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Role of Blood Donation in Patient Care: Awareness among University Students in Malaysia

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Worldwide, healthcare systems depend on consistent donors, and blood donation is essential to patient treatment. Similar to numerous other nations, Malaysia encounters persistent challenges, including a low incidence of blood donation, especially from the younger demographic, which results in inconsistent blood supply. Given that knowledge is necessary to create a society's superior awareness, awareness is a critical component that needs to be considered in order to raise the contribution rate. The assessment and appraisal of Malaysian university students' understanding of blood donation and its significance in enhancing patient outcomes was the main goal of this study. Methodology: Using a cross-sectional survey approach, the knowledge of university students in the Klang Valley, Malaysia, was evaluated from November to December 2024. The instrument was a Google Docs survey that used convenience sampling and simple random sample methods. The questionnaire was broken up into six sections to assess our target group's comprehension in various areas. The questionnaire was divided into six sections: socio-demographic data, knowledge of eligibility requirements and the blood donation process, understanding of health conditions that affect eligibility, awareness of the health benefits of blood donation, perception of the role that blood donation plays in saving lives, information sources, and preferred platforms for raising awareness. The data were analyzed using SPSS version 25.0. Statistical significance was defined as a p-value of less than 0.05. Findings: Out of 412 participants, 53.9% were aware of the life-saving potential of blood donation, and awareness was significantly correlated with age, educational attainment, and academic discipline. There was a correlation found between the participants' gender, ethnicity, and awareness level. 35.2% showed that the main obstacles to blood donation were ignorance, needle phobia (29.1%), and health issues (22.4%). Most people (57.04%) learnt about blood donation from friends and family, while 17.96% learnt about it from different social media sites.

Social media, however, was found to be the most effective medium for raising awareness. (83.3%) Conclusion: This study indicated that university students had a decent grasp of blood donation and its critical role in the healthcare system, while non-donors had significant knowledge gaps. Age group, educational attainment, and study/course type are some of the most important criteria in increasing awareness. To close these gaps and increase blood donation rates, particularly among young people like college students, targeted public education and awareness campaigns mostly through social media are advised.

Keywords: blood donation, role of blood in healthcare, donor criteria, concerns as donors

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Introduction

Blood donation is a selfless gesture that embodies the principle of "Give Life, Give Blood" and has the potential to grant lives. The two primary types of blood donation in Malaysia are apheresis donation and whole-blood donation (Ying et al., 2024). Although medical professionals understand the need to preserve the country's steady supply of blood, each donor has their own driving forces for giving blood. In conjunction with an individual's driving forces for blood donation, a survey was conducted with US blood donors, which has shown that the primary motivation to donate blood to be altruism, while awareness of the need for blood placed second in the trend line (Glynn et al., 2002). Despite its significant role in patient management, ensuring a safe, reliable, and regular blood supply remains a global challenge, including Malaysia. As mentioned by Dr. Noryati Abu Amin, the head of the National Blood Centre in Kuala Lumpur, "blood is an irreplaceable therapeutic product and there is no synthetic material that can replace the function of blood completely, and we depend on each other to help patients in need of transfusion" (Kwan, 2021).

In Malaysia, the blood demands for therapeutic purposes remain high, with up to 2000 units required daily. With the goal to meet the demands of nearby hospitals as well as aiding East Malaysia, the Klang Valley alone seeks to collect 500–600 units each day. It's a matter of concern that there has been a decline in blood donations in recent years, showing a drop from 740,000 units in 2019 to 650,000 in 2023 (Kwan,

2021). The COVID-19 pandemic hampered the donation activity, worsening the situation (Ying et al., 2024).

The reason behind this trend is that the blood donation rate in Malaysia is low, as only 2.2% of the population donates blood, compared to 3.5–5.0% in developed countries (Ling et al., 2018) Abidin & Shet, 2021). Despite a 4.7% rise in university graduates in 2021, which reached the 5.36 million mark, only 12% of blood donors are university students, indicating that blood donation rates among Malaysians remain disproportionately low. An increasing number of new donors must be recruited by blood centers to compensate for the donors who no longer meet the requirements, hence preventing a shortage of supply.

It is essential that children understand the value of blood donation in order to ensure a consistent supply of blood. The purpose of this study is to evaluate public awareness of blood donation and its life-saving potential in light of the demand for young donors. This could raise the donation rate by encouraging young people to give. Therefore, the goal of this study was to assess how well Malaysian university students understood the importance of blood donation in saving lives.

Literature Review

To guarantee a steady supply of blood, it is crucial that young donors comprehend the importance of donating blood. Given the need for young donors, the aim of this study is to assess public knowledge of blood donation and its potential to save lives. By encouraging young individuals to donate, this could increase the rate of donations. Thus, this study set out to evaluate the degree to which Malaysian university students comprehended the significance of blood donation in saving lives. The supply of blood and blood products depends on the number of people who volunteer to give blood. However, the current pressure on blood usage is quite demanding, raising concerns for health institutions since the blood supply remains below the set goals (Hasnoor et al., 2023). In Malaysia, various initiatives, such as the perpetual organization of blood donation campaigns, encourage voluntary donations, particularly among the young donor groups. These initiatives promote social responsibility, foster community engagement, and enhance the long-term sustainability of the healthcare system (Gasparovic Babic et al., 2024). In exploration of the initiatives, it was potentially suggested for a user-friendly mobile application which includes booking of appointment, eligibility check, and reminder to facilitate the convenience of donation processes and attract entitled donors. (Rahim, 2024). Hence, it is pivotal to encourage university students, who are considered safer, based on their educational background

and socioeconomic status being higher than the general population (Dorle et al., 2023). In suggestion to that encouraging more young donors between the ages of 17 and 24 is crucial, emphasizing the study's target demographic. (Majdabadi et al., 2018)

Awareness and Knowledge about Blood Donation

The degree of information and level of awareness about blood donation are critical to engaging and increasing participation, in general and among university attendees in particular. According to research by Ying (2024), Malaysian university students' levels of blood donation knowledge ranged significantly (Ying et al., 2024). In this study, the majority of blood donors showed a high level of proficiency in blood donation protocols. Nonetheless, it also turns out that those who did not donate showed a poorer degree of understanding of blood donation (Ying et al., 2024). The need for focused campaigns and tactics to increase awareness among non-donors is highlighted by this discrepancy. The "Health Belief Model" holds that if people are aware of the benefits of blood donation, they will be more likely to do it (Boskey, 2024). According to this theory, a study by Abidin and Shet (2021) found that while most participants knew a lot about most aspects of blood donation, more than half of them correctly identified the important details, including the universal blood group, the frequency of donations permitted annually, and the amount of blood drawn during each donation. Nevertheless, there were still some important knowledge gaps (Abidin & Shet, 2021). Another research by Abidin and Shet (2021) showed the same pattern among university students, for instance, less than 50% of the participants were unaware of some crucial pieces of information, individuals with which blood group are considered as ‘universal’ donors or what is the recommended frequency of donations (Abidin et al., 2021).

Understanding the Role of Blood Donation in Saving Lives.

Numerous studies have shown that college students generally understand the importance of blood in medical therapy and how it can save lives in emergency situations. 96.8% of students were willing to donate blood, especially in emergency situations, according to research from University Sains Malaysia, demonstrating that students recognized the critical necessity for blood donation in such situations (Ying et al., 2024; Abidin et al., 2021; Malaysian Investment Development Authority [MIDA], 2023). Karakkamandapam et al. (2011) showed a similar trend, with 91.1% of female university students and 95.4% of male students indicating they would want to donate blood in an emergency. The studies frequently emphasize the importance of situations where donations are

lifesaving, hence, focusing on emergencies. Yet, they seldom ever comment concerning the way blood transfusions alter long-term health outcomes (Karakkamandapam et al., 2011). World Health Organization's vision of, "Safe blood saves lives," highlights the importance of blood donations in addition to emergencies, as regular blood donations are necessary for numerous kinds of medical situations, such as preserving continuity of treatment for patients who need surgery or recurrent transfusions or who have chronic illnesses (World Health Organization WHO, 2023).

Factors that Encourage and Discourage Blood Donation

To increase donor rates and improve recruiting results for young donors, it is essential to comprehend the elements that either demotivate or stimulate blood donation. For instance, the general public should be aware of the eligibility requirements, which include minimum age, weight, and pertinent medical and social history, as well as issues like the typical amount of time required for each donation, etc. In addition to raising public awareness, this will help dispel widespread misconceptions about blood donation that arise from ignorance.

"Fear or pain" and "never thinking about donating blood" were cited as the most common excuses for not donating blood, according to research by Ying (2024) that examined the obstacles to blood donation among college students (Ying et al., 2024; Abidin & Shet, 2021). Furthermore, a cross-sectional study carried out in Saudi Arabia has confirmed that "fear of needle" and "blood donation never crossed their mind" are the most common explanations (Alsaiari et al., 2018). These findings are consistent with other studies showing that psychological factors like anxiety, fear, and a lack of awareness play an important role in hindering potential donors. The American Red Cross has addressed this issue by saying, "Some devoted donors barely feel the needle anymore, being familiar with the procedure," allaying future donors' fears that the procedure may be unpleasant.

According to a study by Karakkamandapam et al. (2011), 62% of participants had never given blood, over 25% indicated they had never thought about giving blood, and the majority of non-donors felt they were not medically qualified to do so (Ying et al., 2024). (2011) Karakkamandapam et al. Baig et al. reported various unexpected viewpoints on the difficulties of blood donation, including "not being approached by Anybody" (45%), worries regarding equipment (2013). As a result, the majority of these studies pinpoint obstacles that range from internal concerns and misconceptions to extrinsic factors like a lack of

face-to-face engagement and communication (Ying et al., 2024; Karakkamandapam et al., 2011; Baig et al., 2013).

Steps to increase awareness about blood donation

Hence, ensuring a regular blood supply needs promoting awareness, and provision of facilities to the general population with a particular focus on young people like college and university students, as shown by Abidin & Shet's (2021) study. According to Baig et al. (2013) research, 70% of respondents stated they would be willing to donate blood if donation camps were held on university grounds, and 53% of participants stated they would do so if a friend, family member, or relative needed it (Baig et al., 2013).

Based on the reviewed literature, we can say that Malaysian university students have a wide range of knowledge about blood donation, with many displaying enough knowledge but not understanding the process and its main life-saving consequences. The small study also focused on the awareness of blood donation among students. Consequently, additional research is required to evaluate Malaysian university students' comprehension of blood donation and its significance in saving lives.

Rationale

Blood donation remains a critical component of healthcare systems globally, playing a pivotal role in saving lives during emergencies, surgeries, and the treatment of chronic illnesses. Despite this significance, Malaysia continues to face challenges in maintaining a consistent blood supply, particularly from the younger population. Data show that only 2.2% of Malaysians donate blood, far below the 3.5–5.0% seen in developed nations, with university students contributing only 12% of the donor population despite their large numbers and high education levels.

University students represent an ideal demographic for blood donation due to their generally good health, accessibility, and potential to be long-term regular donors. However, misconceptions, lack of knowledge, and psychological barriers such as fear of needles continue to hinder participation among this group.

This study was therefore necessary to assess the awareness, knowledge, and perceptions regarding blood donation among Malaysian university students. Understanding the factors influencing their willingness to donate, as well as the barriers they face, can help inform targeted education and intervention strategies. Such initiatives are crucial to promoting voluntary blood donation, increasing donor recruitment, and

ultimately ensuring a sustainable blood supply to meet the nation's healthcare needs.

By identifying knowledge gaps and preferred awareness channels such as the strong influence of social media this study aims to support the development of effective communication and outreach strategies to boost blood donation rates among youth.

Objectives of the Study

- To assess the level of knowledge of the university students about blood donation and its significance in improving the outlook for the patients.

Hypotheses

- University students in Malaysia have high level awareness about blood donation and its role in saving lives

Method

Research Design

Using a cross-sectional survey approach, was used to collect the data.

Sample

Malaysian university students made up the study's target demographic. In this study, a cross-sectional survey approach was used. The sample, which consisted of N=412 individuals, was chosen to represent a diverse group of students from different faculties and educational levels. The sampling strategy that was utilized was cluster sampling, where university students from a particular region of Malaysia were sampled. In addition to that, convenience sampling was employed as questionnaires were distributed to a reachable set of the audience. Importantly, the most significant inclusion criteria were participants who are currently university students, while exclusions were taken into account when choosing participants who fit into the region of study, i.e., students from Klang Valley, Malaysia. To ensure ease and wide reach, the study was conducted over four weeks in 2024 using an online questionnaire. Anonymous responses were obtained by self-administration of the survey, and frequent reminders were provided to encourage participation to achieve a high participation rate. Accordingly, N=412 data of complete responses were examined.

Measures

The questionnaire was created using Google Docs by merging many questions pertaining to the aims and study statement. With the use of Google Forms, we created an online link to distribute to esteemed participants, and the questionnaire was produced and published in English. The questionnaire used in this study was divided into six sections, each designed to gather specific information. The first part includes the participant's socio-demographic information, including age, gender, education level, course, ethnicity, blood donation history, and the rationale behind not donating blood. In the second part of the questions, the participants' knowledge of the eligibility requirements and blood donation process was assessed. Knowledge about blood types, universal donor and recipient groups, weight and age restrictions, the frequency of donations, and the length of the donation procedure are all included in this. The final section of the questions assessed their awareness of disease screening for donated blood as well as their knowledge of health issues that affect eligibility, such as diabetes, pregnancy, and prior diseases. Questions concerning the health advantages of blood donation, such as lowering cardiovascular risk, burning calories, and encouraging blood cell formation, make up the fourth section. Understanding the life-saving potential of blood donation—including its use in emergency situations, surgeries, cancer treatments, and pregnancy complications—is tested in the fifth section. One point was awarded for accurate responses and "Yes." "I don't know," "No," and inaccurate responses received zero points. A maximum of 28 points could be earned from sections 2 through 5. Finally, section six included strategies for promoting awareness, including questions about how they learnt about blood donation and their favourite platforms for doing so. For validity and clarity, the questionnaire was evaluated with 17 students. The final version incorporated the feedback to enhance the clarity and comprehension of the questions.

Procedure

The study followed a structured procedure designed to assess the awareness and knowledge of blood donation among university students in Malaysia. A cross-sectional survey design was employed, targeting students from various faculties and educational backgrounds within the Klang Valley region. A combination of cluster and convenience sampling techniques was used to recruit participants, resulting in a total of 412 complete responses. Data collection was conducted over a four-week period between November and December 2024 using an online questionnaire developed via Google Forms.

The questionnaire consisted of six sections, including socio-demographic details, knowledge of blood donation eligibility and processes, awareness of health conditions affecting donation eligibility, benefits of donating blood, the role of blood donation in saving lives, and preferred sources and platforms for awareness. To ensure clarity and validity, the survey instrument was pre-tested with 17 students, and their feedback was used to refine the final version.

Participants were informed of the voluntary nature of the study, and their anonymity was safeguarded by not collecting any personally identifiable information. Ethical approval was obtained from the university's Human Ethics Committee prior to data collection. Once responses were collected, the data were analyzed using SPSS version 25.0. Descriptive statistics (frequencies and percentages) were used to summarize response patterns, while inferential statistical tests such as Chi-square, t-tests, and one-way ANOVA were applied to identify significant relationships between awareness scores and demographic variables. A p-value of less than 0.05 was considered statistically significant throughout the analysis.

Ethics

To protect participants' privacy and anonymity, the questionnaire did not contain any personally identifiable information, such as name, address, etc. Participation in this study was completely voluntary, and participants gave their proper informed permission prior to the questionnaire being administered. The University's Human Ethics Committee examined and authorized the study.

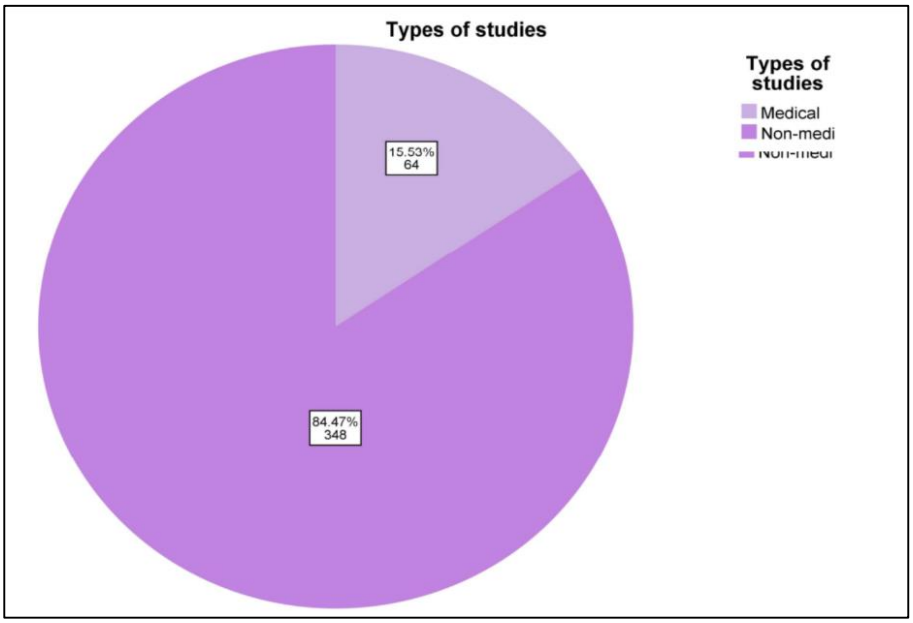
Results

This chapter presents the findings of the study on the awareness and knowledge of blood donation among university students in Malaysia. The data were collected from a total of 412 respondents through a structured online questionnaire. The results are organized and reported in accordance with the study objectives, focusing on participants' socio-demographic characteristics, their level of knowledge and awareness regarding blood donation and its life-saving potential, as well as the factors influencing awareness levels such as age, gender, education level, study discipline, and donor status. In addition, the chapter highlights common barriers to blood donation and identifies the most effective strategies for promoting awareness among university students.

Table 1
Participants Socio-demographic

Variables	Ranges	Total Participants	Frequency	Percentage (%)
Age Range of Participants	< 20 yrs	412	176	42.72%
	20–30 yrs		230	55.83%
	> 30 yrs		6	1.46%
Gender	Male	412	115	27.91%
	Female		297	72.09%
Level of Education	Pre-U	412	85	20.63%
	Diploma		28	6.80%
	Undergraduate		278	67.48%
	Postgraduate		21	5.10%
Types of Studies	Medical	412	64	15.53%
	Non-medical		348	84.47%
Ethnicity	Malay	412	73	17.72%
	Chinese		194	47.09%
	Indian		90	21.84%
	Others		55	13.35%
Donor Status	Yes	412	75	18.20%
	No		337	81.80%

Figure 1: Distribution of participants' course of study



Participants socio-demographic:

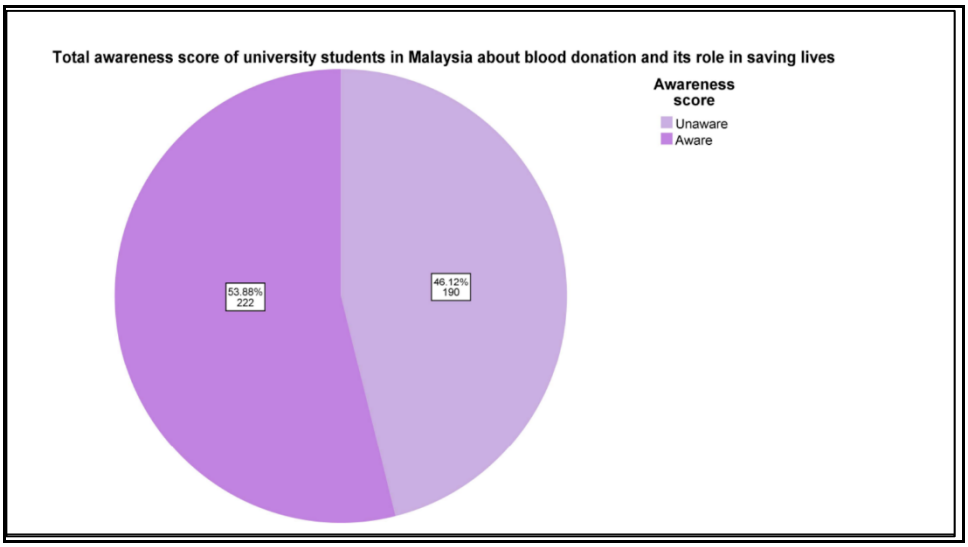
The research included N=412 participants. Among them, 42.72% were under 20 years old, while the majority (55.83%) fell within the 20–30 age group. Just 1.46 percent were beyond 30. 72.09% of the sample was female, whereas 27.91% of the individuals were male. Undergraduates accounted for 67.48% of the group, with pre-university students at 20.63%, diploma holders at 6.80%, and postgraduates at 5.10%. A significant portion (84.47%) was non-medical students, with 15.53% studying medicine. Ethnically, 47.09% of participants identified as Chinese, followed by Indian (21.84%), Malay (17.72%), and others (13.35%). In terms of blood donation, only 18.20% of participants reported having donated blood, while 81.80% have had not.

Table 2

Malaysian university students' awareness of blood donation and its life-saving potential

Responses	Donor (75 participants)				Non-Donor (337 participants)			
	Correct answer		Incorrect answer		Correct answer		Incorrect answer	
	n	(%)	n	(%)	n	(%)	n	(%)
1.Do you know your blood group?	70	93.33	5	6.67	264	78.34	73	21.66
2.Do you know which blood group is the universal donor?	67	89.33	8	10.64	294	87.24	43	12.76
3.Do you know which blood group is the universal recipient?	61	81.33	14	18.67	239	70.92	98	29.08
4.In order to be able to donate blood, do you know the minimum weight requirement?	47	62.67	28	37.33	195	57.86	142	42.14
5.In order to be able to donate blood, do you know the age limit required	31	41.33	44	58.67	121	35.91	216	64.09
6.How many times can a person donate blood in a year?	39	52.00	36	48.00	99	29.38	238	70.62
7.What is the amount of blood drawn in a single donation?	44	58.67	31	41.33	114	33.83	223	66.17
8.How long does it take for the donation of whole blood to be completed ?	53	70.67	22	29.33	216	64.09	121	35.91

Figure 2: Malaysian university students' awareness of blood donation and its life-saving potential



According to Figure 2, 53.88% of Malaysian university students are aware of blood donation and how this can save lives, while 46.12% are not.

Knowledge of the eligibility requirements and the blood donation process of those who took part, 337 are not donors, whereas 75 are. In terms of knowledge, Table 2 demonstrates that donors routinely fared better than non-donors. When it came to identifying their blood type, donors consistently performed better than universal donors (89.33% of donors and 87.24% of non-donors) 93.33% of donors replied properly, compared to 78.34% of non-donors and universal recipients (81.33% of donors and 70.92% of non-donors). However, this might be because the number of non-donors is 4.5 times more than the number of donors. However, neither group had basic information on issues such as the age limit (58.67% of donors and 64.09% of non-donors provided false answers) or the frequency of donations (48% of donors and 70.62% of non-donors provided incorrect answers).

Table 3

Participant's Awareness on requirements for health

Responses	Donor (75 participants)				Non-Donor (337 participants)			
	Correct answer		Incorrect answer		Correct answer		Incorrect answer	
	n	(%)	n	(%)	n	(%)	n	(%)
1.Can a pregnant woman donate blood?	59	78.67	16	21.33	254	75.37	83	24.63
2.Can a person who has diabetes or high blood pressure donate blood?	61	81.33	14	18.67	278	82.49	59	17.51
3.Can a woman who is menstruating in the first three days donate blood?	56	74.67	19	25.33	220	65.28	117	34.72
4.Can a person who has or has had any type of cancer donate blood?	45	60.00	30	40.00	249	73.89	88	26.11
5.Is all donated blood tested for AIDS, Hepatitis B, Hepatitis C, and syphilis to ensure it is free of transmissible diseases?	41	54.67	34	45.33	179	53.12	158	46.88
6.If a donor has a fever on the day of donation, can he donate blood?	59	78.67	16	21.33	214	63.50	123	36.50
7.To donate blood, should the donor be fasting?	47	62.67	28	37.33	164	48.66	173	51.34
8.Can women who are breastfeeding donate blood?	33	44	42	56	170	50.45	167	49.55
9.Does donated blood have to be used within 24 h after donation, otherwise it is not good anymore?	49	65.33	26	34.67	212	62.91	125	37.09
10.Can a person acquire a disease by donating blood?	49	65.33	26	34.67	146	43.32	191	56.68

Table 3 shows that donors were generally more informed, despite the fact that both groups had misconceptions, such as whether nursing mothers could donate blood. 44% of donors and 50.45% of non-donors gave correct responses. Donors and non-donors were roughly equally aware of the importance of blood tests in halting the spread of disease. 54.67% of donors and 53.12% of non-donors gave accurate answers.

Table 4

Participants' knowledge of the advantages blood donation has for donors' health

Responses	Donor (75 participants)						Non-Donor (337 participants)					
	Yes		No		I don't know		Yes		No		I don't know	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
1.Are you aware that blood donation can reduce risk of cardiovascular diseases?	46	61.33	12	16	17	22.67	117	34.72	121	35.91	99	29.38
2.Are you aware that burning calories is one of the benefits obtained through blood donation?	44	58.67	14	18.67	17	22.67	125	37.10	125	37.10	87	25.82
3.Are you aware that blood donation can potentially promote blood cell development?	50	66.67	9	12	16	21.33	200	59.35	76	22.55	61	18.10
4.Are you aware that donors get medical incentives through the practice of donating blood in Malaysia?	37	49.33	16	21.33	22	29.33	169	50.15	86	25.52	82	24.33

Table 4 Donors were more aware of benefits including promoting blood cell formation and reducing cardiovascular risks (61.33% and 66.67%, respectively) than non-donors (34.72% and 59.35%). Just 49.33% of blood donors and 50.25% of non-donors in Malaysia are aware that giving blood can result in medical benefits for donors.

Table 5

Participants' awareness on blood donation's role in saving lives

Responses	Donor (75 participants)						Non-Donor (337 participants)					
	Yes		No		I don't know		Yes		No		I don't know	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
1.Do you think blood donation is crucial to saving lives in burnt and trauma?	59	78.67	4	5.33	12	16	256	75.96	25	7.42	56	16.62
2. Are you aware that blood donation is crucial for patients undergoing cancer treatment?	43	57.33	10	13.33	22	29.33	145	43.03	65	19.29	127	37.69
3.Are you aware that blood donation plays an important role in pregnancy complications.	43	57.33	10	13.33	22	29.33	175	51.93	53	15.73	109	32.34
	Correct answer			Incorrect answer			Correct answer			Incorrect answer		
	n		(%)	n		(%)	n		(%)	n		(%)
5.Do all surgical procedures require blood transfusion?	33		44	42		56	169		50.15	168		49.85
6.How many bags of blood are needed to save lives in Malaysia?	30		40	45		60	144		42.73	193		57.27
7.How many lives can be saved by a single blood donation?	23		30.67	52		69.33	92		27.30	245		72.70

Table 5 According to donors and non-donors (78.67% and 75.96%, respectively), blood donation is crucial for saving lives in burn and trauma situations. Fewer people, nevertheless, were aware of its significance in long-term healthcare, including the management of cancer and pregnancy-related issues. Furthermore, 69.33% of donors and 72.70% of non-donors provided the wrong response, indicating that neither parties are aware of the potential number of lives that a single contribution could save.

The awareness score's correlation with other variables

The association between blood donation awareness and socio-demographic characteristics was investigated using a Chi-Square test. Statistical significance was defined as a p-value of less than 0.05. Tables 16 and 17 provide a summary of the findings.

Table 6 & 7

Participants' ages and awareness scores

Table 6:Cross tabulation between age range of participants and awareness score

		Awareness score		Total
		Unaware	Aware	
Age range of participants	<20 yrs	105	71	176
	20-30 yrs	82	148	230
	>30 yrs	3	3	6
Total		190	222	412

Table 7: Chi-Square test between age range of participants and awareness score

		Awareness score
Age range of participants	Pearson's Chi-Square value	23.162[a]
	Asymptomatic significance (2-sided)	< 0.0001
	N	412

The results are summarized in Tables 6 and 7. There was a strong correlation ($p<0.0001$) between the participants' blood awareness score and age range. Compared to those under 20, who only demonstrated 40% awareness, those between the ages of 20 and 30 shown a higher awareness level (64.35%).

Table 8 & 9

Gender of participants and Awareness score

Table 8:Cross tabulation between gender of participants and awareness score

		Awareness score		Total
		Unaware	Aware	
Gender of participants	Female	134	163	297
	Male	56	59	115
Total		190	222	412

Table 9: Chi-Square test between gender of participants and awareness score		
		Awareness score
Gender of participants	Pearson's Chi-Square value	0.427[a]
	Asymptomatic significance (2-sided)	0.513
	N	412

The awareness score and gender did not significantly correlate (p = 0.513). According to Tables 8 and 9, knowledge of blood donation was comparable among males and females.

Table 10 & 11

Participants' educational attainment and awareness score

Table 10:Cross tabulation between level of education and awareness score				
		Awareness score		Total
		Unaware	Aware	
Level of education	Diploma	16	12	28
	Post-graduate	8	13	21
	Pre-U	51	34	85
	Undergraduate	115	163	278
Total		190	222	412

Table 10 indicates that postgraduate students had the highest awareness (61.90%), followed by undergraduates (58.63%), while diploma holders (42.86%) and pre-university students (40%) had the lowest awareness

Table 11: Chi-Square test between Level of education and awareness score		
		Awareness score
Level of education	Pearson's Chi-Square value	11.031[a]
	Asymptomatic significance (2-sided)	0.012
	N	412

Given that the p-value (0.012) is smaller than 0.05, Table 11 shows a significant relationship between awareness ratings and educational achievement.

Table 12 & 13

Study types as well as the awareness score

Table 12:Cross tabulation between types of studies of participants and awareness score				
		Awareness score		Total
		Unaware	Aware	
Types of studies	Medical	11	53	64
	Non-medical	179	169	348
Total		190	222	412

Table 12 demonstrates that medical students were significantly more aware (82.81%) than non-medical students (48.56%).

Table 13: Chi-Square test between Type of studies and awareness score		
		Awareness score
Type of studies of participants	Pearson's Chi-Square value	25.518[a]
	Asymptomatic significance (2-sided)	< 0.0001
	N	412

Table 13 shows a substantial correlation between research type and awareness levels, with the p-value (<0.0001) being significantly below 0.05.

Table 14 & 15

Table 14:Cross tabulation between donor status and awareness score				
		Awareness score		Total
		Unaware	Aware	
Donor status	No	170	167	337
	Yes	20	55	75
Total		190	222	412

According to table 14 Donors had a higher knowledge level (73.33%) than non-donors (49.55%).

Table 15: Chi-Square test between donor status and awareness score		
		Awareness score
Donor status of participants	Pearson's Chi-Square value	13.959[a]
	Asymptomatic significance (2-sided)	< 0.0001
	N	412

Table 15 shows a substantial ($p < 0.0001$) correlation between donor status and awareness score.

Table 16 & 17

Ethnicity and Awareness score

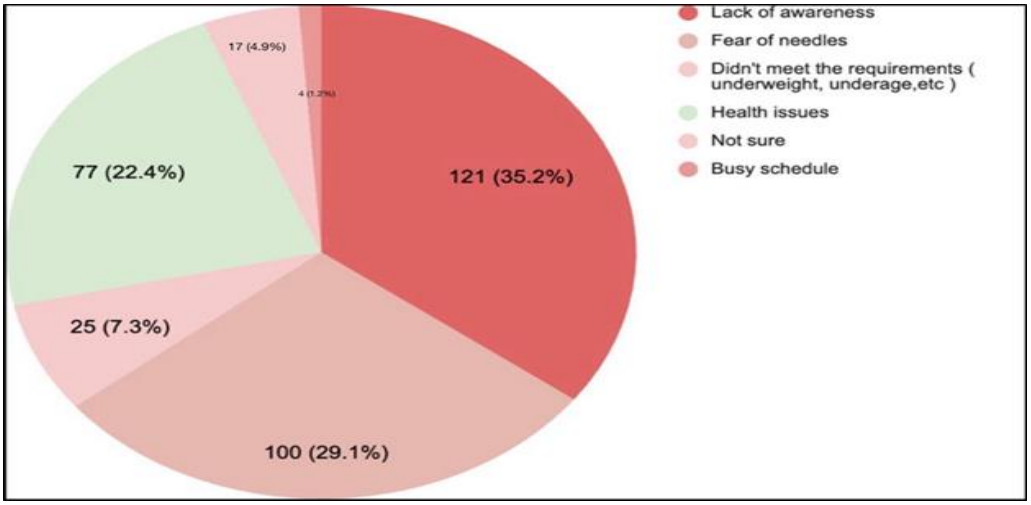
Table 16:Cross tabulation between ethnicity of participants and awareness score				
		Awareness score		Total
		Unaware	Aware	
Ethnicity of participants	Chinese	87	107	194
	Indian	34	56	90
	Malay	37	36	73
	Others	32	23	55
Total		190	222	412

Table 17: Chi-Square test between ethnicity of participants and awareness score		
		Awareness score
Ethnicity of participants	Pearson's Chi-Square value	6.480[a]
	Asymptomatic significance (2-sided)	0.090
	N	412

There is no discernible correlation between awareness score and ethnicity ($p = 0.090$) in Table 16 & 17. In general, knowledge levels were consistent across ethnic groups.

Barriers to Blood Donation

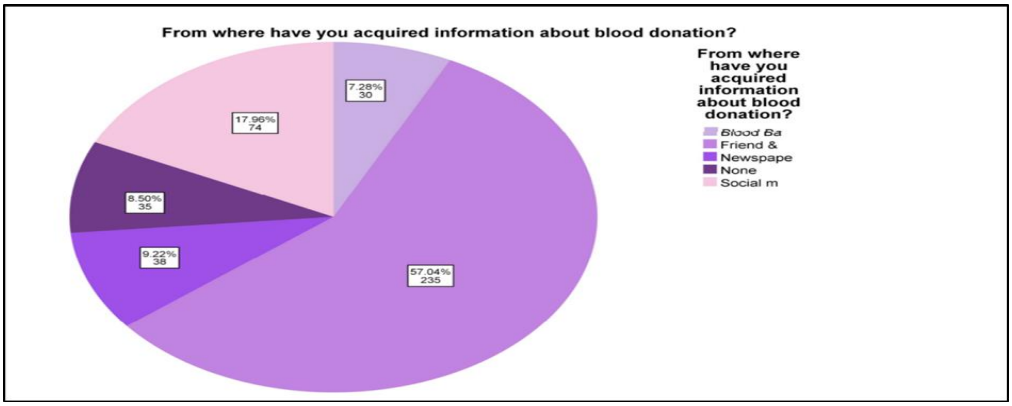
Figure 3: The distribution of reasons not to donate blood is displayed in a pie chart.



According to the data, the most frequent excuses offered by non-donors for not donating blood were health concerns (22.4%), needle phobia (29.1%), and ignorance (35.2%). Furthermore, 4.9% were unsure of the reason why 7.3% did not match the qualifying standards. Only 1.2% of respondents said they had a hectic schedule.

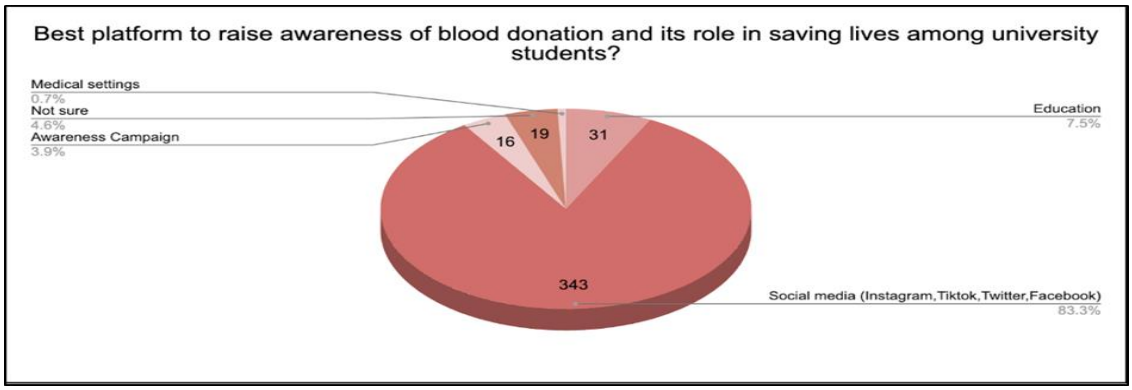
Strategies for raising blood donation awareness

Figure 4: Pie chart shows the sources participants acquire information from blood donation



The majority of people (57.04%) discovered about blood donation from friends and family, with social media (17.96%), newspapers, and books (9.22%) following closely behind. Some people (7.28%) also received information from blood bank staff. Moreover, 8.5% of them got their knowledge from absolutely no sources. University students agreed that social media was the most effective way to spread the word about blood donation and its life-saving benefits, saving advantages (83.3%), followed by education (7.5%) and awareness campaigns (3.9%). 4.6% of students were unsure, whereas 0.7% of students suggested medical settings (clinics and hospitals).

Figure 5: Pie chart demonstrates the most effective venue for awareness-raising



The pie chart illustrates the perceived most effective platform for raising awareness about blood donation and its life-saving importance among university students. A significant majority of participants (83.3%, n = 343) identified social media platforms (such as Instagram, TikTok, Twitter, and Facebook) as the most impactful medium. This highlights the growing influence of digital platforms in reaching younger populations effectively. The second most favored option was education (7.5%, n = 31), indicating that formal educational settings still play a role, albeit a smaller one, in disseminating health-related information. Not sure responses accounted for 4.6% (n = 19), while awareness campaigns were selected by 3.9% (n = 16), showing relatively limited confidence in traditional awareness methods. Only 0.7% (n = 3) considered medical settings as an effective platform for raising awareness. Overall, the data suggest that to maximize impact among university students, awareness campaigns should prioritize engaging, informative content delivered via popular social media channels.

Discussion

The study assessed the knowledge of Malaysian university students on blood donation, taking into account variables including age, education, and donor status. It looked at obstacles, how well awareness campaigns work, and possible ways to boost student involvement in the future.

(i) Knowledge of blood donation and how it can save lives

The survey results revealed that 53.88% of college students had a moderate understanding of blood donation and its importance in saving lives, consistent with Hasnoor et al. (2023), who found similar levels of knowledge. Most participants scored above 50% on tests related to blood donation and transfusions, consistent with findings by Abidin and Shet (2021) and Zainal Abidin (2021), who also reported adequate awareness among students. Additionally, a study in Chennai found that 66.7% of participants understood blood donation well (Devi et al., 2024). A Saudi Arabian poll showed moderate awareness (48.8%), perfect awareness (29.3%), and limited awareness (22%) (Alharbi et al., 2018).In contrast, studies in Nigeria and Addis Ababa revealed higher knowledge levels, with respondents in Nigeria showing good knowledge and those in Addis Ababa scoring 85% and 83% respectively, higher than the present study's findings (Salaudeen et al., 2011; Misganaw et al., 2014). However, Baig et al. (2013) found lower levels of understanding in their study. 93.33% of blood donors in this study knew their blood group, a substantially higher awareness score than 78.34% of non-donors. After making their first donation, donors could receive a blood card, which could explain this. However, only 52% of donors and 29.38% of non-donors correctly answered, indicating knowledge gaps in both groups, particularly with relation to donation frequency. When asked about age restrictions and the volume of blood drawn each donation, both groups received low scores. According to a different survey, less than half of respondents were aware of important details regarding blood donation, such as the annual cap, the amount of donations, and the universal blood types used for transfusions (Malaysia Investment Development Authority [MIDA], 2023; Abidin & Shet, 2021). Additionally, a another survey found that 90.9% of students couldn't accurately identify the minimum age to donate blood (Mahfouz et al., 2021). The majority of participants (78.67% of donors and 75.96% of non-donors) acknowledged the life-saving value of blood donation in emergency situations, while less were aware of its usefulness for long-term treatments including cancer therapy and pregnancy difficulties. This is consistent with the findings of Karakkamandapam et al. (2011), who discovered that people's awareness of blood donation tended to concentrate on crises while ignoring more extensive medical applications. According to a

survey conducted in Nigeria, 47.5% of participants knew very little about the medical illnesses that need blood transfusions; just 43% of them could properly identify conditions such anaemia, trauma, traffic accidents, sickle cell anaemia, and surgery (Salaudeen et al., 2011).

The observed discrepancies in the proportion of blood donation might be related to differences in socio-demographic factors and accessibility to information about the vital role of blood donation.

(ii) Age of participants and Awareness score

Individuals aged 20–30 showed greater awareness, with a score of 64.35%, whereas 60% of participants below the age of 20 were found to be unaware. A strong and statistically significant correlation was observed between participants' age and their level of awareness ($p < 0.0001$). The findings highlight the greater exposure to blood donation knowledge and imply that older students may have a better awareness score as a result of their increased exposure to health activities, peer interactions, and educational materials.

(iii) Donor status and Awareness score

Among 412 participants, 75 were donors and 337 were non-donors. The analysis identified a significant relationship between donor status and level of awareness ($p < 0.0001$). Donors had a greater awareness level (73.33%) than non-donors (49.55%), underscoring how experience can enhance knowledge. This concurs with findings by Ying et al. (2024) and Abidin & Shet (2021), which indicated that donors typically have higher awareness due to their exposure to the donation process and relevant information. Therefore, encouraging first-time donations could be an effective way to boost awareness and engagement. It is also crucial to recognize that even donors may not have complete knowledge. For example, a study conducted in Ghana found that only about one-third of donors were aware of the minimum age for blood donation (36.0%) and the permissible annual donation amount (37.7%) (Mohammed et al., 2018). These results emphasize the necessity for ongoing and targeted educational initiatives to enhance awareness, even among current donors.

(iv) Education level and Awareness score

Awareness levels were found to be significantly linked to education level ($p = 0.012$). The study revealed that postgraduate students had the highest level of knowledge (61.90%), followed by undergraduates (58.63%). In contrast, awareness was lowest among pre-university (40%) and diploma students (42.86%). These findings highlight the crucial role of education in enhancing awareness. A different study reported that 97.9% and 96.8% of 94 undergraduate students possessed adequate knowledge and held positive perceptions about blood donation. Similarly, research conducted in Saudi

Arabia found a statistically significant rise in awareness corresponding with higher education levels ($p < 0.001$) (Majdabadi et al., 2018; Mahfouz et al., 2021). Higher educated individuals are more likely to comprehend the significance of blood donation, according to this pattern, which could lead to an increase in participation rates.

(v) Educational degree type and awareness score

The type of study or course was significantly correlated ($p < 0.0001$) with awareness scores. Medical students in this study had a considerably higher awareness level (82.81%) than non-medical students (48.56%). This is expected, as regular exposure to health-related content enhances medical students' understanding and awareness of blood donation. In a similar vein, a survey conducted in India revealed that medical participants had an average knowledge score of 74.4% (Mohammed & Essel, 2018), and another study discovered that 95.7% of USM School of Health Sciences students knew how to donate blood (Abidin et al., 2021). Furthermore, Chauhan et al. (2018) also observed a significant relationship between academic stream and knowledge level. Pharmacy students had the lowest awareness (20.7%), whereas allied health science students had the highest (53.1%). These findings suggest that students in health-related fields are generally better informed and more aware of the life-saving importance of blood donation, making them more likely to participate.

(vi) Obstacles to Giving Blood

337 of the 412 participants did not donate. The study found a number of obstacles to blood donation, including a lack of knowledge, needle phobia, and health-related problems. Insufficient awareness was cited by a sizable majority of participants (35.2%) as a major obstacle, highlighting the necessity of focused educational initiatives to address this problem. This result aligns with other research emphasizing the need for increased public education on eligibility, safety, and the effects of blood donation (Ling et al., 2018; Karakkamandapam et al., 2011; Sabu et al., 2011). Moreover, the study revealed that almost 30 % of participants had needle anxiety, which corresponds to previous studies stressing this obstacle to blood donation. This psychological barrier may discourage potential blood donors. It' ‘s important to explore strategies to reduce anxiety and make blood donation more accessible. Desensitization, through controlled exposure to images of blood donation or needle simulators, can help diminish needle-related anxiety over time. Another effective method is relaxation therapy, where individuals practice gradual muscle relaxation or deep breathing exercises before receiving a needle (Sabu et al., 2011).In contrast,a study by Özgür et al. (2018) found that anxiety was the biggest obstacle for men, while anemia was the primary reason why female Turkish university students did not donate blood.

As noted by Shaz et al. (2010), 35% of participants expressed anxiety, nervousness, or fear when giving blood (Kocic et al., 2024). The majority of participants (73.1%) agreed with the statement, "I don't want my blood to be given to other religions," while 67.8% felt the same way about giving blood to individuals of various races (Shaz et al., 2010). This is according to Mat Noh et al. (2019). However, concerns regarding the potential sale of donated blood were found to be a substantial disincentive to donation by Özgür et al. (2018). Similar concerns were voiced by Lownik et al. (2012), who pointed out that concerns regarding the sale of donated blood represent a major barrier to donation in developing countries.

(vii) Effective Awareness Strategies

The research revealed that a majority of participants (57.04%) discovered blood donation through friends and family, with social media at 17.96% and newspapers/books at 9.22%. Similarly, research conducted among university students in KSA revealed that the two most common sources through which students learned about blood donation were friends (53%) and television (24%) (Baig et al., 2013; Mahfouz et al., 2021). Friends and family likely have a significant impact, as people tend to trust and value the advice of those they know personally. Additionally, social media greatly influences particularly younger generations who are frequently online. Additionally, according to this survey, social media was deemed the most successful method of increasing awareness by 83.3% of respondents, followed by education (7.5%) and awareness campaigns (3.9%). This was corroborated by Alharbi et al. (2018), who proposed that the blood donation strategy should maximise the use of social media and public events (Dubey et al., 2014). A similar study in Chennai, Tamil Nadu, indicated that organizing donation camps on campuses increased students' willingness to donate, with awareness campaigns and educational events playing a crucial role in motivating them (Devi et al., 2024). This study is consistent with a study conducted in Thailand, which noted that having more knowledge about blood donation does not automatically lead to increased donations. Therefore, targeted campaigns are required to convert awareness into actual voluntary donations (Wiwanitkit, 2002). According to Turkish research, emphasizing the health benefits of donating blood, establishing blood collection stations on college campuses, and enhancing the availability of Red Crescent blood donation vehicles could significantly boost the number of university students who voluntarily donate blood (Özgür et al. , 2018).

Conclusion

In conclusion, this research examined the awareness of blood donation among Malaysian university students. While 53.88% of participants were familiar with the concept of blood donation, significant information gaps were observed especially among non-donors.

For instance, only 29.38% of non-donors knew how frequently an individual can donate blood each year. On the other hand, donors showed a greater sense of awareness, truly embodying the saying, “Experience is the best teacher.” Factors like age, educational background, and area of study had a significant impact awareness. Students who were older and better educated knew more about blood donation. For example, compared to their non-medical peers, medical students demonstrated much higher awareness levels. We might emphasise the importance of education in forming consciousness by saying, "Education opens doors to understanding." We can urge more young people to donate blood by filling in these information gaps and strengthening focused awareness campaigns, ultimately supporting life-saving medical activities.

Limitations

This study was conducted at several institutions within a single state, so the findings may not be representative of all universities in Malaysia. Additionally, distribution of questionnaires was not equalized to all existing universities of the chosen study location, subsequently leading to a lack of representation of a wide range of students. The outcome was an uneven distribution of specific subgroups, which directly impacted the results. Due to the voluntary nature of participation, response bias poses a limitation since some respondents might provide answers that align better with social desirability. Therefore, this might be improved in future studies by employing more representative sampling techniques and a larger, more diverse sample.

Recommendations & Implications

To increase awareness and involvement in blood donation among university students, frequent donation campaigns on campus should be undertaken to make it easier and more convenient for students to give. Given that a large number of students rely on social media for information, campaigns should use straightforward and interesting material on sites like Instagram and TikTok. Additionally, introduction sessions or pertinent university courses might incorporate basic information regarding blood donation. Brief awareness presentations or support meetings may help ease the anxiety of those who are afraid or unsure. Additionally, designating student ambassadors to advocate for blood donation within their faculties may inspire more students to participate. These initiatives might close knowledge gaps and increase youth blood donation rates.

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