

**BLOOD TRANSFUSION SERVICES IN COVID: SCALING THE UNSCALABLE**

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**ABSTRACT****Objective:** The present manuscript discusses our journey of providing safe BTS during this ongoing COVID-19 pandemic.**Methods:** It was a single-center, retrospective type of study conducted over a period of 1 year (January 2020–December 2020) in the department of transfusion medicine. The number of donations (replacement and voluntary) was compared during the pre-COVID months with that during the COVID outbreak. The measures included but were not limited to various aspects of staff management, environmental factors, guidelines implementation, and innovative assertions for implementing COVID-19 appropriate behavior. Gradually, provisions were also made for the collection of the COVID convalescent plasma from the recovered donors as a part of the management guidelines issue by the Indian Council of Medical Research.**Results:** COVID-19 pandemic has had a drastic negative impact on the blood donation but it has also highlighted the potential and the ability of the BTS to withstand such testing times.**Conclusion:** COVID-19 has left a profound impact on the blood transfusion services. It has highlighted the importance of having a coping strategy in place to withstand such times without compromising the health and the needs of the patients.**Keywords:** Blood transfusion services, COVID-19, Blood supply management, Blood demand, Blood donation.© 2022 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2022v15i6.44498>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>**INTRODUCTION**

On December 2019, the first case of a respiratory illness caused by an unknown virus was detected in Wuhan, Hubei Province, China [1]. The virus spreads rapidly across the globe affecting many people. These patients reported symptoms of pneumonia. In late December, the World Health Organization (WHO) identified this pathogen as a new strain of coronavirus and it was named by International Committee on Taxonomy of viruses as SARS-CoV-2 and the associated disease was coined as coronavirus disease 2019 or COVID [2]. On January 5, 2020, the WHO declared the COVID-19 outbreak a public health emergency of international concern and later a pandemic on March 11, 2020 [3]. The disease has had a devastating impact on the world, killing millions of people globally, and affecting lives and livelihood of innumerable people [4]. India too could not escape the wrath of this deadly virus, and on March 24, 2020, nationwide lockdown was announced as a preventive measure to curb the spread of COVID-19 [5].

This pandemic has had a very profound impact on the health-care services including blood donation and blood supply. Safe blood and blood components are an indispensable human product and their supply relies solely on blood donation which was reduced substantially during the COVID times. Many blood centers in India and abroad have struggled with the blood transfusion services (BTSs) during this COVID pandemic. It has been a testing time for both hospital staff and the patients alike. Each pandemic comes with its own challenges which need to be managed meticulously through proper planning and actions. These measures should be in accordance with the existing policies of the blood center and should abide by the guidelines laid down by the concerned governmental agencies.

Although during this time, numerous challenges and obstacles were presented to the health-care fraternity, it also showed many silver linings in the form of undeterred commitment of the health care workers (HCW). They not only had to look after the patients but also would “take the battle home” where they had to isolate themselves from their own families. Similarly, the BTSs were presented with such unique challenges. The global pandemics in the past have greatly enhanced the knowledge, attitude, and practice with respect to the

preparedness of health-care services including the BTS [6]. Maintaining a continuous, uninterrupted supply of blood and blood components plays a lifesaving role in many situations [7]. Blood transfusion is almost a routine medical procedure in repleting blood losses due to surgery, trauma, chemotherapy, hematology, etc. The latter two being the major consumers of packed red cells, closely followed by bone marrow transplant (BMT) and solid organ transplant units [8].

We discuss our journey of providing safe BTS during this ongoing COVID-19 pandemic.

**METHODS****Study design**

The retrospective study performed from January 2020 to December 2020 was divided into two phases. The initial 3 months being the pre-COVID phase and the last 9 months belonging to the COVID phase. All the parameters and activities related to BTS were taken into account, namely, whole blood donation, component preparation, and issue, various apheresis procedures, namely, preparation of single donor platelets (SDPs), plasma on cell separator, therapeutic plasma exchanges, peripheral blood stem cell harvest, and preparation of COVID convalescent plasma (CCP).

The COVID period spanning over a period of 9 months witnessed a total of 9770 WB donation, preparation of 9745 blood components, and 1380 apheresis procedures. There was also a gradual rise in demand of CCP and the period from April 2020 to December 2020 witnessed preparation of around 439 CCP. There was also a steep decline in the number of voluntary whole blood donors from around 1288 in the pre-COVID period to almost 471 during the COVID time, a massive reduction to almost one-third of the original figures.

**RESULTS****Challenges and measures**

The COVID-19 pandemic has affected both the demand and the supply of blood with the latter facing a major blow due to the widespread fear and anxiety among the voluntary and replacement blood donors [9]. The

challenge in procuring blood during COVID-19 is not primarily due to the disease itself but secondarily due to the movement restrictions [3,6]. Ever since the lockdown was announced, the entire nation came to a standstill. Schools, colleges, offices, industries, IT sectors, and public places all had been shut down. Any kind of public gathering, social, or otherwise were denied and any permissions granted for the same stood cancelled in the face of COVID-19. This hit a major blow on outdoor blood donation camps and mobile drives which were often organized. All of a sudden, blood donation came to a grinding halt without any prior intimidation or arrangements. With no camps being organized, people not willing to come to blood banks for donating blood either due to the fear of contracting the disease or due to ban on transport facilities, the blood bank inventories all over India, stood at the verge of facing acute shortage of blood and its components [3,6,10].

Various steps and measures had to be taken to tide over these difficult times in accordance with the time to time guidelines issued by the National Guidance to Blood Transfusion Services in India in light of COVID-19 pandemic as issued by National Blood Transfusion Council (NBTC) and Ministry of Health and Family Welfare (MoHFW), Government of India. These guidelines mainly stated the exclusion criteria for donors, measures to maintain social distancing, blood safety, infection control measures, criteria for post-donation care, recommendation to test blood and component for COVID-19, guidance to maintain blood stock at blood center in accordance to the blood requirement of the region, managing the supply chain system for commodities required in BTS, collection of CCP, and finally toll-free numbers and helplines for COVID-19 information and assistance.

All these guidelines and norms were incorporated in a timely manner and acted on by our blood bank staff. From the very beginning of the pandemic, it was understood that COVID-19 would result in reduced blood donation and blood supply. A declining trend in demand of blood was also observed due to reduction in number of hospital admissions, postponement of elective surgeries, and non-urgent medical procedures [11]. However, it was not sufficient enough to balance out the reduced supply. With our hospital being declared as one of the COVID-19 care centers, the patient load did increase with respect to the individuals affected with COVID-19. Besides inpatients, the regular patients admitted mainly for blood and component transfusion such as the thalassemic patients, oncology patients, dialysis patients, and BMT patients; we now had to cater to the needs of the COVID-19 patients as well. Utilization of blood component was lesser in mild to moderately affected patients and greater in those with severe illness [7]. Contributory factors such as prolonged hospital stay, experiencing a thrombotic event, and intubation were associated with need for BTS.

Various aspects to manage the blood bank inventory were looked on. It was like a "double-edged sword." The idea was to collect just enough blood to cater the needs of patient without wastage due to excess collection. Platelets, that is, both random donor platelets and SDPs were running short due to decrease in the blood donation and their short shelf life. Usual measures like talking to the concerned physician team and using SDP modified by platelet additive solution helped in group switchover of the platelets, thereby reducing the wastage of this precious component. First in, first out (FIFO) policy was followed for all blood components. Components prepared from whole blood were kept under quarantine for period of 14 days from the date of collection. However, due to their short life span of 5 days, platelet concentrates had to be issued.

## DISCUSSION

The following areas were specifically looked into donors, environment, and the staff.

### Donors

The 1<sup>st</sup> major problem was unavailability of donors due to nationwide lockdown and lack of transport services, especially for blood donors residing within Delhi and nearby regions. Efforts were made to reach out to voluntary donors by means of telephonic calls, SMS services. Social media platforms were also used for this purpose.

At our center, we initiated a special corridor passage by means of issuing special passes for blood donors to help them reach the blood bank without any hassle. The same was communicated to various district authorities who were very cooperative. As soon as the donors reached the hospital, a mandatory temperature check was conducted at the main entrance. Any donor with the body temperature of  $>37^{\circ}\text{C}$  or with any obvious symptoms of cold and cough was denied entry. Once the donor reached the blood bank, they were provided with two forms – a regular one and a special form bearing questions regarding the donor's health, travel history, and contact history with respect to COVID-19. Routine post-donation care advice was given to donors in addition to specific instructions regarding follow-up call 14 days after donation. The donors were also instructed to immediately inform the blood bank in case they develop any symptom or came in contact with a COVID-positive individual.

With a depleting inventory and almost negligible donation, the hospital staff had to be requested to come forward for donating blood. The request received a positive response with many staff members and HCWs turning up for donation. Such gestures instilled a sense of positivity and responsibility among the entire hospital staff. To further boost their morale, special felicitation gestures were done with the support of hospital management. These included "public felicitation" and "certificates of appreciation" for these corona warriors.

### Environment

A mandatory 1-m distance between individuals was ensured by means of markings and labels put on the chairs and on the floor. Arrangement for alternate seating was also done to practice physical distancing in the waiting area. Masks were provided to donors who did not have any. Hand sanitizers were kept at every checkpoint in the blood bank to ensure maximum safety and hygiene. Every staff member was provided with hospital scrubs, gown, masks, caps, and protective face shield to minimize the risks of contracting the infection.

The phlebotomy and apheresis rooms were sanitized regularly at short intervals. Alternate bed was provided for the donors with proper screens to maximize the distance between two donors and to offer them privacy as well. Only two donors were allowed at a time inside the donation room to maintain the practice of physical distancing. All of these measures did cause a slight increase in waiting time for donation but they ensured maximum safety of the blood donors and the staff which was of prime importance. It was always worthwhile to spend an extra minute talking to the donor and explaining him/her of the safety measures adopted at our institute.

E-forms and WhatsApp were used as a mode of communication with the COVID wards and COVID ICUs. No hard copies of the forms were accepted or sent to these special wards and ICUs to minimize the contact exposure.

All COVID samples were marked as "Q." A special code name generated to identify these samples. A staff member was assigned to handle these samples and perform the various tests on them as requested by the clinicians. The staff member handling these "Q" samples was instructed to wear personal protective equipment at all times during his/her duty. A separate laminar hood and equipment were allotted to run the routine tests on these "Q" samples. The storage of these sample was done in a separate refrigerator.

### Staff management

The BTS is operational round the clock all throughout the year. This would mean the requisite staff had to be present so as to run an effective BTS. The foremost difficulty that we faced with the staff management was to facilitate their movement to and fro from the hospital, especially during the complete lockdown. With the hospital support, the transportation facilities in the form of cabs and buses, with adequate safety measures, were made available to the staff to commute to and from the hospital. To reduce the incidence of exposure of the staff, rotation policy (rest and rotate) was followed. Quarantine was practiced for any staff member

returning from leaves and they were allowed to resume duties only after being tested negative for COVID-19 by RT-PCR technique.

The fear of our own staff getting positive and thereby affecting their family was always looming on us. Many colleagues decided to rent out a place nearby so as to minimize the risk to their family members. Those who did come positive were provided an isolation room in case they were not able to do so on their own. Before resuming their duties after the due period, for the benefit and safety of fellow colleagues, a COVID RT-PCR test was always performed.

To spread awareness about COVID-19, to clear any doubts, anxiety, or misconceptions and to boost the morale of the staff and the HCW, webinars were conducted from time to time. E-messages were displayed as the screen savers on the desktop monitors across the hospital in all the departments. Various online sessions both at inter- and intra-departmental levels were also conducted.

Online meetings were also held on a regular basis to discuss any amendments or upgradations needed in our departmental SOPs corroborating with the changes made by the NBTC and MoHFW for various activities including the CCP collection. All staff members were encouraged to attend the meetings and to discuss about their welfare.

Special emphasis was laid on the conduction of online classes for the postgraduate students ensuring their academics could continue in an uninterrupted manner.

#### CCP

With time, gradually, the CCP collection was also started as per the evidence-based advisory issued by the Indian Council of Medical Research (ICMR) [12].

A prior request form from the primary clinician and an informed consent form from the patient party were required for the preparation and administration of CCP (C plasma), respectively. Both the potential donors and potential recipients were identified on the basis of the criteria's laid down by ICMR.

A potential C-plasma donor could be a male or a nulliparous female of age 18–65 years, body weight >50 kg, and whose symptoms have resolved 14 days ago [13]. A RT-PCR COVID-positive report was mandatory for plasma donation. A negative report of the same was not needed.

A potential recipient was one in early stage of COVID-19 disease, that is, within 3–7 days from onset of symptoms but not later than 10 days and without any IgG antibody against COVID-19 by appropriate test [8].

All C-plasma donors were provided with a regular apheresis form and another form for a detailed history of COVID infection. A separate room (different from the routine screening room) was provided to collect test samples from the C-plasma donors. The samples were tested for group and screen and infectious marker testing by ELISA techniques. The antibody titers were also checked, namely, IgG antibody against COVID-19 [12]. Donors who met all of the above-mentioned criteria were taken up for apheresis procedure.

#### CONCLUSION

Our study revealed the negative impact that COVID-19 had on blood donation, its demand and supply all of which have adversely affected the blood transfusion services and have posed new challenges for the staff of blood bank [2].

Transfusion medicine as an integral aspect of health care has been highly affected as blood availability and safety are a real challenge across the globe [1]. To optimize the utilization of resources, blood banks should practice the “first in, first out” or commonly known as the “FIFO” policy [6].

The situation has made us realize the necessity of having an emergency blood management plan prepared in accordance with the national and international guidelines, to be kept ready at all times to ensure the best possible utilization and management of our limited resources in a sustainable and safe manner [14].

#### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethical approval was obtained from the patient at the time of admission that the data may be used for any research or academic purposes.

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#### AUTHORS' CONTRIBUTIONS

All authors performed the analyses of the data reviewed, revised the manuscript, and approved the final manuscript as submitted.

#### CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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