

Knowledge, Attitudes, Motivations, and Inhibitory Influences regarding Blood Donation of Selected Filipinos Ages 18-65 years old in Metro Manila during the COVID-19 Pandemic

Kevin Carlo Ganas

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
kevincarlo.ganas.pharma@ust.edu.ph

Hannah Demate

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
hannah.demate.pharma@ust.edu.ph

Jose Carlo Domingo

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
josecarlo.domingo.pharma@ust.edu.ph

Jose Domingo Penetrante

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
josedomingo.penetrante.pharma@ust.edu.ph

Emmanuelle Alfonso Rendon

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
emmanuellealfonso.rendon.pharma@ust.edu.ph

Exequiel Sangco III

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
exequiel.sangco.pharma@ust.edu.ph

James Oliver Tiquia

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
jamesoliver.tiquia.pharma@ust.edu.ph

Diana Leah M. Mendoza, RMT, MLS (ASCPi)cm, MPH

University of Santo Tomas, Faculty of Pharmacy
España Blvd, Sampaloc, Manila, 1008 Metro Manila
dmmendoza@ust.edu.ph

ABSTRACT

A decrease in blood transfusion and blood donation occurred worldwide due to the COVID 19 pandemic. Specifically, the Philippines had a significant drop in blood donations in 2020, compared to 2019. Hence, the study was conducted since there is a limited number of related publications in Metro Manila regarding Filipino's knowledge, attitudes, motivations, and inhibitory influences towards blood donation during the COVID-19 pandemic. The study aimed to determine the knowledge, attitudes, motivations, and inhibitory influences of 18-65 years old eligible Filipinos residing in Metro Manila towards blood donation during the COVID-19 pandemic. The study utilized the quantitative cross-sectional descriptive research design that includes a survey to collect the necessary data for interpretation. Also, purposive sampling technique was performed to collect information from 385 participants that were deemed fit for the inclusion criteria. Out of 385 participants, majority had moderate knowledge (49.4%), and a more positive attitude (88.8%) towards blood donation. The participants agreed that donating blood to a family member/friend that is in dire need of blood was the main motivation. Meanwhile, exposing themselves and others to COVID-19 was the most agreeable inhibitory influence. The attitude and motivation were significantly associated with blood donation status, age, and educational attainment. Moreover, knowledge was only significantly associated with sex while the inhibitory influence was only significantly associated with blood donation status. Therefore, the study concluded that sex, blood donation status, age, and educational attainment have a significant relationship to the knowledge, attitudes, motivations, and inhibitory influences of Filipinos towards blood donation.

KEYWORDS: Attitude, Blood Donation, COVID-19, Knowledge, Motivation

1 INTRODUCTION

Blood provides numerous functions which are beneficial for the human body. These include transport of oxygen, regulation of temperature, and resistance against infection (IQWiG, 2006). Therefore, alterations in the blood volume will pose severe threats to an individual's health. Ever since blood circulation was discovered, experts from all over the world had since tried to carry out this procedure successfully, and it was not until almost 200 years later that the first successful blood transfusion between humans had occurred (American Red Cross, 2021). With the recent advancements in modern medicine and technology, blood donation has become essential in treating and preventing blood-related diseases and disorders. In fact, according to the Centers for Disease Control and Prevention, most patients that participate in blood transfusions rarely encounter adverse reactions or side effects. Thus, blood transfusion has been an integral part of saving lives with minimal risk.

Nonetheless, there are still factors that discourage people from donating blood. One of them is poor healthcare. According to the World Health Organization, 40% of globally donated blood comes from high-income countries, which is only home to 16% of the global population. In addition, the rate of blood donation is directly proportional to a country's income. This means that lower-income countries would have a more scarce amount of blood compared to higher-income countries. In the Philippines, the amount of blood units collected has slowly improved, but the target amount of blood units for 2014 and 2016 were still not met (Department of Health, 2017). In recent times, there was a 17% decrease in blood transfusion worldwide during the COVID 19 pandemic and an 11% decrease in blood donation due to lockdowns (Delabranche et al., 2021). As a result, some blood banks made adjustments to comply with the decreasing supply of blood. In Wang *et al.*(2021) study, blood bank centers of Zhejiang province in China postponed elective surgeries and enforced restrictive transfusion strategies. Moreover, mobile blood drives in donors' homes were the response of King Abdullah Hospital in Saudi Arabia to the blood shortage (Yahia, 2020). However in the Philippine setting, the Department of Health follows a different approach to address the decreasing blood supply during pandemic, they posted an article that encourages people to donate more blood since there was a decrease of 22.8% in the total blood collection during the COVID-19 pandemic (Department of Health, 2021). Moreover, Dr. Christie Nalupta, the head of the Philippine Red Cross National Blood Services, stated that the Philippines had a significant drop in blood donations in 2020, with 365,000 units compared to 516,000 units in 2019, a 29% reduction in donation (Lacsamana, 2021).

Correspondingly, the COVID-19 pandemic greatly affects the blood collection in the country. Blood drives, encouragement and promotions are some ways to improve the overall supply of blood in the country especially in Metro Manila which is the most densely populated area in the Philippines with a density of 21,765 persons per square kilometer, which is significantly higher compared to the national average of 363 persons per square kilometer in the country (PSA, 2021). However, Metro Manila ranks 13th out of the 17 regions in terms of the number of health facilities in the country. For these reasons, there is an extreme need for blood supply in Metro Manila since there is an inadequate amount of health facilities catering to a large population. Additionally, the study was conducted since there is a limited number of related publications in Metro Manila regarding the knowledge, attitudes, motivations, and inhibitory influences of Filipinos towards blood donation during the COVID-19 pandemic.

Therefore, the study aims to determine the knowledge, attitudes, motivations, and inhibitory influences of 18-65 years old eligible Filipinos who are residing in Metro Manila towards blood donation during COVID-19 pandemic. The outcomes of the study would also help further research in assessing the appropriate actions that should be taken based on the factors affecting potential

donors by providing accurate reliable data regarding the knowledge, attitudes, motivations, and inhibitory influences of Filipinos that are residing in Metro Manila.

2 RESULTS

Table 1 Summary of Knowledge Scores of People in Metro Manila during the COVID-19 Pandemic

Remarks	Knowledge Score Range	Frequency (n(%))
Low Knowledge	0-4	77 (20.0)
Moderate Knowledge	5-7	190 (49.4)
High Knowledge	8-10	118 (30.6)

Table 1 is the summary of the score of 385 participants wherein, 77 (20.0%) have low knowledge, 190 (49.4%) have moderate knowledge, and 118 (30.6%) have high knowledge towards blood donation during COVID-19 pandemic. The mean knowledge of the total participant is 6.319 ± 2.010 SD. Majority of the Filipino people of Metro Manila (49.4%) have moderate knowledge regarding blood donation.

Table 2 Summary of Attitudes Scores of People in Metro Manila during the COVID-19 Pandemic

Remarks	Attitudes Score Range	Frequency (n(%))
Less Positive Attitude	10-29	43 (11.2)
More Positive Attitude	30-50	342 (88.8)

Table 2 is the summary of scores of 385 participants wherein 43 (11.2%) have less positive attitude, and 342 (88.8%) have more positive attitude towards blood donation during COVID-19 pandemic. The mean attitudes of the total participants is 37.423 ± 8.787 SD. Most Filipinos in Metro Manila (88.8%) have a more positive attitude towards blood donation.

Table 3 Summary of Motivation Scores based on a weighted sum analysis of People in Metro Manila during the COVID-19 Pandemic

Motivational Factors	Scores
I am willing to donate blood during this pandemic	1,407
I am open to donate blood out of my sense of duty	1,429
I would be more willing to donate blood if there was no pandemic present	1,470
I would be more willing to donate blood if my family member/friend is in dire need of blood	1,698

I would be more willing to donate blood if donors were paid to do so	1,043
I would be more willing to donate blood if donors were given insurance from any nosocomial diseases that they may contract, especially on COVID-19	1,429
I would be more willing to donate blood if I knew that the country is in dire need of donors	1,544
I would donate blood if I would be given “ayuda” or financial assistance for the COVID-19 pandemic	1,021
I am generally amenable to receiving blood from someone who has a history of COVID-19	1,155
I believe that I am physically fit and mentally able to donate blood	1,471

Table 3 shows the summarized motivation scores of selected respondents in Metro Manila. The mean motivation score of the total participants is 35.499 ± 7.100 SD. Based on the gathered results of the study, the participants were most agreeable with the motivational factor of donating blood to a family member/friend that is in dire need of blood (1,698). Meanwhile, the participants were the least agreeable to the motivational factor of giving “ayuda” or financial assistance for the COVID-19 pandemic (1,021).

Table 4 Summary of Perceived Inhibitory Influences Scores based on a weighted sum analysis of People in Metro Manila during the COVID-19 Pandemic

Perceived Inhibitory Influences	Scores
I am not physically/mentally fit to donate blood	950
I am afraid of needles	850
I am afraid of medical personnels (eg. nurses, doctors)	615
I am afraid of blood or any operations that involve seeing /touching blood	813
I am afraid to expose myself and others to COVID-19 in the process of donating blood	1,209
I am afraid to donate blood considering the risks brought by the pandemic	1,129

I am afraid of making contact with potentially unvaccinated individuals in the process of donating blood	1,207
The lockdowns and the enforcement of social distancing makes me hesitate in donating blood	1,108
I am not able to donate blood as someone else is preventing/prohibiting me from doing so	749
I am currently physically/mentally impaired or disabled, and is thus preventing me from potentially donating blood especially during this pandemic	677

Table 4 shows the summarized scores of perceived inhibitory influences among selected respondents in Metro Manila. The mean inhibitory influence score of the total participants is 24.174 ± 6.877 SD. Based on the gathered results of the study, the participants were most agreeable to the inhibitory influence of exposing themselves and others to COVID-19 in the process of donating blood (1,209) as well as making contact with potentially unvaccinated individuals in the process of donating blood (1,207). On the other hand, the participants were the least agreeable to the inhibitory influence of being afraid of medical personnels (615). The participants’ most notable grounds of being inhibited to donate blood being their potential exposure to COVID-19 unvaccinated individuals as well as the COVID-19 virus itself would indicate the general fear caused by COVID-19, leading to people taking precautionary measures to avoid being infected by the virus.

Table 5 Test statistics of knowledge, attitude, inhibitory influence, and motivation scores with Sex using Mann-Whitney U Test

Variable	W	p-value
Knowledge	21487	0.0002
Attitude	17511	0.9797
Inhibitory Influence	19225	0.1119
Motivation	16374	0.2727

Table 5 shows the test statistics of knowledge, attitude, inhibitory influence, and motivation scores with Sex using Mann-Whitney U Test. This is performed to compare if there is a significant difference in the distribution of scores for knowledge, attitude, inhibitory influence and motivation for sex. And, it appears that only the knowledge scores were significant at 5% alpha. For attitude, inhibitory influence and motivation, there is insufficient evidence to conclude that the scores are significantly different between females and males.

With a similar shape of distribution in both groups; it can be concluded that at 5% level of significance, the median knowledge scores of females (7) and males (6) are statistically significantly different.

The mean knowledge score was 6.62 for the females compared to 5.84 for males. Meanwhile, the obtained attitude values were consistent with the findings of Shahshani et al. (2006), in which it revealed that females compared to males, had a slightly more positive attitude towards blood donation. However, Table 5 revealed that there is no significant relationship between the scores of

males and females in terms of attitude, motivation and inhibitory influences. This insignificance may suggest that there are no factors (due to culture, etc.) within biological sex that may cause a differing approach towards blood donation during the COVID-19 pandemic.

Table 6 Test statistics of knowledge, attitude, inhibitory influence, and motivation scores with blood donation status using Mann-Whitney U Test

Variable	W	p-value
Knowledge	10325	0.0758
Attitude	9647.5	0.0113
Inhibitory Influence	15531	< 0.0001
Motivation	9351.5	0.0041

Table 6 shows the test statistics of knowledge, attitude, inhibitory influence, and motivation scores with Blood Donation Status using the Mann-Whitney U Test. This is performed to compare if there is a significant difference in the distribution of scores for knowledge, attitude, inhibitory influence, and motivation for blood donation status. Moreover, only the knowledge scores were not significant at 5% alpha; thus, there is insufficient evidence to conclude that the scores for knowledge are significantly different for blood donation status.

Out of the four factors, only the knowledge scores were not significant at 5% alpha; thus, there is insufficient evidence to conclude that the scores for knowledge are significantly different for blood donation status.

For attitude scores with a similar shape of distribution in both groups; it can be concluded that at 5% level of significance, the median attitude scores for those who have donated blood (40) and those who have not donated blood (38) were statistically significantly different.

For inhibitory influence and motivation with a p-value less than 5% alpha, since the shapes of distribution for these scores were not similar in both groups, it can only be concluded that there is a significant difference between their scores for those who have donated blood compared to those who have not.

These findings are supported by a study conducted by Alfouzan (2014) as well as Aedh (2021) which revealed that people who had previously donated blood showed a higher attitude score than those that have not donated blood.

Table 7 Test Statistics of Knowledge, Attitude, Inhibitory Influence, and Motivation Scores with Age Groups using the Kruskal Wallis Test

Variable	Kruskal-Wallis Chi-Squared	df	p-value
Knowledge	4.3298	3	0.2280
Attitude	25.5920	3	<0.0001
Inhibitory Influence	0.8858	3	0.8288
Motivation	25.4210	3	<0.0001

Table 7 shows that a test statistic, specifically, Kruskal-Wallis test was used to compare the equality of distribution of knowledge, attitude, inhibitory influence, and motivation scores of the participants according to their age group. As for knowledge and inhibitory influence, there is insufficient evidence to conclude that the scores are significantly different among the age groups.

For attitude and motivation, since the p-value was less than 5% alpha but the shapes of the distribution are not similar in both groups, it can only be concluded that there is a significant difference among the groups for attitude and motivation. The mean attitude score for the age groups ranges from 26.8 to 38.9, while the mean motivation score for the age groups ranges from 31.4 to

36.6. Thus we conclude that the sample of people in Metro Manila during the COVID-19 pandemic grouped by age are non-identical populations.

Table 8 Test Statistics of Knowledge, Attitude, Inhibitory Influence, and Motivation Scores with Religion using Kruskal Wallis Test

Variable	Kruskal-Wallis Chi-Squared	df	p-value
Knowledge	3.6500	4	0.4554
Attitude	3.3828	4	0.4959
Inhibitory Influence	2.4921	4	0.6461
Motivation	7.3504	4	0.1185

Kruskal-Wallis test was used to compare the equality of distribution of knowledge, attitude, inhibitory influence, and motivation scores of the participants when grouped according to their educational attainment. None were significant at 5% alpha. There is insufficient evidence to conclude that the religious groups' knowledge, attitude, inhibitory influence, and motivation scores are significantly different.

In the study, religion is not a significant factor that affects the participants' knowledge, attitude, inhibitory influences, and motivation toward blood donation, in contrast to the Malaysian study, which found that religion was significantly associated with the attitude of the participants (Meiku et al., 2016). Another study in Saudi Arabia found that religion is a primary motivator for the local community to donate blood, with 71% of donors believing that blood donation is a religious obligation (Alfouzan, 2014). The disparity between studies may be due to the religion and culture of the said countries.

3 DISCUSSION

The study has determined the sociodemographic profile of selected Filipino blood donors in Metro Manila. Most are between the ages of 18-29; there were also more female respondents (61.6%); the majority of the respondents had achieved tertiary education (64.6); most of the respondents are Roman Catholics (77.9%), and most of the respondents had not donated blood before (80%). The data analysis led to the assessment of the perceived knowledge of the selected Filipino blood donors. The questions with the most incorrect answers were whether one could donate blood soon after getting a flu shot (52.5%), whether someone with tattoos and piercings can donate blood months after getting them (54%), and whether blood donated from someone who has had COVID-19 can transfer the virus (52.5). The two items mentioned above are among the most common myths regarding blood donation, and according to the data, these items are still not disproved for half of the selected blood donors. Regarding sex, females are generally more knowledgeable regarding blood donation than males. And as for history, regardless of whether the respondents had previous blood donation experience, their knowledge level is moderate. However, those who donated blood had a slightly higher knowledge score. True, if someone has had experience in blood donation, they understand the process and its system sufficiently. Regardless of age and educational attainment, on the other hand, the respondents have average knowledge scores. Regarding religious affiliations, those with none scored the lowest knowledge score, while the rest was moderate. No religious affiliations may be a factor in insufficient knowledge regarding blood donation; however, there were not enough respondents under this group that may prove this true. The knowledge score is in concordance with the previous study by Fauzi et al. (2019) and Melku et al. (2016). In the current study, good blood donation knowledge was a crucial component in blood donation, as more knowledgeable subjects tended to donate blood more than those with less knowledge, according to Alfouzan (2014) and Beyene (2020).

Next, the data analysis has led to assessing the attitudes of selected Filipino blood donors. According to the data gathered, most of the selected Filipino blood donors (88.8%) have a more positive attitude towards blood donation, which corresponds to other studies. Female respondents have a slightly more positive attitude than males—those who donated before also, because they may have fewer fears or concerns regarding the process. All age groups have a more positive attitude toward blood donation except for ages 54-65, the oldest age group. Regarding educational attainment, all levels had a positive attitude towards blood donation. However, there was a significant difference, and a noticeable decrease in positive attitude as the educational attainment improved. And all religious affiliates generally have a more positive attitude toward blood donation. The findings are similar to the study of Fauzi et al. (2019), Alfouzan (2014), and Meiku et al. (2016). Hence, in spite of the COVID-19 pandemic, blood donation remains to be a vital medical procedure that could support those who are in need of blood, given the positive disposition towards donating blood during the pandemic.

In succession, data analysis was done to assess the motivations affecting the blood donor's drive to donate blood during the pandemic. Association with a family member or friend who is in urgent need of blood is the driving force for the decision of some Filipino blood donors to donate, with a leading motivation score of 1,698. Although the male respondents had higher motivation scores than the female respondents, the difference between these two groups is insignificant. Regarding blood donation status, respondents who had donated blood before are more motivated to do the practice. Meanwhile, the youngest age group of 18-29 had the highest motivation, while the oldest age group of 54-65 had the lowest. There was a noticeable decrease in motivation to donate blood as the age of the respondents increased. Additionally, respondents who achieved secondary education had the highest motivation score, while those who received post-graduate education had the lowest. And regarding religion, the Roman Catholic respondents had the highest motivation score. However, scores were not significantly different among the religious groups.

The most notable factor of donating blood due to having a family member in need of blood, suggests a strong sense of altruism and the selfless motive in donating blood, which is further supported by the idea of receiving financial assistance or incentives being the least agreeable motivational factors, as these constitute a transactional approach in being motivated to donate blood.

Subsequently, the perceived inhibitory influences of selected Filipino blood donors were determined in the data analysis as well. The fear of COVID-19 exposure to oneself and others and the dread of interaction with unvaccinated people during the donation process are the two main perceived factors preventing selected Filipino blood donors from donating during COVID-19. Females had a higher inhibitory influence score than males. However, the difference between these two groups' scores is insignificant. In terms of blood donation status, however, those without experience donating blood had a significantly higher inhibitory influence score. Therefore, those who have not donated blood are more susceptible to inhibitory influences, a factor significant to a person's hindered intention to donate during the COVID-19 pandemic. As for the age, the youngest age group, 18-29, had the highest inhibitory influence score, while the oldest age group, 54-65, had the lowest. And although there was a noticeable decrease in inhibition as the education level of the respondents increased, educational attainment is not a substantial factor in influencing the inhibition of blood donors. And lastly, respondents not affiliated with religious groups had the highest inhibition, but overall the scores were not significantly different among the other groups. Moreover, the relationship between the respondents' sociodemographic factors and their perceived knowledge, attitudes, motivations, and inhibitory influences towards blood donation were evaluated. The significant differences between the groups were ascertained using the Mann-Whitney U test and the Kruskal-Wallis test. In terms of sex, it was found that only the knowledge scores between males and females were significantly different, and that the difference between males and females in terms of their attitudes, motives, and inhibitory influences was not statistically

significant. While there was insufficient data to determine whether there was a significant difference in knowledge scores, there were significant differences in attitude, inhibiting influences, and motivations between those who had donated blood and those who had not. The Kruskal Wallis test revealed that there were substantial differences in knowledge and inhibitory influences between the age groups, while there was inadequate data on attitude and motivation to evaluate their significance in differences. While there was no significant correlation between participants' educational attainment and their knowledge about and inhibitory influences toward blood donation, it was found that attitudes and motivations significantly varied across educational levels. Finally, it was shown that religion had no discernible influence on the participants' knowledge, attitude, motivation, or inhibitory influences with regard to blood donation.

4 METHODS

This study utilized the quantitative cross-sectional descriptive research design. In this method, the variables such as the sociodemographic, knowledge, attitudes, motivations, and inhibitory influences were observed without any influences during a particular time frame.

The study identified the target participants based on the data of the Philippine Statistics Authority. Afterward, the proponents adapted and modified the survey questionnaire from the previous studies of Alfouzan (2014), Shahshahani *et al.* (2006), Al Drees (2007), and Zaller *et al.* (2005) to assess the knowledge, attitudes, motivations, and inhibitory influences of the respondents regarding blood donation during the COVID-19 pandemic. The reliability of the questionnaire was determined by conducting pilot testing. Subsequently, individuals who have the potential to be a respondent were screened based on the inclusion and exclusion criteria. Those individuals who are not qualified were excluded from the study, while those qualified proceeded. Then, the significance and purpose of the study were explained to the qualified respondents thoroughly. Also, a consent form was provided and required signing before proceeding. The survey questionnaire was given only to those who signed the consent form. All qualified respondents answered the questionnaire completely through Google Forms for approximately 10 minutes, given an adequate internet connection. Then, all responses were compiled and analyzed. The proponents did interpret and make a conclusion based on the data collected.

Descriptive statistics (frequency, percentage, mean, and standard deviation) were used in participant response analysis. The knowledge scores were computed by assigning a score of “1” for every correct answer and a score of “0” for those who chose incorrect and do not know answers. Therefore, the total knowledge scores ranged from 0 and 10. After this, the knowledge scores were then further classified into “low knowledge”, “moderate knowledge”, and “high knowledge”. Knowledge scores that ranged from 0-4 were classified as “low knowledge”, while those scores that ranged from 5-7 were classified as “moderate knowledge”, while knowledge scores that ranged from 8-10 were classified as “high knowledge”. The responses were also assessed for attitudes wherein the strongly agree option was given a score of “5,” agree “4,” neutral “3,” disagree “2,” and strongly disagree “1”. Hence, the total attitude score ranged from 10 and 50. The attitude scores were then further classified into “less positive attitude” for scores that ranged from 10-29, while a “more positive attitude” was associated with scores that ranged from 30-50.

In terms of identifying the socio demographic profile of selected Filipino blood donors and its relationship with the perceived Knowledge, Attitudes, Motivations, and Inhibitory Influences, frequency tables and percentages were utilized to summarize the data. Meanwhile, the knowledge, attitudes, motivations, and inhibitory influences of selected Filipino blood donors were identified by determining the mean and standard deviation. A weighted sum analysis was also performed to determine the motivations that affects the donor’s drive to donate blood as well as inhibitory influences of the participants regarding blood donation. Aside from this, the Mann-Whitney test

was utilized to determine significant differences on the distribution of two groups. With this in mind, the null hypothesis was that the distribution of the scores for the knowledge, attitudes, motivations, and inhibitory influences of people towards blood donation are the same for two groups (sex, blood donation status). This hypothesis was tested by using the formula: $U = N_1 N_2 + \frac{N_1(N_1+1)}{2} - R_1$

to compute the test statistic wherein, N_1 is the number of scores in the first condition and N_2 is the number of scores in the second condition. The null hypothesis would be rejected if the value of the test statistic is greater than or equal to subcritical value from the Mann Whitney U Table or if the p-value of the test statistic is less than the level of significance. Likewise, the Kruskal Wallis test was also utilized to compare the equality of distribution between three or more groups. Thus, the formulated null hypothesis is that there is no significant difference between the distribution of knowledge, attitudes, motivations, and inhibitory influences scores of the participants when grouped according to their sociodemographic profile (age, educational attainment, religion). This hypothesis was tested by using the formula:

$$H = \frac{12}{n(n+1)} \sum \frac{R_j^2}{n_j} - 3(n+1)$$

to compute the test statistic wherein, k is the number of comparison groups, n is the total sample size, n_j is the sample size in the j th group and R_j is the sum of the ranks in the j th group. The null hypothesis would be rejected if the p-value of the test statistic is less than the level of significance. Statistically significant differences were considered at $P < 0.05$.

5 CONCLUSION

In general, the selected Filipino blood donors in Metro Manila are knowledgeable regarding blood donation. However, some common misconceptions about donor qualifications exist and are still not disproven, such as those who have had a flu shot or those with tattoos or piercings. Moreover, lacking or inappropriate information regarding the transmission of SARS-Cov-2 in most of the respondents was evident in the knowledge assessment. Most of the selected Filipino blood donors in Metro Manila had a more positive attitude regarding blood donation during the pandemic. The motivator that affects the drive of selected Filipino blood donors the most to donate blood during the pandemic is association when a family member or a friend is in dire need of blood. The two most significant perceived inhibitory influences of selected Filipino blood donors to donate during the COVID-19 are the fear of COVID-19 exposure to themselves and other people and the fear of contact with unvaccinated individuals during the donation process. Sex has a significant relationship with only the knowledge of Filipino blood donors. Meanwhile, blood donation status has a significant relationship with only the attitudes, motivation, and inhibitory influences. And finally, age and educational attainment both have a significant relationship with only attitudes and motivation. On the other hand, religion is not a significant factor in any of the selected Filipino blood donors' knowledge, attitudes, motivation, and inhibitory influences.

Based on the findings, the study decided to reject the null hypothesis. Thus, the sex, blood donation status, age, and educational attainment have a significant relationship to the knowledge, attitudes, motivations, and inhibitory influences of people towards blood donation.

FUNDING: This research was funded by its members and no external funding was received.

CONFLICT OF INTEREST: Authors declare no conflict of interest.

REFERENCES

- [1] Aedh, A. (2021). Knowledge, Attitudes and Practices towards Blood Donation and Associated Factors among Najran University's Students, KSA. *International Journal of Medical Research & Health Sciences*, 10(10), 122–129.
- [2] Alfouzan, N. (2014). Knowledge, Attitudes, and Motivations towards Blood Donation among King Abdulaziz Medical City Population. *International Journal of Family Medicine*, 2014, 1–8. <https://doi.org/10.1155/2014/539670>
- [3] Altmann, T. K. (2008). Attitude: A concept analysis. *Nursing Forum*, 43(3), 144–150. <https://doi.org/10.1111/j.1744-6198.2008.00106.x>
- [4] American Red Cross. (n.d.). Frequently Asked Questions. American Red Cross Blood Services. Retrieved January 29, 2022, from <https://www.redcrossblood.org/faq.html>
- [5] American Red Cross. (2021). *History of blood transfusions*. History Of Blood Transfusions 1628 To Now | Red Cross Blood Services. <https://www.redcrossblood.org/donate-blood/blood-donation-process/what-happens-to-donated-blood/blood-transfusions/history-blood-transfusion.html>.
- [6] Apuke, O. D. (2017, October). *Quantitative Research Methods : A Synopsis Approach*. ResearchGate. Retrieved March 28, 2022, from https://www.researchgate.net/publication/320346875_Quantitative_Research_Methods_A_Synopsis_Approach
- [7] Arafat, Y., & Mohamed Ibrahim, M. I. (2018). The Use of Measurements and Health Behavioral Models to Improve Medication Adherence. *Social and Administrative Aspects of Pharmacy in Low- and Middle-Income Countries*, 53–69. <https://doi.org/10.1016/b978-0-12-811228-1.00004-2>
- [8] Basilio, J. M., Awatin, A. S., Bagsit, K. C., Capio, F. M., Fajardo, F. A., Gamutan, E. A., Ronquillo, K. E., Sadang, G. M., Jose, J. C., Manaois, R. M. (2021). Prevalence of Blood Donors and Significant Factors Affecting Blood Donation within NCR, Bulacan, and East Rizal During the Pre-COVID-19 and the COVID-19 Period. *Public Health Research*, 11(3). <https://doi:10.5923/j.phr.20211103.02>
- [9] Branscum, P., & Lora, K. (2017). Using the Integrative Behavioral Model to Predict Monitoring of Fruit and Vegetable Consumption Among Hispanic Mothers. *Family & Community Health*, 40(1), 32–38. <https://doi.org/10.1097/fch.0000000000000130>
- [10] Burgdorf, K. S., Simonsen, J., Sundby, A., Rostgaard, K., Pedersen, O. B., Sørensen, E., Nielsen, K. R., Bruun, M. T., Frisch, M., Edgren, G., Erikstrup, C., Hjalgrim, H., & Ullum, H. (2017). Socio-demographic characteristics of Danish blood donors. *PLOS ONE*, 12(2), e0169112. <https://doi.org/10.1371/journal.pone.0169112>
- [11] Burns, M. E., Farris, K. L., Paz, M. & Dyhre, S. (2021). "Thriving Instead of Surviving: The Role of the Reasoned Action Model in Assessing the Basic Course," *Basic Communication Course Annual*, 33(12), Available at: <https://ecommons.udayton.edu/bcca/vol33/iss1/12>
- [12] Centers for Disease Control and Prevention. (2020, March 18). *Blood Safety Basics* | CDC. [cdc.gov](https://www.cdc.gov/bloodsafety/basics.html). Retrieved January 29, 2022, from <https://www.cdc.gov/bloodsafety/basics.html>
- [13] Chandler, T., Neumann-Böhme, S., Sabat, I., Barros, P. P., Brouwer, W., Exel, J., Schreyögg, J., Torbica, A., & Stargardt, T. (2021). Blood donation in times of crisis: Early insight into the impact of COVID-19 on blood donors and their motivation to donate across European countries. *Vox Sanguinis*, 116(10), 1031–1041. <https://doi.org/10.1111/vox.13103>

- [14] Choudhury, N., Mathur, A., & Smit Sibinga, C. T. (2020). COVID-19 Pandemic – blood supply challenges and approaches in AATM member countries. *ISBT Science Series*, 15(4), 353–361. <https://doi.org/10.1111/voxs.12578>
- [15] Clark A, Jit M, Warren-Gash C, Guthrie B, Wang HHX, Mercer SW, Sanderson C, McKee M, Troeger C, Ong KL, Checchi F, Perel P, Joseph S, Gibbs HP, Banerjee A, Eggo RM; Centre for the Mathematical Modelling of Infectious Diseases COVID-19 working group. Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. *Lancet Glob Health*. 2020 Aug;8(8):e1003-e1017. doi: 10.1016/S2214-109X(20)30264-3. Epub 2020 Jun 15. PMID: 32553130; PMCID: PMC7295519.
- [16] Delabranche, X., Kientz, D., Tacquard, C., Bertrand, F., Roche, A., Tran Ba Loc, P., Humbrecht, C., Sirlin, F., Pivot, X., Collange, O., Levy, F., Oulehri, W., Gachet, C., & Mertes, P. (2021). Impact of COVID -19 and lockdown regarding blood transfusion. *Transfusion*, 61(8), 2327–2335. <https://doi.org/10.1111/trf.16422>
- [17] Department of Health. (2021, June 14). *DOH CELEBRATES WORLD BLOOD DONOR DAY, ENCOURAGES YOUTH TO DONATE BLOOD* | Department of Health website. Department of Health Website. Retrieved January 29, 2022, from <https://doh.gov.ph/press-release/DOH-CELEBRATES-WORLD-BLOOD-DONOR-DAY-ENCOURAGES-YOUTH-TO-DONATE-BLOOD>
- [18] Department Of Health. (2020). *Visayas Blood Center in need of blood - doh-7: Department of Health Website*. DOH. Retrieved October 9, 2021, from <https://doh.gov.ph/node/23274>.
- [19] Fauzi, H. F., Noh, S. M., Karim, F. A., & Kambali, M. M. (2019). Knowledge and Attitude towards Blood Donation among Non Blood Donor Residents of Kuala Terengganu at Hospital Sultanah Nur Zahirah, Kuala Terengganu. *Malaysian Journal of Medical Sciences*, 15(1), 53–62. Retrieved from https://medic.upm.edu.my/upload/dokumen/2019010811400108_MJMHS_Jan_2019.pdf
- [20] Getie, A., Wondmieni, A., Bimerew, M., Gedefaw, G., & Demis, A. (2020). Blood Donation Practice and Associated Factors in Ethiopia: A Systematic Review and Meta-analysis. *BioMed Research International*, 2020, 1–8. <https://doi.org/10.1155/2020/8852342>
- [21] Gonzales, C. (2021, May 22). DOH calls for blood donation amid lower output in 2020. *INQUIRER.net*. <https://newsinfo.inquirer.net/1434897/doh-calls-for-blood-donation-amid-lower-output-in-2020>
- [22] Gopinath, G. (2020, April 14). The Great Lockdown: Worst Economic Downturn Since the Great Depression. *IMF Blog*. <https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economic-downturn-since-the-great-depression/>
- [23] Guglielmetti Mugion, R., Pasca, M. G., di Di Pietro, L., & Renzi, M. F. (2021). Promoting the propensity for blood donation through the understanding of its determinants. *BMC Health Services Research*, 21(1). <https://doi.org/10.1186/s12913-021-06134-8>
- [24] History of blood. (n.d.). Retrieved January 29, 2022, from <https://deputyprimeminister.gov.mt/en/nbts/Pages/About-Blood/History-of-Blood.aspx>
- [25] Hossain Parash, M., Suki, N., Shimmi, S., Hossain, A., & Murthy, K. (2020). Examining students' intention to perform voluntary blood donation using a theory of planned behaviour: A structural equation modelling approach. *Transfusion Clinique et Biologique*, 27(2), 70–77. <https://doi.org/10.1016/j.tracli.2020.02.002>
- [26] Hosen, M. Z., Biswas, A., Islam, M. R., Nazrul, M., Bhuiyan, I., & Hossain, S. J. (2020). Comparison of physicochemical and antioxidant properties of edible fruits in the Sundarbans' mangrove forest, Bangladesh. *Bangladesh Journal of Botany*, 49(3), 671–678. <https://doi.org/10.3329/bjb.v49i3.50009>
- [27] Ihudiebube-Splendor, C., & Chikeme, P. (2020). A Descriptive Cross-Sectional Study: Practical and Feasible Design in Investigating Health Care-Seeking Behaviors of Undergraduates. *SAGE Research Methods Cases: Medicine and Health*. <https://doi.org/10.4135/9781529742862>

- [28] Institute for Quality and Efficiency in Health Care (IQWiG). (2019, August 29). *NCBI - WWW Error Blocked Diagnostic*. InformedHealth.Org. Retrieved September 28, 2021, from <https://www.ncbi.nlm.nih.gov/books/NBK279392/>
- [29] Javadzadeh Shahshahani, H., Yavari, M. T., Attar, M., & Ahmadiy?H, M. H. (2006). Knowledge, attitude and practice study about blood donation in the urban population of Yazd, Iran, 2004. *Transfusion Medicine*, 16(6), 403–409. <https://doi.org/10.1111/j.1365-3148.2006.00699.x>
- [30] Jukić, I., Hećimović, A., & Vuk, T. (2021). Blood donation during natural disasters – experience with COVID-19 and earthquakes in Croatia. *Croatian Medical Journal*, 62(2), 196–197. <https://doi.org/10.3325/cmj.2021.62.196>
- [31] Kan, M. P. H., & Fabrigar, L. R. (2017). Theory of Planned Behavior. *Encyclopedia of Personality and Individual Differences*, 1–8. https://doi.org/10.1007/978-3-319-28099-8_1191-1
- [32] Kassie, A., Azale, T., & Nigusie, A. (2020). Intention to donate blood and its predictors among adults of Gondar city: Using theory of planned behavior. *PLOS ONE*, 15(3), e0228929. <https://doi.org/10.1371/journal.pone.0228929>
- [33] Kazdin, A. E. (2000). *definition of knowledge from Oxford Dictionaries Online*. Oxforddictionaries.Com. https://web.archive.org/web/20100714023323/http://www.oxforddictionaries.com/view/entry/m_en_us1261368
- [34] La Morte, W. W. (2019). *The Theory of Planned Behavior*. sphweb.bumc.bu.edu. Retrieved November 9, 2021, from <https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/BehavioralChangeTheories3.html>
- [35] Majdabadi, H. A., Kahouei, M., Taslimi, S., & Langari, M. (2018). Awareness of and attitude towards blood donation in students at the Semnan University of Medical Sciences. *Electronic physician*, 10(5), 6821–6828. <https://doi.org/10.19082/6821>
- [36] Melku, M., Terefe, B., Asrie, F., Enawgaw, B., Melak, T., Tsegay, Y. G., Areba, M., & Shiferaw, E. (2016). Knowledge, Attitude, and Practice of Adult Population towards Blood Donation in Gondar Town, Northwest Ethiopia: A Community Based Cross-Sectional Study. *Journal of Blood Transfusion*, 2016, 1–10. <https://doi.org/10.1155/2016/7949862>
- [37] Mls, K. E. P., Dlm, S. M. M. P. C. O. N., & (Ascp)Hcm, W. J. P. M. (2019). *Rodak's Hematology: Clinical Principles and Applications, 6e* (6th ed.). Saunders.
- [38] Mohammed, S., & Essel, H. B. (2018). Motivational factors for blood donation, potential barriers, and knowledge about blood donation in first-time and repeat blood donors. *BMC Hematology*, 18(1). <https://doi.org/10.1186/s12878-018-0130-3>
- [39] O'Neill, A. (2022, February 1). *Philippines - age structure 2020*. Statista. Retrieved February 7, 2022, from <https://www.statista.com/statistics/578779/age-structure-in-philippines/>
- [40] Oswalt, R. (1977). A review of blood donor motivation and recruitment. *Transfusion*, 17(2), 123–135. <https://doi.org/10.1046/j.1537-2995.1977.17277151916.x>
- [41] Oxford Dictionary. (n.d.). *blood-drive noun - Definition, pictures, pronunciation and usage notes | Oxford Advanced American Dictionary at OxfordLearnersDictionaries.com*. https://www.oxfordlearnersdictionaries.com/us/definition/american_english/blood-drive
- [42] Pagano, M. B., Hess, J. R., Tsang, H. C., Staley, E., Gernsheimer, T., Sen, N., Clark, C., Nester, T., Bailey, C., & Alcorn, K. (2020). Prepare to adapt: Blood supply and transfusion support during the first 2 weeks of the 2019 Novel Coronavirus (COVID-19) pandemic affecting Washington State. *Transfusion*, 60(5), 908–911. <https://doi.org/10.1111/trf.15789>
- [43] Philippine Statistics Authority. (2021, July 23). *Highlights of the Population Density of the Philippines 2020 Census of Population and Housing (2020 CPH) | Philippine Statistics Authority*. psa.gov.ph. Retrieved October 12, 2021, from <https://psa.gov.ph/content/highlights-population-density-philippines-2020-census-population-and-housing-2020-cph>

- [44] Philippine Statistics Authority. (2020, August 17). Retrieved March 28, 2022, from [https://psa.gov.ph/content/how-much-vulnerable-and-elderly-population-aged-60-and-above-spending-health-care#:~:text=Persons%2060%20years%20old%20and,2019%20\(COVID%2D19\)](https://psa.gov.ph/content/how-much-vulnerable-and-elderly-population-aged-60-and-above-spending-health-care#:~:text=Persons%2060%20years%20old%20and,2019%20(COVID%2D19)).
- [45] Raturi, M., & Kusum, A. (2020). The blood supply management amid the COVID-19 outbreak. *Transfusion Clinique Et Biologique*, 27(3), 147–151.
- [46] Roberts, N., James, S., Delaney, M., & Fitzmaurice, C. (2019). The global need and availability of blood products: a modelling study. *The Lancet Haematology*, 6(12), e606–e615. [https://doi.org/10.1016/s2352-3026\(19\)30200-5](https://doi.org/10.1016/s2352-3026(19)30200-5)
- [47] Romero-Domínguez, L., Martín-Santana, J. D., Sánchez-Medina, A. J., & Beerli-Palacio, A. (2021). Blood donation barriers: How does donor profile affect them? *International Review on Public and Nonprofit Marketing*. <https://doi.org/10.1007/s12208-021-00303-5>
- [48] Sachdev, S., Kishore, K., Singh, L., Lamba, D. S., Hans, R., Dhawan, H. K., Grover, S., & Sharma, R. R. (2021, March 9). *Exploration of COVID-19 related fears deterring from blood donation in India*. Wiley Online Library. Retrieved January 29, 2022, from <https://onlinelibrary.wiley.com/doi/full/10.1111/voxs.12623>
- [49] Sadler, A., Shi, L., Bethge, S., & Mühlbacher, A. (2018). Incentives for Blood Donation: A Discrete Choice Experiment to Analyze Extrinsic Motivation. *Transfusion Medicine and Hemotherapy*, 45(2), 116–124. <https://doi.org/10.1159/000481142>
- [50] Sahu, K. K., & Cerny, J. (2020). Managing patients with hematological malignancies during COVID-19 pandemic. *Expert Review of Hematology*, 13(8), 787–793. <https://doi.org/10.1080/17474086.2020.1787147>
- [51] Sampath, S., Ramsaran, V., Parasram, S., Mohammed, S., Latchman, S., Khunja, R., Budhoo, D., Poon King, C., & Charles, K. S. (2007). Attitudes towards blood donation in Trinidad and Tobago. *Transfusion Medicine*, 17(2), 83–87. <https://doi.org/10.1111/j.1365-3148.2007.00731.x>
- [52] Setia, M. S. (2016). *IJD® MODULE ON BIOSTATISTICS AND RESEARCH METHODOLOGY FOR THE DERMATOLOGIST - MODULE EDITOR: SAUMYA PANDA*. Indian Journal of Dermatology. Retrieved November 27, 2021, from <https://www.e-ijid.org/article.asp?issn=0019-5154;year=2016;volume=61;issue=1;spage=21;epage=25;aulast=Setia;type=0>.
- [53] Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- [54] Tey, Y. S., Arsil, P., Brindal, M., Lee, S. K., & Teoh, C. T. (2019). Motivation structures of blood donation: a means-end chain approach. *International Journal of Health Economics and Management*, 20(1), 41–54. <https://doi.org/10.1007/s10754-019-09269-8>
- [55] U.S. Department of Health and Human Services. (n.d.). *Blood donation*. National Heart Lung and Blood Institute. Retrieved January 29, 2022, from <https://www.nhlbi.nih.gov/health-topics/blood-donation>
- [56] U.S. National Library of Medicine. (1970, January 1). *Voluntary blood donation: Foundation of a safe and sufficient blood supply*. Towards 100% Voluntary Blood Donation: A Global Framework for Action. Retrieved January 29, 2022, from <https://www.ncbi.nlm.nih.gov/books/NBK305666/>
- [57] *US Blood Supply Facts*. Facts About Blood Supply In The U.S. | Red Cross Blood Services. (n.d.). Retrieved January 29, 2022, from <https://www.redcrossblood.org/donate-blood/how-to-donate/how-blood-donations-help/blood-needs-blood-supply.html>
- [58] Wang, Y., Han, W., Pan, L., Wang, C., Liu, Y., Hu, W., Zhou, H., & Zheng, X. (2020). Impact of COVID-19 on blood centres in Zhejiang province China. *Vox Sanguinis*, 115(6), 502–506. <https://doi.org/10.1111/vox.12931>
- [59] World Health Organization. (n.d.). *Blood products: Blood donation*. World Health Organization. Retrieved January 29, 2022, from <https://www.who.int/news-room/q-a-detail/blood-products-why-should-i-donate-blood>

- [60] World Health Organization. (2022, April 7). *Risk factors of ill health among older people*. World Health Organization. Retrieved April 7, 2022, from <https://www.euro.who.int/en/health-topics/Life-stages/healthy-ageing/data-and-statistics/risk-factors-of-ill-health-among-older-people>
- [61] Yahia, A. I. O. (2020). Management of blood supply and demand during the COVID-19 pandemic in King Abdullah Hospital, Bisha, Saudi Arabia. *Transfusion and Apheresis Science*, 59(5), 102836. <https://doi.org/10.1016/j.transci.2020.102836>
- [62] Zaller, N., Nelson, K. E., Ness, P., Wen, G., Bai, X., & Shan, H. (2005). Knowledge, attitude and practice survey regarding blood donation in a Northwestern Chinese city. *Transfusion medicine (Oxford, England)*, 15(4), 277–286. <https://doi.org/10.1111/j.0958-7578.2005.00589.x>