Factors Affecting Attitude and Behaviour towards Organ Donation among Medical Students in Malaysia: A Cross-Sectional Study

L. W. J. Edmund[1*], H. J. Nurul Shazlyiana[1], N. Farah Nursyahirah[1], J. C. Fam[1] and J. Chua[1]

[1]Melaka-Manipal Medical College (MMMC), Jalan Batu Hampar, Bukit Baru, 75150 Malacca, Malaysia.

Original Research Article

ABSTRACT

Aim: To assess the factors affecting attitude and behaviour towards organ donation among medical students.
Study Design: Analytical cross-sectional study
Place and Duration of Study: Melaka-Manipal Medical College (Muar Campus), Malaysia between November and December 2016.
Methodology: A total of 350 students from Batch 33 and 34 were given the questionnaire. The response rate was 228 students and 216 were included in this analysis. Non-probability sampling was used. The questionnaires encompassed demographic profiles, The Big Five personality test and a modified standardised structured questionnaire on Knowledge, Attitude and Practice toward organ donation. All answered questionnaires were collected and subjected to data analysis using Epi-info software version 7.1. The data were interpreted using the Chi-square test.
Results: The response rate to our questionnaire is 65.1%. The risk factors with significant positive associations are race, religion, birth order, and personality traits. The Malay group was chosen to be the reference for the race group. High scores correspond to higher willingness to donate meanwhile low scores corresponds to lower willingness towards organ donation. The Others group has 4.29 times more likely to have higher scores (*P* =.02). This is followed by the Chinese group which is 3.25 times more likely to have higher scores (*P* = .001); the Indians are 2.77 more feasible towards organ donation (*P* =.02). In the religion category, Islam was chosen as the reference group. Other religions have 6.33 times a higher chance to have higher scores and the *P* value was significant (*P* =.03). This is followed by Christianity which is 3.69 times more probable to have higher scores (*P* =.003). Buddhism has an OR of 2.7 with a significant *P* value of .01. Lastly, Hindus are 2.41 times more prospective for organ donation when compared to Muslims (*P* =.03). First-borns have 2.19 higher tendencies towards organ donation when compared to last-borns (*P* =.04). As for personality, the study shows the dominant openness trait to have a positive and significant association to organ donation (*P* =.03).
Conclusion: It is apparent that multiple factors may contribute to the Knowledge, Attitude and Practice towards organ donation of a medical student. The results suggest that there is an association between race, religion, birth order and personality to the likelihood of an individual donating an organ. Awareness and consciousness of this issue can be improved among medical students with adequate exposure and education on issues pertaining organ donation.

**Corresponding author: E-mail: edmundlee0712@gmail.com;*

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1. INTRODUCTION

Shortage of organs for transplantation is a global burden. Malaysia records as one of the lowest rates for organ donation among Asian countries and in the world [1]. In 2009, there were only 39 actual donors per 28.3 million in Malaysia [2]. Organ donation is defined as the gift of an individual's body parts after their demise for transplantation [3]. In Malaysia, an expressed consent is needed for organ donation. Malaysia introduced the Human Tissue Act in 1974, followed by a National Transplantation Program in 1975 to facilitate and promote organ donation. The first living kidney transplant was performed in Malaysia in 1975 and the first deceased donation follows suit two years later [4].

Organ for transplantation can be obtained from living or deceased donors with the decision to donate specific organs or tissue [5]. In the year 2012, 114690 organs were successfully transplanted worldwide. In spite of a 1.8% increase from the previous year, this number constitutes less than 10% of the global demand for organs. According to the World Health Organization (WHO)'s Global Observatory on Donation and Transplantation (GODT) 2012, Malaysia has one of the lowest rates for organ donations in the world at 1.3 organ donor per million populations when compared to Australia, United States of America and Spain at 11, 26 and 35.1 per million populations respectively [6]. In February 2015, around 10 000 people in Malaysia are in need of a transplant and around 7000 people are on the transplant waiting list [7]. Until August 2016, a total of 17 458 people had signed up as donors which are about 1% of the total Malaysia population [8].

The chronic shortage is attributed to lack of awareness and knowledge among public especially medical students [1] and passivity among health professionals in approaching families of potential donors [9]. It is important to assess the factors affecting the knowledge and attitude towards organ donation in the public especially in future medical personnel. A study was done among relatives of patients awaiting treatment in University Malaya Medical Centre (UMMC), Malaysia has shown a host of reasons behind negative attitude towards organ donation such as fears of organs being used for research, religio-cultural factors, and fear of less active treatment if the patient is known to be a donor [10]. Another study has shown a low education level, low household income and age group are also important aspects associated with not pledging as an organ donor [11].

This study aims to assess the factors affecting the attitudes and behaviours of medical students in Malaysia towards organ donation.

2. METHODOLOGY

2.1 Research Design

This study is a cross-sectional study (also known as a cross-sectional analysis, transversal study, or a prevalence study); a type of observational study that analyses data collected from a population, or a subgroup of the population, at a particular point in time. The study was conducted for 6 weeks starting mid-November 2016 to the end of December 2016.

It was conducted at Melaka-Manipal Medical College (MMMC), Muar Campus, Johor, Malaysia. MMMC was established in 1997 through the vision of Dr.RamdasPai, Chancellor of Manipal University, and the instrumental efforts of the late Datuk K Pathmanaban, former Malaysian Deputy Minister of Health. There was a shortage of doctors in the country at that point in time. They recognised that the problem could be effectively addressed if more Malaysians had the opportunity to achieve their aspirations of becoming doctors and healthcare professionals. The national aspiration was for Malaysia to be a leading education hub in Southeast Asia. This was aligned with MMMC's vision of imparting quality medical education at an affordable price. This led to the signing of an agreement in New Delhi in 1993, between Manipal Academy of Higher Education (MAHE) and the college. The signing was witnessed by both the Prime Ministers of Malaysia and India. The college was the first Indo-Malaysian alliance in education and was among the spearheads to offer private medical education in the country.

2.2 Sample

Medical students from Batch 33 and Batch 34 of Melaka-Manipal Medical College were included in the study. Based on a previous study done [12], the sample size was calculated.
Please mention refs. no. 13-15 after ref. no. 12
Sample size formula for the cross-sectional study:

$$n = Z^2_{1-\alpha/2} P(1-P)/d^2, \textit{ where,}$$

n	= sample size
$Z^2_{1-\alpha/2}$	= confidence interval
P	= estimated proportion
d	= desired precision

Where,
P= prevalence rate, 88.3%
Z= 95% confidence level

A sample size of 162 participants was the minimum number required to obtain valid results. 350 students from Batch 33 and 34 were given the questionnaire. The response rate was 228 students and 216 were included in this analysis. Students were briefed about the objectives of the study and a written consent form was attached with the questionnaire for willing respondents to sign. Non-probability sampling was used. The inclusion criteria included those who had given consent willingly. Despite distributing all the questionnaires, there were some students who refused to take part in the study. Those who were absent were excluded from the study.

2.3 Research Methods

Demographic profiles were obtained from the students and these include their roll number, age, gender, race, religion, address, birth order, blood groups, handedness, family's literacy, and family income. This study also compares different personality types and the likelihoods of them donating an organ. The Big Five Personality Test is a model based on common language descriptors of personality. In a table, for each standardised question, a score was given, 1 is for disagreeing, 2 is for slightly disagree, 3 is for neutral, 4 is for slightly agree and 5 agrees. The scores should be between zero and forty. Five descriptive types are identified which are Extroversion (E), Agreeableness (A), Conscientiousness (C), Neuroticism (N) and Openness to Experience (O). Extroversion (E) is the behavior of striving contentment from sources outside the self or in the community. High scorers tend to be very outgoing while low scorers prefer to work alone. Agreeableness (A) reflects individuals who adjust their conduct to suit others. High scorers are typically polite and gregarious. Low scorers have a tendency to speak their mind. Conscientiousness (C) is the personality trait of being honest and hardworking. High scorers tend to abide by rules and favor organised home environment. Low scorers may be messy and may tend to deceive others. Neuroticism (N) individuals are emotional and sensitive beings. Openness to Experience (O) is the personality trait of seeking new capabilities and scholarly pursuits. High scorers tend to daydream and fantasise. Low scorers are most likely people who are subservient and unassertive.

A Knowledge, Attitude, and Practices (KAP) study is a quantitative scheme (predefined questions structured in standardised questionnaires) that provides access to quantitative and qualitative information.

For example:

Knowledge: Organs for transplant can be legally bought and sold in Malaysia
Attitude: Are you willing to accept organs from other people?

Practices: Have you registered as an organ donor in the national registry?

A modified structured questionnaire was administered to the students and the collection of questionnaires was done.

2.4 Data Analysis

The completed questionnaire was analysed individually. Scores 20 and above was considered as high score and those with 19 and below were considered low scores. Data obtained in the report was analysed using the data analysis software program Epi Info version 7.2 and Microsoft Excel 1997-2003. Descriptive statistics included mean and standard deviation for personality as well as frequency and percentage for gender, race, and religion, place of stay, birth order, blood group, and handedness. For inferential statistics, we used chi-square for nominal data to test the hypothesis. We used odds ratio and 95% confidence interval as the measure of association. The level of significance was set at a *P* value of .05. A *P* value less than .05 was regarded significant.

2.5 Ethical Consideration

Partaking was voluntary and written informed consent was taken. Before the students completed the questionnaires, they were briefed about the objective of the study. Participants were reassured that their particulars will not be revealed to any third parties. Anonymity was also maintained.

3. RESULTS AND DISCUSSION

3.1 Demographics

The response rate to our questionnaire is 65.1% in which, 228 of the questionnaires were returned answered. About 12 questionnaires were excluded due to incomplete or invalid answers; the resultant valid questionnaires were 216.

Table 1 shows demographic data and results of the Big Five Personality test done on our respondents. Our study sample size consisted of 129 females making up 59.7% of the population while males were 87 in number with a percentage of 40.3%. Among the four races, Malay is the highest in number encompassing 41.6% of the population, Chinese and Indian made up the same percentage with 26.9% of the total population followed by the least, 4.6% which is the Others category. Most of the population were Muslims at 43.5%, followed by Hindus at 20.4%, Buddhism at 19.9%, Christianity at 13.9% and others which made up the minority of the population with 2.3%. 82.9% of our sample population were urbanites meanwhile 17.1% comes from the rural areas of Malaysia. Our study also took birth order as one of our independent variables. First-borns made up most of our sample size with a percentage of 40.7%, followed by middle children at 35.7%, and last-borns at 23.6%. Blood group was also taken as one of our parameters, in which blood group O was the highest among all four groups at 42.5%. We also requested that the participants fill out their handedness. Right-handers made up 86.1% of our subjects, 11.6% were left-handers and 2.3% were ambidextrous. Based on the Big Five Personality Test, that was subjected to our sample size; some of the study samples had more than one dominant personality trait. It is due to this that only the dominance of each personality could be tabulated and not the total scores. 10.2% of our study sample was dominant for extroversion, 44.4% was dominant for Agreeableness, 25.0% was dominant for Conscientiousness, 15.3% was dominant for Neuroticism and 20.4% was dominant for openness.

Table 2 shows inferential statistics by comparing different parameters with high and low scores. High scores correspond to higher willingness to donate meanwhile low scores corresponds to lower willingness towards organ donation. In order to interpret the data, we used the odds ratio which includes a 95% Confidence Interval, Chi-square, and two-tailed *P* -value. For interpretation of Odds Ratio (OR), OR is equal to 1 if there is no association between the independent and dependent variable; if OR is more than 1, this result can be interpreted as the independent variable having positive association against the dependent variable; if OR is less than 1; the independent variable has negative associations against the dependent variable. For Chi-square, if the value obtained is more than 3.841, the data is considered to be significant. *P* value is significant if the value is less than .05.

Table 1. Descriptive statistics of basic variables

Variables	Number (n)	Percentage (%)
Total participant	216	
Gender		
Female	129	59.7
Male	87	40.3
Race		
Chinese	58	26.9
Indian	58	26.9
Malay	90	41.6
Others	10	4.6
Religion		
Buddhism	43	19.9
Christianity	30	13.9
Hindu	44	20.4
Islam	94	43.5
Others	5	2.3
Place		

Rural	37	17.1
Urban	179	82.9
Birth order		
First	88	40.7
Last	51	23.6
Middle	77	35.7
Blood group		
A	55	25.5
AB	12	5.6
B	57	26.4
O	92	42.5
Handedness		
Both	5	2.3
Left	25	11.6
Right	186	86.1
Personality traits		
Dominant extroversion trait		
No	194	89.8
Yes	22	10.2
Dominant agreeableness trait		
No	120	55.6
Yes	96	44.4
Dominant conscientiousness trait		
No	162	75.0
Yes	54	25.0
Dominant neuroticism trait		
No	183	84.7
Yes	33	15.3
Dominant openness trait		
No	172	79.6
Yes	44	20.4

Based on Table 2, males are 1.04 times more likely to have higher scores, but the value is not significant based on 95% CI, chi-square and *P* value (*P* =.91). The Malay group was chosen to be the reference group for the race. The others group has 4.29 times more likely to have higher scores and the value is significant (*P* =.02). This is followed by the Chinese group which is 3.25 times more likely to have higher scores, (*P* =.001); the Indians are 2.77 more feasible towards organ donation, (*P* =.02). In the religion category, Islam was chosen as the reference group. Other religions have 6.33 times a higher chance to have higher scores and the *P* value was significant (*P* =.03). This is followed by Christianity which is 3.69 times more probable to have higher scores (*P* =.003). Buddhism has an OR of 2.7 with a significant *P* value of .01. Lastly, Hindus are 2.41 times more prospective for organ donation when compared to Muslims (*P* =.03). Between urbanites and those who come from rural regions, urbanites have 1.1 times higher a chance to have higher scores, but this value has no significance. First-borns have 2.19 higher tendencies towards organ donation when compared to last-borns, this value is significant (*P* =.04). As for blood group, group A was set as the reference. Blood group AB has the highest likelihood for better scores followed by groups B and O; however, the values are not significant. Lastly, left-handers are 1.21 more likely to have higher KAP scores compared to right-handers, but the value is not significant.

Table 3 shows that Dominant Agreeableness, Conscientiousness, Extroversion, Neuroticism, and Openness are more prone to organ donation but only Dominant Openness has significant *P* value (*P* =.03).

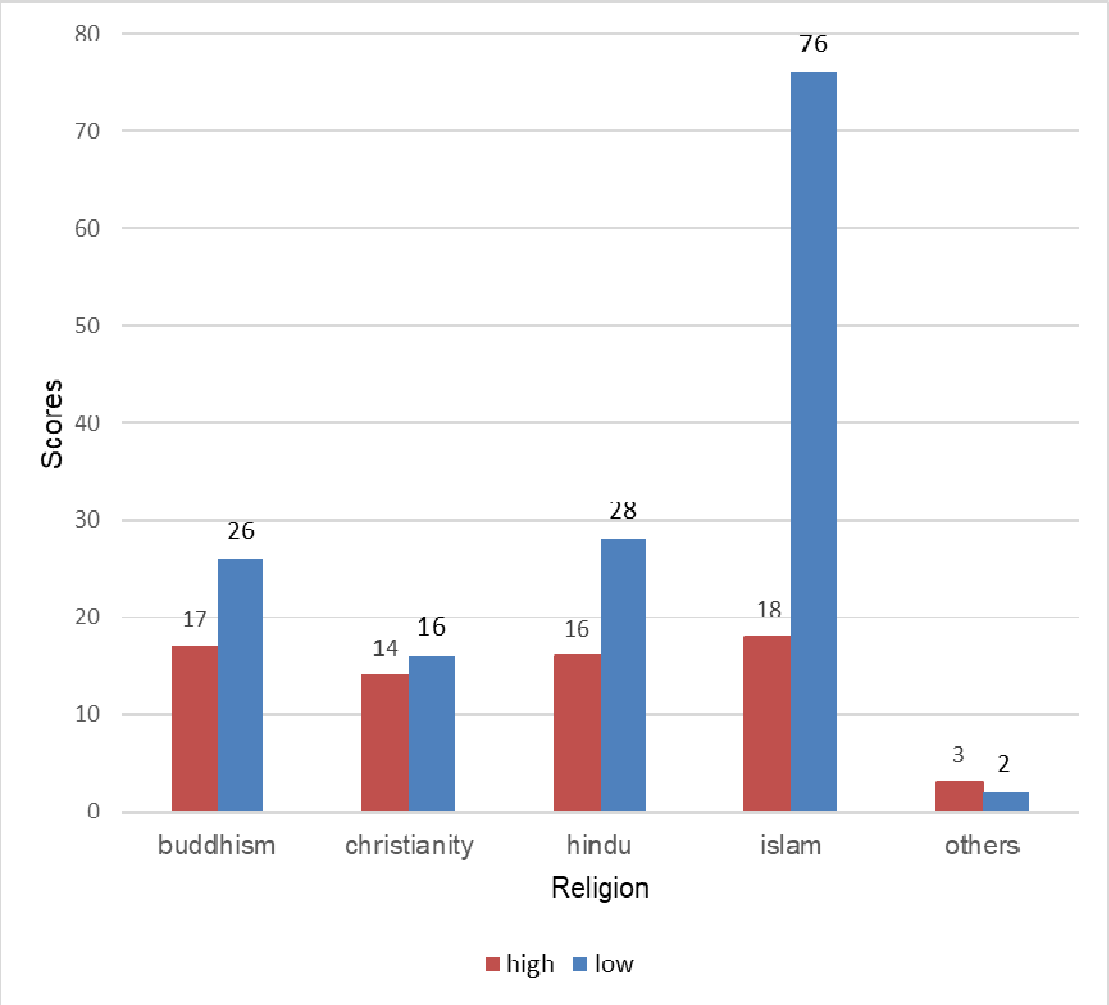

Fig. 1. Bar chart shows scores (willingness to donate) obtained plotted against different religions

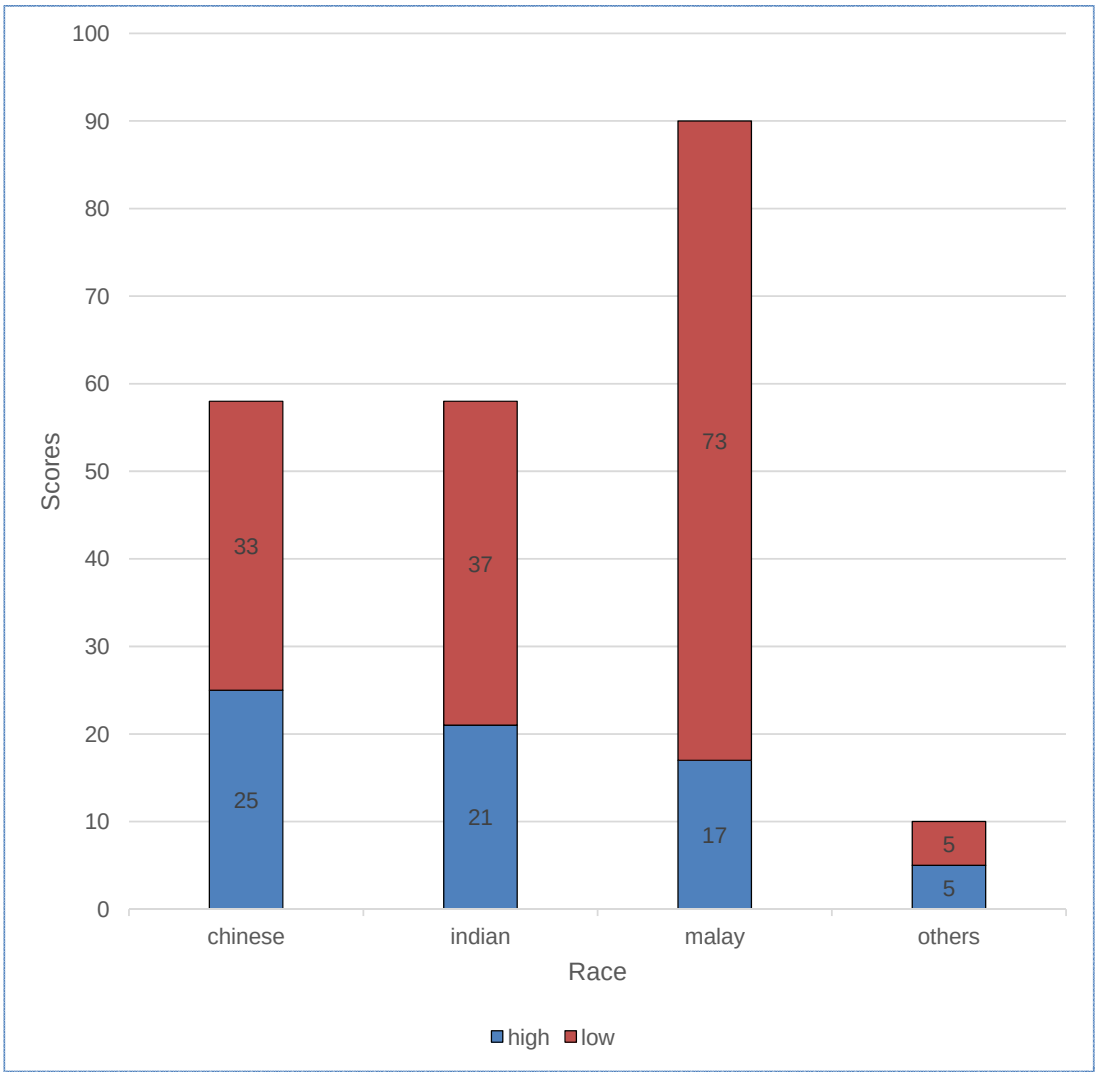

Fig. 2. Bar chart shows scores (willingness to donate) obtained against different races

3.2 Discussion

The attitude and behaviour are undeniable in affecting a person's perception of organ donation. Donation decisions are examined as a function of attitude toward donation and the religious, cultural, noble, normative, and knowledge-based beliefs that comprise the attitude [16]. In view of this, this study was conducted to determine the factors affecting attitude and behaviour towards organ donation. Among the 5 types of personalities, openness was found to be most willing to be an organ donor.

In Table 2, we found that the sociodemographic data of religion have a significant association with attitude on organ donations. We established that others are 6.33 times (*P* value=.03) and Christianity, 3.69 times more likely to have a positive attitude on organ donations (*P* value=.003) when compared to Muslims.). Buddhism has 2.7 times with a significant *P* value of .01. Lastly, Hindus are 2.41 times more prospective towards organ donation when compared to Muslims (*P* =.03) In another similar study [17], religion-wise, almost two-thirds (66%) of the donors were Buddhists, with Hindus at 24%, Islam at 3%, Christians at 3% and others at 5%. This can be justified by the fact that Muslims face the dilemma of being unsure whether their religion allows them to make organ donations [18, 19, 20]. The culture-specific issues among some Muslims arguing against donation includes a sense of the sacredness of the body; they believe that it is important to have an intact body

after passing away and fear of illegal trade in organs and the poor would suffer [21]. From the Islamic perspective, a fatwa (decree) on organ donation had been declared in Malaysia in the year 1969 stating that organ donation was not haram (forbidden) and was in fact permitted not only for the benefit of fellow Muslims but for non-Muslims as well [22]. This decree is in line with similar fatwas in other Muslim countries. However, it appears that there are still widely held belief that it is forbidden in Islam [23]. There is even a very recent review article in the medical setting erroneously stating that organ donation was forbidden in Islam as the human body is considered sacred after death [24]. Conversely, there is no commandment that prohibits the Hindus to donate their organs. Donating organs is a good deed that may positively affect their karma and reincarnation and rebirth process [25]. In Christianity, donating organs is generally accepted and Pope Benedict XVI has shown his support by becoming a donor himself. His predecessor John Paul II had once stated that donating organs is an act of Christian's love and duty [26].

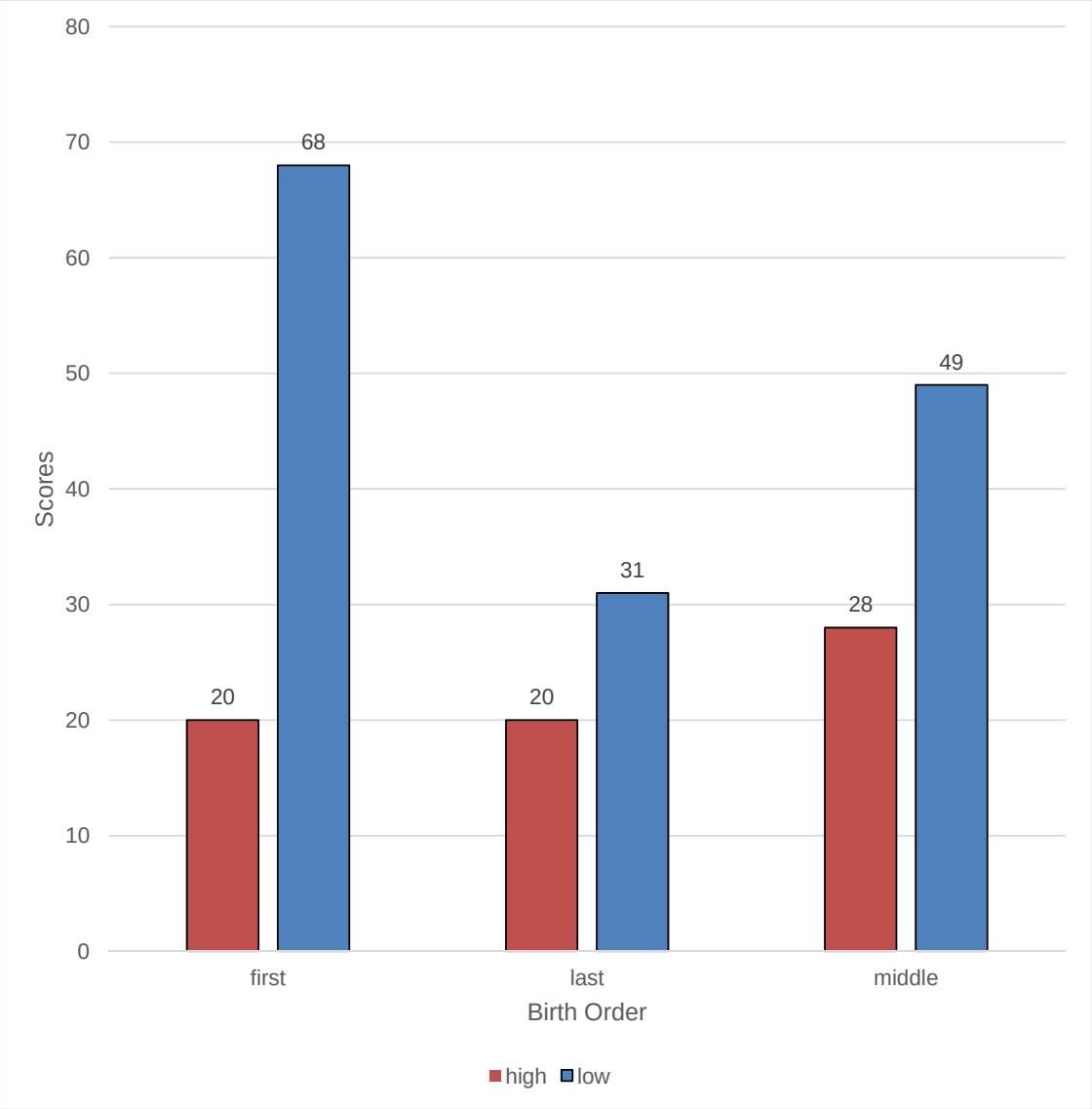

Fig. 3. Bar chart shows scores (willingness to donate) obtained plotted against the birth order of the subjects

Table 2. Comparison of characteristics against scores (Willing to donate) via qualitative analysis

Parameter	Scores		Odds ratio (95% CI)	Chi-square	*P* value
	High	Low			
Gender					
Male	19 (42.2%)	42 (41.2%)	1.04 (0.51 - 2.13)	0.01	0.91
Female	26 (57.8%)	60 (58.8%)			
Race					
Malay	17 (25.0%)	73 (49.3%)	1.00 (reference)		
Chinese	25 (36.7%)	33 (22.3%)	3.25 (1.55 - 6.82)	10.17	0.001***
Indian	21 (30.9%)	37 (25.0%)	2.77 (1.15 - 5.17)	5.54	0.02***
Others	5 (7.4%)	5 (3.4%)	4.29 (1.12 - 16.52)	5.08	0.02***
Religion					
Islam	18 (26.5%)	76 (51.3%)	1.00 (reference)		
Christianity	14 (20.6%)	16 (10.8%)	3.69 (1.53 - 8.93)	8.99	0.003***
Hindu	16 (23.5%)	28 (18.9%)	2.41 (1.08 - 5.37)	4.78	0.03***
Buddhism	17 (25.0%)	26 (17.6%)	2.76 (1.24 - 6.14)	6.45	0.01***
Others	3 (4.4 %)	2 (1.4%)	6.33 (0.98 - 40.75)	4.74	0.03***
Place					
Urban	57 (83.8%)	122 (82.4%)	1.10 (0.51 - 2.39)	0.06	0.80
Rural	11 (16.2%)	26 (17.6%)			
Birth order					
First	20 (50.0%)	68 (68.7%)	2.19 (1.03 - 4.65)	4.28	0.04***
Last	20 (50.0%)	31 (31.3%)			
Blood group					
A	13 (19.1%)	42 (28.4%)	1.00 (reference)		
AB	5 (7.3%)	7 (4.7%)	2.31 (0.63 - 8.51)	1.63	0.20
B	18 (26.5%)	39 (26.4%)	1.49 (0.65 - 3.44)	0.88	0.35
O	32 (47.1%)	60 (40.5%)	1.72 (0.81 - 3.67)	2.01	0.16
Handedness					
Left	9 (13.2 %)	16 (11.2%)	1.21 (0.51 - 2.90)	0.18	0.67
Right	59 (86.8%)	127 (88.8%)			

Table 3. Comparison of dominant personality against scores via qualitative analysis

Dominant personality	Scores		Odds ratio (95% CI)	Chi-square	*P* value
	High	Low			
Dominant agreeableness (DOMA)					
Yes	24 (35.3%)	72 (48.6%)	0.58 (0.32 - 1.04)	3.37	0.07
No	44 (64.7%)	76 (51.4%)			
Dominant conscientiousness (DOMC)					
Yes	16 (23.5%)	38 (25.7%)	0.89 (0.46 - 1.74)	0.11	0.38
No	52 (76.5%)	110 (74.3%)			
Dominant extroversion (DOME)					
Yes	7 (10.3%)	15 (10.1%)	1.02 (0.40 - 2.62)	0.00	0.97
No	61 (89.7%)	133 (89.9%)			
Dominant neuroticism (DOMN)					
Yes	11 (16.2%)	22 (14.9%)	1.11(0.50 - 2.43)	0.06	0.80
No	57 (83.8%)	126 (85.1%)			
Dominant openness (DOMO)					
Yes	20 (29.4%)	24 (16.2%)	2.15 (1.09 - 2.45)	5.00	0.03
No	48 (70.6%)	124 (83.8%)			

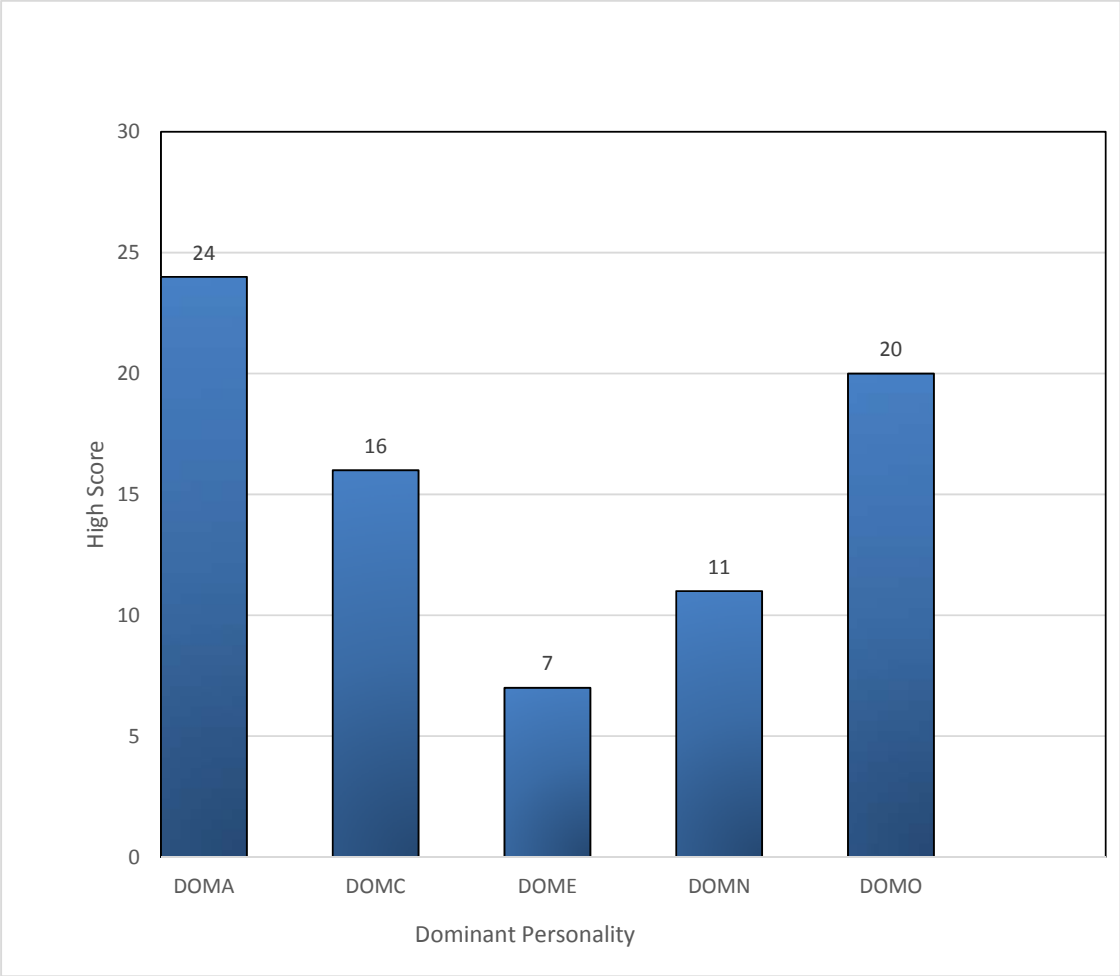

Fig. 4. Bar chart shows scores (willingness to donate) obtained plotted against dominant personalities

When comparing likelihood among different ethnicity to register for organ donation, the Others group are most willing to register for organ donations with 4.29 with (*P* value=.02), followed by Chinese with 3.25 times more likely with (*P* value=.001). Lastly, Indians with an odds ratio of 2.77 with a *P* value of .02. This is in line with the national transplant registry where it noted an increasing trend in the number of donors among the Chinese ethnic group for the past five years while Malays made up only 5% of total donors in the recent years [27]. The Malays in Malaysia is the largest ethnic group, but unfortunately, the statistics show that the Malays are the least to sign up for organ donation as seen in a similar study [28]. Similarly, the willingness to donate one's own organ was significantly and positively associated with a higher knowledge and attitude score as seen in a similar study [29].

In Table 3, our studies show that students with dominant openness trait have 2.15 times higher tendency to donate an organ with (*P* value=.03). Openness is negatively correlated with harm avoidance and positively correlated with novelty seeking [30]. Participants who score are dominant for openness have the tendency to be generous toward strangers in the absence of any guarantee of reciprocity. Openness covers intellect that is not constrained by experience or culture. Individuals with a high degree of openness are creative, imaginative, curious, broad-minded, and intelligent [31, 32, 33]. Openness to experience is the personality trait of seeking new experience and intellectual pursuits and probably due to this; they are more likely to be a prospect organ donor.

From the result, males have 1.04 times higher probability to donate an organ as compared to

female; however, our value is not significant. A study among Indian dental students also concluded that gender had no association with the practice of organ donation [34]. There was another study done among nursing students in Hong Kong which showed no significant association between age, gender, and willingness towards organ donation [35].

4. LIMITATIONS

There are a few limitations that needed to be overcome in our study. First of all, the population of the study is only based on MMMC students in Muar campus, it is not only limited in a specific institution, but the study is also limited to only 2 batches of students, the sample size although is not small, but can be increased for better reliability. Thus, it is required for the research to be extended to other medical institutions in Malaysia like International Medical University (IMU), Penang Medical College (PMC) and medical faculties in public universities to compare and contrast on the results obtained. As this study is cross-sectional, the findings are not to be compared on causality effect.

5. RECOMMENDATIONS

Future studies should involve more institutions, and more respondents ranging from the 1st year to the last year. In our study, it was found that the dominant openness personality is most likely to become an organ donor. Certain strategies to increase knowledge of organ donation among medical students should be imparted as this would provide different attitudes and behaviours towards organ donation. Hence, more information regarding organ donation should be disclosed to medical students to improve their knowledge regarding this field.

6. CONCLUSION

The chronic shortage of organ donors in Malaysia is largely attributed to the lack of public awareness and the apathy of doctors approaching individuals or families of prospective donors. Change in the public mind set is vital to increase the availability of organs for those in need. This change can only be brought about with awareness and education within the medical personnel itself. This study provides an insight of the factors that influence the attitude and behaviour of the future medical workforce towards organ donation. Based on the results obtained, race, religion, birth order and personality trait are those with positive association towards organ donation. Awareness and consciousness of this issue can be improved among medical students with adequate exposure and education on issues pertaining organ donation.

CONSENT

A written, informed consent was taken from the participants of the study before they proceeded to answer the questionnaire. The anonymity of the participants was maintained.

ETHICAL APPROVAL

The research was approved by the research ethics committee, Faculty of Medicine, Melaka-Manipal Medical College. The committee comprises of Prof. Dr. Soumendra Sahoo, Prof. Dr. Adinegara Lutfi Abas and Prof Dr. Htoo Htoo Kyaw Soe. A written, informed consent was taken from each participant. Privacy and anonymity of each participant were maintained throughout the course of the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Seo YH, Katarina CSY, Janusha SR, Mathias PP, Muhammad IS. Knowledge, awareness, and attitudes on organ donation among undergraduate medical students in Malaysia: an analytical cross-sectional study. British Journal of Medicine and Medical Research 2016,16(3):1-14.
2. National Transplant Registry. 6th Report of National Transplant Registry. Malaysia: MOH, 2009.
3. Transplantation Unit, Medical Development Division, Ministry Of Health Malaysia. Living Organ Donation What You Need To Know. Malaysia: MOH, 2011.
4. Makmor T, Abdillah N, Raja Noriza RA, Nurulhuda MS, Sook-Lu Y, Lim SK, Ng KP. Low organ donation rate in Malaysia: A survey. Journal of Health and Translational Medicine. 2014;17(1):14-17.
5. National Kidney Foundation of Malaysia. Organ Donation & Kidney Transplantation. Malaysia: NKF, 2012. http://www.nkf.org.my/article/view/id/8437.html Accessed 19 December 2016.

6. World Health Organization. Global Observatory on Donation and Transplantation. Spain: WHO, 2012. http://www.transplant-observatory.org/ Accessed 19 December 2016.
7. National Transplant Resource Centre. Organ Donation: What You Need to Know. Malaysia: NHS, 2015.
8. Anonymous. Malaysia's organ donation rate among the lowest in the world. The Star 2016. https://www.thestar.com.my/news/nation/2016/10/04/malaysia-organ-donation-rate-among-lowest-in-the-world/ Accessed 20 December 2016.
9. Satyapal KS. Ethics, transplantation, and the changing role of anatomists. Clinical Anat. 2005;18(2):150-3. Accessed 20 December 2016. Available: https://onlinelibrary.wiley.com/doi/abs/10.1002/ca.20066
10. Abidin ZL, Ming WT, Loch A, Hilmi I, Hautmann O. Are health professionals responsible for the shortage of organs from deceased donors in Malaysia? Transplant Int. 2013;26(2):187-94.
11. Riyanti S, Hatta M, Norhafizah S, Balkish MN, Siti ZM, Hamizatul AH, et al. Organ donation by sociodemographic characteristics in Malaysia. Asian Social Science. 2014; 10(4):132-40.
12. Hilmi I, Mazam Z, Yegan P, D Choon. Differences in attitude towards cadaveric organ donation: observations in a multiracial Malaysian society. Hong Kong Journal of Emergency Medicine. 2010;17(3):236-243.
13. Rumsey S, Hurtford DP, Cole AK. Influence of knowledge and religiousness on attitudes toward organ donation. Transplant Proc. 2003;35(8):2845-50.
14. Morgan S, Miller J. Communicating about gifts of life: the effect of knowledge, attitudes, and altruism on behavior and behavioural intentions regarding organ donation. Journal of Applied Communication Research. 2002;30(2):163-78.
15. Goldberg LR. The structure of phenotypic personality traits. American Psychologist. 1993;48(1):26-34.
16. Radecki CM, Jaccard J. Psychological aspects of organ donation: a critical review and synthesis of individual and next-of-kin donation decisions. Health Psychology. 1997;16(2):183-95.
17. Wong LP. Factors limiting deceased organ donation: focus groups' perspective from culturally diverse community. Transplant Proc. 2010;42(5):1439-44.
18. Noordin N, Zakaria Z, Aminuddin A, Sawal MZHM, Daud MS, Yusof ASM et al. Organ donation among Malaysian: The Malay dilemma toward social development. Asian Social Science. 2012;8(10).
19. Tokalak I, Kut A, Moray G, Emiroglu R, Erdal R, Karakavali H et al. Knowledge and attitudes of high school students related to organ donation and transplantation: a cross-sectional survey in Turkey. Saudi Journal of Kidney Diseases and Transplantation. 2006; 17(4):491-6.
20. Rashid A. Muslim families: Donating organs and asking for post mortems. Archives of Disease in Childhood. 2001; 85:79.
21. Bhandary S, Khanna R, Rao KA, Rao LG, Lingam KD, Binu V. Eye donation - awareness and willingness among attendants of patients at various clinics in Melaka, Malaysia. Indian Journal of Ophthalmology. 2011;59(1):41-5.
22. Albar M. Islamic ethics of organ transplantation and brain death. Saudi Journal of Kidney Diseases and Transplantation. 1996;7(2):109-14.
23. Shaheen FA, Al-Jondeby M, Kurpad R, Al-Khader AA. Social and cultural issues in organ transplantation in Islamic countries. Ann Transplant. 2004;9(2):11-3.
24. Puchalski CM, O'Donnell E. Religious and spiritual beliefs in end of life care: how major religions view death and dying. Tech RegAnesth Pain Manag. 2005;9(3):114-21.
25. Anonymous. Hinduism and organ donation. British Broadcasting Corporation 2003. http://www.bbc.co.uk/religion/religions/hinduism/hinduethics/organdonation Accessed 29 November 2016.
26. Badrolhisam NI, Zakaria Z. Knowledge, religious beliefs and perception towards organ donation from death row prisoners from the perspective of patients and nonpatients in Malaysia: A Preliminary Study. 2012; 2(24):197-206.
27. Hooi LS, Lela YM. Seventh report of the national transplant registry Malaysia 2010. National Transplant Registry Kuala Lumpur; 2013.
28. Nazni N, Zaherawati Z, Adnan A, Mahazril' AY, MohdZool HMS, MohdShamsul D, et al. Organ Donation among Malaysian: The Malay Dilemma toward Social Development. 2012;8(10):8-15.

29. Anonymous. Organ Donation- What Can Be Donated 2014. Available: http://www.nhs.uk/Conditions/Organ-donation/Pages/Definition.aspx
30. De Fruyt F, Van De Wiele L, and Van Heeringen C. Cloninger's psychobiological model of temperament and character and the five-factor model of personality. Personality and Individual Differences. 2000;29(3):441–452.
31. Barrick MR, Mount MK. The Big Five personality dimensions and job performance: a meta-analysis. PersPsychol. 1991;44(1):1–26.
32. Goldberg, Lewis R. The structure of phenotypic personality traits. American Psychologist. 1993;48(1):26-34.
33. McCrae RR, John OP. An introduction to the Five-Factor Model and its applications. J Pers. 1992;60(2):175–215.
34. Chakradhar K, Doshi D, Srikanth RB, Kulkarni S, Padma RM, Sruthi RS. Knowledge, Attitude and Practice Regarding Organ Donation among Indian Dental Students. Int J Organ Transplant Med. 2016;7(1):28–35.
35. Tam WW, Suen LK, Chan HY. Knowledge, Attitudes and Commitment towards Organ Donation among Nursing Students in Hong Kong. Transplantation Proceedings. 2012;44(5):1196–1200.