Junior and Senior Medical Technology students' willingness towards Blood donation during the COVID-19 pandemic

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Abstract: - A significant gap is seen between willingness to donate blood and the effect of the COVID-19 in blood donation. Individual's willingness to donate blood helps in providing adequate blood supply to patients who are suffering from various diseases especially during this time. The study determined the impact of the factors that influence the Junior and Senior Medical Technology students' willingness to perform blood donation and their willingness to donate blood during the COVID-19 pandemic. At least 292 Medical Technology students in the university who meet the inclusion requirements are invited to participate in the study on purpose. An online survey questionnaire through Google Forms was distributed among the respondents. Descriptive statistics, Pearson's correlation Beta coefficient, and a 95% confidence interval was utilized to statistically assess the responses. The results of the study showed that around 79% of respondents say they would be willing to donate blood during the pandemic. And the results also showed a significant relationship between the percentage of willingness to donate blood and the level of knowledge towards blood donation. Only two out of the six factors were considered significant namely altruism & social responsibility, and access to health communication. In conclusion, the willingness to donate blood during the COVID-19 was significantly affected by the 2 specific factors: those being altruism and social responsibility, and access to health communication. It is recommended that the insignificant factors could play more important roles in another study in terms of affecting an individual's willingness to donate blood.

Key Words: — ***Medical Technology students, willingness, blood donation, COVID-19.***

I. INTRODUCTION

A. Background of the study

Blood supply shortage has been a long-term issue in the Philippines and this problem is getting worse especially now in our current situation with the COVID-19 pandemic. Despite the shortage and high demand in blood for transfusion purposes, only a few people are willing to donate their blood (Shah et al., 2011). One study from Roopadevi et al. (2017) suggests that the Blood donation practice is influenced by various factors like age, gender, education, socio-economic status, altruism, social responsibility, peer influence, access to health communication, knowledge about importance of blood donation, previous donations, influence of active blood donors. Donated blood is a very important component in managing different diseases. It is the main lifesaving procedure for an individual with loss of large volumes of blood caused by accidents, surgery, and hemorrhage (Enawgaw et al., 2019). Blood supply issues during the pandemic are very crucial since a lot of people who are suffering from blood related diseases are still in need. A huge number of individuals view blood donation as a possibility to contract the virus; however, there is no recorded COVID-19 transmission caused by blood transfusion, yet it is theoretically possible (Yuan et al., 2020). In addition, people's perception of blood donation during the pandemic is affecting the number of blood donors and it will continue to decrease due to the risk of possibly contracting the virus.

B. Objectives of the Study

People have different knowledge and perceptions on blood donation. In line with the previous statement, the study utilized different variables to determine the variations in reasons on why people may or may not participate in blood donation. The variables include education and socio-economic status, altruism and social responsibility, peer influence and experience, access to health communication,

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medical factors and personal/psychological factors. With this, the study aims to sufficiently answer the following specific objectives:

- Determine the demographic profile of the respondents.
- Determine the percentage of willingness of the respondents in blood donation.
- Determine the level of knowledge of the respondents to blood donation.
- Determine the factors that influence the respondents' willingness to perform blood donation.
- Determine the relationship between the percentage of willingness and the level of knowledge of the respondents towards blood donation.
- Determine the relationship between the factors that influence the respondents' willingness to perform blood donation and the respondents' willingness to donate blood during the COVID-19 pandemic.

C. Hypotheses of the Study

The study hypothesized the follow:

- There is a significant relationship between the percentage of willingness and the level of knowledge of the respondents to blood donation.
- There is a significant relationship between the factors that influence the respondents' willingness to perform blood donation and the respondents' willingness to donate blood during the COVID-19 pandemic.

D. Research Impediments (Limitations of the Study)

The participation of at least 292 students from 3rd and 4th year level enrolled in the B.S. Medical Technology program of the Pontifical and Royal University of the Philippines during the A.Y. of 2020-2021 was through the use of surveys without bias with regards to courses nor year level. The participation of at least 292 students from 3rd and 4th year level enrolled in the B.S. Medical Technology program was done through the use of surveys to avoid biases with regards to courses or year level. Preferably, the survey was done while the pandemic is still on-going in order to secure the authenticity of the results. Due to the pandemic and stay at home order given by the Philippine government, the surveys were performed through the use of online means (Google Forms) which took the respondents 10 minutes to answer. This was done one month after the pandemic had ceased at most, in order to get a more valid amount of data from the respondents.

E. Significance of the Study

The study holds significance as it aims to promote blood donation because there is insufficient supply of blood especially during pandemic. The promotion of blood donation will save a lot of lives, as the supply of blood needs to be replenished in order to prevent shortage for patients who are in need of blood transfusion, regardless whether or not they are COVID-19 patients. This study will give the students better knowledge on the risks of blood donation during the pandemic period. This is especially in the case of Faculty of Pharmacy students from the Pontifical and Royal University of the Philippines, as they are given insight to the process of blood transfusion in their early years. This study will also serve as an acquisition of learning skills and knowledge for future employment in the medical field and encourage the students to have an active role in the country's society. This study will help improve the information and knowledge of the faculty on the risks of blood donation and safety protocols to be followed during pandemic. This will serve as new knowledge to be taught to medical students who will later be involved in the work area and guide them on how to deal with the situation of blood donation in times of pandemic. This study will help the administration to better educate the students and faculty on blood donation and on COVID-19's risks, transmission and effects. This will be beneficial for them to have updated information for the students to study and for faculty to teach. It will also be helpful in implementing new rules for the school community regarding the safety and benefits of blood donation to the community especially during times of pandemic.

F. Conceptual Framework

The study utilized the theory of reasoned action. This study assessed the different variables that influence an individual's willingness to donate blood that causes the different perceptions they have on blood donation and the current conditions they have which are hindering them from donating blood. Each individual has a different view on blood donation as a process therefore, they will have different levels of willingness to donate. The variables are levels of knowledge, education and socio-economic status, altruism and social responsibility, peer influence and experience, access to health communication, and medical factors and personal/psychological factors.

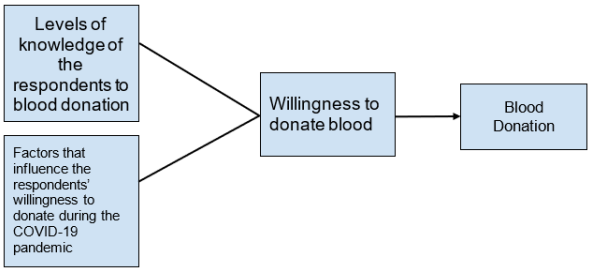

Fig.1. Diagram of Theory of Reasoned Action

The theory of Reasoned Action in which the study used explains that even though an act has a good intention, people do not favor it because of different factors like attitude and/or subjective norm. According to Schifter and Ajzen (1985) people are forming different beliefs about consequences of actions and behavior because of their different experiences and beliefs. These beliefs lead to attitudes and subjective norms which lead to the identification of the intention and behavior. Knowing and tracing these leads to better understanding of behavior and how they influence the behavior. This theory helped the study to establish the factors affecting blood donation.

G. Definition of Terms

- *Altruism.* This refers to an act of selfless blood donation which benefits the others without expecting anything in return.
- *Asymptomatic individuals.* This refers to individuals that are infected but show no symptoms.
- *Blood donation.* This refers to an act of giving blood.
- *Blood transfusion.* This refers to the procedure of transferring blood to a person.
- *Blood donor.* This refers to a person who donates blood.
- *Blood safety.* This refers to the quality of blood to be transfused.
- *Blood supply.* This refers to the supply storage of blood to be transfused.
- *COVID-19.* This refers to the novel coronavirus that affects blood donation worldwide.
- *Donated blood.* This refers to the blood to be transfused given by a donor.
- *Healthcare system.* This refers to the health system of a country in charge of taking care of the COVID-19.
- *HIV/AIDS.* This refers to a deadly virus that can be transmitted through blood transfusion.
- *Quarantine.* This refers to the safety protocol of staying at home to minimize the risk of transmission of COVID-19.
- *Pandemic.* This refers to the state wherein the whole world is affected by the COVID-19.
- *Perception.* This refers to the people's subjective view on blood donation during the COVID-19 pandemic.
- *Pre-pandemic state.* This refers to the time before COVID-19 prevailed in the world.
- *Social distancing.* This refers to the safe distance protocol implemented to minimize the risk of acquiring COVID-19 during the pandemic period.
- *Stigma.* This refers to the people's discrimination on blood donation during the COVID-19 pandemic.
- *Volunteers.* This refers to the people who willingly donated blood.

II. METHODOLOGY

A. Research Design

This study utilized a descriptive analytical research design. According to the study of Loeb, Dynarski, McFarland, Morris, Reardon and Reber et al. (2017) a descriptive analytical design aims to answer a specific question. They also stated that it is used to describe trends and variation in different populations and also the effects of a certain event. This design was used to determine the effect of level of knowledge on willingness to donate blood and the effect of different factors that influence the respondents' willingness to perform blood donation on the respondents' willingness to donate blood during the COVID-19 pandemic. As mentioned in prior chapters, the study will determine different variables that have an impact on a person's willingness to donate blood.

B. Research Participants

The data that were obtained was gathered through the use of a survey from given to the selected students through purposive sampling. Purposive sampling involves the intentional selection of the target participants that will participate in the study. The respondents who were selected are members of the population who are qualified based on the inclusion criteria set by the study and participated of one's own volition, through an informed consent form prior to answering. The respondents who participated in the study are Medical Technology students of at least 18 years of age from the Pontifical and Royal University of the Philippines. The

study excluded and did not cover the students who are below 18 years of age, who are not enrolled in the Medical Technology program at the Pontifical and Royal University of the Philippines, and those who are not enrolled as 3rd and 4th year students in the said program during the A.Y. of 2020-2021. The study made use of the Raosoft® sample size calculator in formulating the recommended sample size needed. The survey was conducted to students from third and fourth year with a total of at least 292 students from the total population of 1671 students over the course of at least one month (April 2021). The total population was obtained by contacting the faculty's secretary. The respondents were able to answer the survey questionnaire through the use of Google Form, due to the limitations set by the COVID-19 pandemic. In addition, online surveys offered the best convenience for the study and the respondents during the pandemic.

C. Research Tool

The data instrument that was employed by the study is an online survey questionnaire that used a true or false test type of questions about blood donation, adapted from the study of Suen et al. (2019) to assess a respondent's knowledge regarding blood donation, and another series of questions which are to be answered using the Likert scale adapted from the study of Wang et al. (2020) to assess how the factors influenced their willingness to participate in blood donation during the COVID-19 pandemic. The questionnaire includes the variables specifically education and socio-economic status, altruism and social responsibility, peer influence and previous donations, access to health communication, medical factors, and personal/psychological factors; these variables are essential for data gathering required by the study. Each variable was allotted with two to four questions. Before distributing the questionnaires, a sample questionnaire was first submitted to the Ethics Review Committee for validation. The reliability of the survey questionnaire was checked through Cronbach's alpha, the survey questionnaire obtained a score of 0.922.

The first part of the questionnaire includes an informed consent form that requires the respondent to submit their student number, and the student email provided by their university prior to proceeding with the socio-demographic questions. This is to validate that the participant is indeed a current student at the university. Their names, age, sex, and year level will be asked from the respondents. Under the socio-demographic data are questions asking if the respondent had participated in a previously conducted blood donation drive and the times they participated. The willingness to donate during this time of pandemic was also included.

The second part of the questionnaire was adapted from the study of Suen et al. (2019). This contained true or false questions about blood donation that assess the level of knowledge of the respondents regarding blood donation. The respondents were required to have at least 70% of correct answers to pass, in accordance with the curriculum of the Faculty of Pharmacy. Based on the number of correct answers they got, their levels of knowledge are then categorized by the following: 10 correct answers - Excellent knowledge on blood donation; 7 to 9 correct answers - Sufficient knowledge on blood donation; 4 to 6 correct answers - Minimal knowledge on blood donation; and 0 to 3 correct answers - Lacks knowledge on blood donation.

The third part of the questionnaire was adapted from the study of Wang et al. (2020). This contained questions that are directly related to the variables to completely assess the respondent's perception on blood donation during the COVID-19 pandemic. The first variable, education, and socio-economic status assessed the respondent's knowledge, ability, and socioeconomic capacity to be involved in blood donation drives. The second variable which is altruism and social responsibility tackled the respondent's willingness to be a blood donor because of blood shortages, and because of an act of selflessness. The third variable assessed the respondent's peer influence and previous donations. This variable identifies the respondent's perception if they are motivated or hindered because they are swayed by others, or due to any past experiences with donating blood. The fourth variable identified the respondent's access to health communication. The fifth and last variable are the medical factors and personal/psychological factors.

The last variable assessed the respondent's possible reasons not to partake in donating blood that may be due to medical factors such as present diseases, or personal/psychological factors that include the fear of infection, avoidance of public places, and religious beliefs. A pilot testing was conducted to measure the reliability of the tool.

D. Data Gathering Procedure

The study secured an ethical clearance from the Research Ethics Committee prior to conducting the study. The collection of data for the study commenced right after securing the ethical clearance and had a duration of one month. Prior to conducting the survey, the study organized a

pilot testing to determine the reliability of the survey questionnaire.

The study gathered 303 students who are qualified to take part in the study based on the criteria required. The student should be at least 18 years old, and a 3rd or 4th year student currently enrolled in Bachelor of Science in Medical Technology program in the University. The study obtained respondents by contacting the presidents of each section. The class presidents were informed about the online survey questionnaire. The link for the Google forms was given to them as they were expected to disseminate it to their respective blockmates. Before answering any of the survey questions, a consent form was required to be filled out including the respondent's student number and university-provided email. The consent form mentioned the different data which will be collected from the respondents and how the study will be conducted.

Respondents were informed about the study protocol, benefits, risk, and significance of the study and then they were asked to answer the consent form whether or not they are willing to participate in the survey and are allowed to withdraw at any time they feel necessary. With all things considered, the study ensured that confidentiality will be maintained throughout the course of the study. The study started to examine the survey results using statistical procedures required as soon as all responses are gathered, and sufficient data is obtained from the respondents.

E. Ethical Considerations

The study requested for an approval from the Ethics Review Committee before proceeding and conducting the study. The study had proper consent from the respondents before participating and that they are free to withdraw their responses at any time.

For the selection of respondents, it was ensured that the respondents were treated fairly without one-sided judgment. It was also guaranteed that the identity of the respondents will be kept anonymous, and their personal information will be highly confidential as well. The name of the respondents was only kept optional to avoid biased opinions. The conducted survey was only used to evaluate the factors applicable to the study. All of the gathered data was kept highly confidential, and the privacy of respondents was of utmost concern, this is in accordance with Republic Act 10173 or the Data Privacy Act of 2012 and was also stated in the consent form.

The results obtained from the data were not disclosed to any unknown entity aside from the researchers. The main agenda of this research is to reduce negative perceptions of students on blood donations. The study does not intend to force anyone to donate their blood but only to possibly change their outlook on blood donation. Maintaining the confidentiality of the information gathered from the respondents and all of the data gathered from the results is also a responsibility of the study. Alteration and manipulation of the results to satisfy the desired results was not done under any circumstance and remained as an important objective in the duration of the study. The study did not condone the offering of monetary compensation to respondents who are willing to fabricate their answers to satisfy the results needed by the study.

F. Data Analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) was used in the participant response analysis. Pearson's correlation was utilized to determine the accuracy of a given relationship towards the collected values of the respondents, whether there is a significant relationship between the factors that influence the respondents' willingness donate blood and willingness of the respondents to donate blood during the COVID-19 pandemic, and percentage of willingness and level of knowledge of the respondents towards blood donation.

Pearson's correlation is a measure of the degree to which two quantitative variables, whether ratio or interval, coincide with one another, proving the extent to which two variables are linearly related which can be concurred when changes in one variable equate to changes in the other. Beta coefficient was calculated in order to establish the relationship between the independent variable towards the dependent variable. In order to determine if the relationship between variables is significant, a 95% confidence interval was utilized.

III. RESULTS AND DISCUSSION

A. Demographic Profile

Table 1 displays the age, biological sex and year level of the respondents using frequency and percentage. The majority of the respondents are female (70.3%), ages 21 years old (60.7%) and are 3rd year Medical Technology students (86.8%).

Table.1. Demographic profile of the Respondents

Age	f	%	Sex	f	%	Year level	f	%
19	5	1.7	Male	88	29.0	3rd year	263	86.8
20	69	22.8	Female	213	70.3	4th year	40	13.2
21	184	60.7	Prefer not to say	2	0.7	Total	303	100.0
22	38	12.5	Total	303	100.0			
23	7	2.3						
Total	303	100.0						

B. Percentage of willingness

Table 2 displays the percentage of willingness of the respondents towards blood donation. The majority of the respondents (79.2%) said Yes, who are willing to donate blood during the pandemic. While 20.8% of the respondents said No, who are not willing to donate blood during the COVID-19 pandemic.

Table.2. Percentage of willingness of the respondents to blood donation

	f	%
Yes	240	79.2
No	63	20.8
Total	303	100.0

C. Level of Knowledge

Table 3 displays the respondent's level of knowledge regarding blood donation. Through obtaining a standard deviation of 0.90667 and a mean of 8.9505, the results obtained from respondents indicate that the majority of them have "Sufficient knowledge on Blood Banking practices" since the computed data falls under the criteria of 7-9/10.

Table.3. Level of knowledge of the Respondents to blood donation

	Mean	Standard Deviation	Interpretation
Knowledge	8.9505	0.90667	Sufficient knowledge on Blood Banking practices

Criteria of Scores: Respondents require at least a 70% of correct answers to pass, in accordance with the curriculum of the Faculty of Pharmacy. 10/10: Excellent knowledge on Blood Banking practices; 7-9/10: Sufficient knowledge on Blood Banking practices; 4-6/10: Minimal knowledge on Blood Banking practices; 0-3/10: Lacks knowledge on Blood Banking practices.

D. Factors that influence the respondents' willingness to perform blood donation during the COVID-19 pandemic

Table 4.1 displays the questions that measure the effect of education and socio-economic status on the respondents' willingness to perform blood donation during the COVID-19 Pandemic. The respondents' willingness to perform blood donation is affected by education and socio-economic status (x=2.88).

Table.4.1. Education and Socio-Economic status

	Mean	SD	Interpretation
I don't donate blood because I don't know much about it.	1.2508	0.47079	Strongly Disagree
I know the process and significance of blood donation.	3.7756	0.48398	Strongly Agree
Total	2.8845	0.35916	Agree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

Table 4.2 displays the questions that measure the social responsibility of respondents regarding the donation of blood. As shown in the mean of the total responses of the associated questions regarding this factor, it is shown that altruism and social responsibility are factors which strongly affect the respondents' willingness to donate blood (x=3.64).

Table.4.2. Altruism and Social Responsibility

	Mean	**SD**	**Interpretation**
I feel the need to donate because of the ongoing blood supply shortages.	3.4125	0.72201	Strongly Agree
Blood donation is good because it contributes to research.	3.5050	0.61370	Strongly Agree
Blood donation is important because it will help a lot of people and it can save lives.	3.9340	0.24870	Strongly Agree
Total	3.6403	0.48756	Strongly Agree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

Table 4.3 displays the questions that measure the effect of peer influence and previous donations to the respondents' willingness to perform blood donation during the COVID-19 Pandemic. The respondents' willingness to perform blood donation is not affected by peer influence and previous donations (x=2.14).

Table.4.3. Peer influence and previous donations

	Mean	**SD**	**Interpretation**
I feel confident about donating blood because I have donated in the past.			
My family and friends do not support me nor anyone else from going out to donate blood.	1.5710	0.81424	Strongly Disagree
My family and friends want me to participate in blood donation.	2.7888	0.86216	Agree
Total	2.1419	0.56056	Disagree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

Table 4.4 displays the questions that measure the respondent's access to health communication. The respondents' sufficient access to health communication strongly affected their willingness to donate blood (x=3.81).

Table.4.4. Access to health communication

	Mean	**SD**	**Interpretation**
Public health information about blood donation is very important	3.9340	0.28587	Strongly Agree
I am given a healthy amount of time to discuss blood donation in public health	3.2937	0.77813	Strongly Agree
Total	3.8053	0.39664	Strongly Agree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

Table 4.5 displays the questions that measure the influence of medical factors to the respondent's willingness to perform blood donation during the COVID-19 Pandemic. The respondent's current conditions do not affect their willingness to donate blood (x=2.08).

Table 4.5. Medical factors

	Mean	SD	Interpretation
I cannot donate blood because of predisposing health conditions that disqualify me in becoming a potential blood donor.	1.8647	1.08794	Disagree
I am afraid to go to blood donation facilities because I have a weak immune system which puts me at risk of acquiring COVID-19.	1.8977	0.88368	Disagree
Total	2.0792	0.88419	Disagree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

Table 4.6 displays the questions that measure the influence of personal or psychological factors to the respondent's willingness to perform blood donation during the COVID-19 Pandemic. The respondent's religious beliefs do not affect their willingness to donate blood. In addition, the respondents want to avoid public places, but they do not fear the possibility of being infected with COVID-19 or life-threatening blood diseases during blood donation (x=1.95).

Table.4.6. Personal/Psychological factors

	Mean	SD	Interpretation
My religion prohibits us to donate blood or even attend a blood donation drive.	1.0330	0.17894	Strongly Disagree
I cannot donate blood due to religious reasons.	1.0330	0.17894	Strongly Disagree
I am not comfortable going to public places because of COVID-19.	3.0363	0.92536	Agree
I do not want to donate blood because I want to avoid public places as much as possible.	2.4488	0.98827	Disagree
I feel anxious about the possible side effects I will get after blood donation.	1.5908	0.76178	Strongly Disagree
I feel like blood donation can cause dangerous/life-threatening blood-related infections.	1.5248	0.72231	Strongly Disagree
I am afraid to participate in blood donation drives especially with the on-going threat of	2.4983	1.01927	Disagree

contracting COVID-19.			
I am afraid to participate in blood donation because of the fear of acquiring COVID-19 through the equipment/apparatus used during blood donation.	2.0297	0.98454	Disagree
Total	1.9505	0.56456	Disagree

Interpretation:

1-1.75 - Strongly Disagree; 1.76-2.5 - Disagree; 2.51-3.25 - Agree; 3.26-4 - Strongly Agree

E. Relationship between the percentage of willingness and the level of knowledge to donate blood

As shown in tables 5.1 and 5.2, the tabulated data regarding the willingness of the respondents and their corresponding scores were evaluated through the use of the Pearson correlation coefficient, and a 95% confidence interval. The Pearson correlation coefficient is used to determine how strong the linear relationship between the two variables is. In table 5.2, it is shown that there is a strong correlation between the scores of the respondents and their willingness to donate. The P-value obtained between the two factors (P= 0.000) indicates that the relationship is significant, when a 95% confidence interval is utilized (as ideally, the P-value should be <0.05).

Table.5.1. Distribution of knowledge in relation to the respondents' willingness to donate blood

		Knowledge					**Total**
		6.00	**7.00**	**8.00**	**9.00**	**10.00**	
Willingness	No	1	4	12	26	20	63
	Yes	2	13	51	103	71	240
Total		3	17	63	129	91	303

Table.5.2. Correlation table between knowledge on blood donation and willingness to donate blood

Pearson r	**P-value**	**Significance**
0.964	0.000	Significant

F. Relationship between the factors and the respondents' willingness to donate blood during the COVID-19 pandemic

As shown in table 6, the only factors considered significant in donating blood during the COVID-19 pandemic are altruism and social responsibility, as well as access to health communication.

This is due to both factors yielding a P-value below 0.05 (0.046 and 0.049 respectively), when utilizing a 95% confidence interval. Beta coefficient is another value evaluated, wherein it determines the extent of effect in a dependent variable due to a one unit change of the independent variable.

As shown in the table, the same significant factors also possessed the highest beta coefficient among the six. However, it should be noted that the presence of a value not equal to 0.000 indicates that all six factors have a relationship with the respondents' willingness to donate blood.

Table.6. Evaluation of the relationship between the factors that influence the respondents' willingness to perform blood donation and the respondents' willingness to donate blood during the COVID-19 pandemic based on significance and beta coefficient

	Mean	**SD**	**Beta**	**P-value**	**Significance**
Education and socio economic status	2.8845	0.35916	0.025	0.703	Not significant

Altruism and social responsibility	3.6403	0.48756	0.101	0.046	Significant
Peer influence and experience	2.1419	0.56056	0.044	0.303	Not significant
Access to health communication	3.8053	0.39664	0.160	0.049	Significant
Medical factors	2.0792	0.88419	0.014	0.606	Not significant
Personal and psychological factors	1.9505	0.56456	0.026	0.551	Not significant

IV. Conclusion

A. Summary

The results show that there is a significant relationship between the percentage of willingness and the level of knowledge of the respondents to blood donation as the majority of the respondents showed a high score when tested about their knowledge on blood donation. The respondents' willingness to donate blood during the COVID-19 pandemic was affected by the 2 specific factors: first is altruism and social responsibility, and the second is access to health communication. While these factors have the greatest impact on an individual's willingness to donate blood, it is important to note that the levels of altruism and sense of social responsibility can change depending on the situation. These significant factors also mean that the respondents' willingness to donate blood during the COVID-19 pandemic is impacted by access to health communication and a sense of social responsibility. Therefore, there is a significant relationship between the factors that influence the respondents' willingness to perform blood donation and the willingness of the respondents to donate blood during the COVID-19 pandemic.

B. Conclusion

Blood donation is very important especially during the time of pandemic and it is important to determine what affects the number of blood donors that contribute to the blood supply. Knowledge is a very important factor that affects the respondent's willingness to donate blood. The results showed that there is a significant relationship between knowledge on blood donation and willingness to donate, and the data also indicate that the majority of the students are knowledgeable about blood donation. The other factors that affect blood donation are altruism and social responsibility and access to health communication. Wherein the study showed that there is a significant relationship between these 2 factors and the respondent's willingness to donate blood. It should be noted that due to the COVID-19 pandemic, the study was unable to meet with any potential respondents face-to-face. Succeeding studies with a similar subject being covered should attempt to add more of a hands-on psychological approach towards data gathering, such as in-depth interviews or focus group discussions. Increasing the sample size of the respondents would be highly recommended for future researchers to work on for further improvement of the study. Through improving the sample size, this would yield more accurate, and more generalized results.

References

[1]. Anwer, M., Ul Fawwad, S., Anwer, S., & Ali, A. (2016). Attitude toward blood donation among medical and nonmedical students across Karachi. *Asian Journal of Transfusion Science*, *10*(2), 113–117.

[2]. Asamoah-Akuoko, L., Hassall, O. W., Bates, I., & Ullum, H. (2017). Blood donors' perceptions, motivators and deterrents in Sub-Saharan Africa - a scoping review of evidence. *British journal of haematology*, *177*(6), 864–877.

[3]. Baig, M., Habib, H., H Haji, A., T Alsharief, F., M Noor, A., & G Makki, R. (2013). Knowledge, Misconceptions and Motivations towards Blood Donation among University Students in KSA. *Pakistan journal of medical sciences*, *29*(6), 1295–1299.

[4]. Bednall, T. C., & Bove, L. L. (2011). Donating Blood: A Meta-Analytic Review of Self-Reported Motivators and Deterrents. *Transfusion Medicine Reviews*, *25*(4), 317–334.

[5]. Beyerlein, K. (2016). The Effect of Religion on Blood Donation in the United States. *Sociology of Religion*, *77*(4), 408–435.

[6]. Bhopal, R. S., Mcewan, R. T., Madhok, R. & Mccallum A. (2007). Perceptions about blood donation, transfusion and the risk of HIV infection: implications for the blood transfusion service. *AIDS Care*, *4*(1), 43-52.

[7]. Cai, X., Ren, M., Chen, F., Li, L., Lei, H., & Wang, X. (2020). Blood transfusion during the COVID-19 outbreak. Retrieved October 04, 2020.

[8]. Carver, A., Chell, K., Davison, T. E., & Masser, B. M. (2018). What motivates men to donate blood? A systematic review of the evidence. *Vox Sanguinis*, *113*(3), 205–219.

[9]. Desai KN, Satapara V. A study on knowledge, attitude, and practice on blood donation among health professional students in Anand: Gujarat. J Appl Hematol 2014 [cited 2021 Jun 7]; 5:51-3.

[10]. Duboz, P., & Cunéo, B. (2009). Influence de l'appartenance à une catégorie socioprofessionnelle sur la pratique du don de sang [Impact of socioeconomic status on blood donation]. *Transfusion clinique et biologique: journal de la Societe francaise de transfusion sanguine*, *16*(4), 371–378.

[11]. El-Hamamy E, Newman DS. (2014). Jehovah's Witnesses and Those Who Refuse Blood Transfusion. Retrieved November 12, 2020.

[12]. Enawgaw, Bamlaku; Yalew, Aregawi; Shiferaw, Elias (2019). Blood donors' knowledge and attitude towards blood donation at North Gondar district blood bank, Northwest Ethiopia: a cross-sectional study. *BMC Research Notes*, *12*(1), 729.

[13]. Evans, R., & Ferguson, E. (2014). Defining and measuring blood donor altruism: a theoretical approach from biology, economics and psychology. *Vox Sanguinis*, *106*(2), 118–126.

[14]. Ferguson, E., & Lawrence, C. (2016). Blood donation and altruism: the mechanisms of altruism approach. *ISBT Science Series*, *11*(S1), 148-157.

[15]. France, C. R., France J. L., Kowalsky, J.M. (2009) Education in donation coping strategies encourages individuals to give blood: further evaluation of a donor recruitment brochure.

[16]. Glynn, S., Kleinman, S., Schreiber, G., Zuck, T., McCombs, S., Bethel, J., Garratty, G., & Williams, A. (2002). Motivations to donate blood: demographic comparisons.

[17]. Huis in 't Veld, E. M. J., de Kort, W. L. A. M., & Merz, E.-M. (2019). Determinants of blood donation willingness in the European Union: a cross-country perspective on perceived transfusion safety, concerns, and incentives. *Transfusion*, *59*(4), 1273–1282.

[18]. Jaafar, J. R., Chong, S. T., Alavi, K. & Kam, W. (2017). Experience and Coping Strategy Based on the Theory of Planned Behavior among Young Blood Donors. *Akademika*, *90*(2), 17-26. Retrieved October 9, 2020.

[19]. Jaafar, J., Chong, S., & Alavi, K. (2017). EXPERIENCE AS FACTORS ASSOCIATED WITH REPEAT BLOOD DONATION AMONG UNIVERSITY STUDENTS IN MALAYSIA. *Southeast Asian J Trop Med Public Health*, *48*(5), 1118–1126.

[20]. Khatun R, Otaibi BW, Ssentongo A, Hazelton JP, Cooper A. (2021) Medical Student Attitudes Toward Blood Donation in Times of Increased Need. *The American Surgeon*. April 2021.

[21]. Kostoff, R., Briggs, M., Porter, A., Aschner, M., Spandidos, D., Tsatsakis, A. (2020). [Editorial] COVID-19: Post-lockdown guidelines. *International Journal of Molecular Medicine*, *46*(2), 463-466.

[22]. Kwon, S., Kim, E., Jung, Y. S., Jang, J. S., & Cho, N. (2020). Post-donation COVID-19 identification in blood donors. *Vox Sanguinis*, *115*(8), 601-602.

[23]. Leung, J., & Lee, C. (2020). Impact of the COVID-19 – a regional blood centre's perspective. *ISBT Science Series (2020)*, *15*(4), 362-364.

[24]. Loeb, S., Dynarski, S., McFarland, D., Morris, P., Reardon, S., & Reber, S. (2017, February 28). Descriptive Analysis in Education: A Guide for Researchers. NCEE 2017-4023. National Center for Education Evaluation and Regional Assistance.

[25]. Márquez-Melgarejo, A., Pérez-Chávez, F., Cázares-Tamez, R., Díaz-Olachea, C.G. (2015). Attitude, knowledge and perception of the altruistic donation of blood in a city in Northeastern Mexico. *Medicina Universitaria*, *17*(66), 34-37, ISSN 1665-5796.

[26]. Masser BM, Hyde MK, Ferguson E. (2020). Exploring predictors of Australian community members' blood donation intentions and blood donation-related behavior during the COVID-19 pandemic. *Transfusion*. 2020 Dec; 60(12):2907-2917.

[27]. Misganaw, C., Tenkir, M., Deresea, A., Tesfaye, M., Teshome Tessema, T., & Taye, H. (2014). The Level and Associated Factors of Knowledge, Attitude and Practice of Blood Donation Among Health Science Students of Addis Ababa University. *International Journal of Medical and Health Sciences Research*, *1*(10), 105–118.

[28]. Ogundeji, S. P., Ajayi, O. D., Busari, O. E., Ogundeji, O. A., Adepoju, O. A., Esan, F. G. J. (2021). Knowledge, attitude, and perception towards voluntary blood donation among university students in Nigeria. *ISBT Science Series, 16*(1), 85–91.

[29]. Ou-Yang, J, Li, S-J, Bei, C, et al. (2020). Blood donor recruitment in Guangzhou, China, during the 2019 novel coronavirus (COVID-19) epidemic. *Transfusion, 2020*(60), 2597– 2610.

[30]. Papagiannis, D., et al. (2016). Blood donation knowledge and attitudes among undergraduate health science students: A cross-sectional study. *Transfusion and Apheresis Science, 54*(2), 303–308.

[31]. Parash, M. T. H., Suki, N. M., Shimmi, S. C., Hossain, A. B. M. T., & Murthy, K. D. (2020). Examining students' intention to perform voluntary blood donation using a theory of planned behaviour: A structural equation modelling approach. Transfusion Clinique et Biologique.

[32]. Pule, P. I., Rachaba, B., Magafu, M. & Habte, D. (2014). Factors Associated with Intention to Donate Blood: Sociodemographic and Past Experience Variables. *Journal of Blood Transfusion*.

[33]. Raghuwanshi, B. (2016). Voluntary blood donation among students - a cross-sectional study on knowledge and practice vs. attitude. *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH, 10*(10), EC18 - EC22.

[34]. Raturi, M., & Kusum, A. (2020, April 25). The blood supply management amid the COVID-19 outbreak. Retrieved October 04, 2020.

[35]. Roopadevi V, Nanjaiah R, & Karinagannanavar A. (2017). A Descriptive Study on Factors Affecting Blood Donation among Young Adult Students. *Natl J Community Med 2017, 8*(8), 487-491.

[36]. Sayedahmed, A., Ali, K., Ali, S., Ahmed, H., Shrif, F., & Ali, N. (2020). Coronavirus disease (COVID-19) and decrease in blood donation: *A cross-sectional study from Sudan. ISBT Science Series (2020), 15*(4), 381-385.

[37]. Sachdev, S., Mishra, S. K., Marwaha, N., & Avasthi, A. (2016). Study of knowledge and attitude among college-going students toward voluntary blood donation from north India. *Journal of Blood Medicine, 2016*, 19-26.

[38]. Sahu, K. K., Raturi, M., Siddiqui, A. D., & Cerny, J. (2020). "Because Every Drop Counts": Blood donation during the COVID-19 Pandemic. *Transfusion clinique et biologique: journal de la Societe francaise de transfusion sanguine, 27*(3), 105–108.

[39]. Schifter, D. E. & Ajzen, I. (1985). Intention, perceived control, and weight loss: An application of the theory of planned behavior. *Journal of Personality and Social Psychology, 49*(3), 843–851.

[40]. Shah, V., Patil, P., Sawant, D., Deokar, M., Puranik, G. V. (2011). A Study of Public Perception towards Blood Donation. *Bombay Hospital Journal, 53*(1), 34–37.

[41]. Smith, A., Matthews, R., & Fiddler, J. (2011). Blood Donation and Community: Exploring the Influence of Social Capital. *International Journal of Social Inquiry, 4*(1), 45–63.

[42]. Spekman, MLC, Ramondt, S, Quee, FA, et al. (2021). New blood donors in times of crisis: Increased donation willingness, particularly among people at high risk for attracting SARS-CoV-2. *Transfusion. 2021*; 1–8.

[43]. Standworth, S. J., New, H. V., Apelseth, T. O., Brunskill, S., Cardigan, R., & Doree, C. (2020). Effects of the COVID-19 pandemic on supply and use of blood for transfusion. Retrieved October 04, 2020.

[44]. Steele WR, Schreiber GB, Guiltinan A, Nass C, Glynn SA, Wright DJ, Kessler D, Schlumpf KS, Tu Y, Smith JW, Garratty G. (2008) Retrovirus Epidemiology Donor Study. role of altruistic behavior, empathetic concern, and social responsibility motivation in blood donation behavior. *Transfusion. 2008* Jan; 48(1):43-54.

[45]. Soriano, G. P. (2019). Factors Affecting Blood Donation among Experienced and Prospective Blood Donors in Manila, Philippines. *International Public Health Journal, 11*(2), 109-116. Retrieved October 09, 2020.

[46]. Suen LKP, Siu JY, Lee YM, et al. (2019). Knowledge level and motivation of Hong Kong young adults towards blood donation: a cross-sectional survey. *BMJ Open, 10*(1).

[47]. Tagny, C.T. et al. (2020). Trends in blood donations, blood donors' knowledge, practices and expectations during the COVID-19 pandemic in Cameroon. *Vox Sanguinis*.

[48]. Ugwu, N. I., Uneke, C. J., Ugwu, C. N., Oti, W., Agbo, U. N., & Akamike, I. C. (2020). Effect of Blood Donor Educational intervention on the knowledge and Attitude towards Voluntary Blood Donation among Medical Students at a Nigerian University. *Nigerian medical journal: journal of the Nigeria Medical Association, 61*(3), 163–168.

[49]. Wang, Y., Han, W., Pan, L., Wang, C., Liu, Y., Hu, W., Zheng, X. (2020). Impact of COVID-19 on blood centres in Zhejiang province China. *Vox Sanguinis (2020), 115*(6), 502-506.

[50]. Yuan, Z., Chen, D., Chen, X., & Wei, Y. (2020). Estimation of the number of blood donors during the COVID-19 incubation period across China and analysis of prevention and control measures for blood transfusion transmission. *TRANSFUSION*, *60*(8), 1778-1784.

[51]. Zucoloto, M. L., Bueno-Silva, C. C., Ribeiro-Pizzo, L. B., & Martinez, E. Z. (2020). Knowledge, attitude and practice of blood donation and the role of religious beliefs among health sciences undergraduate students. Transfusion and Apheresis Science, 102822.