A Comparative Analysis on the Rates of Blood Donation in Hospitals of Quezon City Before and During the COVID-19 Pandemic from November 2019- October 2020

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Abstract

Blood collection has been a crucial procedure for different hospitals and blood banks to obtain blood supply in order to be used in various therapeutic procedures for the patients. Conducting blood collection drives offer access to quality and safe health services given to the patients that need blood. The current situation of the healthcare system is being hindered by the COVID-19 pandemic which made a lot of restriction and limitation to hospitals due to quarantine protocols and social distancing. Blood donation is one of the affected procedures by the COVID-19 and it is the purpose of this study to determine the rates of blood donation in selected hospital-based blood banks of Quezon City during the pandemic crisis. The trends of blood donation between phase 1, phase 2, and phase 3 of the pandemic from November 2019 to February 2020, March 2020 to May 2020, and June 2020 to October 2020 respectively is compared to find changes and effects of the pandemic to health services. This research is focused on the comparative analysis on the data gathered from the blood banks and is used to monitor the trends of blood donation services. The researchers had formulated a consent letter that was reviewed by the ethics committee and was sent to the blood banks for data privacy purposes. A letter requesting for the amount of blood donation per month of specified dates was given to the hospitals. The letter will be accessible online through email for easier access and gathering of data. Those hospitals which agreed to participate in the study and willing to share data will be included in this paper. The collected data was statistically analyzed by using IBM® SPSS® Statistics. Five hospitals were able to participate and give data on the number of blood donations. The analysis showed that most numbers of blood donations happened in phase 1 with 49.54% of the total donations throughout the study while the lowest is in phase 2 which only has 15.2%. The phase 3 period had 35.26% of the total donations which increased from phase 2. Based on the statistical analysis, the result from One way ANOVA proved that there were no significant differences between the 3 phases in the study. The rate of change in blood donation showed a decrease of 69.33% in phase 2 from the total donations in phase 1. On the other hand, phase 3 had a 132.05% increased rate from the total donations in phase 2. In conclusion, blood donation rates were affected based on the quarantine protocol which drastically decreased during phase 2 and increased in phase 3. Other than that, the study found out that donor attendance was also less in the pandemic phase than the pre-pandemic phase because of restrictions and health protocols in hospitals and in public.

Keywords: blood donation; COVID-19; pandemic; Quezon City

1.   Introduction

Blood collection is an essential method for gathering safe blood samples needed by the hospitals to give quality and safe services, specifically to patients that are in demand of blood. By conducting blood donations, hospitals can provide health services to the patients and would be able to satisfy the demand of blood supply. As the current situation of the healthcare system is challenged by the COVID-19 pandemic, this research focused on identifying the rates of blood donation during these trying times. According to the Food and Drug Administration (2020), the cancellation of blood drives and social distancing has led to the decrease in blood donation and because of this the demand on the supply of blood increases. The increasing number of cases of patients with the virus has been a challenge to the health services because it is being limited. The cancellation of hospital operations, surgeries, transplants, and transfusions had a significant impact on the demand and supply of blood wherein transfusions are tremendously reduced (Gehrie et al., 2020). The purpose of this research is to give an outlook on different angles of how this pandemic affects the blood demand and supply by conducting quantitative analysis within the

hospital-based blood banks in Quezon City during the time of COVID-19 pandemic. The rate of blood donation was measured to identify if there had been major changes or a reduction in line with the pandemic.

The impacts of the virus did not only affect the social, economic, and the public aspect of the society but also the healthcare system (WHO, 2020). Blood is very essential to hospitals and its supply should be well-managed to give out quality services to all patients requiring transfusion. This research has provided us an idea on the accessibility of blood during this pandemic which will provide data for future studies that will be conducted. Basic measures that can boost blood donation during the pandemic may be possible through public awareness and clarifying the common queries of the masses (Sahu et al., 2020). Based on the study of Raturi, M. & Kusum, A. (2020), the lockdown has been the early intervention of the government to minimize the spread of the virus and because of this there has been a significant drop on the amount of blood supply and drying of blood stocks. Surgeries requiring blood had also been postponed because blood supply has dropped which diminished other services that are given out by the hospital. A study in Italy by Grandone et al. (2020) elucidates that, the decrease in blood supply in the country is caused by the decrease of blood donations due to the limitations brought by COVID-19 which made the maintenance of proper levels of blood to be difficult in blood centers. In a study conducted by Cho et al. (2020), they revealed that there is a possible transmission of COVID-19 through blood transfusion and found out that blood products from asymptomatic positive patients did not result in the transmission of the disease. Patients who are also critically ill with COVID-19 have low transfusion requirements and the potential infectivity of blood by the disease are relatively low as well as transfusion transmission (Stanworth et al., 2020). This gives more assurance that blood donations may still be conducted amid the pandemic without the thought of transmitting the disease through blood. This research will benefit the different hospitals in the country by giving out data and information to the correlation of the COVID-19 pandemic to the rates of blood donation which is crucial for determining the status of blood demand and supply in hospitals and blood banks and to give insights on what actions should be implemented.

Contribution to new knowledge will also be assured especially to the implications of the pandemic to the state of the hospitals to identify major changes in blood drives that will definitely benefit the future of our healthcare system. Dhiman et al. (2020) also stated that there had been wastage of blood supply because of its shelf-life and how it is safely stored and in this case the pandemic makes it harder for transportation and storage of blood which is a challenge for most hospitals. Wastages of blood supplies and components may also lead to increased risk of infection to patients which will be a reason for a hospital or a blood bank to be shut down (Arcot et al., 2020). Although COVID-19 had generally severe impacts in blood centers and the supply of blood, some blood centers have taken measures during the pandemic that would minimize the effects of COVID-19. According to a study in China by Chang et al. (2020), blood banks had conducted several measures to continue blood donation like taking the patient's temperature before donation, additional donor screening questions about exposure to people or travel to places with the disease, contacting the donors and asking for their conditions after donation, and recalling blood products from infected donors which has not been transfused. By utilizing this knowledge, it may also be implemented in other places to conduct a safe blood donation drive during the COVID-19 pandemic. Based on the study of Bloch et al. (2020), plasma recovered from patients who recovered from the disease had also been effective for the therapeutic treatment of infected patients, but further clinical trials must be conducted to confirm its efficacy. Using plasma may be a convenient way of providing therapy because it may be gathered from blood donated by patients who recovered from COVID-19. This research talks about the quantitate of blood donation rates using statistical tools that will enable to determine the changes that COVID-19 brought upon the blood banks and to differentiate the supply and demand of blood before and during this pandemic to identify the degree of its effect.

Accordingly, the research was conducted on selected hospital-based category A and B blood banks around Quezon City that are readily available to accept blood donations during the on-going pandemic by gathering information through emailing these hospitals for the needed data. Descriptive and longitudinal approach was utilized in measuring the blood rates which helped to know the current situation, analyze crucial factors to blood donation, and compare the trends and differences of donating before and during the pandemic. Gathering data from different hospitals would require a consent which is formulated by the researchers and was reviewed by the ethics committee for approval. The data that gathered in this research was analyzed using a statistical tool, specifically the IBM® SPSS® Statistics, wherein descriptive statistics was used to measure the rates of collection and compare the rates from phase one (November 2019 to February 2020), phase two (March 2020 to May 2020), and phase three (June 2020 to October 2020). The results gathered were discussed by the researchers for interventions on the problem and contributions to new knowledge that may be utilized by future research in the same field.

1.1. Problem Statement

The study focused on blood donation before and during the pandemic. As stated, the pandemic became a global threat and countries are prioritizing the health care of citizens. A problem which covers a population must be measured using statistical tools. Nonetheless, this must be observed so that a specific action can be implemented. Therefore, the study investigates the following questions:

1. What is the total blood donation in hospitals of Quezon City before and during the COVID-19 pandemic from November 2019 to October 2020?
2. What is the rate of blood donation for each phase?
3. What is the change in blood donation rate between these phases?

1.2. General Objectives

To measure the current rates of blood donations in hospitals of Quezon City during the COVID-19 pandemic.

1.3. Specific Objectives

1. To collect the number of blood donations in hospitals of Quezon City before and during the COVID-19 pandemic from November 2019 to October 2020.
2. To determine the rate of blood donations in hospitals of Quezon City for phase one from November 2019 to February 2020, phase two from March 2020 to May 2020, and phase three from June 2020 to October 2020.
3. To compare the rates of blood donations in phases one, two, and three.

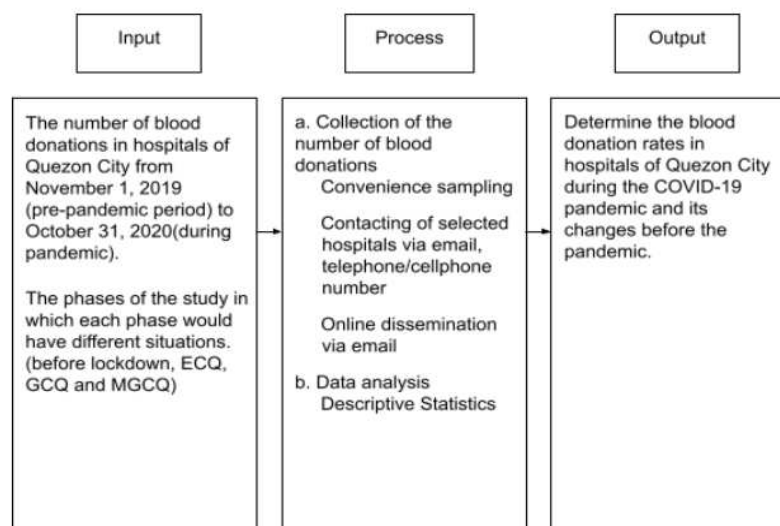## 1.4. Conceptual Framework

Figure 1. Conceptual Framework of the Study

The framework of this study was based on the study of Raturi & Kusum (2020). Based in India, the paper was about the effects of the COVID-19 pandemic and the lockdown towards the freedom of people to donate blood. This leads to the suspension of blood donation drives and dried up blood stocks.

In this paper's conceptual framework, the IPO model was also utilized. The input box contains the data that came from hospitals from Quezon City about the number of blood donations during the Pre-Pandemic Phase (November 2019-February 2020) until the ongoing Pandemic Phase (March 2020-October 2020), as there are different situations in each phase (before lockdown, ECQ, GCQ, and MGCQ), the freedom of people to donate would be restricted during the pandemic phases. In the process box, the hospitals were contacted through email and telephone number, and the dissemination of data as well. As for sampling collection, the group used a convenience sampling technique since only selected hospitals from Quezon City were included in the study. To analyze the data, the SPSS Statistics app was used. After the analysis of data, the group could determine the blood donation rates in Quezon City before and during the pandemic, as shown in the output box.

1.5. Significance of the Study

The continuous and regular blood donations are needed to ensure that there would be sufficient safe blood available whenever and wherever it is needed. In today's pandemic, blood supplies are affected putting those who need blood at risk.

This research would reveal the importance of blood donations and how essential it is during this pandemic. Particularly, the study would be beneficial to the following:

To the General Public:

It would benefit the society because blood donors are mainly from voluntary blood donors. Through the data that was presented, people would gain knowledge on the rates of blood donations during the pandemic and be encouraged to donate too.

To the Hospital Community:

The specific information of this study would aid the hospitals in managing the blood supply that they have and use it efficiently. From the findings, hospitals can plan effective strategies on the management of blood supply whenever there would be an acute loss of blood supply.

To the Medical Technology Practice:

It could be a source or an accurate evidence that the blood supplies from hospitals are essential especially when at crucial times like this in the pandemic. With the scientific findings, this would help future medical technologists in the process of storing blood and utilizing blood efficiently so that there would be enough supply.

To the Future Researchers:

This could possibly help another group of researchers as this could be their basis or source of another idea for a study or could be replicated with a different or additional variable using different respondents. The researchers could improve the variables from this study to strengthen their own findings and could also use the results from this study for their own conceptual framework.

1.6. Research Impediments

This study focused mainly on the rates of blood donation in selected blood banks before and during the early COVID-19 pandemic. In this study, there were three phases that have been conducted: phase one was from November 2019 to February 2020, phase two was from March 2020 to May 2020, and phase three was from June 2020 to October 2020. The rates of blood donation came from the number of donations accommodated during each phase before and during the COVID-19 pandemic in Quezon City. The researchers selected Quezon City as the target area for the study because hospitals and health centers in this city, monitor and facilitate most COVID-19 active patients during the pandemic (Department of Health, n.d-a.). The selected blood banks served as the research locale of the study and were categorized and limited to hospital-based category A and B blood banks with level 3 accreditation. However, the true and specific blood banks that were selected depends on whether the blood banks permitted the researchers to gather their data or not. The data of the number of blood donations accommodated was utilized directly from the selected hospital-based blood banks' documents from November 2019 to October 2020 only.

Specifically, the documents that were utilized were the private documents and secondary data permitted by the custodian of the selected hospitals during the November 2019 to February 2020 for phase one, March 2020 to May 2020 for phase two, and June 2020 to October 2020 for phase three, thus general checklists, checklists (D1) and the informed consents were prepared by the researchers for this matter. Its data were compiled and analyzed by the researchers to measure the rates of blood donation in Quezon City. However, due to possible breaching of the data, the hospitals were selected and qualified only if they approved the researcher's permission requests.

2. Research Methodology

2.1 Research Design

The study used a multi-method approach, wherein it utilizes a descriptive and longitudinal design intending to measure the current rates of blood donations from the selected hospital-based Blood banks during the COVID-19 pandemic phases. The descriptive method was accompanied by the data from numbers of blood donations that are available from the blood banks within selected hospitals from Quezon City. Thus, it was used in assessing the rates of blood donation. Furthermore, this also helped in describing the current situation of blood donation and in analyzing the factors that cause the current blood donation rates.

Simultaneously, the longitudinal design was used aiming to monitor and compare the trends of the blood donation services between the three phases of the pandemic within the selected periods specifically from November 2019 to February 2020 for Phase 1, March 2020 to May 2020 for Phase 2, and June 2020 to October 2020 for Phase 3.

2.2   Subject and Study Sites

The primary subjects of this research were the various hospital-based category A and B blood banks, which have provided blood donation services and operations in Quezon City. The researchers selected the hospitals in Quezon City because according to the COVID-19 Tracker (Department of Health, n.d-a.), Quezon City has the greatest number of COVID-19 cases in the National Capital Region (NCR) during these times.

The numbers of blood donations in these hospital-based blood banks were the target data of this research and these were collected and gathered to figure out the rates of blood collection before and during the COVID-19 pandemic. The inclusion criteria for the subjects were the category A and B hospital-based blood banks with level 3 accreditation that provide blood services like blood donation and blood collection. Hospitals that are readily available to accept and conduct blood donation during the COVID-19 pandemic are also in the inclusion criteria for this study. For the exclusion criteria, hospitals that did not accept or conduct blood donations during the pandemic or do not have a blood service facility were not considered.

Different hospital-based blood banks that fall under category A and B that accepted blood donations in Quezon City were used as samples in this research. According to the Department of Health (n.d.-b), there are 19 hospitals with level 3 accreditation that can collect blood donations. The researchers included those hospitals who will participate and approve in giving the data needed. The sampling technique used was the convenience sampling which was conducted through contacting the selected hospitals in Quezon City. Communication to the hospital laboratory was through email and contacting the telephone or cellphone number of the hospital provided in the official list of licensed government and private hospitals as of December 31, 2019, by the Health Facilities and Services Regulatory Bureau. (Department of Health, n.d.-b). Upon being contacted, consent letters were delivered through email in this time of pandemic. The letters were addressed to the director and head of the pathology department of the hospitals listed. There were no vulnerable subjects that were involved in the study considering that the participants are blood banks and the data needed to be gathered from them were the number of blood donations only. By comparing the rates of blood donation of different blood banks in Quezon City, it helped the researchers to determine if there had been major changes in blood donation because of the pandemic. This research relied on the data that was given by the participating hospitals and related research articles focused on the effects of the pandemic on the blood donation rates.

2.3.   Data Measure/Instrumentation

This research required the use of a letter as the researchers needed information about blood donation rates during the COVID-19 pandemic, specifically during the duration of November 2019 to October 2020 from Hospital-based category A and B blood banks with level 3 accreditation. It contained a request for data regarding the number of blood donations during these periods. This letter was written in English and had a consent form for the hospital to confirm if they approve of sharing their data and of course, following strict confidentiality. This was sent through email only.

The gadgets that were used in this paper were personal computers/laptops for the data inputting and interpretation. The program that was used for the inputting of data was Microsoft Excel and it was analyzed using IBM® SPSS® Statistics that will be discussed later in this paper.

2.4.   Data Gathering Procedure

The research utilized convenience sampling. This is a sampling method that acquires samples depending on the availability of the respondent. There are possibilities that the blood banks would not allow revealing of information. This may be because of some procedure which may limit the researchers. Thus, sample size may also vary depending on how many blood banks agreed to participate and to provide data.

In acquiring this, the researchers needed to formulate a consent which contains permission for collecting data from the institute. The consent was first processed by an ethics committee which would review the purpose and the safety of the research. If data cannot be collected due to some circumstances of the blood bank, then the data will not be included. If data can be collected, then it will be included in the research. After acquiring data, the data was processed in statistical analysis for interpretation.
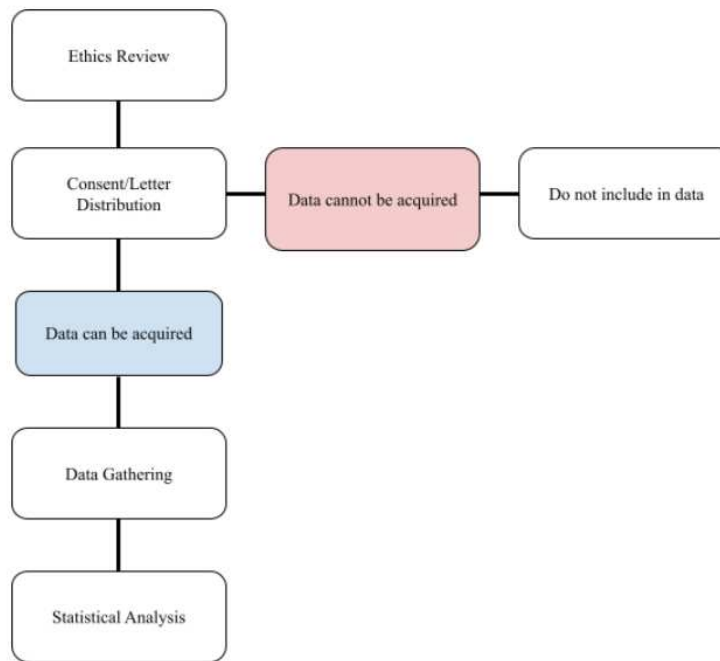
Figure 2. Data Collection and Procedural Flowchart

2.5. Ethical Considerations

The study observed informed consent, confidentiality, and privacy, minimizing the risk of harm, and the right to withdraw. The study focused on the use of private data from hospital-based category A and B blood banks in Quezon City. Permission from the custodian of the hospitals' documents was needed for the use of such private documents and secondary data from the hospitals since this information is not in the public domain. The general checklist, the checklist (D1), and the Informed consent assessment form were filed and attached together with the full research proposal with instruments to be used and Curriculum Vitae to be passed to the Ethics Research Committee for approval.

The data obtained was stored in Google Drive with its privacy settings changed to restricted access, hence, only authorized users can view its contents. For further security, only University of Santo Tomas's student emails were used for the Google Drive to ensure that only authorized users may be able to access the data and prevent emails not belonging to University of Santo Tomas from viewing this drive. A backup copy was stored in an external hard drive and was encrypted with a password. The data was used as soon as it is obtained and would be destroyed after successfully complying with the final output of Thesis 3.

Upon completion of the study, the results will be shared to the participating hospitals that requested to have a copy. The hospitals that participated in this paper are:
1. National Children's Hospital-Institutional Review Board 8724-0656 to 59 local 102 Dr. Elsie Lynn B. Locson, MPH, FPPS, Chair
2. De Los Santos Medical Center
3. East Avenue Medical Center
4. Quezon City General Hospital
5. University of the East Ramon Magsaysay Memorial Medical Center, Inc.

2.6. Data Analysis

The data that was collected and organized in Microsoft Excel and was analyzed using IBM® SPSS® Statistics. The data was divided into its corresponding phases. Phase 1 covered data from November 2019 to February 2020, Phase 2 covered data from March 2020 to May 2020, and Phase 3 covered data from June 2020 to October 2020. The researchers used descriptive statistics to determine the rates of blood donation in each month. These were expressed as frequency, percentages, and measure of central tendency. The computation of rate of blood donations was based on the following formula:

$$Rate\ of\ blood\ donation = \frac{total\ number\ of\ blood\ donations\ in\ a\ phase}{total\ number\ of\ blood\ donations}$$

In comparing the changes in each phase, percentage change would be utilized to see if there is an increase or decrease in each phase. The use of one way-ANOVA was used to know if there have been significant changes between the three phases. In knowing the significant difference in phase compared to the other phase, independent sample t-test was utilized. After treating the data, these were verified by a statistician to ensure that the data is accurate.

## 3.	Results or Findings

The researchers emailed and contacted 19 hospital-based category A and B blood banks with level 3 accreditation in Quezon City. Out of those 19 hospitals, only five hospitals agreed to participate in our study and have given the needed data. These hospitals include De Los Santos Medical Center, East Avenue Medical Center, National Children's Hospital, Quezon City General Hospital, and University of the East Ramon Magsaysay Memorial Medical Center, Inc. The rest of the hospitals that were not able to participate in our study because of the following reasons: the communication within the hospitals took too long and some did not respond at all, and hospitals were busy and understaffed thus no one was able to accommodate us in giving the needed data.

3.1	Total number of blood donations

Month	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Total
Phase 1						
November 2019	120	999	137	80	187	1,523
December 2019	188	1,114	125	21	168	1,616
January 2020	87	1,152	260	35	186	1,720
February 2020	140	864	253	41	344	1,624
Phase 2						
March 2020	31	573	103	36	15	758
April 2020	62	276	38	4	53	433
May 2020	99	554	143	7	0	803
Phase 3						
June 2020	141	739	208	2	0	1,090
July 2020	79	540	148	0	0	767
August 2020	85	620	170	27	2	904

September 2020	107	595	127	79	4	912
October 2020	84	617	211	0	42	954
Total	1,223	8,643	1,923	332	1,001	**13,122**

Table 1. Distribution of the Blood Donation of the Hospitals per Month

Table 1. shows the total blood donation within the participating hospitals in Quezon City from the month of November 2019 to October 2020. In general, there were a total of 13,122 blood donations during the months mentioned. Among the months, it can be shown that most of the blood donations happened during the month of January 2020 with a total of 1,720 donations, while the least blood donations were during the month of April 2020 with 433 donations. Among the hospitals, Hospital 2 had the most blood donations with a total of 8,643 donations, while the least blood donations were from Hospital 4 with a total of only 332 donations.

3.2. Rate of blood donation for each phase

Phases	N	Percentage	Mean	SD	SE	95% Confidence Interval for Mean	
						Lower	Upper
1	6501	49.54%	1300.2	1604.48	717.55	1261.2	1339.2
2	1994	15.20%	398.8	569.55	254.71	373.8	423.8
3	4627	35.26%	925.4	1265.21	565.82	888.94	961.86
Total	13,122	100.00%	4374	2264.13	1307.19	4335.3	4412.7

Table 2. Distribution of Blood Donation of Hospitals by months based on Phases

Table 2 shows the total blood donation within the hospitals in Quezon City from the different phases of the pandemic. It can be shown that most of the blood donations occurred during phase 1 with a total of 6,501 donations from the months November 2019 to February 2020 for all hospitals included in the study, which is 49.54% of the total blood donations throughout the period. The next greatest number of blood donations were during phase 3 with a total of 4,627 donations during the months of June 2020 to October 2020 for all hospitals included in the study, which is 35.26% of the total blood donations donated throughout the period. Lastly, phase 2 had the least number of blood donations with 1,994 donations during the months of March 2020 to May 2020 for all hospitals included in the study, which is 15.20% of the total blood donations throughout the period.

3.3. Change in blood donation rate between phases

Phase	Total Blood Donations	Change of Rate

Phase 1	6, 501	-
Phase 2	1, 994	-69.33%
Phase 3	4, 627	132.05%

Table 3. Rate of Change of the Blood Donations per Phase

Table 3 shows the rate of change on the blood donations from its former phase. Based on the table below, during phase 2, the blood donations decreased by 69.33% from the total blood donations from phase 1. Meanwhile, the blood donations in phase 3 increased by 132.05% from the total blood donations from phase2.

Groups	SS	dF	MS	F	P-value	F-critical value
Between Groups	364802.88	2	182401.44	2.32	0.11	3.16
Within Groups	4481887.72	57	78629.61			

Table 4. Analysis of Variance on the blood bags donated when grouped according to Phases

Table 4. shows whether there are significant differences between the blood donations among the three phases of the study. One-way ANOVA was conducted to determine such results. Considering that the F-value=2.32, which is less than the critical value of 3.16, the researchers do not reject the null hypothesis. Therefore, there are no significant differences on the blood donations among the three phases of the study.

(I) Phase	(J) Phase	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	192.117*	95.778	.050	.32	383.91
	3	139.970	84.123	.102	-28.48	308.42
2	1	-192.117*	95.778	.050	-383.91	-.32
	3	-52.147	91.581	.571	-235.54	131.24
3	1	-139.970	84.123	.102	-308.42	28.48
	2	52.147	91.581	.571	-131.24	235.54

Note - The mean difference is significant at the 0.05 level.

Table 5. Post Hoc Analysis of the ANOVA

Table 5. shows the post-hoc analysis of the groups. Considering that all p-values are greater than or equal to 0.05, there is no significant difference in blood donations among the different phases.

	Phase 1	Phase 2
Mean	325.05	132.93
Variance	140433.42	35561.07
Observations	20	15
Hypothesized Mean Difference	0	
df	29	
t Stat	1.98	
P(T<=t) one-tail	0.03	
t Critical one-tail	1.70	
P(T<=T) two-tail	0.06	
t Critical two-tail	2.05	

Table 6 T-Test: Two-Sample Assuming Unequal Variances between Phase 1 and Phase 2

Table 6. shows whether there is a significant difference between the blood donations among phase 1 and phase 2. Independent Sample T-Test was conducted to determine such results. Considering that the t-value=1.98, which is less than the critical value of 2.05, the researchers do not reject the null hypothesis. Accordingly, there is no significant difference on the blood donations between phase 1 and phase 2.

	Phase 1	Phase 3
Mean	325.05	185.08
Variance	140433.42	54824.91
Observations	20	25
Hypothesized Mean Difference	0	
df	30	
t Stat	1.46	

P(T<=t) one-tail	0.08
t Critical one-tail	1.70
P(T<=T) two-tail	0.16
t Critical two-tail	2.04

Table 7. T-Test: Two-Sample Assuming Unequal Variances between Phase 1 and Phase 3

Table 7. shows whether there is a significant difference between the blood donations among phase 1 and phase 3. Since the t-value=1.46, which is less than the critical value of 2.04, the researchers do not reject the null hypothesis. Evidently, there is no significant difference on the blood donations between phase 1 and phase 3.

	Phase 2	Phase 3
Mean	132.93	185.08
Variance	35561.07	54824.91
Observations	15	25
Hypothesized Mean Difference	0	
df	35	
t Stat	-0.77	
P(T<=t) one-tail	0.22	
t Critical one-tail	1.69	
P(T<=T) two-tail	0.45	
t Critical two-tail	2.03	

Table 8. T-Test: Two-Sample Assuming Unequal Variances between Phase 2 and Phase 3

Table 8. shows whether there is a significant difference between the blood donations among phase 2 and phase 3. Independent Sample T-Test was conducted to determine such results. Considering that the t-value=-0.77, which is less than the critical value of 2.03, the researchers do not reject the null hypothesis. Consequently, there is no significant difference on the blood donations between phase 2 and phase 3.

	Phase 1	Phase 2&3
Mean	325.05	165.53

Variance	140433.42	47157.59
Observations	20	40
Hypothesized Mean Difference	0	
df	26	
t Stat	1.76	
P(T<=t) one-tail	0.04	
t Critical one-tail	1.71	
P(T<=T) two-tail	0.09	
t Critical two-tail	2.06	

Table 9. T-Test: Two-Sample Assuming Unequal Variances between Phase 1 and Phase 2&3

Table 9. shows whether there are significant differences between the blood donations among phase 1 and combined phase 2 and phase 3. Independent Sample T-Test was conducted to determine such results. Since the t-value=1.76, which is less than the critical value of 2.06, the researchers do not reject the null hypothesis. Hence, there are no significant differences on the blood donations between phase 1 and combined phase 2 and 3.

3.4.   Discussion

The demand for safe blood is an essential component for treatment and public health. Every day, it saves millions of lives and enhance the health and quality of life of many people. The COVID-19 pandemic had the blood banks throughout the world require the assistance of blood donors to satisfy the demands of patient treatment. In this study, only five out of 19 hospitals in Quezon City agreed to participate in our study. In a news article written by Mendoza (2020), he reported that Nurses United national president, Maristela Abenojar, revealed that some medical facilities had reduced the quarantine time for exposed medical personnel to five or seven days instead of the Department of Health's recommended 14 days. She said that nurses and other medical personnel were weary from working long hours. This might be a reason some of the hospitals were not able to participate in our study. Furthermore, there was a surge of COVID-19 cases in the National Capital Region (NCR) when the researchers started data gathering. Leopoldo Vega, DOH Undersecretary, said in a Zoom meeting that isolation beds, ward beds, and critical care units (ICUs) are in great demand in Makati, Quezon, Taguig, and Manila. He added that the NCR and the provinces of Laguna, Bulacan, and Cavite account for around 53% of new COVID-19 cases (Cruz, 2021). In terms of the protocol dealt, blood transfusion services are issuing donation appointments through phone call to encourage them to come forward in blood collection centers and or mobile collection facilities based on their convenience and to ensure social distancing (Sahu et al., 2020). Similarly, the Philippines also have this protocol in accordance with DOH. The Department of Health implemented guidelines in which all donors should issue an authorization pass for qualification (Department Memorandum No. 2020-0124, 2020).

In a similar research of Sharma et al. (2021), it showed that the number of blood donations decreased from 2019 to 2020 with major decline in months of April and May 2020. In table 4.2.1, it showed that phase 2 (March 2020-May 2020) had the least number of blood donations and in table 4.3.1, it had a decrease of 69.33% when compared to phase 1. These months were mostly under the Enhance Community Quarantine and people were prevented from going out as a means of preventing the transmission of COVID-19. (Inter-Agency Task Force for the Management of Emerging Infectious Diseases Resolution No. 37, 2020). However, their study also included mobile donation drives such as blood donation camps in contrast with this research which only gathered blood donations that were done in hospitals. Other studies also found out that there was a decrease in blood donations during the early stage of the pandemic. A study from Zhejiang, China found out that the

majority of their respondents (81.2%) were concerned about the possibility of contracting COVID-19 during blood donation. This accounts for the decrease of donor attendance which also leads to the decrease of blood donations. There was also a decrease of 10–30% donor attendance in the state of Washington, USA during the first two weeks of the COVID-19 pandemic. (Pagano et al., 2020).

Despite having a decrease in the blood donation in phase 2, the study revealed that there were no significant changes between the three phases of the study. A similar study by Gupta et al. (2021) stated that during the lockdown, from 25 March 2020 with controlled opening that started 1 June 2020, the overall number of blood donations fell, although the difference was not statistically significant. Furthermore, the utilization of blood in their study showed that it was compensated by a decrease and/or postponement of elective surgeries and medical treatments.

Blood donation in phase 3 of the study increased by 132.05%. A probable reason for this increase may be the declaration of GCQ in NCR. (Inter-Agency Task Force Resolution No. 40, 2020) Furthermore, with the World Blood Donor Day celebrated globally every 14th of June, Department of Health authorities, led by Undersecretary Dr. Maria Rosario Singh-Vergeire encourage blood donors during the pandemic. It had the theme of "Safe blood saves Lives" with the slogan " Give blood and make the world a better place." She revealed at the June 10 Beat COVID-19 Virtual Presser that research is presently being undertaken to evaluate if convalescent plasma is an effective therapy against the virus. (Department of Health, 2020; Philippine National Volunteer Service Coordinating Agency, 2020). Guidelines on acceptable blood donors, in line with COVID-19 precautions, were released during this period. With the ongoing commitment to fight COVID-19 pandemic, U.S. Food and Drug Administration published recommendations for immediate implementation today to meet the urgent and immediate demand for blood and blood components. Recommendations, such as adjusting the deferral period of certain donor eligibility requirements can be changed without harming the blood supply's safety. In addition, these recommendations will only be in effect for the length of the declared pandemic.

4.   Conclusion

The study conducted was all about the analysis of blood donation rates on different hospitals in Quezon City before and during the COVID-19 pandemic. The healthcare system was severely affected by the pandemic because of emerging cases of the virus and various quarantine protocols that restricted many services. Safe blood supply is challenged because of the effect of pandemic on society. This study focused on gathering the number of blood donations and comparing the rates from hospitals to assess the situation of blood availability in hospitals. The number of donations from five hospitals in Quezon city during and before the pandemic was collected. Number of blood donations were measured thus the researchers were able to determine the rates of blood donation and compare it to the three phases of the pandemic covered in the study.

In conclusion, it can be inferred that different quarantine protocols have an effect on the number of blood donations and are seen in most of the hospitals included in this paper. Even though there is an ongoing pandemic and strict quarantine protocols, it did not stop people from voluntarily donating their blood to help those in need since blood is an essential in saving lives. This paper shows the significance of blood donation during crucial times as blood stocks in hospitals should never run out. This could encourage even more voluntary donors to donate blood when they see the situation of blood stocks in hospitals.

5.   Recommendations

The study presented some issues which lead to limitations. With that, the study could be recommended for future researchers. Firstly, the study would recommend lengthening the duration of the whole study. The study also suggests increasing the budget for acquiring data due to the fact that other hospitals require higher payment for data. Another, future studies could increase the number of participants by expanding the area covered rather than a particular city. Quezon City would only cover a small sample size thus expanding the area covered would further give another conclusion. Finally, the study suggests for other studies to tackle more on the other factors of blood donors such as age group, sex, or even deferred patients. This will further give more conclusion to the study.

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