



**KNOWLEDGE AND ATTITUDE TOWARDS BLOOD
DONATION AMONG NON BLOOD DONOR RESIDENTS
OF KUALA TERENGGANU AT HOSPITAL SULTANAH
NUR ZAHIRAH, KUALA TERENGGANU**

BY

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**DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENT FOR THE DEGREE OF MASTER IN
MEDICINE (TRANSFUSION MEDICINE)**

**ADVANCED MEDICAL AND DENTAL INSTITUTE (AMDI)
UNIVERSITI SAINS MALAYSIA**

2018

DECLARATION

I hereby declare that this research has been sent to Universiti Sains Malaysia (USM) for the degree of Master of Medicine (Transfusion Medicine). It is not to be sent to any other universities. With that, this research can be used for consultation and photocopied as a reference.



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P-IPM0010/14

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim

Alhamdulillah, praise be to Allah SWT, peace and blessings be upon the Prophet Muhammad SAW, his family members, his companions as well as those who follow in his footsteps.

My highest gratitude goes to the Almighty Allah SWT for giving me the opportunity, good health, ample time and determination during this journey of my lifetime. It is only due to His blessings that I was able to complete my Master programme with the submission of my dissertation.

Especially to my dearest other half, my husband, Mohd Hisham bin Azlan and our only son, Ameer Harraz bin Mohd Hisham, I will not be able to reach this point without both of you. Your love and sacrifice gave me the strength to complete this journey.

To my beloved parents, Mat Noh bin Supaat and Najlah binti Ali Sabran, and in-laws, Azlan bin Tan and Normadiah binti Hamzah, I cannot thank you enough for your endless love, prayer, strength, and support throughout this journey. Thank you for always being there to take care of my son. Also to my other family members, thank you for the advice and support.

My next appreciation goes to my supervisors, Dr Hafizuddin bin Mohamed Fauzi from Advanced Medical and Dental Institute (AMDI), Universiti Sains Malaysia (USM),

Dato Dr Faraizah binti Abdul Karim from Pusat Darah Negara, and Dr Mohd Muhaimin bin Kambali from Hospital Sultanah Nur Zahirah, who provided me with continuous guidance, advice and moral support throughout and helped me to complete my thesis. Also special thanks to the statisticians from AMDI, Dr. Rohayu binti Hami, Dr. Noorsuzana binti Mohd Shariff and Encik Nizuwan bin Azman for their contribution in the statistical analysis part in this study.

Special thanks to the Director of Hospital Sultanah Nur Zahirah, Dr. Nor Azimi binti Yunus for allowing me to do this study in the hospital. I would also like to express my gratitude to the staffs of Transfusion Medicine Department of HSNZ head by Dr. Mohd Muhaimin for their great cooperation in helping me complete this thesis. Special thanks to the participants who agreed to participate in this study. Without your participation, this thesis will not be able to be completed.

To my dearest colleagues and seniors, thank you for your advice, support, and encouragement during this journey.

Lastly, I would like to thank all those who had supported me either directly or indirectly in completing this dissertation. Thank you, thank you and thank you.

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LIST OF ABBREVIATIONS

AABB	American Association of Blood Bank
AMDI	Advanced Medical and Dental Institute
BMI	Body Mass Index
BTS	Blood Transfusion Service
CPD	Continuous Professional Development
FTKL	Federal Territory of Kuala Lumpur
GDP	Gross Domestic Product
HDI	Human Development Index
HREC	Human Research Ethics Committee
HSNZ	Hospital Sultanah Nur Zahirah
KAP	Knowledge, Attitude, and Practice
MOHM	Ministry of Health Malaysia
NBC	National Blood Centre
NMRR	National Medical Research Register
NSCC	National Stem Cell Coordination Centre
REDS	Retrovirus Epidemiology Donor Study
SD	Standard Deviation

TMD	Transfusion Medicine Department
TMS	Transfusion Medicine Specialist
UN	United Nations
USM	Universiti Sains Malaysia
WHO	World Health Organization

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**Pengetahuan dan Sikap Terhadap Pendermaan Darah di Kalangan Penduduk
Kuala Terengganu Yang Bukan Merupakan Penderma Darah di Hospital
Sultanah Nur Zahirah, Kuala Terengganu**

ABSTRAK

Latar belakang kajian: Peningkatan permintaan bekalan darah dan pengurangan jumlah pengumpulan darah merupakan masalah sejagat termasuk Malaysia. Terengganu mencatatkan kadar pendermaan yang terendah diantara kesemua negeri bermula tahun 2011 sehingga tahun 2015. Pencapaian negeri Terengganu adalah masih jauh jika dibandingkan dengan negeri lain di Malaysia.

Objektif kajian: Untuk menentukan skor pengetahuan dan sikap terhadap pendermaan darah dan faktor-faktor yang berkaitan di kalangan penduduk bukan penderma darah di Kuala Terengganu di Hospital Sultanah Nur Zahirah (HSNZ).

Rekabentuk kajian: Ini adalah kajian keratan rentas menggunakan borang soal selidik dan melibatkan 320 orang peserta yang dipilih secara persampelan rawak sistematik di kalangan penduduk Kuala Terengganu yang bukan merupakan penderma darah di HSNZ. Borang soal selidik ini mengandungi 8 soalan berkenaan pengetahuan (skor keseluruhan 8 markah) dan 20 soalan berkenaan sikap (skor keseluruhan 100 markah).

Keputusan kajian: Skor pengetahuan min dalam kajian ini adalah 5.19 (1.87) manakala skor sikap min adalah 70.79 (8.19). Majoriti peserta mempunyai tahap pengetahuan dan sikap yang baik terhadap pendermaan darah dengan peratusan 64.69% dan 92.81%, masing-masing. Perempuan mempunyai tahap pengetahuan yang lebih

rendah berbanding lelaki ($p=0.02$), manakala peserta yang mempunyai tahap pendidikan kolej atau universiti mempunyai tahap pengetahuan yang lebih tinggi berbanding peserta dengan tahap pendidikan rendah. Peserta yang bekerja di sektor swasta dan bekerja sendiri didapati mempunyai pengetahuan yang lebih tinggi berbanding pekerja kerajaan ($p=0.04$ dan $p=0.013$). Bagi bahagian sikap, peserta dengan pendidikan sekolah menengah mempunyai sikap yang lebih baik berbanding mereka yang berpendidikan tahap rendah ($p=0.012$). Peserta yang tidak bekerja didapati mempunyai sikap yang lebih rendah berbanding pekerja sektor kerajaan ($p=0.017$). Tiada perkaitan yang signifikan ditemui di antara tahap pengetahuan dan sikap terhadap pendermaan darah. Halangan yang sering diberikan berkaitan pendermaan darah adalah tidak bersetuju darah diberikan kepada agama lain (73.1%) dan kaum (67.8%). Majoriti peserta melaporkan media sosial sebagai sumber maklumat utama mengenai derma darah (42.2%).

Kesimpulan: Secara umum, majoriti peserta mempunyai pengetahuan dan sikap yang baik terhadap pendermaan darah tetapi tidak ada perkaitan yang signifikan ditemui di antara pengetahuan dan sikap terhadap pendermaan darah. Walaupun tahap pengetahuan dan sikap adalah baik, namun amalan pendermaan darah masih rendah dalam populasi ini disebabkan oleh sikap mereka yang tidak mahu memberikan darah mereka kepada bangsa dan agama lain. Oleh itu, Perkhidmatan Transfusi Darah perlu memberi tumpuan kepada menggalakkan aktiviti pendermaan darah di kalangan bukan penderma dengan melibatkan jabatan agama untuk membantu membetulkan mitos mengenai pendermaan darah, memberikan risalah kepada bukan penderma semasa kempen derma darah dan menubuhkan kelab penderma muda yang memberi tumpuan kepada pelajar.

Knowledge and Attitude Towards Blood Donation Among Non-blood Donor Residents of Kuala Terengganu at Hospital Sultanah Nur Zahirah, Kuala Terengganu

ABSTRACT

Background: Increment in blood utilisation and reduction in blood collection leading to blood supply shortage has been a worldwide problem including Malaysia. It was noted that Terengganu recorded the lowest blood donation rate among all states in Malaysia from 2011 until 2015, and still lagging far behind other states in Malaysia in terms of blood donation rate.

Objectives: To determine knowledge and attitude score towards blood donation and their associated factors among non-blood donor residents of Kuala Terengganu at Hospital Sultanah Nur Zahirah (HSNZ).

Study design and method: This is a cross-sectional study using a self-administered questionnaire involving systematically random sampling selection of 320 participants who are non-blood donor residents of Kuala Terengganu attending HSNZ. The questionnaire consists of 8 questions in knowledge section (total score of 8 marks) and 20 questions in attitude section (total score of 100 marks).

Results: The mean knowledge score in this study was 5.19 (1.87) while the mean attitude score was 70.79 (8.19). Majority of the participants have good knowledge and good attitude with percentages of 64.69% and 92.81%, respectively. Female has a significantly lower level of knowledge as compared to male ($p=0.02$), while participants

with college/university education have significantly higher knowledge than participants with low education level ($p=0.037$). Participants working in private sectors and self-employed were found to have a significantly higher level of good knowledge compared to government employees ($p=0.004$ and $p=0.013$). As for the attitude section, participants with secondary school education has significantly higher attitude compared to those with low education level ($p=0.012$). Unemployed participants were found to have significantly lower attitude compared to government employees ($p=0.017$). No significant association was found between the knowledge and attitude level. The mostly reported barriers to blood donation were refused to give blood to other religion and race with 73.1% and 67.8%, respectively. This study reported social media as the main source of information regarding blood donation (42.2%).

Conclusion: In general, the majority of the participants have good knowledge and attitude towards blood donation but there was no association found between knowledge and attitude. Even so, the practice of blood donation is still poor in this population with most of the participants refused to give their blood to other religion and race. Thus, Blood Transfusion Service should focus on encouraging non-donors to donate by involving the religious departments to help to correct the myths pertaining to blood donation, giving out pamphlets to non-donors during a mobile campaign or establishing young donors club focusing to students.

CHAPTER 1

INTRODUCTION

1.1 Overview of blood donation in general

Blood is a precious entity that can be donated from a healthy human being from a process called blood donation. In general, blood donation involves a few steps that are equally important to ensure safe and adequate blood. This is in concordance with the vision and mission of most of Blood Transfusion Services (BTS) from all over the world, including Malaysia which is to provide adequate and safe blood at any time (National Blood Centre, 2016). In order 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 the different point of view. World Health Organization (WHO) stated that regular, voluntary, non-remunerated blood donors play the most important role in ensuring an adequate and safe blood supply. This group of donors is considered the safest as they have the lowest prevalence of transfusion-transmitted infections. Voluntary, non-remunerated blood donors from low-risk populations are considered as the safest donor by the WHO as they are seen to have no conflict of interest in rewards of blood donation.

There are three basic principles in ensuring safe blood and it includes an adequate number of safe blood donors, Blood Transfusion Services who carries the responsibility to provide an appropriate and safe method of blood screening and processing and judicious use of blood and blood products (WHO, 2017). According to Thomson and colleagues in the Retrovirus Epidemiology Donor Study (REDS) in 1998, identifying

and studying safe donors, defined that a safe donor is those who have a negative screening test and do not practice any high-risk behaviors in a post-donation survey. In addition, regular donors who are women, aged 45 years and older and with a higher level of education contributes to the group of safe donors (Thomson *et al.*, 1998).

As basic information, blood donation can be divided into whole blood and apheresis donation. However, both of the donation types applied the same basic steps which include filling up a blood donation registration form, determining the adequacy of haemoglobin level, screening of the health status of the donor by medical officers and nurses, registration and blood collection. All first-time donors need to start with whole blood donation and can only change to apheresis donation after becoming a regular whole blood donor. The whole blood that has been donated will then be processed into components, namely packed red cells, platelet concentrate and plasma via centrifugation (Greening *et al.*, 2010). Each of the blood products will then be stored at an optimal temperature that has been set as per guideline to ensure the efficacy of the products (AABB, 2011).

The indication and usage of blood and blood products have widened together with the changing of the population's age group and advancement of the medical field. Even with the advancement of medical technologies, transfusion of blood and blood products remain as the key player in certain medical and surgical field. Blood transfusion saves lives, especially in bleeding cases and haematological malignancies in which blood and blood products mainly packed red cells, platelet concentrate, fresh frozen plasma, and cryoprecipitate are always being requested and transfused. One of the reasons that contribute mainly to this condition is because up until today, there is no blood substitute that is able to replace the function of human blood. Even though there are many types of research from various countries claimed to have developed novel blood substitutes,

unfortunately, there are still no reports on the clinical trial (Simoni, 2017). However, each of the transfusion carries risk and adverse effects that may cause more harm to the recipient rather than a benefit. Unfortunately, in some countries, blood products are neither available nor safe to cover the ever-growing demand for blood, especially in developing or underdeveloped countries.

1.2 Overview of Malaysia and the Blood Transfusion Services

Malaysia is a country located in South East Asia, bordered by Thailand, Singapore, Indonesia, and Brunei. Malaysia has a total area of almost 330,323 km² and comprises of 13 states and 3 federal territories. Peninsular Malaysia is separated from the states of Sabah and Sarawak by the South China Sea. The capital state of Malaysia is the Federal Territory of Kuala Lumpur (FTKL). At the present time, the total number of population of Malaysia has increased from 29.51 million in 2012 to 31.19 million in 2015 and expected to increase year by year. Out of the 31 million of the total population in 2015, there is a slight predominance of male sex with 16.11 million compared to female sex with 15.07 million. In terms of population by age group, 22.3 million (69.7%) of the population were from the age group between 15 to 64 years old, 7.7 million (24.1%) were from the age group between zero to 14 years old, while the remaining 2 million (6.2%) of the population were contributed by the elderly population which is age 65 years and above. Malaysia recorded a Gross Domestic Product (GDP) per capita of RM 37,123 and Human Development Index (HDI) of 0.78 in 2015 (Department of Statistics, Malaysia, 2017).

Terengganu is one of the states in Malaysia located in the east coast of Peninsular Malaysia and it is bounded by Kelantan in the north, Pahang in the south and the South China Sea in the east. Terengganu has a total area of 12,974 km² with a total number of population of 1.16 million in 2015. There is almost a balance proportion in terms of sex with a slight predominance of male sex with 0.59 million as compared to female sex with 0.57 million. The GDP per capita for Terengganu recorded in 2015 was RM 26,529 (Department of Statistics, Malaysia, 2017). Kuala Terengganu is the capital city of Terengganu with a total population of 333,227 people and Hospital Sultanah Nur Zahirah (HSNZ) which is located in the heart of Kuala Terengganu serves as the main healthcare service provider for the local population. It is considered as a hospital with major specialist services and functions as a main tertiary hospital in the state. This hospital receives referrals from other district hospitals and government health care clinics from all over Terengganu (Kuala Terengganu City Council, 2010).

In terms of Blood Transfusion Services in Malaysia, the National Blood Centre (NBC) is located in FTKL which act as the tertiary and referral centre for blood transfusion services in Malaysia. The NBC is responsible for supplying adequate and safe blood and blood products to all government hospitals within FTKL and Klang Valley as well as private hospitals. The NBC also provides blood donation services covering FTKL and Klang Valley. Besides blood procurement, screening and supply, NBC also provides many other services including reference laboratory for immunohaematology, haematology and haemostasis, histocompatibility and immunogenetic, haemophilia clinic and cord blood collection and processing centre. NBC also act as part of the National Stem Cell Coordination Centre (NSCCC) as well as haemovigilance coordinator (National Blood Centre, 2015).

All hospitals with major specialist services from other states and federal territories have their own Transfusion Medicine Department (TMD) head by Transfusion Medicine Specialist (TMS). This is also applicable to HSNZ where the department currently consists of 40 staffs which include one TMS who is also the head of the department, nine medical officers sharing responsibilities with the pathology department and other staffs including science officers, medical assistants, staff nurses, medical laboratory technologist, public relation officers and other support group staffs. The main function of this department is to supply adequate and safe blood and blood products for patients internally from all departments in HSNZ and also externally to the district hospitals in Terengganu as well as offering clinical diagnostic services to help the clinicians to provide a proper treatment to patients. As many other blood transfusion services in Malaysia, Transfusion Medicine Department of HSNZ involves in blood procurement by offering blood donation services in their centre and also mobile blood donation campaign organised by government offices, non-governmental organisations, colleges, universities and private companies. All the donated blood will then be screened and processed into blood components. Besides that, this department also provides immunohaematology laboratory services that include crossmatching and antibody identification (HSNZ, 2015).

1.3 Problem statement and study rationale

Based on the Annual Report of Blood Transfusion Services, Ministry of Health, Malaysia; Terengganu recorded the lowest blood donation rate among all states in Malaysia for the past five 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 FTKL. Total donations in Terengganu in 2015 were only 19,010 with 7,582 donations come from new donors (39.9%). Male donors comprise 70.37% while female donors comprise 29.63%. A total number of recipients in Terengganu in 2015 increased from 8,232 to 8,611 (increment of 4.4%) with the total number of blood units utilised also increased from 26,626 units in 2014 to 28,903 units in 2015 (increment of 7.9%). On top of that, Transfusion Medicine Department of HSNZ, as the main collection centre in Terengganu, also need to supply blood and blood products to district hospitals within Terengganu and this unit will supply about 7,000 to 8,000 units per year.

Due to this burden, at times, this unit was unable to supply all the amounts of blood units as per request due to low or critically low stock. To overcome this problem, TMD of HSNZ will get help from blood banks in other hospitals in other states. According to previous record and statistics, TMD of HSNZ has been getting blood supply from outside Terengganu for almost 8% of their blood utilisation from the year 2011 to 2015. This unit usually gets additional blood stock from various blood banks outside Terengganu, for example, Hospital Universiti Sains Malaysia, Kubang Kerian, Hospital Raja Perempuan Zainab II, Kota Bharu, Hospital Tengku Ampuan Afzan, Kuantan, National Blood Centre (NBC), Kuala Lumpur and as far as Hospital Melaka and Hospital Muar, Johor. 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 as evidenced by the lowest blood donation rate among all states in Malaysia for the past five consecutive years despite various measures that have been taken these few years to create awareness, be it, at the national level or state level.

It is time to analyse and determine the knowledge and attitude towards blood donation in the current local population of Kuala Terengganu, in particular, the non-blood donors, in order to understand the main issues and problems. The outcome of this research may help in formulating the best method and approach to targeted people and government as well as private organisations to make aware and incorporate them in donor education and publicity regularly and that can lead to a continuous donation activity.

1.4 Study Objectives

1.4.1 General Objective

To determine knowledge and attitude score towards blood donation and their associated factors among non-blood donor residents of Kuala Terengganu at HSNZ.

1.4.2 Specific Objectives

- i. To determine knowledge and attitude score towards blood donation among non-blood donor residents of Kuala Terengganu at HSNZ.
- ii. To determine the association between demographic factors with knowledge and attitude score among non-blood donor residents of Kuala Terengganu at HSNZ.
- iii. To determine the association between knowledge score with attitude score among non-blood donor residents of Kuala Terengganu at HSNZ.

1.5 Hypotheses

- i. There is a significant association between demographic factors with knowledge score.
- ii. There is a significant association between demographic factors with attitude score.
- iii. There is a significant association between knowledge score with attitude score.

1.6 Conceptual framework

There are many factors that may affect blood donation practices as shown in Figure 1.1. The factors that were highlighted were studied and that includes demographic factors, knowledge, and attitude towards blood donation.

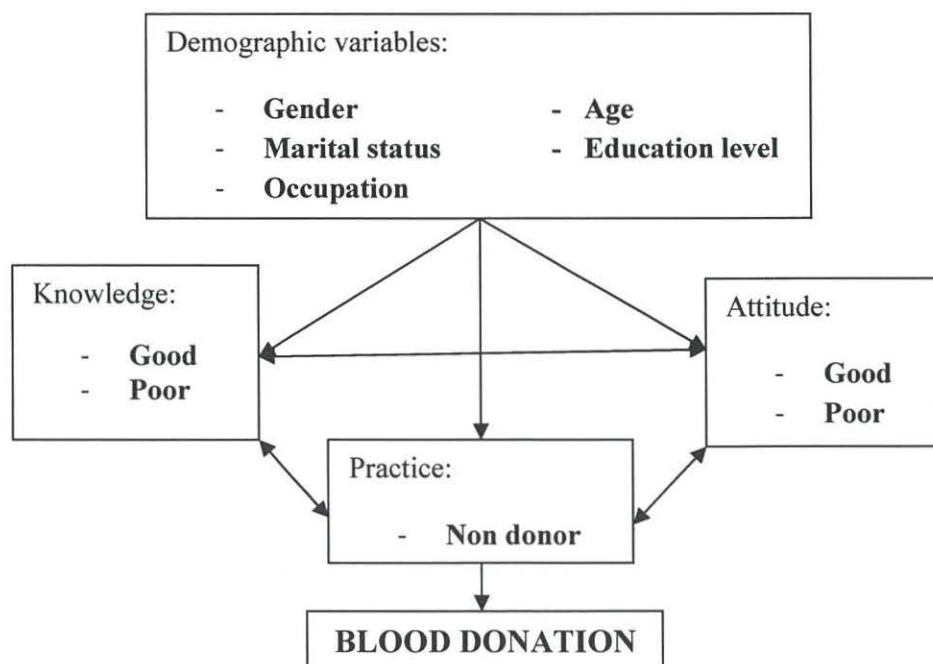


Figure 1.1: Conceptual framework

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The demand for blood has been increasing over the years. Previously, about twenty years ago, the demand for blood transfusion mostly came from pregnancy-related complications especially postpartum haemorrhage, severe anaemia in childhood malaria as well as trauma-related injuries (WHO, 2006). However, since the last few decades, with the advancement of medical technologies, there are more surgical-related indications for blood transfusion, for example, cardiac-related surgeries, transplant surgeries, and interventional radiological procedures. According to Stanworth and colleagues in a study in 2002, more than 50% of red cell products were transfused in the surgical unit as compared to the medical and other units (Stanworth *et al.*, 2002). Trauma-related injuries still continues to become part of high users of blood and blood products most probably due to higher incidence of motor-vehicle accidents and other type of trauma which is proven by the increased in request and blood transfusion event in Emergency Department as compared to other departments in hospitals in Spain (Díaz *et al.*, 2017).

There were many changes that occurred 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

increase in demand but a decrease in supply (Seifried *et al.*, 2011). This situation can be seen in most developing countries, for example, India, China, Thailand as well as Indonesia (Chaiwuttisak *et al.*, 2016; Dwiartika *et al.*, 2017; Lowalekar and Ravi, 2017; Sun *et al.*, 2016). However, according to a report in 2011, for established and developed countries, the demand for blood transfusion has decreased but RBC remains as the leading products in the request (Sapere Research Group, 2011).

WHO has stated that their goal is for all countries to obtain all their blood supplies from voluntary unpaid donors by the year 2020. Regular voluntary blood donation rate should be at least 5% of the population in developed countries. Another statistic from WHO stated that the median blood donation rate in high-income countries currently is 32.1 donations per 1000 population (3.21%), compares with 14.9 donations (1.49%) in upper-middle-income countries, 7.8 donations (0.78%) in lower-middle-income countries and 4.6 donations (0.46%) in low-income countries (WHO, 2017).

2.2 Malaysia and problems with blood donation

The World Bank has ranked Malaysia as upper middle income based on GDP per capita of RM 37,123 at number 58 of 177 countries on the economic outcome as reported in a working paper from International Monetary Fund (Cherif and Hasanov, 2015) and World Economic Situation And Prospect Report 2014 (UN, 2014), where Malaysia was included in middle development outcome countries. According to United Nation, Human Development Report country classification in 2014, Malaysia who has HDI of 0.78 was ranked at number 62 out of 187 countries and considered as countries with

high human development (UN, 2014). At the present time, the population of Malaysia has increased to 31.0 million in 2015 with 6.2% of the population were contributed by the elderly age group (65 years and above). Department of Statistics Malaysia has estimated that Malaysia will reach the ageing population by 2020 with the elderly age group will reach more than 7% of the total population (Department of Statistics Malaysia, 2017).

In terms of blood transfusion services in Malaysia, based on the National Blood Bank Annual Statistics reports from 2011 to 2015, Malaysia has not reached the standard of WHO (5%) whereby the blood donation rate ranging from 2.0% to 2.2% of total population or 22.0 donations per 1000 population. The total number of donations in 2015 was 707,419 donations with 237,362 donations contributed from new donors (33.6%). This makes the percentage of regular donors in 2015 was 66.4%. Male donor comprises of 69.54% while female donor contributes 30.46% to the total number of donors. The increment of the total number of donations was only 7.82% from 2014 and it may be contributed by the fact that strict donor assessment for safer blood has been applied by the collection centers. The increment of the usage and utilisation of blood and blood products by the hospitals can be seen every year since 2011 until 2015 (5%). From the year 2011, the total utilisation of all blood products was 939,396 units, and by the year 2015, the total usage has increased to 989,544 units (Ministry of Health Malaysia, 2011-2015). 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 (Greinacher *et al.*, 2017). Therefore it is very important to understand the blood donation motivation among non-blood donors as reported by a study done in Netherlands, where it concluded that there are a few factors that correlate significantly with the blood donation intentions among the Dutch non-blood donors, namely affective attitude, subjective norm, descriptive norm and moral norm (Lemmens *et al.*, 2009).

2.3 Eligible criteria of blood donation

In general, the vision and mission of a Blood Transfusion Service is to supply adequate and safe blood to the hospitals, in conjunction with the aim of World Health Organization (Canadian Blood Services, 2017; Hong Kong Red Cross Blood Transfusion Service, 2013; National Blood Centre, 2016; National Blood Transfusion Service Sri Lanka, 2016). Safe blood in this context includes the safety of the donors as well as the recipients. Blood donation process has long been developed in a way to ensure the safety of the blood and blood products as well as to ensure the safety of the donor.

In Malaysia, the age for a first-time blood donor is between 18 to 60 years old. 60 years old is the maximum allowable age limit for first-time donation as this age is often associated with the underlying medical condition, especially non-communicable diseases with complications such as hypertension or diabetes mellitus with organ involvement. One previous study reported that these diseases have been significantly affecting people aged 60 and above especially in low and middle-income countries, surpassed the reports in high-income countries (Scommegna, 2012). However, regular donors especially rare blood donors are allowed to donate until 70 years old with a certified medical report assessing the general health status of the donor. As for young donors who are 17 years old, they are allowed to donate with a written consent from parents or guardians. The minimum weight for blood donation is 45 kilogram. According to American Association of Blood Bank (AABB), the maximum blood volume allowed to be extracted is 10.5 ml/kilogram of body weight per each session of donation (AABB, 2011). In Malaysia, the maximum blood volume allowable for extraction during one session of donation is not more than 15% of total blood volume. The acceptable haemoglobin level for blood donation in Malaysia is different between male and female donors. For male donors, the acceptable haemoglobin level is 13.5 g/dL or more, while for female donors is 12.5 g/dL or more. This level has been recently used as the new acceptable level based on a study determining the normal haematological range for multiethnic Malaysian population (Ambayya *et al.*, 2014). Previously, the acceptable levels of haemoglobin between male and female donors were the same, which was at 12.5 g/dL. This level was related to an earlier study done by Roshan and colleagues in 2009, focusing on determining the haematological reference values of healthy Malaysian population (Roshan *et al.*, 2009).

The other basic requirements for blood donation are uninterrupted sleep for at least 5 hours and must take at least a light meal within 4 hours before donation. A group of researchers conducted a study in Japan analysing the risk factors to vasovagal reaction during blood donation, and reported that donors aged less than 50 years, female, a Body Mass Index (BMI) of less than 25, pulse of 90 beats per minute and above, sleep duration of less than 8 hours, the time after eating which was more or equal to 4 hours, a first time donor and circulating blood volume of less than 4.3 litres were the factors that can result in vasovagal reaction during blood donation. This study shows that first time donors with sleep duration of less than 6 hours have a higher risk of getting adverse donor reaction of vasovagal reaction type (Takanashi *et al.*, 2012). All intended donors must be healthy on the day of donation and the most important criteria is donors must be voluntary non-remunerated and never been involved in any high-risk behaviours including male having sex with male, multiple sex partners, lifestyle of casual sex, prostitutes and intravenous drug users as to reduce the risk of transfusion-transmitted infection. WHO Blood Safety Indicator in 2008 stated that there were a number of studies that reported a significantly lower prevalence of transfusion-transmitted infection in voluntary donors, especially the regular type of donors (WHO, 2008).

2.4 Demographic factors with knowledge score

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. According to Shahshahani and colleagues in 2006, determining the knowledge and attitude of random Yazd population of Iran, found that in general, the level of knowledge towards blood donation among the studied population was just above the mean of the total score of knowledge with a mean of 16.45 ± 6.23 . Question about blood investigation performed on blood donated had the highest score among all questions for knowledge, whilst the minimum awareness was on the minimum age requirement for eligibility of blood donation. Female has significantly lower knowledge level as compared to male (Shahshahani *et al.*, 2006). To further clarify regarding the female gender that has a significantly lower level of knowledge towards blood donation as compared to male, the same author has conducted another study to determine the reasons for the female to not donating blood. The results showed that, in general, the female population of Yazd, Iran has a moderate level of knowledge toward the blood donation with a score of 5.35 ± 1.24 which is just above the mean for the total score of knowledge section. Most of the women were not aware of the age criteria for blood donation which is in concordance with the previous study of the same author (Shahshahani, 2007). From the earlier study by Shahshahani *et al.* (2006), respondents who aged between 30 to 39 years old, those with university level of education and also working as an employee has the highest mean score in knowledge section within their own categories. Meanwhile, respondents aged 20-29 years old, those who are illiterate and those who are housewives have the lowest mean score in knowledge section within their own categories.

A study that was conducted in Western China in 2005, assessing the knowledge and attitude towards blood donation among randomly selected local population of a north-western Chinese city, showed that more than 70% of the sample population were non

donors and with most of the respondents were male with lesser percentage of them having higher education background as well as working in government or private sectors. In general, the non donor population in this study has a significantly lower level of knowledge regarding blood donation as compared to donors (Zaller *et al.*, 2005).

Another study assessing the knowledge and attitude towards blood donation was done in Tehran, another region of Iran, where the author chose sex, age group, marital status, and education level as the demographic factors to be determined with knowledge and attitude score. As per the knowledge section, in general, the mean score of knowledge of the sample population was 8.6 which were considered as good knowledge. Surprisingly, the female has a significantly higher level of knowledge as compared to male. However, respondents with the highest education level consistently have significant relation with the higher mean level of knowledge score. As for the age categories and marital status, this study found no significant relation with the knowledge score (Mousavi *et al.* (2011).

Dubey and colleagues reported that non-donors in North India population have the least knowledge scores and this study found a significant relationship between gender, age group, marital status, education level and occupation. Male non-donor aged 18 to 30 years old, unmarried, students and having a postgraduate level of education had a significantly higher level of knowledge score as compared to other variables within the same category (Dubey *et al.*, 2014).

The population of Gondar town, Ethiopia generally has adequate knowledge on blood donation as reported by Melku *et al.* (2016). Males, aged 20-30 years old, married, higher educational status and working as civil employees have higher knowledge level. The author also found a significant relationship between age, educational status, marital

status and occupation with the level of knowledge towards blood donation using bivariate logistic regression. However, only the educational status was found to be significantly associated with the level of knowledge using multivariate logistic regression, where it was found that secondary and higher educational status were significantly associated with adequate knowledge.

In Malaysia, there were not many studies on knowledge, attitude, and practice towards blood donation that was being done and published. Kelantan is one of the states in Malaysia located on the east coast and also neighbour to Terengganu with an almost similar background of their populations in terms of demography (Department of Statistics, Malaysia, 2010). A small, unpublished study done by Mahmood and colleagues in 2008 assessing 165 non-donors representing the Kelantanese populations, found that the overall knowledge regarding blood donation was good among the sample population, however, it was not turned into a practice of donating blood. More than 50% of the respondents answer correctly to all questions in the knowledge section. However, this study only reported a descriptive analysis of the demographic factors without analysing the relation with the knowledge and attitude towards blood donation (Mahmood *et al.*, 2008). Recently, another knowledge, attitude, and practice (KAP) study assessing randomly selected college students in Selangor towards blood donation have been published. This study reported that almost all of the students in the sample population have good knowledge level and gender was the only factor that significantly associated with the knowledge. The female college students were found to have a higher level of knowledge towards blood donation as compared to male students (Elnajeh *et al.*, 2017).

2.5 Demographic factors with attitude score

The attitudes towards blood donation among the populations in different countries vary and the reported factors that significantly affect the attitudes also vary. A study that was done in 2000, assessing 400 randomly selected local population of Bang Sapan, Thailand, found out that most of the respondents, with less than 50% of them, have a good attitude even with the facts that Bang Sapan is considered an urban area. Majority of the female was reported to have a fair attitude towards blood donation, as well as those who aged 21 to 25 years old and 36 to 40 years old and respondents with secondary school education level. The author also found that age and education level correlates significantly with the attitude score while gender does not found to be significantly related (Wiwanitkit, 2000).

Shahshahani *et al.* (2006) reported that the respondents in this study, which represents the population of Yazd in Iran, showed a slightly positive attitude towards blood donation, and this result followed the good knowledge that was also reported. In the knowledge section, the male was reported to have higher score compared to female, however, the result was different for attitude section, where the female respondents showed significantly higher attitude score. Meanwhile, among the age group, those who aged 30 to 39 years old records the highest attitude score and the lowest attitude score was recorded from those aged 50 to 59 years old.

The attitude towards blood donation was assessed among randomly selected non-medical college students in South India by Karakkamandapam and colleagues in 2011. This study reported that more than 85% of the respondents have a positive attitude towards blood donation with predominance of the male gender. However, the relation

between gender and attitude score was not statistically significant (Karakkamandapam *et al.*, 2011). Different results have been reported in another study assessing university students in Ambo town, Ethiopia in 2014. More than 50% of the respondents showed a negative attitude towards blood donation with the family's educational background and the year of the study showed a significant relation with the attitude. Literate family and fourth-year students have a more positive attitude towards blood donation and are more likely to donate blood in the future (Nigatu and Demissie, 2014).

Even though the respondents in the study conducted in Tehran, Iran, assessing the knowledge and attitude towards blood donation among local population showed a good level of knowledge; however, it was not followed by a good attitude score. In general, respondents who showed good attitude was only 26% and the factors that significantly affect the level of attitude were age, gender, and education status. Those in the age group of 15 to 34 years old have 1.65 times higher possibilities to donate blood as compared those in the age range of 35 to 65 years old (Mousavi *et al.*, 2011).

Another study that was conducted in 2015 in Barbados also reported that the mean total attitude score of the sample population, which are randomly selected adult representing the population of Barbados, was 27.78 out of a possible 40, which is slightly higher than the mean of the total score of attitude section. This high total attitude score was statistically significant in respondents with higher education level and those with married status and live-in participants (Atherley *et al.*, 2016). New Delhi also reported almost the same results with regards to attitude towards blood donation among the local population. More than 50% of the respondents showed a positive attitude towards blood donation. However, this study only analysed the results descriptively but not inferentially (Kurian and Sarkar, 2016).

Srirangaramasamy and colleagues conducted a study to assess the knowledge and attitude towards blood donation among teachers in Tamilnadu, India and this study reported that almost all of the respondents, which is more than 95%, had a positive attitude towards blood donation and they agreed with the statement that blood donation should be a voluntary process without asking for anything in return (Srirangaramasamy *et al.*, 2017).

As for Malaysia, Elnajeh *et al.* (2017) reported that majority of the respondents in this study have positive attitudes towards blood donation, which is more than 85% from the total number of respondents. However, there were no sociodemographic factors that were found to be significantly associated with the attitude towards blood donation.

2.6 Association between knowledge score with attitude score

Knowledge, attitude, and practice of a subject are closely related to each other. However, to know whether these variables are significantly correlated or not, it needs to be analysed inferentially. During the 90's, there were many psychological studies to determine the correlation between all three variables. Previous studies show that by explaining the reasons for such attitude will change the attitude-behaviour consistency. However, knowledge does play an important role in changing such attitude, either positive or negative, depending on many other factors (Wilson *et al.*, 1989).

There were not many KAP studies that determined the association between knowledge and attitude score of their sample population as compared to knowledge and attitude with the practice of blood donation (Devi *et al.*, 2012; Gilani *et al.*, 2007; Paknahad *et*

al., 2015). In the study conducted by Shahshahani *et al.* (2006) in Yazd, Iran, whose respondents showed slightly good knowledge and positive attitude towards blood donation, the author also reported a positive and significant correlation between knowledge and attitude score of the sample population with an r value of 0.437. In another study by Melku *et al.* (2016) also reported almost the same result for the correlation between the level of knowledge with the attitude towards blood donation, where in this study; it found out that there is a significant but weak positive correlation between these two variables, with an r value of 0.238.

One of the KAP studies in Ambo town, Ethiopia found out that respondents with good knowledge had 2.16 times more likely to have a positive attitude toward voluntary blood donation as compared to those with poor knowledge (Nigatu and Demissie, 2014). The same result was also reported by Jemberu *et al.* (2016) who conducted another study in other parts of Ethiopia. One KAP study done in Barbados in 2016 reported that the total knowledge scores statistically significantly predicts the total score of attitude towards blood donation and the author also reported that 31.8% of the explained variability in attitude is accounted by knowledge level (Atherley *et al.*, 2016).

Almost all of the previous studies regarding KAP towards blood donation reported a good knowledge and attitude level of their sample population with a positive correlation between these two variables, however, the donation rate in those countries are still low as the good knowledge and attitude did not turn into the practice of donating blood. Most of the studies concluded that educations regarding blood donation should be delivered to targeted groups of non-donors depending on their level of knowledge and attitude towards blood donation (Duboz *et al.*, 2010; Durugu and Ganta, 2016; Mahmood *et al.*, 2008).

2.7 Barriers to blood donation among non-blood donors

In order to improve the practice of blood donation in a certain population, the factors and barriers against blood donation activity within the population must be acknowledged and analysed. Local BTS will be able to create a specific plan targeting the non-blood donors of the population based on the analysis. Previous studies have reported a variety of results pertaining to barriers towards blood donation activity among non-blood donors depending on the sociodemographic background of a certain population.

Majority of the local population of Harar town, Eastern Ethiopia recently reported that they were not being asked to donate (65.8%) and no opportunity to blood donation activity (38.6%) as the main reasons for not donating blood (Urgesa *et al.*, 2017). Another similar study assessing local population in the south west of Ethiopia also reported that 51.2% of the respondents stated they were not being approached for any blood donation activity, while only 20.1% stated that they do not donate because of fear of knowing their own infective status (Mulatu *et al.*, 2017).

In a more developed country compared to Ethiopia, for example, Saudi Arabia and Turkey, the main barriers to blood donation that were reported were slightly different. Agus *et al.* (2015) found out that almost 40% of the population of western Turkey stated that the main reason for not donating was due to lack of time, while only 28% of the respondents stated health problems as the reason for not donating blood. A few studies that were done in Saudi Arabia assessing the barriers to blood donation among their local population also showed almost similar results. Data from a study done in 2014 showed that 45% of the participants agreed that lacking time as the main reason for not

donating, followed by 37.6% that stated fear of needle as the barriers to blood donation (Alfouzan, 2014). A more recent study done by AlMutairi *et al.* (2016) reported that the barriers for blood donation were due to lack of time (44.3%) and the perception that blood donation is a painful procedure (37.5%).

As noted, there were not many studies done in Malaysia assessing the barriers to blood donation among the non-donor population. Data from a study by Mahmood and colleagues assessing non-donor population in Kota Bharu, Kelantan reported that almost 35% of the sample population did not donate because they do not want their blood to be given to other religion. Another 27.9% of the non-donors do not donate as they do not want their blood to be given to different race. Other common reasons for not donating among the assessed population were due to fear of needles (35.2%) and lack of time with 27.9% (Mahmood *et al.*, 2008).

CHAPTER 3

MATERIAL AND METHODOLOGY

3.1 Study background

This study was done with the general aim of assessing the level of awareness of the non-donor populations towards blood donation. It was conducted in Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu, where for the past five years; from 2011 to 2015; Terengganu had recorded the lowest blood donation rate among all states in Malaysia. Transfusion Medicine Department of HSNZ caters blood requests internally from other departments within the hospital as well as other district hospitals in Terengganu. This unit also plays the role of main blood procurement unit for Terengganu, in particularly Kuala Terengganu and the adjacent areas.

3.2 Study design

This was a cross-sectional study involving giving out questionnaires to the sample population assessing the level of knowledge and attitude towards blood donation among the non-donor populations. The practice was not included as part of the study as the practice of blood donation was already proven to be low with the lowest record of blood donation rate for Terengganu state for the past five years.