

Original Research Article

Impact of COVID-19 outbreak on the blood donation and utilization and strategies adopted to combat it in a tertiary care center of Jammu province

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ABSTRACT

Background: The COVID-19 pandemic has major implications for blood transfusion. There are uncertain patterns of demand, and transfusion institutions need to plan for reductions in donations and loss of crucial staff because of sickness and public health restrictions. A range of strategies need to be planned to maintain ongoing equitable access to blood for transfusion during the pandemic, in addition to providing new therapies such as convalescent plasma. The main role of transfusion institutions during this period, is the monitoring of supply and demand so that sufficient blood stocks are maintained to support ongoing critical needs. The main aim of our study was to study the impact of COVID-19 outbreak on blood transfusion services (BTS) and to identify the challenges faced by our blood center and mitigation strategies adopted to combat it.

Methods: Total number of donations and total number of blood and its components issued were noted from the donor and issue registers respectively, both during the pre-COVID and COVID-19 pandemic and the results were compared thereafter. Various strategies were adopted during the COVID pandemic in order to maintain balance between demand and supply of blood and its products.

Results: There has been sudden decrease in the number of blood donations in the month of April 2020 (35%) in the COVID pandemic as compared to pre-COVID time with percentage difference of 65%. This was followed by gradual decrease in the no. of donations in COVID pandemic when compared with donations in the pre-COVID time. The percentage difference in blood donation gradually improved over a period of time from 65% in April 2020 to 7% in April 2021. Similarly, no. of blood units issued also decreased from 1147 in April 2019 to 553 units in April 2020.

Conclusions: The BTS need to provide an uninterrupted blood supply, and this stays true even in the face of a pandemic. The plan of action has to be started early so that the supply can be maintained and monitored effectively. Health-care workers being one of the main pillars in the fight against COVID-19 have to be supported and protected.

Keywords: COVID-19, Convalescent plasma, BTS, Strategies, Public health

INTRODUCTION

The outbreak of COVID-19 was declared as a public health emergency on 30th January, 2020 by the world health organization and a COVID-19 pandemic on 11th March, 2020.¹ A national lockdown was imposed in the

country on March 24, 2020, by the government of India to contain virus spread which was followed by phased reopening after 3 weeks.² During this period, most of the services came to a standstill except essential services. BTS being an essential medical service cater patient needs and should remain uninterrupted amidst of

outbreak. However, during the disease outbreak and country lockdown, BTS faced numerous challenges to maintain the sustainability in service provision.³ The COVID-19 pandemic has major implications for blood transfusion. There are uncertain patterns of demand, and transfusion institutions need to plan for reductions in donations and loss of crucial staff because of sickness and public health restrictions. Addressing the impact of COVID-19 on transfusion services, there are 4 potential challenges viz. blood/component shortage, donor/ staff safety, consumable supply/logistics, fear of COVID-19 spread to blood donors and staff personnel, staff personnel transportation, handling of medical convalescent plasma need.⁴ A reduction in donor numbers has largely been matched by reductions in demand for transfusion.^{5,6} In this review article, we will be discussing about impact of this pandemic on BTS and potential challenges in detail along with the necessary mitigative steps to be adopted to tide over the COVID-19 crisis in our set up.

Aims and objectives

The aim and objectives of the study were to study the impact of COVID-19 outbreak and the following imposed national lockdown on BTS and to identify the challenges faced by our blood center and explore the mitigation strategies implemented during the COVID-19 pandemic and subsequent lockdown.

METHODS

A retrospective observational study was carried in the department of blood transfusion medicine and immunohaematology, Government Medical College, Jammu over a period of one year from April 2020 to March 2021. Total number of blood donations and total number of blood units issued were noted from donor and issue registers respectively. The problems faced by donors and the staff to reach at blood center due to nationwide lockdown and fear among all because of COVID-19 was noted and mitigation strategies were planned accordingly.

Various mitigative strategies which were planned were: Issuance of donor passes: Approximately, 1200 to 1500 donor passes were issued in the COVID pandemic in order to maintain donor pool. Arrangement of vehicle for carrying voluntary donors to the blood bank for blood donation. Small frequent blood donation camps were organized to maintain the donor pool. Proper SOPs regarding COVID-19 was followed in respect to donor and staff safety. Transportation facility for technical staff which was greatly affected as most of them relied upon public transport services was mitigated by the round the clock arrangement of ambulances, college buses and vans to carry staff to the department and the staff duty roster was modified keeping in view that minimum feasible staff is maintained in the blood bank to meet requirements of donors so that less no. of staff is exposed

to virus at a point of time and also working of the blood bank is not hampered at the same time.

Ethical clearance

The institutional ethical clearance was obtained from institutional ethics committee of our hospital.

Statistical analysis

The results were entered into Microsoft excel sheets, and statistical analysis was performed. All the responses were expressed as frequencies and percentages.

RESULTS

Donation

Total no. of blood donations from april 2020 to march 2021 were 14,445. Total no. of blood donation from April 2019 to March 2020 was 20,659, which shows a significant reduction in blood donation during COVID-19 Pandemic. Among 20,659 blood donors, 6886 were voluntary blood donors and 13773 were replacement donors. In the COVID pandemic voluntary blood donation also decreased, among 14445 total donors 2919 were voluntary donors and 11526 were replacement donors showing a significant reduction in voluntary blood donation in the COVID time which was 2919 as compared to non-COVID times i.e., 6886. About 32 indoor and outdoor voluntary blood donation camps were organized from April 2020 to March 2021 as compared to 64 voluntary blood donation camps which were organized in the pre COVID time i.e., from April 2019 to March 2020. Total no. of female donors from April 2019 to March 2020 were 589 as compared to 165 female donors in the COVID times which also shows a significant reduction in the no. of female donors in the COVID pandemic. In order to maintain the donor pool in the lockdown due to COVID pandemic, about 1250 donor passes were issued but only 257 donors came forward for blood donation with a return rate of less than 50%. Arrangement of vehicles to carry donors to the blood bank for donation was the least common method for retention of donors in the lockdown due to COVID pandemic. Approximately a total of 15 donations took place in the vehicles during that period. Arrangement of small frequent voluntary blood donation camps in which an average no. of 8,925 donations took place was the most effective means to retain donors during the COVID pandemic. On comparing average blood donation before to blood donation in COVID-19 pandemic for the months of April to March as shown in Table 1, we can see that there is sudden significant reduction in the no. of donors in the months of April and May (when Pandemic was at Peak) with a percentage difference of 65% and 33% respectively followed by gradual reduction in the no. of donors till January and February when no. of donors started coming in normal frequency.

Vehicles were also arranged to carry staff to the blood bank due to lockdown and approximately 90 to 95% of staff was carried in vehicles in the initial one month of lockdown after which roster of the technicians was modified with one third of the active staff on duty to minimize the exposed staff to virus.

Issuance

As shown in Table 2 total no. of blood issued in the year from April 2019 to March 2020 is 18,330 compared to blood and blood components issued in April 2020 to

March 2021 i.e., 14031 which signifies that reduction in donor numbers has largely been matched by reductions in demand for transfusion. In order to maintain donor pool in lockdown due to COVID pandemic, about 1250 donor passes were issued but only 257 donors came forward for blood donation with return rate of less than 50%.

As we can see in Table 3, there has been significant decrease in the issuance of random donor platelets and fresh frozen plasma in the COVID pandemic i.e., from April 2020 to March 2021 as compared to that in the pre-COVID time i.e., from April 2019 to March 2020.

Table 1: Comparison of blood donation before and during COVID-19 pandemic.

Time of donation	No. of donors	Time of donation	No. of donors	Percentage decrease (%)	Percentage difference in blood donation (%)
April 2019	1575	April 2020	557	35	65
May 2019	1672	May 2020	1119	67	33
June 2019	1841	June 2020	1211	66	34
July 2019	1594	July 2020	1124	71	29
August 2019	1877	August 2020	1130	60	40
September 2019	1996	September 2020	1237	62	38
October 2019	1743	October 2020	1190	68	32
November 2019	1807	November 2020	1271	70	30
December 2019	1554	December 2020	1136	73	27
January 2020	1636	January 2021	1524	93	7
February 2020	1737	February 2021	1510	87	13
March 2020	1627	March 2021	1587	93	7
Total	20,659		14596		

Table 2: Comparison of issuance of blood before and during COVID-19 pandemic.

Time of issuance	No. of units issued	Time of issuance	No. of units issued
April 2019	1147	April 2020	553
May 2019	1488	May 2020	1045
June 2019	1875	June 2020	1120
July 2019	1450	July 2020	1075
August 2019	1573	August 2020	1027
September 2019	1633	September 2020	1159
October 2019	1523	October 2020	1156
November 2019	1585	November 2020	1205
December 2019	1341	December 2020	1109
January 2020	1598	January 2021	1518
February 2020	1594	February 2021	1489
March 2020	1523	March 2021	1575
Total	18330		14031

Table 3: Comparison of issuance of components before and during COVID-19 pandemic.

Time of issuance	Packed cells	FFP	Platelet concentrate	Time of issuance	Packed cells	FFP	Platelet concentrate
April 2019	619	619	176	April 2020	264	264	64
May 2019	820	820	262	May 2020	614	614	156
June 2019	881	881	259	June 2020	635	635	142
July 2019	805	805	304	July 2020	696	696	170
August 2019	845	845	431	August 2020	782	782	183
September 2019	851	851	263	September 2020	723	723	171
October 2019	1097	1097	376	October 2020	704	704	192

Continued.

Time of issuance	Packed cells	FFP	Platelet concentrate	Time of issuance	Packed cells	FFP	Platelet concentrate
November 2019	710	710	294	November 2020	781	781	209
December 2019	920	920	247	December 2020	617	617	151
January 2020	998	998	303	January 2021	587	587	147
February 2020	1140	1140	315	February 2021	754	754	185
March 2020	1250	1250	359	March 2021	835	835	191

DISCUSSION

Challenges faced by our department

Blood/component shortage

There was significant sudden reduction in donor inflow to our blood center in this pandemic. A reduction in number of donors was seen at other centres as well during the initial days of pandemic.^{4,7} As with other centres, there was a fear of being infected through hospital contact, lack of public transport facilities, travel restrictions due to lockdown, and non-availability of medical student donors in the hospital setting.⁴ All the blood donation camps came to halt due to lockdown and the only donor pool available initially were the hospital-employees. In addition, the donor selection criteria were made more stringent, further decreasing the donation numbers. At the same time there was reduction in blood requirements as most of the noncritical patients were discharged considering the criticality of the situation and all elective surgical cases of the hospitals were cancelled and only emergency cases were taken up as seen in other studies as well.^{8,9} In our blood centers, there was a considerable decrement in trauma cases, including road traffic accidents following the imposed travel restriction by the government. Three strategies were adopted in our department in order to improve donor inflow:

Use of donor passes was implemented in view of imposed lockdown. Donor passes were arranged for many voluntary donors as well as for replacement donors. This was an effective strategy initially but later on these passes were misused by some donors for getting out of their homes as there was a lot of strictness by police personnel in respect to movement of individuals in view of imposed lockdown.

Arrangement of vehicle for carrying voluntary donors to the blood bank. Standard operating procedures were followed properly while carrying donors to the blood bank in terms of social distancing (by keeping one seat empty in between two donors), hand sanitization and wearing masks. But still this was not a very successful strategy as our hospital was declared as COVID hospital and many donors had fear of contacting the disease while visiting to blood bank for blood donation.

Small frequent blood donation camps were arranged on regular basis by various political organizations, voluntary

blood donation groups and Sant Nirankari Mandal which proved to be an effective strategy to maintain donor inflow to the blood bank. Proper SOPS were followed while organizing these small frequent camps which made them successful and effective method of maintaining donor inflow in COVID-19 pandemic.

Donor and staff safety

The safety of donors and staffs was of utmost concern in this pandemic. Voluntary donors residing at a walk-away distance from the blood bank too might be apprehensive to turn up for donation. Thorough disinfection of the donation area and disposal of medical waste needed to be handled more meticulously, in order to improvise safety of donors and staff. Due to mobility constraints, daily commute of employees got affected. Due to nationwide lockdown and lack of public transport and strictness of police department not only donors but also staff found difficulties in reaching hospital.¹⁰ Also, employee absenteeism can be expected due to illness of self/ family or panic especially among those handling infected patient's sample. As health-care workers who are the front-line warriors are at not only at a higher-risk of contracting the disease but may also experience adverse psychological issues like burnout, anxiety, depression and PTSD (posttraumatic stress disorder) amongst many.^{11,12} Personnel transportation of technical staff was greatly affected as most of them relied upon public transport services. The Staff duty roster was modified keeping in view that minimum feasible staff is maintained in the blood bank to meet requirements of donors so that less no. of staff is exposed to virus at a point of time and also working of the blood bank is not hampered at the same time. Staffs were divided into two pools and a weekly rotation of each pool was practiced. The reserve pool was advised to follow a strict homestay. Housekeeping department staff were exhausted due to heavy workload.

Consumable logistics and supply

Most of the reagents used in blood banking are manufactured abroad and due to lack of local producers the service during lockdown period was hampered.¹³ There was a delay in receiving test kits, reagents, and blood bags from the distributor company to the store of the institute, but was adjusted by the surplus stock in the central store. Initially, there was a hospital-wide shortage of masks and sanitizers which was later resolved after the

state government intervened with the production and distribution of the same.

Medical records

Handling of files, documents, forms, and the requests were another difficulty faced. Staff personnel were instructed to practice minimum handling and was briefed about the need of following hand sanitization after handling documents.

Convalescent plasma

An additional challenge to blood banks is to provide convalescent plasma.^{14,15} Although the blood demand might decrease due to cancellation of elective surgeries and routine transfusion services, there was a need for donors to donate convalescent plasma. A dedicated team was created and pre-donation antibody screening was carried out. This added to the burden on already stretched human resources of blood bank.

Laboratory section

To ensure safe blood sample handling and processing in the context of possibility of COVID-19 positive/suspected samples, separate standard operating procedure was developed and implemented.¹⁶

The limitation of this study was that we have not followed the 23 respondents deferred for travel history, and thus we cannot exclude infection with SARS-CoV2 during that period. The effectiveness of the donor deferral strategy for COVID-19 has not been evaluated.

CONCLUSION

Being an essential service, BTS should cater with safety and adequacy without any interruption. The blood center team should always be prepared and vigilant to adapt and implement new practices even before guidelines are set by regulatory authorities and are bound to follow the guidelines. Blood centers shall always be updated with the changes advocated by the national and state regulatory authorities. Considering the critical shortage of blood units in the country, restrictive strategies of blood transfusion need to be emphasized.

Transfusion requirements are low, even in patients who are critically ill with COVID-19. There are no robust data on the numbers of pre-symptomatic or asymptomatic donors who have subsequently seroconverted, or on the potential infectivity of blood with SARS-CoV-2, although the risk of transfusion transmission is likely to be low.^{17,18} As it is going to be a prolonged melee, impending challenges need to be anticipated. Identifying crucial areas, proactive planning, coordinated strategies and their timely implication is essential for transfusion services to tide over the current COVID-19 pandemic.

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REFERENCES

1. Inter-Agency Standing Committee (IASC) secretariat (Circulated on: 17 March 2020) Version 1.1, Available at: <https://www.who.int>. Accessed on 3 July 2021.
2. MHA Order Dt. 30.5.2020 with guidelines on extension of LD in containment zones and phased reopening. Available at: https://www.mha.gov.in/sites/default/files/MHAOrderDt_30052020.pdf. Accessed 12 February 2020.
3. Priyadarsini J. Challenges faced by blood bank services during COVID-19 pandemic and their mitigative measures: The Indian scenario. *Transfusion and Apheresis Sci.* 2020;59:102877.
4. Rajendran V, Pinki S. Impact of COVID-19 outbreak in blood transfusion services in India: Experience from tertiary care blood centres in Kerala: A short review. *Glob J Transfus Med.* 2020;5:215-7.
5. Cai X, Ren M, Chen F, Li L, Lei H, Wang X. Blood transfusion during the COVID-19 outbreak. *Blood Transfus.* 2020;18:79-82.
6. Fan BE, Ong KH, Chan SSW. Blood and blood product use during COVID-19 infection. *Am J Hematol.* 2020;95(7):E158-60.
7. Pagano MB, Hess JR, Tsang HC. Prepare to adapt: blood supply and transfusion support during the first 2 weeks of the 2019 novel coronavirus (COVID-19) pandemic affecting Washington state. *Transfusion.* 2020;60:908-11.
8. Yazer M, Pagano MB, Cho D, Lin Y. Vox Sanguinis International Forum on transfusion services about response to COVID-19. *Vox Sang.* 2020;115(6):536-42.
9. Franchini M, Farrugia A, Velati C. The impact of the SARS-CoV-2 outbreak on the safety and availability of blood transfusions in Italy. *Vox Sang* 2020;115(8):603-5.
10. Caramello V, Camerini O, Ricceri F, Ottone P, Mascaro G. Blood bank preparedness for mass casualty incidents and disasters: a pilot study in the Piedmont region. Italy. *Vox Sang.* 2019;114:247.
11. Spoorthy MS. Mental health problems faced by healthcare workers due to COVID-19 pandemic-a review. *Asian J Psychiatr* 2020;51:102119.
12. Du J, Dong L, Wang T, Yuan C, Fu R, Zhang L. Psychological symptoms among frontline workers during COVID-19 outbreak in Wuhan. *Gen Hosp Psychiatry.* 2020;S0163-S8343(2):30045.
13. Choudhury N, Mathur A, Smit Sibinga CT, On behalf of AATM. COVID-19 Pandemic-blood supply challenges and approaches in AATM member countries. *ISBT Sci Series.* 2020;15:353-61.

14. AminJafari A, Ghasemi S. The possible of immunotherapy for COVID-19: a systematic review. *Int Immunopharmacol.* 2020;83:106455.
15. Bloch EM, Shoham S, Casadevall A. Deployment of convalescent plasma for the prevention and treatment of COVID-19. *J Clin Invest.* 2020;130:2757-65.
16. Interim Laboratory Biosafety. Guidelines for Handling and Processing Specimens Associated with Coronavirus Disease 2019 (COVID-19). Available at: <https://www.cdc.gov/coronavirus/2019-ncov/lab/lab-biosafety-guidelines.html>. Accessed on 12 February 2020.
17. Chang L, Yan Y, Wang L. Coronavirus disease 2019: coronaviruses and blood safety. *Transfus Med Rev.* 2020;34:75-80.
18. Gandhi M, Yokoe DS, Havlir DV. Asymptomatic transmission, the Achilles' heel of current strategies to control Covid-19. *N Engl J Med.* 2020;382:2158-160.

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