Analysis of Blood Availability During the COVID-19 Pandemic Period in Blood Bank Dr. Wahidin Sudirohusodo Hospital

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ABSTRACT

Blood Bank's challenge during the COVID-19 era is securing and protecting blood supplies even though countries are taking precautionary measures with social distancing to prevent or reduce the number of infections caused by COVID-19. This study aimed to compare blood availability before and during the COVID-19 pandemic at the blood bank of Dr. Wahidin Sudirohusodo Hospital. A Descriptive-analytic study with an observational approach using the Shapiro-Wilk test to determine the normality of the sample and the paired T-test. Sample data was taken between March-August 2019 and March-August 2020. A significant difference was found in blood demand (p-value=0.004), amount of blood transfusion (p-value=0.006), stock and reference report (p-value=0.005), blood service report (p-value=0.005), cito waiting time (p-value=0.002) and regular waiting time (p-value=0.016). There was no significant difference in blood indicator Packed Red Cell (PRC) (p-value=0.119). The Large-Scale Social Restriction Policy (PSBB) and reduction of elective surgery in hospitals affect the fulfillment of Blood Bank and faster attendance time of blood during the pandemic. The decrease in a number of blood demands during the COVID-19 pandemic affected the number of blood transfusions, blood service reports, stocks, referrals, and cito and regular waiting time services.

Keywords: COVID-19 pandemic, availability of blood, the amount of blood demand, blood attendance time

INTRODUCTION

A pneumonia epidemic was reported in Wuhan city (Hubei Provence, China) on December 31st, 2019, and identified as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2) caused by Beta Coronavirus genus Coronaviridae. World Health Organization (WHO) on March 11th, 2020 declared the SARS-Cov-2 epidemic as a pandemic known as COVID-19.[1]

The challenge that the blood bank faced was obtaining and fulfilling blood supplies. In contrast, the demand for blood and blood products might decrease during the pandemic due to the delay of several elective operations. Several countries were forced to take preventive action such as social distancing to prevent and reduce the amount of COVID-19 infections, affecting several aspects include the blood donor process.[2,3]

Pan American Health Organization (PAHO) warned about the decline of voluntary blood donations during the COVID-19 pandemic, which could cause a lack of blood supplies in the United States. In contrast, blood and its components would still be needed for patients with a blood disease, cancer, traumatic injuries, and emergency surgeries throughout the pandemic. The main job of a transfusion unit or hospital Blood Bank is to monitor the availability and demand of blood components so blood supply would be sufficient during critical conditions. Without proper management of blood supply and demand, hospitals will experience a lack of supply, worsening patients' condition and even causing death.[4-6]

The demand for blood at Dr. Wahidin Sudirohusodo General Hospitals' Blood Bank increases from year to year. There were 16,044 demands in 2018, rising to 16,995 in 2019. The hospitals' Blood Bank could not fulfill all blood demands in the hospital. Dr. Wahidin Sudirohusodo Blood Banks' reports stated that in 2017 there were 21,045 referrals to the Red Cross Blood Transfusion Unit and Public Health Office of South Sulawesi Blood Transfusion Unit, increasing to 16,840 and 32,917 in 2018 and 2019, respectively.[7]

COVID-19 pandemic also impacted the supply

and demand of blood in Dr. Wahidin Sudirohusodo General Hospital Blood Bank, causing the need for cooperation from the blood transfusion unit dan hospital to ensure blood availability. The blood transfusion unit must respond quickly to changes where blood supply would be compromised. A national approach must be taken for a coordinated and comprehensive response to ensure the blood availability and safety for transfusion.[8,9]

This study compared blood availability before and during the COVID-19 pandemic at Dr. Wahidin Sudirohusodo General Hospitals' Blood Bank.

METHODS

This research was a descriptive-analytic study with an observational approach using the Shapiro-Wilk test to determine the normality of the sample and using the paired T-test to know the differences before and during the COVID-19 pandemic. The study sample was the data of blood availability in March-August 2020 (during a pandemic), compared to the data in March-August 2019 (before the pandemic).

Approval of ethical eligibility was obtained from the Health Research Ethics Commission (KEPK) of Hasanuddin University Medical Faculty/Hasanuddin University Hospital/Dr. Wahidin Sudirohusodo Makassar with Number 582/UN4.6.4.5.31/Pp36/2020.

RESULTS AND DISCUSSIONS

The Kolmogorov-Smirnov dan Shapiro-Wilk normality tests showed that the results in 2019 and 2020 were normally distributed, so they were continued with paired T-test statistics with the following results.

In Table 1, for blood demands consisting of Whole Blood (WB) and blood components; the amount of blood transfusion; amount of stock and blood referrals; and amount of blood service before and after the pandemic had a p=0.004 (p<0.05), p=0.006, p=0.005, and p=0.005, respectively, showing a significant difference from 2019 before the pandemic and 2020 during the pandemic. On the other hand, the indicator of blood availability for Packed Red Cell (PRC) had a p=0.119 (p<0.05), showing no significant difference in 2019 before the pandemic with 2020 during the COVID-19 pandemic. Cito blood waiting for time < 45 minutes had a p=0.002 (p < 0.05), and regular blood waiting time had a p=0.016, both showing significant differences in 2019 before pandemic with 2020 during COVID-19 pandemic.

Significant differences in the amount of blood demand in 2019 compared with 2020 during the COVID-19 pandemic shows a declining graph during the pandemic with the highest difference in May (33.4%), due to the decrease of patients, resulting from the Large Scale Social Restriction (PSBB) and hospital policy that temporarily stopped or delayed elective surgeries, as an effort to stop the spread of COVID-19 viruses in the hospital (Fig. 1). Blood transfusion was still needed in the hospital for emergencies such as traumatic injuries, post-partum bleeding, severe anemia in children, blood dyscrasia, and urgent surgery.[9]

Table 1. Results of data test before and during a pandemic

Researched Variable	Year	Mean	SD	p
Amount of blood demand	2019	4158,50	540,81	.004
	2020	2678,83	540,59	
Amount of transfusion (amount of bags)	2019	907,17	206,24	.006
	2020	383,17	190,14	
Stock and reference report	2019	4195,50	566,74	.005
	2020	2715.67	537,86	
Blood service report	2019	4168,67	552,39	.005
	2020	2678,83	540,59	
PRC availability indicator (amount of bag)	2019	70.73	25.01	.119
	2020	47.63	21.28	
Cito waiting time (minute)	2019	36.77	1.54	.002
	2020	34.92	1.18	
Regular waiting time (minute)	2019	46.75	1.90	.016
	2020	44.37	1.88	

* Secondary data source SPSS T-paired test
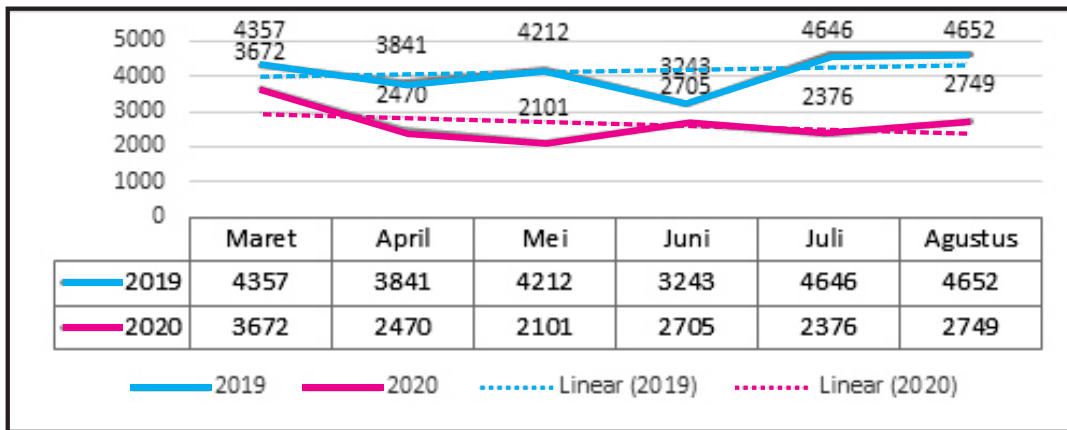* SD: Standard Deviation

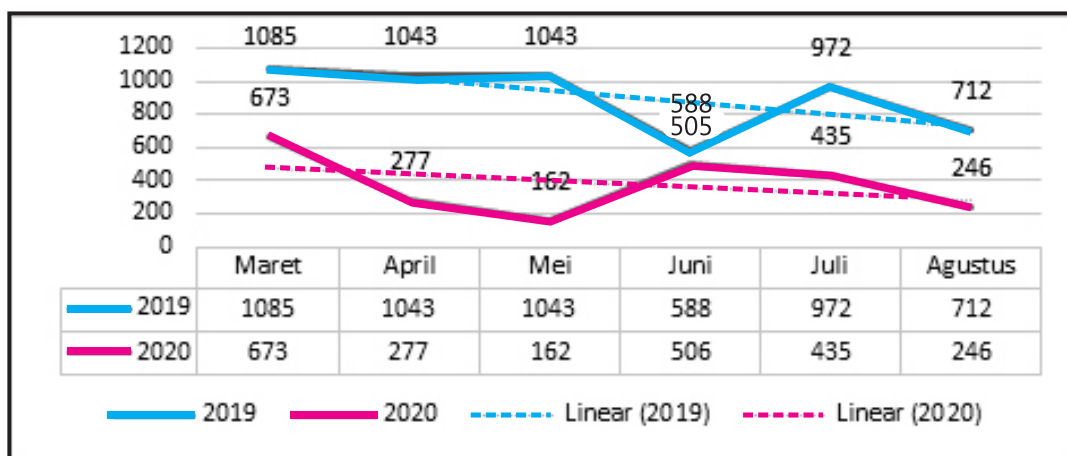**Figure 1.** Graph of blood demand report

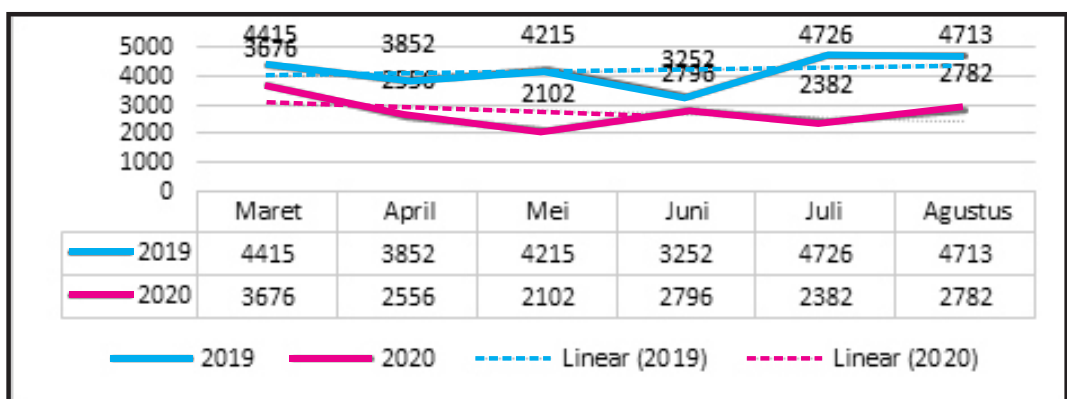**Figure 2.** Graph of the amount of blood transfusion

Figure 3. Graph of stock and blood referrals' report

There was a significant difference in the amount of transfusion in 2019 compared to 2020 during the COVID-19 pandemic, showing a declining graph with the highest difference from the amount of transfusion was in May, which was 73.11%, due to the decrease in demand during the pandemic (Fig. 2).

Significant differences in the stock and referrals' report in 2019 compared to 2020 during the COVID-19 pandemic, showing a declining chart. The highest difference was during May 2020, which was 33.45%, caused by the decrease of blood demand during the pandemic (Fig. 3).

Significant differences in blood services in 2019 and 2020 during the COVID-19 pandemic show a decline in the blood services graph caused by the reduction in the demand for blood services (Fig. 4).

There was no significant difference in the reports of blood availability indicators for Packed Red Cell (PRC) in 2019 compared to 2020 during the COVID-19 pandemic (Fig. 5). This finding showed that PRC components were always available at the hospitals' causing all demands for PRC to be fulfilled, as seen in the 2020 graph during the pandemic showing an increasing trend. However, it decreased during May 2019 and 2020 due to the month of Ramadhan for moslems. The Blood Management Information System (SIMERAH) in the Hospital Information System (SIRS) ensures the monitoring of blood availability at the Dr. Wahidin Sudirohusodo Makassar Hospitals' Blood Bank.[7]

There were significant differences in the city turnaround time in 2019 and 2020 during the COVID-19 pandemic. The graph showed a faster time in 2020. There is a decrease in cito blood demand in the pandemic (Fig. 6).
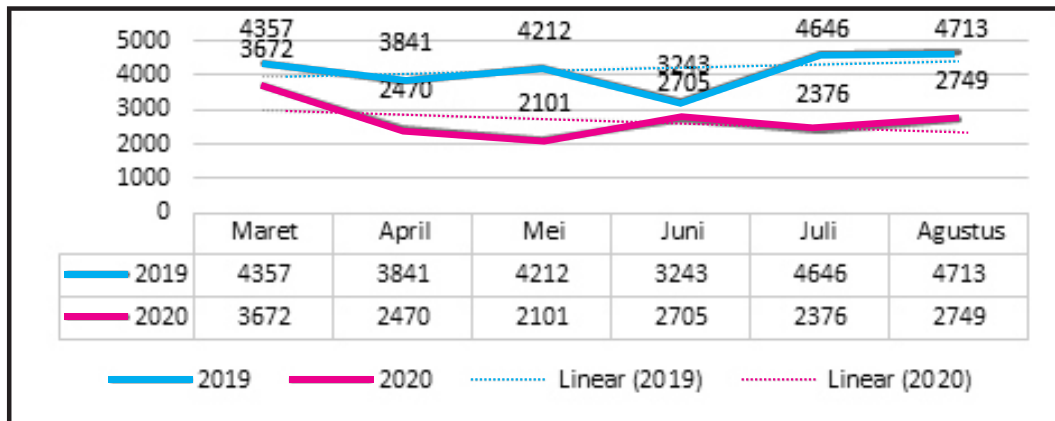

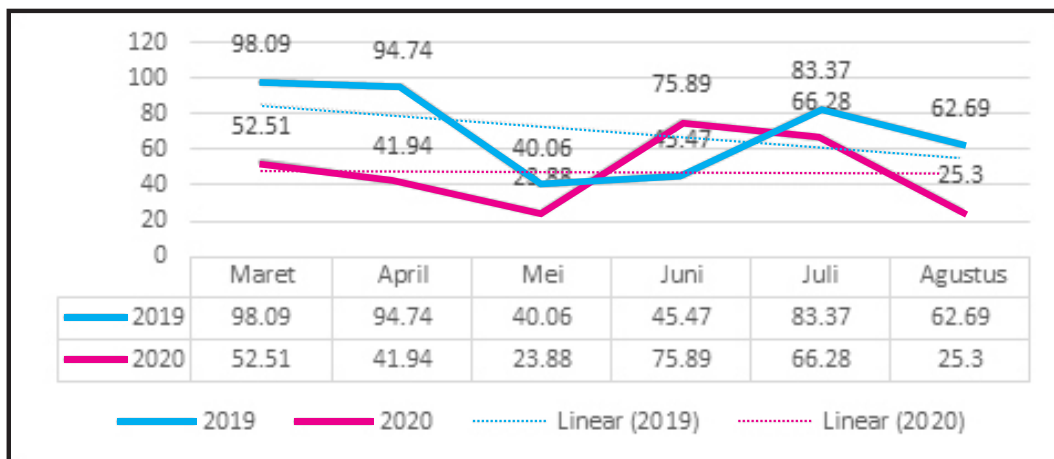|	Maret	April	Mei	Juni	Juli	Agustus
2019	4357	3841	4212	3243	4646	4713
2020	3672	2470	2101	2705	2376	2749

Figure 4. graph of blood services' report

	Maret	April	Mei	Juni	Juli	Agustus
2019	98.09	94.74	40.06	45.47	83.37	62.69
2020	52.51	41.94	23.88	75.89	66.28	25.3

Figure 5. Graph indicator blood availability PRC

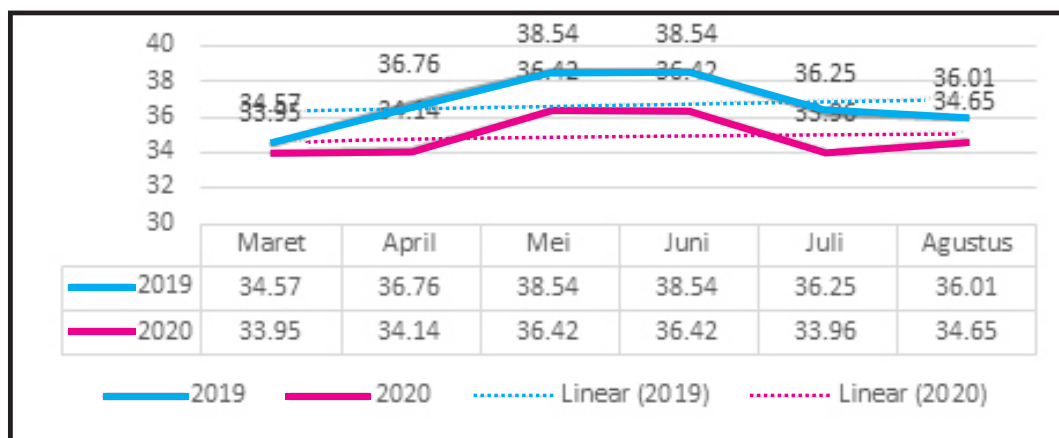|	Maret	April	Mei	Juni	Juli	Agustus
2019	34.57	36.76	38.54	38.54	36.25	36.01
2020	33.95	34.14	36.42	36.42	33.96	34.65

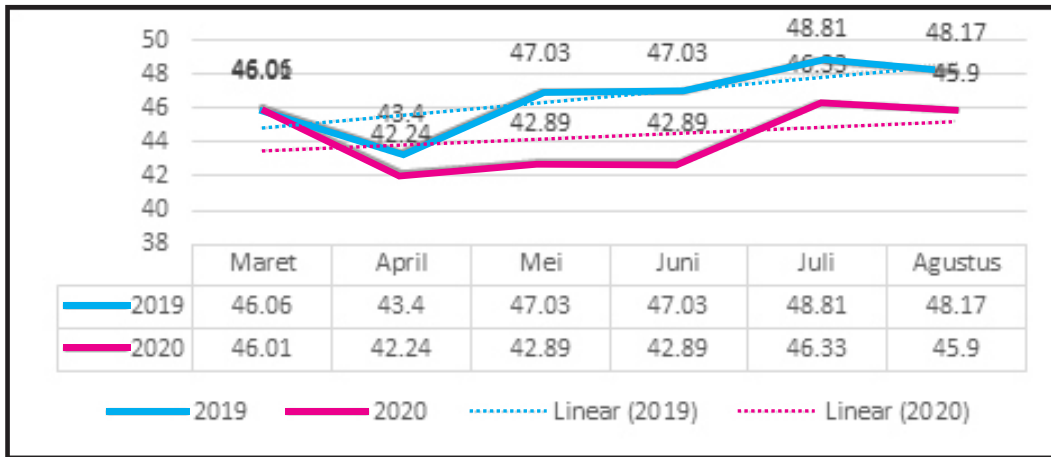**Figure 6.** Graph cito < 45 minutes turnaround time

Figure 7. Regular waiting time < 60 minutes

A significant difference of the regular turnaround time in 2019 with 2020 during the COVID-19 pandemics' graph shows a shorter time compared to the previous year. It is due to the decrease of blood demand in the pandemic, causing blood service to be faster (Fig. 7).

CONCLUSIONS AND SUGGESTIONS

According to this study, the following conclusions can be made: There was a decrease in blood demand during the COVID-19 pandemic in 2020, affecting the number of blood transfusions, blood service report, stock, and referrals of Wahidin Sudirohusodo Makassar General Hospitals' Blood Bank; The Wahidin Sudirohusodo General Hospitals' Blood Bank can maintain the availability and distribute blood (particularly PRC) according to blood demand and was not affected by the 2020 pandemic; The decreased amount of blood demand during the COVID-19 pandemic causes cito and regular waiting time to be faster during the pandemic compared to before.

Standard laboratory biological safety practices based on national and international guidelines, as suggested. For example, if the blood transfusion unit laboratory is conducting a pretransfusion investigation, samples from patients under monitoring or confirmed for COVID-19 should be handled according to COVID-19 guidelines.

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