KNOWLEDGE, ATTITUDE, AND PRACTICE ON BLOOD DONATION AMONG POSTGRADUATE STUDENTS OF ADVANCED MEDICAL AND DENTAL INSTITUTE, USM

By

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DISCLAIMER

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

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LIST OF ABBREVIATIONS

AMDI	Advanced Medical and Dental Institute
COVID-19	Coronavirus Diseases 2019
FDA	Food and Drug Administration
HIV	Human Immunodeficiency Virus
HREC	Human Research Ethics Committee
IPPT	Institut Perubatan dan Pergigian Termaju
KAP	Knowledge, attitudes, and practices
MJMHS	Malaysian Journal of Medicine and Health Sciences
Mmed	Master of Medicine
MSc	Master of Sciences
NPRA	National Pharmaceutical Regulatory Agency
PhD	Doctor of Philosophy
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization
USM	Universiti Sains Malaysia

LIST OF APPENDICES

ABSTRAK

Pengenalan: Menderma darah secara sukarela dan berulang-ulang oleh individu sihat boleh mengelakkan kekurangan produk-produk darah untuk merawat pesakit yang mempunyai permasalahan darah.

Objektif: Tujuan kajian ini untuk menentukan tahap pengetahuan, sikap, dan amalan (KAP) mengenai pendermaan darah dan hubungannya dengan faktor-faktor demografik di kalangan pelajar pascasiswazah di IPPT, USM.

Metod: Sebanyak 118 pelajar siswazah telah menjawab soalan dalam talian yang telah disahkan dalam bentuk 'Google Form' melalui pautan jemputan yang telah disebarkan melalui e-mel, mesej WhatsApp, dan kod QR yang dicetak pada risalah. Kedua-dua analisis logistik mudah dan pelbagai digunakan untuk melakukan analisis statistik. Hasil yang dianalisis dengan nilai $p < 0.05$ dianggap signifikan.

Keputusan: Peserta kajian menunjukkan pengetahuan yang baik dan sikap positif terhadap pendermaan darah. Semua item daripada bahagian pengetahuan mendapat jawapan yang betul daripada 53.4% hingga 100% peserta, manakala semua item daripada bahagian sikap mendapat respons positif daripada sekurang-kurangnya 80% peserta. Mereka menunjukkan amalan derma darah yang baik, dengan 69.5% peserta telah menderma darah. Namun, tidak terdapat hubungan yang signifikan dengan nilai p lebih daripada 0.05 antara ciri demografi (jantina, umur, etnik, status perkahwinan dan kursus akademik) dan KAP pendermaan darah.

Kesimpulan: Kajian ini menunjukkan bahawa pelajar pascasiswazah di IPPT, USM mempunyai sikap yang positif, pengetahuan yang baik dan amalan yang baik mengenai

pendermaan darah tanpa mengira sosio-demografik. Memahami faktor-faktor yang mempengaruhi pendermaan darah dalam sebuah populasi penting untuk membangunkan strategi-strategi yang berkesan untuk mengekalkan bekalan darah. Penyelidikan masa depan perlu mengkaji faktor-faktor tambahan yang mempengaruhi tingkah laku pendermaan darah seperti faktor motivasi, halangan dan jangkaan.

Kata Kunci: Pengetahuan, sikap, amalan, derma darah

ABSTRACT

Introduction: Donating blood voluntarily and repeatedly by healthy individuals can prevent shortages of blood products to treat patients with blood disorders.

Objective: This study aims to determine the knowledge, attitudes, and practices (KAP) on blood donation and their association with demographic factors among postgraduate students at AMDI, USM.

Methods: A total of 118 postgraduate students had answered an online validated questionnaire in Google Form via the invitation links which were distributed by email, WhatsApp messages, and QR codes printed on flyers. Both simple and multiple logistic analyses were used to perform statistical analysis. The analysed results with a p-value of <0.05 were considered significant.

Result: Participants in the study demonstrated good knowledge and positive attitudes towards blood donation. All items from the knowledge section received correct responses from 53.4% to 100% of participants, while all items from the attitude section received positive responses from at least 80% of participants. They showed good blood donation practices, as 69.5% of participants have donated blood. However, there was no significant association with the p-value more than 0.05 between demographic characteristics (gender, age, ethnicity, marital status, and academic courses) and KAP of blood donation.

Conclusion: This study showed that postgraduate students at AMDI, USM have positive attitudes, good knowledge, and good practice regarding blood donation regardless of socio-demographics. Understanding factors influencing blood donation

in a population is important for developing effective strategies to sustain blood supply. Future research should investigate additional factors that influence blood donation behaviour, such as motivation, barriers, and expectations.

Keywords: Knowledge, attitude, practice, blood donation

CHAPTER ONE:

INTRODUCTION

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter includes the outline of the study on Knowledge, Attitude, and Practice of Blood Donation among Postgraduate Students of the Advance Medical and Dental Institute (AMDI) at Universiti Sains Malaysia (USM). This chapter also highlights the research justification and research question for this study.

1.2 Background of the study

Blood is a type of biological therapeutic product that is recognized by the World Health Organization (WHO) and is subject to regulation by both the Food and Drug Administration (FDA) and the National Pharmaceutical Regulatory Agency (NPRA) (1). Plasma and blood cells, each of which performs a unique role, are found in every unit of whole blood. Haemoglobin in red blood cells is responsible for the transportation of oxygen. The platelets transfusion may swiftly stop bleeding episodes, and plasma reduces the risk of severe bleeding.

The method to collect blood, according to WHO, is through the generous donation of a human who is in good health and is eligible for the procedure (2). Currently, there is

neither a substitute nor any artificially produced blood that is accessible (3). Red blood cells have a lifespan that is reduced from 120 days inside the body to 35 or 42 days once collected and stored in a blood bag (4). There is an ongoing demand for a consistent supply of blood because it can only be stored for a short period before being used. It is essential for enough healthy people to regularly donate blood to ensure a constant supply of blood will always be available whenever and wherever it is required. This is the only method to guarantee that there will never be a shortage of blood (5).

A study has summarised several challenges in the procurement and delivery of blood in tandem with the Malaysian population's diversity. Seasonal shortages occur during religious and cultural festive seasons because of long holiday seasons that reduce blood donation attendance. Additionally, cultural beliefs regarding blood donation prohibit blood giving during the Chinese New Year. Furthermore, the variations in the distribution of red cell phenotypes among the Malay, Chinese, and Indian populations have contributed to decreased blood supply according to different phenotypes (6). Certain religions, like Jehovah's Witness, firmly forbid their devotees from giving blood, transfusing blood, and using blood products since, in their views, blood is life and sacred (7). This demonstrated how information from a specific group might provide essential considerations for implementing blood donation education and marketing.

Blood and blood products need to always be readily available in all situations and times. Patients suffering from bone marrow and blood diseases such as thalassaemia,

aplastic anaemia, and leukaemia require blood transfusions regularly. General surgery, neurosurgery, obstetric surgery, orthopaedic surgery, and many other specialties rely on the availability of blood supplies to perform invasive procedures. An emergency scenario emerges when bleeding patients require massive transfusions of blood and blood products due to bleeding disorders, trauma, accidents, or surgical complications (8).

Donations of blood from a significant number of healthy people are required for a nation to be able to consistently meet the clinical demands for blood and blood products. This ability is dependent on the sustainability of the blood supply. The health care system of a nation is in jeopardy if it does not have access to an adequate and trustworthy source of blood donors. The foundation of a sustainable pool of blood donors is made up of voluntary donors who are well-informed and have committed themselves to donating blood regularly. This pool of donors can provide a supply of blood that is safe, reliable, and sufficient in all circumstances (2).

The World Health Organization (WHO) reported in 2010 that the average donation rate in countries with 100% voluntary blood donation is 31 donors per 1000 people (2). Malaysia had achieved a donation rate of 19.7 to 22.5 donors per 1000 population between 2020 and 2022 to ensure that it has a reliable supply of blood and blood products (9). In addition, Malaysia follows the guidelines set forth by the WHO and ensures that all donations of blood are completely voluntary and non-remunerated (10).

Pusat Perubatan USM Bertam (PPUSMB) is a medical centre under the governance of AMDI, USM, that serves patients that require blood transfusions for conditions such

as thalassaemia major, cancer, surgeries, trauma, primary immunodeficiencies, and bleeding. Because of that, AMDI, USM's in-house blood transfusion service, follows WHO's recommendation and framework to do blood donation campaigns, processing of blood and blood components, and blood testing for their patients (11). So far, there are approximately 150 voluntary blood donors registered in its blood bank, which needs to be expanded to prevent shortages of blood supply in the future.

It is important to understand the characteristics of potential donors and recognized any concerns about blood donation to improve blood transfusion services at AMDI, USM. Postgraduate students are ideal participants for the study because they correspond to the WHO framework's recommendations. To obtain an in-depth understanding related to this study, the Knowledge, Attitude, and Practice (KAP) survey can be one of the mechanisms to achieve it. This kind of survey is conducted to gather information about people's knowledge, attitudes, and practices related to a specific topic (2). The KAP survey provides researchers with valuable insights into the level of understanding, attitudes, and behaviours of a target population related to the study. The information collected through the survey helps identify gaps in knowledge, misconceptions, and areas where intervention or education may be needed (12).

According to similar research in 2020, there are a few steps in conducting a KAP survey, which are study design, question preparation, answer options, questionnaire scoring, and questionnaire validation. The design, execution, analysis, and interpretation of KAP surveys are straightforward. The findings of this survey can be used to design targeted interventions, develop educational campaigns, or formulate

policies that address the identified knowledge gaps and promote positive attitudes and behaviours among the surveyed population (12). Thus, this study has been carried out to understand knowledge, attitude, and practice about blood donation among postgraduate students at AMDI, USM.

1.3 Literature review

The donation of blood is the main source of blood and blood products. Despite more than 30 decades of effort, no substitute for blood has been successfully manufactured. The closest function of red blood cells that they can replicate is that of synthetic oxygen carriers. Ideally, these artificial red blood cells are produced not only as a measure to ensure that the need for blood is always sufficient without having to rely on blood donation but also, hopefully, to reduce blood transfusion complications such as allergy reactions, alloantibody formation, and haemolytic transfusion reactions. In addition, artificial red blood cells will prevent bacterial infection through blood transfusion, have a longer lifespan, and do not require pre-transfusion tests (13). If researchers and scientists have not succeeded in manufacturing artificial red blood cells that are free from safety and effectiveness difficulties, blood transfusion services will continue to rely primarily on blood donations and altruistic blood donors (3).

Blood donor retention and repeated donations are crucial at sustaining the bloodstock. Previous research revealed that blood donors with a higher blood donation rate per year significantly increase their return and become regular blood donors (14). It has been suggested that having a generous mindset and acting selflessly or being altruistic

are two factors that might predict how often someone would give blood (15). All these blood donor retention factors are supported by the recent study, which discovered that regular blood donors who donated more frequently per year had a positive attitude and practice towards blood donation even during the COVID-19 pandemic (16).

Difference sub-groups of potential blood donors may show different levels of knowledge, attitude, and practice regarding blood donation. The postgraduate student is one of the subgroups identified as potential donors. To keep young people giving blood regularly, it is necessary to learn about them so that the transfusion service can make specific plans to get them to donate blood. Many KAP studies on blood donation showed variations in results. Even though a population has good knowledge and attitude, it may not eventually lead to positive practice towards blood donation (17).

In terms of knowledge on blood donation, a study showed 53.3% of medical students in Tamil Nadu had adequate knowledge about blood donation (18), whereas a study among undergraduate health campus students in Kelantan, Malaysia, revealed 97.9% had adequate knowledge (19). However, there were different findings on the adequacy of blood donation knowledge among non-blood donor attendees of a state hospital in Terengganu, Malaysia, showing only 64.69% (20).

Certain demographic characteristics were investigated to determine their association with knowledge of blood donation. The demographic characteristics of the participants that were significantly associated with adequate blood donation knowledge were age above 21 years, being male, and being a medical student in the private sector. However,

religion was not significantly associated with adequate knowledge of blood donation (18,21,22).

Attitude towards blood donation is a person's perception and evaluation of their tendency to respond favourably or adversely to an act of blood donation. In terms of attitudes regarding blood donation, a survey of undergraduate health sciences students discovered that 20.8% had a negative attitude about blood donation and just 33.3% were eager to become regular blood donors (23). On the other hand, one study found that all participants agreed that donating blood is an excellent habit (19).

Various studies have found that less than 45% of the participants have donated blood (18,19,23,24). There are several myths and concerns around blood donation, such as the fear of huge needles, fainting after donation, donating blood weakening the body, and blood donation causing HIV infection, which prevent some people from committing. One of the reasons they were not becoming blood donors was that they did not have the chance to give and were not physically fit to do so (18). As a result, it is crucial to assess public perception and attitude to correct any misconceptions head-on. Lastly, various data have shown a positive association between knowledge and attitude, which indicates that if the information gaps can be eliminated, the attitude should also progress in a favour of blood donation (25).

1.4 Research justification

In Malaysia, the number of people who need emergency or non-emergency blood transfusions is not only continuing but also growing. The advancement of the modern health system with multiple complex medical and surgical treatments, trauma management, and blood disorder treatment leads to an increase in the demand for blood. This is supported by the Malaysian Ministry of Health's annual report, which showed an increased number of blood and blood products used (10).

Lifelong blood transfusions are the mainstay of treatment for thalassemia patients. Thalassaemia is the most common hereditary haematological disorder in Malaysia, causing the bone marrow to be unable to produce enough red blood cells as well as the production of fragile red blood cells that easily haemolyse. Blood transfusion services in Malaysia need to work hard to ensure adequate and safe blood collection daily because 56.73% of the 7984 registered thalassaemia patients are on regular blood transfusions (26).

Human blood and blood products can only be obtained in Malaysia through voluntary blood donations. According to statistics, only 16.2% of blood donors in Malaysia were students. In Pulau Pinang, the Malaysian state where AMDI is located, 2.3% of the population aged 17 to 65 donated at least once in 2022 (27). To plan steps to improve blood donation activities, it is valuable to investigate potential blood donors' awareness of blood donation.

To have a well-organized and structured 100% voluntary blood donation programme in a country, WHO developed a framework with strategies and action points to be implemented. In the framework, WHO suggested investigating knowledge, attitudes, and practices (KAP) about blood donation (2). It can be a simple but effective means of identifying factors that need to be addressed in donor information and education.

Postgraduate students are ideal participants for the study because they correspond to the framework's recommendations (2). Firstly, a blood donor programme cannot function in isolation and needs active coordination with partner organizations, including educational institutions, to always fulfil the nation’s demand for blood and blood products. Second, partnerships may help the blood donor programme by sharing research and marketing abilities and offering access to many potential donors. Thirdly, information, education, and ways of getting the word out about blood donors can be tailored to different audiences by finding the right subpopulations within the larger community. Lastly, the demographic data of the population will be used to create a profile of a possible blood donor. Profiling blood donors is an important step in making sure that there will be enough blood in the long run (28).

Thus, this study’s results are intended to help improve blood transfusion services in AMDI, USM particularly, and Malaysia in general by better understanding the characteristics of potential donors. Aside from that, this research is expected to establish any concerns with blood donation. Following the findings, the blood transfusion service may develop customised strategies to promote blood donation, which will aid in recruiting and retaining blood donors at AMDI, USM.

1.5 Research questions

- What is the knowledge level, attitudes, and practices regarding blood donation of the postgraduate students at AMDI, USM?
- Is the demographic characteristic of the postgraduate students at AMDI, USM associated with knowledge, attitudes, and practices about blood donation?

CHAPTER TWO:

OBJECTIVE

CHAPTER TWO

2.1 General objective

To determine postgraduate students' knowledge, attitudes, and practices about blood donation at the Advanced Medical and Dental Institute (AMDI), USM.

2.2 Specific objective

1. To determine postgraduate students' knowledge, attitudes, and practices about blood donation.
2. To determine the association of postgraduate students' demographic characteristics (gender, age, marital status) with knowledge, attitudes, and practices about blood donation.

2.3 Alternative hypotheses

- Postgraduate students at AMDI, USM have poor knowledge, attitudes, and practices towards blood donation.
- There is a significant association between students' demographic characteristics (gender, age, marital status) and knowledge, attitudes, and practices about blood donation.

2.4.1 Null hypotheses

- Postgraduate students at AMDI, USM have good knowledge, attitudes, and practices towards blood donation.
- There is no significant association between students' demographic characteristics (gender, age, marital status) and knowledge, attitudes, and practices about blood donation.

CHAPTER THREE:

METHODOLOGY

CHAPTER THREE

METHODOLOGY

3.1 Study background

This study focused on the knowledge, attitude, and practice of blood donation among postgraduate students at AMDI, USM. This study also predicted the association between the demographic factors of the students and their knowledge, attitude, and practice towards blood donation.

3.2 Study design

This is a cross-sectional study. An online validated self-administrated questionnaire via Google Form was distributed among postgraduate students at AMDI, USM.

3.3 Study duration

This questionnaire was distributed after obtaining ethical approval, from 1st March to 15th April 2023.

3.4 Study area

This study was carried out at the Advanced Medical and Dentistry Institute (AMDI), Universiti Sains Malaysia (USM). It is situated in Bertam, Kepala Batas, one of the districts of Pulau Pinang. The AMDI is an institution that is operated by Universiti Sains Malaysia. It offers postgraduate programmes in the field of medicine, such as a Master of Science, a Master of Medicine, and a Doctor of Philosophy. Through the courses offered, it is thought that AMDI would be able to train the best doctors and scientists, as well as produce commercial drugs from local sources and therapeutic goods. AMDI has its own blood bank for blood procurement as well as processing its blood products. Furthermore, AMDI serves as a medical centre treating patients who require blood transfusions, such as thalassaemia patients and cancer patients.

3.5 Study population

The target population for this study was all registered postgraduate students at the Advanced Medical and Dentistry Institute (AMDI), USM from 1st of March to 15th of April 2023, including those enrolled in the Master of Science (MSc.) in mixed mode, Master of Science (MSc.) in research, Doctor of Philosophy (PhD) in research and Master of Medicine (MMed) in Nuclear Medicine programmes who meet the inclusion and exclusion criteria.

3.6 Subject criteria

3.6.1 Inclusion criteria

- All registered postgraduate students at AMDI, USM who are residing in Malaysia.

3.6.2 Exclusion criteria

- Students of Master of Medicine (Transfusion Medicine) at AMDI, USM

3.7 Sample size

Specific objective 1: To determine postgraduate students' knowledge, attitudes, and practices about blood donation.

For the first specific objective of this study, a single proportion formula was used to calculate the sample size.

In a study by Govindasamy et al. (2019), 53.3% of the participants had adequate knowledge about blood donation.

Thus, the formula for sample size calculation is as follows:

$$n=N\ (Z\alpha/22\ *p*(1-p)\ /\ MOE2)$$

$$n=(z/\Delta)2\ P(1-P)$$

Where n = sample size ((384.16 X 0.533 (1 - 0.533))

Z = the value to estimate the 95% confidence interval (1.96)

Δ = absolute precision (0.1)

P = anticipated population proportion (53.3%)

While N = n + 20% (non-response rate), N = 96 + 19.

Thus, the sample size for this objective is **115 students**.

Specific objective 2: To determine the association of postgraduate students' demographic characteristics (gender, age, marital status) with knowledge, attitudes, and practices about blood donation.

i) Gender

For the second objective, which is to correlate the demographic characteristics (**gender**) of the respondent regarding their knowledge, attitudes, and practices on blood donation, the sample size was calculated using the **double proportion formula**.

A study by Ahmed Z (2014) reported that the proportion of females who had adequate knowledge of blood donation was **69.8%** and male was **30.2%**.

Thus, the formula for sample size calculation is as follows:

$$n = \frac{P_1(1 - P_1) + P_2(1 - P_2)}{(P_1 - P_2)^2} (Z_\alpha + Z_\beta)^2$$

Where P_1 = proportion of exposure in male (0.698)

P_2 = proportion of exposure in female (0.302)

Z_α= Level of significance, 1.96 for α =0.05 (two tailed)

Z_β= Power of study, 0.84 for 80% power

n = 30 per group with 20% drop out.

So, total patients involved (30 x 2) = 60 students.

Thus, the sample size for this objective is at least **60 students**.

ii) Age

For the second objective, which is to correlate the demographic characteristics (**age**) of the respondent regarding their knowledge, attitudes, and practices on blood donation, the sample size was calculated using the **single proportion formula.**

A study by Govindasamy et al. (2019) reported that the proportion of students aged more than 21 who had adequate knowledge of blood donation was 63.7%.

Thus, the formula for sample size calculation is as follows:

$$n=N (Z\alpha/22 *p*(1-p) / MOE2)$$

$$n=(z/\Delta)2 P(1-P)$$

Where n = sample size ((384.16 X 0.637 (1 - 0.637))

Z = the value to estimate the 95% confidence interval (1.96)

Δ = absolute precision (0.1)

P = anticipated population proportion (63.7%, aged ≥21 years)

While N = n + 20% (non-response rate), N = 94 + 18.

Thus, the sample size for this objective is **112 students**.

iii) Marital status

For the second objective, which is to correlate the demographic characteristics (**marital status**) of the respondent regarding their knowledge, attitudes, and practices on blood donation, the sample size was calculated using the **double proportion formula.**

According to a survey conducted by Ooi et al. (2020), **68.4%** of single people and **31.40%** of married people have appropriate information about blood donation.

Thus, the formula for sample size calculation is as follows:

$$n = \frac{P_1(1 - P_1) + P_2(1 - P_2)}{(P_1 - P_2)^2} (Z_\alpha + Z_\beta)^2$$

Where P_1 = proportion of exposure in single (0.684)

P_2 = proportion of exposure in married (0.314)

Z_α= Level of significance, 1.96 for α =0.05 (two tailed)

Z_β= Power of study to demonstrate association if one does exist, 0.84 for 80% power

n = 35 per group with 20% drop out.

So, total patients involved (35 x 2) = 70 students.

Thus, the total sample size for this objective is at least **70 students**.

Based on the calculation from each objective, **the biggest sample size is 115 from first objective**. Thus, the minimum recommended sample size estimated for this study was **115 of registered AMDI, USM postgraduate students.**

3.8 Sampling method and subject requirement

3.8.1 Sampling method

This study used the purposive sampling method, where postgraduate students in AMDI, USM who fulfilled the inclusion criteria were recruited.

3.8.2 Subject requirement

Target population: Postgraduate students of AMDI, USM in Bertam, Pulau Pinang, Malaysia.

Source population: Registered postgraduate students of AMDI, USM.

3.9 Research tool

a) Validated questionnaire, Cronbach's alpha 0.726 (APPENDIX B) (adopted from Zainal Abidin and Shet, 2021). The questionnaire was wholly adopted without any changes from the original study by Zainal Abidin and Shet (2021). No validation is required because it has been validated by previous researchers. Permission to use the questionnaire has been received from the original author to utilize it in the present study (APPENDIX A). The questionnaire was utilized

in English since it is the medium of learning and teaching for postgraduate students at AMDI, USM.

b) Profoma (APPENDIX C) (adopted from Zainal Abidin and Shet, 2021). The data included were:
    - Age
    - Gender
    - Ethnicity
    - Marital status
    - Courses
    - Knowledge towards blood donation
    - Attitude towards blood donation
    - Practices towards blood donation

c) Participant information sheet and consent form

3.10 Data collection method

All postgraduate students at AMDI, USM were invited to answer an anonymous online questionnaire (APPENDIX C). The questionnaire was created using the format of a Google Form. The invitation was sent to the participants via WhatsApp message and email. The link to the questionnaire was provided in the WhatsApp message and email. The PIS-CF form was attached to the invitation link.