ORIGINAL ARTICLE

Knowledge and Attitude towards Blood Donation among Non Blood Donor Residents of Kuala Terengganu at Hospital Sultanah Nur Zahirah, Kuala Terengganu

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ABSTRACT

Introduction: : Blood supply shortage is a worldwide problem including Malaysia. According to statistical data from 2011 to 2015, Terengganu which is one of the states in Malaysia has the lowest blood donation rate. The objective of this study was to determine the knowledge and attitude score towards blood donation and their associated factors among nondonors of Kuala Terengganu. **Methods:** This was a cross-sectional study using a self-administered questionnaire involving systematically random sampling of 320 nondonors attending Hospital Sultanah Nur Zahirah. Data were analysed using Multiple Logistic Regression and Pearson correlation. **Results:** The mean knowledge and attitude scores were 5.19 (1.87) and 70.79 (8.19), respectively. Sixty-four percent (64.69%) and 92.81% of the participants have good knowledge and attitude, respectively. Gender, education level, and occupation have a significant association with knowledge, while education level and occupation were found to be significantly associated with attitude. No significant association found between the knowledge and attitude level. Most reported barriers to blood donation were a refusal to give blood to other religion and race. The main source to acquire information pertaining to blood donation was mainly from social media. **Conclusion:** Refusal of giving blood to other religion and race is recognised as the main issue that hinders participants to donate their blood. Thus, proper education and aggressive promotion regarding blood donation are needed especially among the nondonor in this region of Malaysia.

Keywords: Knowledge, Attitude, Blood donation, Nondonor, Kuala Terengganu

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INTRODUCTION

The vision and mission of most Blood Transfusion Services (BTS) from all over the world, including Malaysia, is to provide enough and safe blood supply according to demand (1). To ensure the safety and effectiveness of blood transfusion, the process starts with selecting donors that are considered safe. There are many definitions of safe blood donors derived from different point of view. World Health Organization (WHO) stated that voluntary, non-remunerated blood donors were considered as the safest donor as they have the lowest prevalence of transfusion-transmitted infections and they have no conflict of interest in rewards from blood donation (2). On the other hand, the indication and usage of blood and blood products have widened together with the changing of the population's

age group and the advancement of the medical and surgical field. There are more surgical-related indications for blood transfusion, for example, cardiac-related surgeries, transplant surgeries, and interventional radiological procedures. The costs of blood transfusion activity in surgical patients were also increased tremendously (3). There are many changes that occur in a developing nation in the progress of becoming a developed nation, and this includes sociodemographic shift, the ageing population as well as changes in the attitude and behaviour of the local population. These changes cause a demand-supply discrepancy of blood and blood products due to an increase in demand but a decrease in supply (4). This situation can be seen in most developing countries, for example, India, China, Thailand as well as Indonesia (5-8). Thus, increasing the blood donation rate together with maintaining the donor pool is important to prevent blood supply shortage (9). Regular voluntary blood donation rate should at least be 5% of the population in any developed countries (10). However, Malaysia has not reached the standard of WHO whereby the blood donation rate only ranging

from 2.0% to 2.25% (10). With the estimated increased ageing population in Malaysia by the year 2020, the Blood Transfusion Services will face a problem in supplying adequate blood and blood products to cater requests from hospitals. The request for blood and blood products from hospitals are estimated to increase to cater for treatment for elderly patients in hospitals. This has been proven by Greinacher A. and colleagues in a study in 2017, studying the implication of demographic changes on blood donation and transfusion demand, where the result reported that the use of blood in particular packed red cells showed an increase in the absolute transfusion demand in the elderly patient who is more than 75 years of age. More than 60% of all transfusion was given to patients of more than 65 years of age most probably due to increment in the number of elderly age group population in Germany (11).

Terengganu which is one of the states in Malaysia was shown to record the lowest blood donation rate for the five consecutive years (from 2011 until 2015) with only 14 to 16 donations per 1000 populations as compared to 92 to 99 donations per 1000 populations recorded in Federal Territory Kuala Lumpur. There was an increment of 4.4% in the number of recipients with an increment of 7.9% in the number of blood units utilised in Terengganu for the year 2015 (10). With an increasing demand but low in supply, the Terengganu transfusion unit will have to obtain an additional 8% of their blood utilisation from other states for the past five years.

Based on the statistics, it is noted that Terengganu is still lagging far behind other states in Malaysia in terms of blood donation rate. The practice of blood donation in Terengganu is still poor despite various measures that have been taken these past few years to create awareness, be it, at the national level or state level. There have been many studies from all over the world assessing the awareness of the public in many categories towards blood donation since the early 90's. Studies from developed countries showed a slight difference compared to developing or under-developed countries. Most of the studies assessed the level of knowledge, attitude and practice towards blood donation and the results have been highlighted in many ways (12-14). Hence, a study of knowledge and attitude towards blood donation among the nondonors in the local population is needed to help in formulating the best approach in increasing the donation activity in this state as well as to understand the blood donation motivation among the non-blood donors. The outcome of this research may help in formulating the best method and approach to targeted people and organisation by enhancing their awareness and incorporating them in blood donation activities.

Thus, the aim of this study is to determine knowledge and attitude status towards blood donation and their associated factors including gender, age, marital status, education level and occupation among nonblood donor residents of Kuala Terengganu. Besides, we are also assessing the association between knowledge and attitude status of the participants.

MATERIALS AND METHODS

Study background
This was a cross-sectional study involving 320 nondonors residents of Kuala Terengganu who were hospital attendee at HSNZ in February 2017. Participants were selected using systematic random sampling.

Inclusion and exclusion criteria
The inclusion criteria included Malaysian citizen, aged 18 to 60 years old (based on a guideline by National Blood Centre, Malaysia) with either permanent or mailing address within Kuala Terengganu for them to be considered as residents of Kuala Terengganu (1). Participants with documented medical or psychiatric illnesses, history of blood donation, did not understand either Bahasa Melayu or English, have never heard of blood donation, and healthcare personnel was excluded to reduce bias.

Study instruments
The questionnaire was adapted from a validated questionnaire by Mahmood et al. (2008) in a study "Barriers to donate blood: How to handle worldwide dilemmas" done in 2008 with permission (12). Gender, age, marital status, education level, and occupation were used as the independent variables in this study. As for the dependent variables, knowledge and attitude scores were used as the outcome. These factors were included based on the literature reviews from previous papers with the hypotheses that they have significant relation with knowledge and attitude towards blood donation (12-15). The questionnaire consists of two main parts. There were eight questions in the knowledge section. The correct answers in the knowledge section were given one mark while the wrong answer or do not know answers were given zero marks. Total score of knowledge was ranged from zero to eight marks. Score zero to four were categorised as poor knowledge while those who scored five to eight were categorised as having good knowledge. For the attitude section, there were a total of 20 questions and answers were in Likert scoring form with more positive attitudes carry a higher score. Score 20 to 60 were categorised as poor attitude while score 61 to 100 were categorised as a good attitude. A self-administered structured questionnaire was given to the participants after obtaining their informed consent.

Ethical issue
Ethical approval was obtained from the Human Research Ethics Committee, Universiti Sains Malaysia (HREC, USM), Ministry of Health and institutional consent from HSNZ prior to the study. The privacy and confidentiality in this study were not compromised as there were no

identifiable personal data taken or recorded from the participants. There was no conflict of interest in this study.

Statistical analysis

Data analyses were executed using IBM SPSS version 22.0 with descriptive analysis using mean and standard deviation. The association between demographic factors with knowledge and attitude status were analysed using simple and multiple logistic regressions. Histogram with normality curve was used to check for the normal distribution of data in this study. Age group of 46-55 years old was combined with age group 56-60 years old and it was renamed as 46-60 years old age group. The no formal education group was also combined with the primary school education group and was renamed as low education level. These steps were done due to the very low number in each group to compare with other groups within the same category. Association between each demographic factors and knowledge with attitude status was analysed by simple logistic regression. Those with p <0.25 were retained in multiple logistic regression. The forward and backward method was tested to get the best model which is the best fit, parsimonious, biologically plausible and statistically significant. Pearson correlation analysis and scatter plot were performed to check the relationship between knowledge score and attitude score. Results were significant if p value less than 0.05.

RESULTS

Demographic characteristics of the sample population

There were 320 participants that fulfilled the inclusion and exclusion criteria. The demographic characteristics of the participants were summarised in Table I.

Knowledge and attitude score towards blood donation

In general, the majority of the participants had good knowledge and attitude level of 64.69% and 92.81%, respectively. The mean score of knowledge among the participants was 5.19 ± 1.87, while the mean score of attitude among the participants was 70.79 ± 8.19.

Association between demographic factors with knowledge status

Results in Table II showed that variables gender, education level, and occupation had a statistically significant association with knowledge status (p<0.05). Female was 46.1% less odds to have good knowledge compared to male (p=0.009), college/university education group had 10.0 times the odds to have good knowledge compared to those with low education group (p=0.042) and those working in private had 2.4 times the odds to have good knowledge compared to those working in government when other confounder was not adjusted (p=0.013). Variables secondary school education level, self-employed and student had p<0.25 and were considered for variables selection in. The

Table I: Participants' demographic characteristics (n=320)

Variables	n (%)
Gender	
Male	162 (50.6)
Female	158 (49.4)
Marital status	
Married	142 (44.4)
Unmarried	178 (55.6)
Age	
18 – 25 years	102 (31.9)
26 – 35 years	155 (48.4)
36 – 45 years	49 (15.3)
46 – 55 years	10 (3.1)
56 – 60 years	4 (1.3)
Education level	
No formal education	3 (0.9)
Primary school	2 (0.6)
Secondary school	140 (43.8)
College / university	175 (54.7)
Occupation	
Government	64 (20.0)
Private	79 (24.7)
Self-employed	87 (27.2)
Student	64 (20.0)
Unemployed	26 (8.1)

forward and backward method gave the same decision for the best model and the results for Multiple Logistic Regression were tabulated in Table III.

Table III showed that gender, education level, and occupation had a significant association with knowledge. Female was 43.6% less odds to have good knowledge compared to male when adjusted for education level and occupation (p=0.02). Variable education level had a statistically significant association with knowledge status where those with college/university education level had 11.4 times the odds to have good knowledge compared to those with low education level group when adjusted for gender and occupation (p=0.037). Occupation also was statistically significant associated with knowledge status where participants working in private had 3.1 times the odds to have good knowledge compared to those working in government (p=0.004), while self-employed participants had 2.7 times the odds to have good knowledge compared to participants working in government sectors (p=0.013) when adjusted for gender and education level.

Association between demographic factors with attitude status

Table IV showed education level and occupation had

Table II: Association between demographic factors with knowledge status by Simple Logistic Regression

Variables	Regression coefficient (b)	Crude Odds ratio (95% CI)	Wald statistics	p value
Gender				
Male	Ref.	1		
Female	-0.619	0.539 (0.338, 0.857)	6.804	0.009*
Marital status				
Married	Ref.	1		
Unmarried	0.213	1.238 (0.781, 1.962)	0.823	0.364
Age				
18 – 25 years	Ref.	1		
26 – 35 years	0.162	1.176 (0.698, 1.982)	0.371	0.542
36 – 45 years	0.022	1.023 (0.505, 2.072)	0.004	0.951
46 – 60 years	0.066	0.891 (0.236, 3.358)	0.013	0.911
Education level				
Low education	Ref.	1		
Secondary school	1.703	5.429 (0.598, 50.403)	2.268	0.132**
College / university	2.303	10.000 (1.091, 91.679)	4.149	0.042*
Occupation				
Government	Ref.	1		
Private	0.894	2.444 (1.206, 4.955)	6.144	0.013*
Self-employed	0.454	1.574 (0.812, 3.051)	1.808	0.179**
Student	0.529	1.697 (0.828, 3.476)	2.087	0.149**
Unemployed	-0.188	0.829 (0.333, 2.064)	0.163	0.686

Simple Logistic Regression
*p<0.05
**p<0.25
Ref. = Reference

Table III: Association between demographic factors with knowledge status by Multiple Logistic Regression

Variables	Regression coefficient (b)	Adjusted Odds ratio (95% CI)	Wald statistics	p value
Gender				
Male	Ref.	1		
Female	-0.573	0.564 (0.347, 0.915)	5.370	0.020*
Education level				
Low education	Ref.	1		
Secondary school	1.476	4.376 (0.454, 42.194)	1.630	0.202
College / university	2.434	11.405 (1.162 1, 111.945)	4.363	0.037*
Occupation				
Government	Ref.	1		
Private	1.139	3.123 (1.451, 6.722)	8.475	0.004*
Self-employed	0.981	2.667 (1.228, 5.794)	6.144	0.013*
Student	0.359	1.432 (0.681, 3.011)	0.896	0.344
Unemployed	0.625	1.868 (0.660, 5.290)	1.384	0.239

Multiple Logistic Regression
*p<0.05
Ref. = Reference

a significant association with attitude. Those attending secondary school had 9.7 times the odds to good attitude compared to those with low education level when other confounder was not adjusted (p=0.02). Those attending college or university had 9.1 times the odds to have good attitude compared to those with low education level when other confounder was not adjusted (p=0.022). Unemployed participant 79.3% less odds to have good attitude compared to those working in government when other confounder was not adjusted (p=0.041). Unmarried and age group of 46 to 60 years old reported p<0.25 and was considered for variables selection in. The backward method gave the best model with two significant variables which were education level and occupation and the results for Multiple Logistic Regression were tabulated in Table V.

Table IV: Association between demographic factors with attitude status by Simple Logistic Regression

Variables	Regression coefficient (b)	Crude Odds ratio (95% CI)	Wald statistics	*p* value
Gender				
Male	Ref.	1		
Female	-0.121	0.886 (0.379, 2.072)	0.078	0.781
Marital status				
Married	Ref.	1		
Unmarried	0.527	1.693 (0.719, 3.984)	1.454	0.228**
Age				
18 – 25 years	Ref.	1		
26 – 35 years	-0.487	0.614 (0.210, 0.1799)	0.790	0.374
36 – 45 years	-0.545	0.580 (0.149, 2.263)	0.615	0.433
46 – 60 years	-0.174	0.309 (0.054, 1.773)	1.735	0.188**
Education level				
Low education	Ref.	1		
Secondary school	2.273	9.704 (1.433, 65.689)	5.424	0.020*
College / university	2.203	9.056 (1.378, 59.512)	5.261	0.022*
Occupation				
Government	Ref.	1		
Private	-0.682	0.506 (0.125, 2.041)	0.917	0.338
Self-employed	-0.410	0.664 (0.160, 2.761)	0.317	0.573
Student	0.422	1.525 (0.246, 9.445)	0.205	0.650
Unemployed	-1.577	0.207 (0.045, 0.940)	4.164	0.041*

Simple Logistic Regression   *p<0.05   **p<0.25   Ref.= Reference

Table V: Association between demographic factors with attitude status by Multiple Logistic Regression

Variables	Regression coefficient (b)	Adjusted Odds ratio (95% CI)	Wald statistics	*p* value
Education level				
Low education	Ref.	1		
Secondary school	2.703	14.923 (1.809, 123.089)	6.304	0.012*
College / university	1.877	6.534 (0.806, 52.966)	3.091	0.079
Occupation				
Government	Ref.	1		
Private	-0.950	0.387 (0.093, 1.610)	1.705	0.192
Self-employed	-0.751	0.472 (0.103, 2.151)	0.942	0.332
Student	0.528	1.696 (0.270, 10.664)	0.317	0.573
Unemployed	-2.113	0.121 (0.021, 0.685)	5.700	0.017*

Multiple Logistic Regression   *p<0.05   Ref.= Reference

From Table V, education level and occupation showed a significant association with the attitude among participants. Those attending secondary school had 14.9 times the odds to good attitude compared to those low education group when adjusted for occupation (p=0.012). Unemployed was 87.9% less odds to have good attitude compared to those working in government when adjusted for education level (p=0.017).

Association between knowledge status with attitude status

Both scatter plot (Fig. 1) and analysis from Pearson correlation shows that there is no association between knowledge score and attitude score (p=0.122). The observed correlation, r was 0.087 which suggests little or no correlation. There was no pattern seen on the scatter plot.
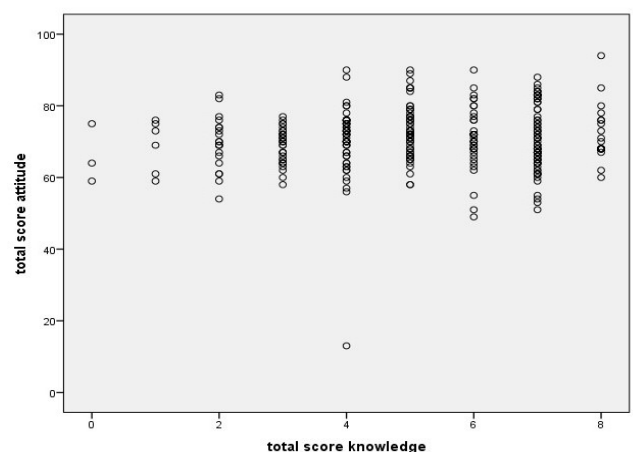

Figure 1: Association between knowledge status with attitude status by scatter plot

Table VI: Barriers toward blood donation among participants

Variables	n(%)				
	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
I do not donate because fear of needles	49 (15.3)	130 (40.6)	101 (31.6)	20 (6.3)	20 (6.3)
I do not donate because lack of time	21 (6.6)	90 (28.1)	130 (40.6)	44 (13.8)	35 (10.9)
I do not want my blood to be given to other races	75 (23.4)	142 (44.4)	29 (9.1)	30 (9.4)	44 (13.8)
I do not want my blood to be given to other religions	104 (32.5)	130 (40.6)	30 (9.4)	24 (7.5)	32 (10.0)
Blood donation is painful	32 (10.0)	144 (45.0)	93 (29.1)	25 (7.8)	26 (8.1)
Blood donation is against law in my religion	2 (0.6)	7 (2.2)	111 (34.7)	65 (20.3)	135 (42.2)
I do not donate because of modesty reason	2 (0.6)	7 (2.2)	92 (28.8)	76 (23.8)	143 (44.7)

Barriers to donating blood among participants

The results for barriers to blood donation among participants were tabulated in Table VI. Surprisingly, the majority of the participants agreed with the statement of "I do not want my blood to be given to other religions" (73.1%), followed by the statement of "I do not want my blood to be given to other races" with 67.8%. Statements of "I do not donate because of the fear of needles" and "Blood donation is painful" were being agreed with 55.9% and 55.0% of the participants, respectively. In terms of the source of information regarding blood donation, 42.2% of the participants had heard of blood donation through social media.

DISCUSSION

Demographic characteristics of the sample population showed a near balance percentage between male and female. This was in concordance with the gender distribution recorded in Terengganu in 2016 with 50.8% of male and 49.2% of female (16). The age distribution in this study reflected the age distribution of the general population in Malaysia where the highest age group was those aged 20 to 24 years old followed by age group from 15 to 19 years old, as well as 25 to 29 years old (16). As compared to the past especially during the pre-independence days, the primary and secondary education in Malaysia has been able to be widely accessed by almost all Malaysian with different background especially in urban areas, thus increasing the demand for a higher education (17). This situation changed the trend of education level among the Malaysian population with a majority of Malaysians were able to obtain higher education status as reflected by the demographics results in this study. The occupation in this study was quite well distributed except for unemployed participants.

This study reported a good mean knowledge score with a majority of the participants had good knowledge level. This result was in concordance with a previous study by Melku et al. (2016) and Atherley et al. (2016) (14, 18). A previous study in 2008 conducted in Kelantan, Malaysia reported that at least more than 50% of the participants for that study had good knowledge of blood

donation (12). Kelantan and Terengganu had almost comparable sociodemographic background with a slight predominance of male and a majority of Malays and Muslims (19). However, this result was lower than the result reported by Elnajeh et al. (2017) who found 97.1% of the participants in his study had good knowledge (20). Participants of the study were college students where being a student gives a better opportunity for knowledge seeking process, and plus the study was only recently being conducted where at present time, the access to the internet and social media for information seeking has widened tremendously.

Gender was reported to significantly associate with knowledge level in this study. Data from studies in Iran, Saudi and Ethiopia supported this finding (15, 21). The significant difference might be because the male participants had wider access to knowledge sharing platform as many of them go out to work especially in government and private sectors, as well as self-employed, while most of the female participants involved in self-employment were either doing home-based business or unemployed (22). Besides that, the use of the internet to seek information including health-related knowledge among female population in Malaysia was lower as compared to male population (23). In the context of association between age and marital status with knowledge of blood donation, the reported result was most likely due to the knowledge gaining process which has started at the early age of adolescents and young adulthood and way before a person commits to a marriage. A study focusing on Malaysian population and the effect of social networking with knowledge sharing reported that the culture of online social networking in Malaysia gave a significant effect as a platform for knowledge sharing among Malaysian population from all age group and demographic characteristics if they have the access to internet services (24). Thus, age and marital status of an individual did not affect the level of knowledge in this study as compared to education level and occupation. This data was supported by studies done in India and Ethiopia (25, 26). The main trends in Malaysian higher education system were more focused on the transformation of the students into a knowledge-based society with a more holistic approach to the

education system (27). Thus, from the total number who had access to the internet to seek knowledge in Malaysia, 72.5% of them had higher education background (secondary and above) while 27.5%of them had lower education background (below secondary education) (23). These current trends in Malaysian higher education system could possibly shape the college and university students to be more knowledge seeker, thus explains the significant association. Data from a different study showed that individuals who were working in private sectors were more exposed and trained towards knowledge sharing and management, from personal matters to organisational matters, and it could explain the significant difference between knowledge level of private and government workers in this study (28). A study by Strategic Entrepreneurship Plan for Malaysian Institutes of Higher Education done in 2013 had shown great improvements in terms of enrolment of university students in entrepreneurship education, from 16.7% in 2011 to 34.6% in 2013 (29). Thus, the current trends of university graduates getting involved in self-employed jobs could explain the significance of them having a higher knowledge than the government workers.

The mean attitude score reported represented good attitude as it was above the mean total score for attitude section and it was in concordance with a report from Atherley et al. (2016) (18). From this study, 98% of the total sample population had a good attitude towards blood donation. This was in concordance and slightly higher with the results reported by Elnajeh et al. (2017) where 88.8% of his participants scored a good attitude towards blood donation but Alemayehu and Hebo (2017) reported a contrast result with 54.8% of the participants had a poor attitude towards blood donation (20, 25). This difference could be explained by the different population assessed where Ethiopia was still considered as an under-developed country and the exposure to such issues might be lower than Malaysia (30).

It was found that education level and occupation had a significant association with attitude status. In Malaysia, an individual with at least secondary school education level and above had a higher chance of getting a job either in government or private sector, as well as developing own businesses (31, 32). Their exposure to knowledge and awareness of any issues were higher and more positive when these individuals mingled with each other from different sectors. Gender, age, and marital status did not show a significant relationship with attitude status where it could be explained by the fact that development of an attitude towards certain issues was mostly influenced by the individual's own personality and the interaction with their surroundings. Data from a study described that the emotional intelligence of an individual significantly affects their attitude differently depending on their social background (33). Another recent report stated that Malaysian women had a

positive attitude towards health-related information and it significantly associated with internet usage for health-seeking information (34). These factors could explain the non-significance between the variables mentioned above.

Surprisingly, being knowledgeable with regards to blood donation did not necessarily transform into a positive attitude. This finding could possibly explain the low blood donation practice in this current population as both knowledge and attitude must come together to turn it into the practice of blood donation. This was in contrast with other studies done previously where higher knowledge levels significantly associated with a more favourable attitude towards voluntary blood donation (13, 14). In this situation, the attitude of the participants in this study could be explained by the false beliefs regarding blood donation that was seeded in the local society for some time and not being corrected with a proper channel. Most of the participants stated that they do not want their blood to be given to other religions and races, with 73.1% and 67.8% respectively. The local population in Kuala Terengganu were mainly comprised of Malay with 94.74%, followed by Chinese with 3.44% and Indian with 0.25% and 1.28% of the total population of Kuala Terengganu was contributed by the foreigners and the remaining 0.27% was other ethnicities (19). Different race or ethnicity may have their own motivating factors or barriers to blood donation (35). A previous study by a Chinese author stated that the Chinese have an old traditional belief connecting blood with Qi or longevity, thus donating blood will cause a person to have a negative effect to his life (36). This showed that even with a good knowledge and attitude status of an individual, it did not prevent the person from believing the myths and false beliefs that have been spreading around for many years regarding blood donation in different religion and race.

Limitations in this study include the socially desirable responses portrayed by the participants might cause bias. The participants in this study were hospital attendee registered under the Specialist Clinic and Outpatient Department. This could cause bias as the general aim of this study was to assess the awareness of blood donation among healthy non-blood donor individuals. Thus, the application of the exclusion criteria and systematic random sampling that were used in this study reduced the possibility of selection bias. This data also cannot be used to describe other population in other states of Malaysia because of sociodemographic differences in different population.

Results from this study gave a clearer picture to the Blood Transfusion Services of HSNZ regarding the demographic characteristics of the non-donor population of Kuala Terengganu, the knowledge and attitude level of the population towards blood donation, as well as the factors that significantly associated with

the knowledge and attitude level. It was noted that this population studied had a generally good knowledge and attitude towards blood donation, thus the action that must be taken by the BTS should be focusing into the barriers of the practice of blood donation and steps to encourage their involvement in blood donation activity. The myths and false beliefs regarding blood donation in different race and religion must be abolished. Majority of Kuala Terengganu population were contributed by the Malays and Muslims. Thus, the involvement of the religious department is crucial to clear the air and for reassurance to the population. The measures that can be taken by the BTS includes, publishing the outcome of 'Muzakarah Fatwa Kebangsaan' regarding the status of blood donation as well as giving a talk about blood donation during Friday prayers in mosques. These measures can also be modified and used to other race and religion based on their culture. Involvement of the government and private sectors as part of the organiser for blood donation campaign had been going on for years, but the encouragement to the staffs especially the non-donor must be improved. Pamphlets regarding blood donation issues can be made and brought together during a blood donation mobile campaign and should be distributed to the non-donors to increase their awareness. Another step that can help the BTS to encourage the participation of non-donors based on the result in this study is involvement of young adults especially students in college and university, for example, the establishment of young donors club. This can be done in collaboration with the student affairs counsel of the university or college with benefits upon registration. The benefits can be of charge-free upon registration and credit points for extracurricular activities. Another way of encouragement to young adults to become blood donors is through collaboration with local celebrities and social influencers promoting blood donation actively via their social media platform. However, measures to increase the knowledge of blood donation should not be disregard as there were group of participants that had significantly lower knowledge and attitude towards blood donation, especially the female and unemployed individuals. Organising educational events with regards to blood donation together in an event celebrating women could increase the awareness of the women towards blood donation. BTS should make full use of social media as the main source of information regarding blood donation and blood transfusion. The social media platform is able to give an interactive two-way communication between BTS and the public. The website, Facebook, Instagram, and Twitter are examples of the popular social media that have gone mainstream for the past years. Information delivery through television and radio must not be left out if there is such an opportunity.

A further research is needed to explore on why the barriers towards blood donation developed among the nondonor population. Another recommendation for future study is to focus on the donor's profile in the population as well as determining the motivating factors to donating blood.

CONCLUSION

In general, the majority of participants in this study had good knowledge and attitude towards blood donation. However, the practice of blood donation was still low. Approach towards targeted groups to increase awareness regarding blood donation should be applied to this population as one of the measures to improve blood donation rate in the future.

ACKNOWLEDGEMENTS

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