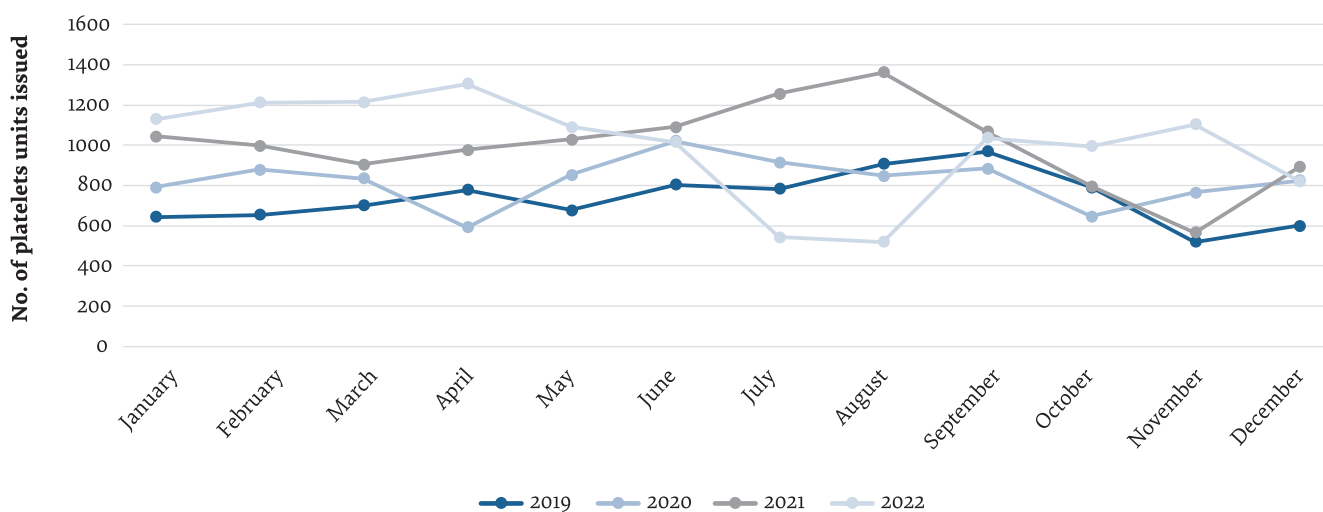


Figure 5. Number of platelet units issued to hospitals. Number of platelet units issued was variable in 2020 compared with 2019, and showed a significant increase throughout 2021 and 2022 ($P < 0.001$).



in whole blood collection coincided with the national announcement of a partial curfew from 20:00 to 06:00 hours on 26 March (6, 9) and the surge in cases across the country (10). As the number of COVID-19 cases increased, the highest decrease in whole blood donations was in April 2020 when the government extended the curfew (11), advising people to stay at home and banning large gatherings; therefore, all blood donation campaigns were cancelled. Decreases in blood donation at the beginning of the pandemic were reported in other countries, mainly because of nationwide curfews and the spread of infection (12-14). Some studies attributed the initial

decrease in whole blood donation to fear among donors of acquiring COVID-19 during the donation process (15).

Blood stocks reached critical levels in April 2020 and Sharjah BTRC activated an emergency plan. This included appealing to regular donors and giving specific appointments to avoid overcrowding at the centre, documented through text messages from the centre so that donors could travel despite the curfew. Donors were also provided with attendance letters when leaving the centre after donation to show at police patrols. When required, free transportation was arranged by the centre. Working hours at the centre were extended to

receive more donors without crowding. The Ministry of Health was contacted to send messages through social and traditional media about the importance of blood donation and to reassure the public on the measures taken to ensure donor safety. The ministry issued a circular to all government and private hospitals to stop elective surgery. Such measures were adopted by many health services globally to minimize blood use (12, 13). The National Emergency Crisis and Disaster Management Authority was alerted about the critical status of the blood stock and requested to approve some mobile blood donation campaigns to communities, under strict control. Sharjah BTRC depends entirely on voluntary blood donors but during the crisis, direct and replacement donors were accepted.

In May 2020, these measures as well as collaborations between Sharjah BTRC, civil society and local communities to organize blood donation campaigns inside the blood donation centre helped increase the number of whole blood units collected. Whole blood collection increased from June to September 2020, with better national control of COVID-19, which led to cessation of the curfew on 24 June (6, 16). On 16 September 2020, UAE authorized the emergency use of COVID-19 vaccination (6, 17) and this resulted in a decrease in whole blood collection in October because of the recommendation to defer blood donors for 14 days after vaccination (18).

Compared with 2019, the decrease in blood collection in March 2021 may have been due to the spring holidays and the return of global travel. The decrease in blood collection in October 2021 may have been because the UAE Government announced that the third booster dose of Sinopharm vaccine would be mandatory (19) and blood donors were deferred after vaccination. In May 2022, compared with 2019, there was a decrease in whole blood units collected because of the public holidays after the month of Ramadan.

The majority of whole blood units collected at Sharjah BTRC were from mobile campaigns. This was similar to other countries where donors were reached in the communities (3, 4). There was a complete cessation of mobile donation campaigns during April 2020, while in May and June 2020, campaigns were organized with the civil society and localized in blood donation centres. Mobile campaigns were cancelled in many countries, which similarly affected blood inventory (12, 20). In 2021 and 2022, there was an increased number of campaigns after lifting of many COVID-19 restrictions.

There were significantly fewer donors in 2020 than in 2019. This could have had multiple reasons including, fear of acquiring COVID-19 and the travel difficulties during curfew. A survey in 7 European countries of blood donation and motivation during the COVID-19 pandemic showed that many donors donated less because of the extra effort needed during that time (15). There was clearly a difficulty in recruiting donors during the pandemic and Sharjah BTRC managed to minimize its effect by having good collaboration with the civil society,

a record of regular donors to approach when needed, and an emergency team with a clear plan pre-pandemic plan.

Most blood donors visiting Sharjah BTRC were male, which was due to cultural and medical reasons. Men could easily commute to the donation centre and they usually had good haemoglobin levels, whereas women who were in the eligible age group for blood donation were more prone to anaemia and low weight. In contrast, a study in Hungary showed an increased number of female donors during the COVID-19 pandemic (3).

Regular donors attended more frequently for donation during 2020 than before the pandemic. This was similarly reported in other studies (3). People who donated more during the 2 years before the COVID-19 pandemic were more motivated to donate during the pandemic (15). Compared with first-time donors, regular donors value blood donation and better understand its importance. Other factors that influence the regularity of donation during crises are age, gender, education, religious beliefs and the presence of an influential role model (21). At Sharjah BTRC, a lecture is delivered by an expert staff member to the donors before organized campaigns, which helped to in recruiting regular donors during the pandemic.

Sharjah BTRC has an emergency contingency plan mandating the availability of a buffer stock of packed RBC units for 5 days. Packed RBC units are either prepared from processing whole blood or collected through apheresis. Both methods are available and were used during the COVID-19 pandemic. Issuing blood to hospitals was based on case-by-case discussion with physicians to minimize waste. Cancellation of elective surgery resulted in a decrease in the number of packed RBC units issued to hospitals during March–May 2020. This allowed Sharjah BTRC to cover the requirements for transfusion-dependent haemoglobinopathies, obstetrics cases requiring transfusion, cancer, chronic renal failure, acute bleeding and emergency surgery, despite the reduction in the number of whole blood donations. This finding was consistent with reports from other countries (5, 14).

During the second half of 2020, issuance of packed RBCs was increased compared with 2019 due to the return of oncology patients treated abroad after resumption of commercial air travel. Reports from the early stages of the pandemic showed lower requirements for blood transfusion in COVID-19 patients (13, 22).

Studies examining the pathophysiology of COVID-19-related anaemia and coagulopathy are limited. Currently available data attribute anaemia developed in later stages of COVID-19 to the inflammatory nature of the infection. Inflammatory cytokines produced during infection can suppress RBC progenitors (23). The autoimmune response to the infection can also manifest as autoimmune haemolytic anaemia (5, 24). Anaemia requiring transfusion support was more evident in patients who required mechanical ventilation and interventional procedures (5, 22). A study conducted to compare the transfusion rate

among COVID-19 with other patients showed that 11.1% of the former needed RBC transfusion (13). This led to an increase in the use of packed RBC units in hospitals treating COVID-19 patients. The increase in requests for packed RBCs was addressed in Sharjah BTRC by increasing the organized campaigns after cessation of the national curfew in June 2020. Packed RBC units were also transferred from regions with less demand to high-demand centres. The decrease in packed RBC units issued in December 2021 may have been due to the winter holidays and resumption of travel.

Platelet units are acquired through separation of whole blood units. The platelets are issued as single donor or pooled platelet units. Platelet units issued to hospitals during 2020 varied from those issued in 2019. The least number of units were issued in April 2020 because of complete cessation of elective surgery. This agrees with another study that showed that the available platelets outnumbered the used platelets at the beginning of the pandemic (25). Sharjah BTRC coped with the requirements of the hospitals by maintaining most of the platelets in single donor units to have greater flexibility to modify the platelet dose per patient. Again, case-by-case discussion was performed. Planning and having the supportive infrastructure for technological initiatives helped the centre to validate platelet apheresis

collection when the COVID-19 pandemic began (6). In June 2020 the centre started collecting platelets through apheresis and that was reflected in the increase in units issued to hospitals.

This study showed that transfusion services were affected by the COVID-19 pandemic, with resultant effects on patient care in hospitals. This indicates the need for blood donation centres to be proactive and have emergency plans to maintain service during crises.

Conclusion

Blood transfusion services are essential and their maintenance is mandatory to ensure the best outcome for patients who need them. The COVID-19 pandemic affected all healthcare services including blood transfusion. Countries that had good infrastructure, emergency plans, adaptation measures and future foresight were able to minimize the impact of the pandemic. There are many lessons to be learnt from the pandemic to improve blood transfusion services. Harnessing technology, improving communication between stakeholders, improving donors' experience and educating people in the community are some of the measures that could help with better management of future pandemics.

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Conflict of interest: None declared.

Défis liés à la COVID-19 dans le domaine du don de sang aux Émirats arabes unis

Résumé

Contexte : Le don de sang a été l'un des services les plus gravement perturbés pendant la pandémie de COVID-19. Différentes mesures ont été prises aux niveaux national et international pour atténuer son impact sur les services de don.

Objectif : Comparer le don de sang avant, pendant et après la pandémie et l'efficacité des efforts visant à atténuer les effets de la COVID-19 sur les services de don.

Méthodes : La présente étude rétrospective, observationnelle et populationnelle a évalué le nombre et les emplacements des dons de sang, le nombre d'unités de sang et de plaquettes livrées aux hôpitaux et les caractéristiques de 82 619 donneurs de sang au centre de référence pour les dons de sang aux Émirats arabes unis en 2019 et 2020. Le rétablissement des services a été évalué en comparant les dons de sang en 2021 et 2022 à ceux de 2019. Les données ont été analysées à l'aide du logiciel SPSS version 26 et l'ampleur de l'effet de la COVID-19 sur les paramètres mesurés a été testée au moyen du test de Pearson χ^2 . Un p inférieur ou égal à 0,05 était considéré comme statistiquement significatif.

Résultats : La COVID-19 a eu un impact considérable sur le nombre de donneurs, l'emplacement des dons de sang et les quantités de sang et de plaquettes livrées aux hôpitaux. Le nombre annuel médian de donneurs était de 19 121 hommes et 1393 femmes. En 2020, le nombre de donneurs de sexe masculin a augmenté de 1,6 % tandis que le nombre de donneurs de sexe féminin a diminué de 22,3 %. Le nombre de donneurs a baissé pour s'établir à 18 977 en 2020, contre 19 035 en 2019, puis a augmenté pour atteindre 22 542 en 2021 et 22 065 en 2022. Les prélèvements de sang total ont diminué de 0,3 % en 2020 et ont augmenté de 18 % en 2021 et de 13,6 % en 2022.

Conclusion : Des mesures proactives, de bonnes infrastructures, de la souplesse, une planification en cas d'urgence, la sensibilisation de la communauté, une bonne communication entre les parties prenantes et une coordination étroite entre les autorités nationales sont nécessaires pour gérer efficacement les centres de don de sang pendant les crises.

التحديات المتعلقة بجائحة كوفيد-19 في مجال التبرع بالدم في الإمارات العربية المتحدة

فاطمة حسين سجواني، أجي جوباكومار

الخلاصة

الخلفية: كان التبرع بالدم من بين الخدمات الأشد تأثرًا خلال جائحة كوفيد-19، واتخذت تدابير مختلفة على الصعيدين الوطني والدولي للتخفيف من تأثير الجائحة على خدمات التبرع بالدم.

الأهداف: هدفت هذه الدراسة الى مقارنة التبرع بالدم قبل الجائحة وأثناءها وبعدها، وفعالية الجهود الرامية إلى التخفيف من آثار كوفيد-19 على خدمات التبرع بالدم.

طرق البحث: قِيمَت هذه الدراسة الاستراتيجية الرصدية السكانية عدد ومواقع التبرع بالدم، وعدد وحدات الدم والصفائح الدموية المصروفة للمستشفيات، وسهات 82619 متبرعًا بالدم في مرفق التبرع بالدم المرجعي في الإمارات العربية المتحدة في عامي 2019 و2020. وقد قِيمَ الباحثون مستوى استعادة الخدمة بمقارنة التبرع بالدم في عامي 2021 و2022 مع عام 2019. وخضعت البيانات للتحليل بالإصدار 26 من برنامج SPSS، مع اختبار مدى تأثير كوفيد-19 على العوامل الخاضعة للقياس باستخدام اختبار مربع كاي لبيرسون. وقد عُدت قيمة الاحتمال ≥ 0.05 ذات دلالة إحصائية.

النتائج: أثَّرت جائحة كوفيد-19 تأثيرًا كبيرًا في عدد المتبرعين، ومواقع التبرع بالدم، وكميات الدم والصفائح الدموية المصروفة للمستشفيات. وبلغت القيمة الوسيطة لعدد المتبرعين السنوي 19121 من الذكور و1393 من الإناث. وفي عام 2020، زاد عدد المتبرعين الذكور بنسبة 1.6٪، في حين انخفض عدد المتبرعات بنسبة 22.3٪. وانخفض عدد المتبرعين إلى 18977 متبرعًا في عام 2020 بعد أن كان 19035 متبرعًا في عام 2019، وارتفع إلى 22542 متبرعًا في عام 2021 و22065 متبرعًا في عام 2022. وقد انخفضت عمليات جمع الدم الكامل بنسبة 0.3٪ في عام 2020، ثم عادت لتزيد بنسبة 18.0٪ في عام 2021 و13.6٪ في عام 2022.

الاستنتاجات: تتطلب الإدارة الفعالة لمراكز التبرع بالدم في أثناء الأزمات اتخاذ تدابير استباقية، وإقامة بنية أساسية جيدة، ومزيد من المرونة، والتخطيط للطوارئ، وإذكاء الوعي المجتمعي، والتواصل الجيد بين الجهات صاحبة المصلحة، والتنسيق الوثيق بين السلطات الوطنية.

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