

The challenges for blood transfusion services during Covid-19 pandemic at 108 Military Central Hospital

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Summary

Objective: To analyze the myriad of ways that Covid-19 has affected blood transfusion safety and to propose solutions for the challenges. **Subject and method:** Retrospective study, data of blood transfusion services in 108 Military Central Hospital were collected from January 2017 to September 2021 to analyze the effect of Covid-19 pandemic on safety blood transfusion. **Result:** The number of voluntary outdoor blood collection and the consumption of three main kinds of blood products in 108 Military Central Hospital during the pandemic decreased noticeably to around the half of that before 2020. Major decline was observed in the first 9 months of 2021. However, there was an upward trend in voluntary indoor and paid/professional blood collection. **Conclusion:** The Covid-19 pandemic has led to a reduction of blood related activities in 108 Military Central Hospital, including the supply and demand, and thus adversely affected blood transfusion services. Suitable strategies and preparedness plans need to be developed by the hospital and the blood bank to overcome the negative impact of the pandemic.

Keywords: Blood transfusion, Covid-19 pandemic, 108 Military Central Hospital

1. Background

The aim of blood transfusion services is timely and uninterrupted supply of safe blood. Covid-19 pandemic has created the major disruption worldwide at all levels of health care. According to the report of Vietnam Ministry of Health, in Vietnam till 30th September of 2021, 790.755 cases of Covid-19 were diagnosed and 19.301 deaths have been reported [4]. In Hanoi, 3.975 cases of Covid-19 were diagnosed till 30th September, and there were 1.632 cases detected in the communities outside of

lockdown areas or concentrated quarantine areas [4]. Covid-19 pandemic has majorly affected the blood transfusion services at 108 Military Central Hospital because Hanoi has enforced strict lockdown under directive 16 to control the spread of virus. Reduction in blood donations due to less number of outdoor blood donation camps to avoid social gatherings as well as to maintain strict social distancing policies caused shortage of blood. Major challenges faced have been finding out the way to preserve healthy blood donor recruitment while keeping the safety of medical staff. Therefore, during the current Covid-19 pandemic, it has been necessary to assess the level of preparedness of blood bank to manage blood supply and demand, especially in maintaining sufficient blood stocks to support emergency needs.

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In this article, we analyze criteria that Covid-19 has affected blood transfusion safety, including the safety of both blood donors and blood product recipients, the management and distribution of blood components during a pandemic, and solutions for challenges in the pandemic.

2. Subject and method

A retrospective study was carried out in the Department of Blood Transfusion at 108 Military Central Hospital. The data of blood collection and blood supply were evaluated retrospectively from 1st January of 2017 to 30th September of 2021. All data was statistical analyzed by SPSS software v.20.

3. Result

3.1. The reality of blood supply from 2017 - 2021 before (2017 - 2019) and during (2019 up to now) Covid-19 pandemic

Table 1. The number of voluntary outdoor blood donation events

Month	Before pandemic			During pandemic		p
	2017	2018	2019	2020	2021	
1	2	4	3	3	1	
2	1	1	1	2	0	
3	3	2	4	3	4	
4	3	4	3	4	5	
5	3	3	4	4	0	
6	2	1	3	4	2	
7	4	2	3	5	3	
8	2	3	3	4	1	
9	1	3	2	1	6	
10	0	3	3	4		
11	2	2	4	2		
12	3	2	3	2		
Total	26	30	36	38	22	0.314
Mean	2.1	2.5	3.0	3.1	2.4	
SD	1.1	1.0	0.8	1.1	2.1	

From 2017 to 2021, after rising gradually to 36 times in 2019, the number of voluntary outdoor blood donation events increased slightly and ended up the year 2020 with 38 times. In each year, there was a stability in that between 12 months. Even though the total number of event in the first 9 months of 2021 still remained, it fluctuated substantially between the months, especially there were 4 months organizing less than 2 times/month.

The average voluntary outdoor blood donation camps per month before COVID-19 pandemic from 2017 to 2019 was 2.1 ± 1.1 , 2.5 ± 1.0 , 3.0 ± 0.8 times/month respectively, while that during the pandemic was 3.1 ± 1.1 times/month in 2020 and 2.4 ± 2.1 times/month in the first 9 months of 2021. There was no significant difference in that between before and during the pandemic ($p > 0.05$).

Table 2. The number of blood units was collected by different sources of blood donation

Sources of blood donation		Before the pandemic						During the pandemic			
		2017		2018		2019		2020		2021	
		Units	%	Units	%	Units	%	Units	%	Units	%
Voluntary donation	Outside the hospital	9.509	74.4	12.934	79.9	15.416	90,8	15.729	83.3	7.227	77.8
	Inside the hospital	2.687	21.0	2.720	16.8	1.266	7.5	2.698	14.3	1.771	19.0
Paid/Professional donation		588	4.6	533	3.3	291	1.7	455	2.4	294	3.2
Total		12.784	100	16.187	100	16.973	100	18.882	100	9.292	100

Between 2017 and 2020, the total number of collected blood units climbed from 12.784 to 18.882 units. After that, it witnessed a downward trend in 2021. It can also be seen that the total number of blood units collected in the first 9 months of 2021 was just nearly a half of that in 2020 (9.292 compared to 18.882 units).

Before Covid-19 pandemic, the percentage of voluntary blood units collected outside the hospital went up through the years and reached a peak of 90.8% in 2019. However, it declined gradually during the pandemic to 77.8% in the first 9 months of 2021 as well as the proportion of blood units collected from the others sources saw a gradual increase.

3.2. The reality of blood demand from 2017 - 2021 before and during COVID-19 pandemic

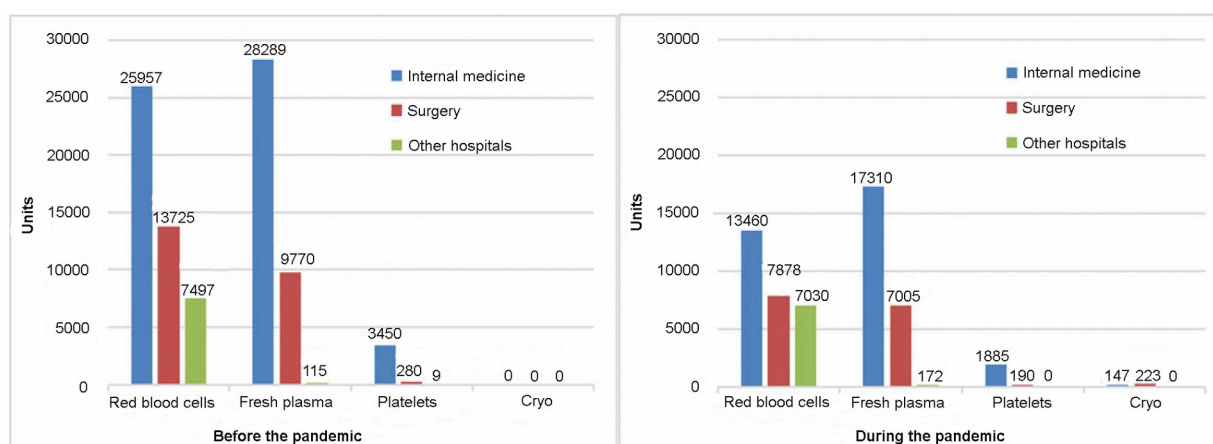


Figure 1. The demand of blood components to Clinical Departments in 108 Military Central Hospital and other hospitals before and during the pandemic

It is clear that red blood cell (RBC) components contributed the highest number of transfused blood units, followed by Fresh plasma, Platelets and Cryo, respectively. Regarding the departments using blood products, the largest consumption of RBCs, Fresh plasma and Platelets was belonged to internal medicine, whereas surgery constituted the largest consumption of Cryo. The number of blood units

supplied to other hospitals was lower than that used in 108 Military Central Hospital.

There is no doubt that during the pandemic, the clinical departments demanded for lower number of blood components, which accounted for around half of that before the pandemic. Meanwhile, the number of blood components supplied to other hospitals remained stable before and during the pandemic.

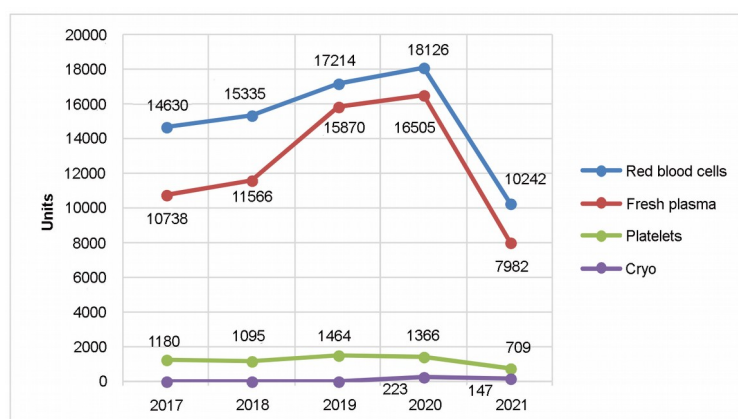


Figure 2. Trends of blood components transfused from 2017 to 2021

The consumption of RBC components rose significantly from 2017 to 2020, then there was a rapid drop by nearly 8,000 units in the first 9 months of 2021. Practically the same as RBCs, the number of transfused Fresh plasma peaked at 16,505 units in 2020 but later fell sharply to less than a half of that in the next 9 months. Likewise, the consumption of platelet components varied before the pandemic before reducing considerably during the pandemic. In contrast, Cryo components were only used in 108 Military Central Hospital from 2020 onwards.

4. Discussion

Like many areas in Vietnam, Hanoi have faced socio-economic disruption due to the COVID-19 pandemic. It has made a significant impact on health service delivery. The proportion of the reduction in the number of blood donations were reported by many countries and regions such as Saudi Arabia, Canada, USA, Malaysia and in Zhejiang province in China [1, 5, 6, 7]. In the countries with reduced blood donations, lockdown orders, social distancing measures, donor anxiety and fear of COVID-19 infection during blood donation, which often stems from popular misconceptions and misinformation, have hindered blood donors from accessing blood transfusion services. Other challenges faced were shortage of supply of consumables like masks, sanitizers; and lack of staff due to quarantine and transport restrictions. Although many employees were encouraged or required to work remotely during the pandemic, this

is not an option for medical staff working in a blood bank. In like manner, it was revealed through our research that safe blood supply and demand at 108 Military Central Hospital were at risk, since there was a decrease of these activities in all around the city from the beginning of the Covid-19 pandemic. The most obvious evidence was that the appearance of non-voluntary outdoor blood donation in February and May of 2021, and there were 4 in 9 months of the year organizing less than 2 times per month. The phenomenon led to a dramatic decline in the number of voluntary outdoor blood donation during the pandemic, especially in 2021 (dropped by 53.1% compared to 2019 and 54.0% compared to 2020). As spoken above, not only has the pandemic affected the blood transfusion service of 108 Military Central Hospital, but it also made an impact on that of other hospitals. For instance, the Vietnam Germany Friendship Hospital, which used to be under lockdown in the outbreak, witnessed an enormous decrease in the number of blood collection from nearly 40,000 units in 2019 to around 20,000 units in 2020 [3]. To enhance blood supply and mitigate potential risks of Covid-19 infection for blood donors, the Department of Blood Transfusion of 108 Hospital implemented measures such as (1) Public awareness strategies through social media platforms; (2) Providing facemasks, hand washing equipment and sanitizers for medical staff and donors; (3) Modifying donor screening questionnaire for exposure to COVID-19; and (4) temperature measurement. The effective solutions

attracted more and more indoor blood donors, including medical staff, patients' relatives and paid/professional donors. As a result, there was a substantial growth in the percentage of voluntary indoor blood donors (from 7.5% in 2019 to 19.0% in 2021) and paid/professional donors (from 1.7% to 3.2%). The changing of blood collection structure helped avoid the risk of shortage blood and prevent expiry of the collected units.

Regarding the blood demand, the decrease in that during the pandemic was primarily due to collapsed number of hospital admissions and elective surgeries, thus maintaining the blood stock for emergencies. The similar results were seen by studies done by Yahia et al [7] and Kim et al [2]. In 108 Military Central Hospital, the significant reduction in blood demand was witnessed in three main kinds of products, namely RBCs, Fresh plasma and Platelets in both internal medicine and surgery. On the contrary, there was a slight decrease in the number of all three kinds of blood components

supplied by 108 Military Central Hospital to the others. This is maybe because these hospitals were not under the completely quarantine control for this period of time, so the blood demand of them did not experience a considerable change compared to before the pandemic. Another point worth noting is that even though our hospital underwent a lot of drawbacks of Covid-19 pandemic, we still developed our profession by producing new blood component called cryoprecipitate or Cryo. The widespread use of the blood product helped 108 Military Central Hospital improve organ transplantation techniques and provide for critical needs, for example, major trauma.

In order to deal with the negative impacts of the pandemic on blood transfusion services, many effective solutions have been applied by 108 Military Central Hospital and the Department of Blood Transfusion. The methods are summarised in the following table.

Criteria	Method
Donor recruitment	Raise awareness about blood donation through social media platforms. Some donor-selection criteria could be adjusted without any meaningful effect on donor or product safety to attract more voluntary donors, for instance, heart rate and blood pressure measurements, interdonation intervals, deferral period for travel in a malaria-risk area and for tattoos, piercings...
Blood collection planning	Adjust the number and size of upcoming outdoor blood donation camps, review physical distancing requirements when choosing locations; focus on expanding indoor blood donation inside the hospital.
Inventory management	Keep close contact with other hospitals to regular update on the expiry; monitor activities requiring increased blood demand, such as organ transplantation.
Protection of staff and donors	Provide personal protective equipment for donors and medical staff; practice physical distancing; monitor COVID-19 testing of donors and staff; prescreening for COVID-19 signs and symptoms.
Availability of personnel	Prepare contingency plans for staff replacement due to COVID-19 infection and quarantine.
Prioritization blood use for patients	Postpone RBC transfusions for patients who are stable and low risk; restrict Platelet transfusions as prophylaxis without clinical bleeding; use appropriate alternative measures for blood transfusion to increase haemoglobin, such as parenteral iron and erythropoietin.

5. Conclusion

The Covid-19 pandemic has led to overall reduction of blood transfusion activities in most areas of Vietnam, in particular blood donations, blood demands and use in health facilities. In similar fashion, 108 Military Central Hospital has faced the same challenges. However, the experience and suitable measures implemented by the hospital to overcome the reduced activities and gain confidence of donors in safe blood donation yielded results. These experience and measures should find an appropriate place in preparedness plans for future similar shocks to the blood transfusion system.

There is need to continue supporting hospitals through strengthening capacity of blood banks, enhancing risk mitigation to ensure services continuity, raising community awareness about the importance of blood transfusion services in the Covid-19 pandemic to develop suitable strategies and preparedness plans for similar situations in the future.

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