Factors Associated With Medical and Nursing Students’ Willingness to Donate Organs

Makmor Tumin, PhD, Khaled Tafran, MEC, Li Yoong Tang, PhD, Mei Chan Chong, PhD, Noor Ismawati Mohd Jaafar, MSc, NurulHuda Mohd Satar, PhD, and Nurhidayah Abdullah, PhD

Abstract: Malaysia suffers from a chronic shortage of human organs for transplantation. Medical and nursing students (MaNS) are future health professionals and thus their attitude toward organ donation is vital for driving national donation rates. This study investigates MaNS’ willingness to donate organs upon death and the factors influencing their willingness. A cross-sectional design was used with a sample of 500 students (264 medical and 236 nursing) at the University of Malaya. A self-administrated questionnaire was used. The responses were analyzed by using descriptive statistics and multiple logistic regression. Of all respondents, 278 (55.6%) were willing to donate organs upon death, while the remaining 222 (44.4%) were unwilling to donate. Only 44 (8.8%) had donor cards. The multiple logistic regression revealed that the minorities ethnic group was more willing to donate organs than Malay respondents (adjusted odds ratio [aOR] = 1.98, P = 0.010). Medical students were more willing to donate than nursing students (aOR = 2.53, P = 0.000). Respondents who have a family member with a donor card were more willing to donate than respondents who do not (aOR = 3.48, P = 0.006). MaNS who believed that their religion permits deceased donation were more willing to donate than their counterparts (aOR = 4.96, P = 0.000). Household income and sex were not significant predictors of MaNS’ willingness to donate organs upon death. MaNS have moderate willingness, but low commitment toward deceased organ donation. Strategies for improving MaNS’ attitude should better educate them on organ donation, targeting the most the Malay and nursing students, and should consider the influence of family attitude and religious permissibility on MaNS’ willingness. (Medicine 95(12):e3178)

Abbreviations: MaNS = medical and nursing students, PMP = per million population.

INTRODUCTION

Malaysia has a tragic gap between demand for and supply of human organs. In December 2013, >18,000 patients were registered on the waiting list for a kidney transplant, but only 94 kidney transplants were performed in that year. The shortfall in human organs is chiefly attributed to the low deceased donation rate. In 2013, Malaysia reported a very low deceased donation rate of 0.5 donations per million population (PMP), which was far lower than the PMP deceased donations achieved in Spain (35.1), USA (26.0), UK (20.8), Brazil (13.2), South Korea (8.4), and Chile (6.4) in that year.

The attitude of healthcare professionals toward organ donation is deemed as one of the most important factors that influences donation rates. Health professionals are responsible for identifying potential donors, contacting organ donation coordinators, and approaching the families of potential donors to gain their consent. Moreover, they can also serve as a role model and promote organ donation to the public. Medical and nursing students (MaNS) are future health personnel and thus their attitude toward organ donation is also of huge importance.

Studies in Malaysia show that many factors influence people’s willingness to donate organs upon death, such as ethnicity, income, sex, and religion. Family attitude has also been found to affect deceased organ donation.

To our knowledge, no studies have thus far explored healthcare students’ attitude toward organ donation in Malaysia. To bridge this information gap, this study sought undergraduate MaNS’ attitude on deceased organ donation to assess their willingness to donate organs upon death and examine the associated driving factors.

METHODS

To achieve the study’s objectives, on the light of previous studies on organ donation experts in social science and medicine (Makmor Tumin, Li Yoong Tang, and Mei Chan Chong) collaborated to produce a self-administrated questionnaire. The questionnaire was prepared and distributed in English.

The questionnaire was pilot tested and revised and the final version was printed and distributed to undergraduate students at the Faculty of Medicine and Universiti Malaya Medical Centre, Kuala Lumpur, Malaysia. Two trained enumerators were asked to approach students between classes in the library and student corner at the faculty from October to December 2014.

The pilot test was performed 1 month before the final questionnaires were distributed, where a group of medical and nursing students were invited to read and answer the questions of the initial questionnaire. Few changes were done after the pilot test. The changes included, adding a short description about the importance of organ donation to save the life of others.
and to improve the national health in general, clarifying that the organ donation after death (not living donation) is what we are asking about in the questionnaire, and giving categorical options on household income instead of asking respondents to give specific figures as it was in the initial questionnaire.

In 2014, there were 933 medical and 600 nursing students registered at the University of Malaya. Based on earlier research in Malaysia, we expected the probability of MaNS’ willingness to donate organs to be about 40%. Therefore, for a confidence level of 95% and a precision level of 5%, a minimum of 384 respondents were needed to meet the study objectives. Although the larger the sample size is preferable, the time and money needed for data collection is a concern for all researchers. Thus, using the available resources, we distributed 600 questionnaires (300 to nursing students and 300 to medical students) and collected 500 completed questionnaires (264 from medical students and 236 from nursing students), resulting in a response rate of 83.3%. Our enumerators were trained to briefly describe the content of the questionnaire and to ask students to complete the questionnaire while the enumerator is attendant. The enumerator reported that the majority of students who did not complete the questionnaire apologized for not doing so stating that they are busy or not having enough time. Some students, however, did not give any justifications for not participating in the survey.

Respondents were first asked to fill in their demographic and socioeconomic information. Next, they were presented with the following question: “are you willing to donate your organs upon death?” Then, respondents were asked whether they believe that their religion permits deceased organ donation or not. Lastly, they were asked if they have a family member who has a donor card.

Statistical analyses were performed by using SPSS 20.0 (SPSS Inc, Chicago, IL). Logistic regression was used to estimate the factors associated with willingness to donate organs upon death. The dependent dummy variable was given the value “1” for willingness and “0” otherwise. The independent variables had 3 themes capturing the influence of demographics, family, and religious permissibility on willingness to donate organs (dependent variable).

First, the association between the dependent and independent variables was tested by using bivariate analyses (Pearson chi-square test). Second, the factors that showed a significant association with the dependent variable were regressed together against the dependent variable in multiple logistic regression to obtain adjusted odds ratios (aORs). The 5% significance level was used as the criterion. To avoid overfitting the estimates, we assured a minimum of 10 outcome events per predictor variable.

All human studies were reviewed by the University of Malaya Research Ethics Committee (Reference Number: UM.TN2/RC/HKE/UMREC-35).

RESULTS

Table 1 reports the breakdown of respondents and their willingness to donate organs upon death. The sample comprised 52.8% medical students and 47.2% nursing students. Almost three-quarters were females (72.4%). The sample ethnic breakdown resembled the Malaysian ethnic profile, which consists of Malay/indigenous (61.9%), Chinese (22.6%), Indian (6.7%), and others (0.7%). Our sample breakdown was as follows: 66.6% Malay, 27% Chinese, and 5.6% Indian, and others. Because the “Indian and others” category was relatively small (28 respondents), all non-Malay respondents were grouped into 1 category named “Minorities.” Of the 500 respondents, 278 (55.6%) stated that they were willing to donate organs upon death (Table 1). Of these respondents, 44 (8.8%) were donor card holders (35 medical students and 9 nursing students).

The bivariate analyses (Table 1) revealed that ethnicity, profession, household income, having a family member with a donor card, and believing that religion permits organ donation were significantly associated with willingness to donate organs upon death (P < 0.05). On the other hand, sex was not associated with willingness to donate.

The results of the logistic regressions presented in Table 2 show that the minorities ethnic group was twice as willing to donate organs as Malay respondents (aOR = 1.98, P = 0.010). Medical students were 2.5 times more willing to donate than nursing students (aOR = 2.53, P = 0.000). Respondents having a family member who has a donor card were 3.5 times more willing to donate than their counterparts (aOR = 3.48, P = 0.006). Respondents who confirmed that their religion permits organ donation were about 5 times more willing to donate than their counterparts (aOR = 4.96, P = 0.000). Household monthly income was an insignificant predictor of willingness in the multiple logistic regression.

The variance inflation factor value was <1.2 across all the independent variables included in the multiple logistic regression, indicating no collinearity problem in the model. The P value of Hosmer and Lemeshow test (P = 0.264) indicates that our model fits the data well.

| TABLE 1. Bivariate Analysis of Respondents’ Willingness to Donate Organs Upon Death |
|-----------------|-----------------|-----------------|
| **Total Respondents**, N (%) | **Respondents Willing to Donate Organs**, N (%) | **P** |
| **Ethnicity** | | | |
| Malay | 333 (66.60) | 151 (45.30) | 0.000 |
| Minorities | 167 (33.40) | 127 (76.00) | |
| **Sex** | | | 0.841 |
| Male | 138 (27.60) | 78 (56.50) | |
| Female | 362 (72.40) | 200 (55.20) | |
| **Profession** | | | 0.000 |
| Medical student | 264 (52.80) | 192 (72.70) | |
| Nursing student | 236 (47.20) | 86 (36.40) | |
| **Household monthly income** | | | 0.045 |
| ≤3000 MYR | 334 (66.80) | 175 (52.40) | |
| >3000 MYR | 166 (33.20) | 103 (62.00) | |
| **I have a family member that has a donor card** | | | 0.000 |
| No | 451 (90.20) | 236 (52.30) | |
| Yes | 49 (9.80) | 42 (85.70) | |
| **My religion permits organ donation** | | | 0.000 |
| No/unsure | 155 (31.00) | 38 (24.52) | |
| Yes | 345 (69.00) | 240 (69.57) | |
| **Total** | 500 (100.00) | 278 (55.60) | |

MYR = Malaysian Ringgit (3000 MYR = USD920; as of January 1, 2014).

Copyright © 2016 Wolters Kluwer Health, Inc. All rights reserved.
Our results thus provide evidence that MaNS’ willingness is higher than that of the Malay ethnic group (47.8%). 5 On the other side, the fact that only 44 (8.8%) of total respondents were donor card holders shows a low level of awareness and willingness to donate organs as suggested in previous research, 5,7 but also on encouraging MaNS to obtain donor cards.

Our earlier study explored the possibility of shifting from the informed consent system to the presumed consent system as a strategy to improve deceased donations in Malaysia.16 The study concluded that Malaysia is not ready yet for such a shift owing to the large public objection to the new system, low family consent rates on relative’s donations, and the absence of adequate medical infrastructure. Nevertheless, the implementation of the presumed consent system may increase deceased donations if the latter mentioned barriers were eliminated. The default organ donation system can be supported or hindered by health professionals’ attitude toward organ donation both directly by their own donations and indirectly through words to others. Hence, any effort to change the organ donation system in Malaysia should take MaNS’ perspective in consideration. Consequently, future research should focus on improving MaNS attitude toward the presumed consent system.

**LIMITATIONS**

Similar to other studies,6,7 this study used observation from a single public university and a nonprobability sampling; thus, the views of MaNS in other institutions may vary. However, we believe that our results provide a very important insight into its context, as the University of Malaya is the leading educational institution in Malaysia. In addition, the correlation between variables does not necessarily mean causation. Future studies may seek time-variant observations to establish causal models.

**CONCLUSIONS**

MaNS’ attitude and commitment toward organ donation should be improved to increase organ donation among future health professionals.

---

**TABLE 2. Factors Associated With MaNS’ Willingness to Donate Organs Upon Death, Multiple Logistic Regression**

| Ethnicity          | Coefficient | cOR | aOR | 95% CI       | P     |
|--------------------|-------------|-----|-----|--------------|-------|
| Malay (Ref)        | 0.68        | 3.82| 1.98| 1.18 3.32    | 0.010 |
| Minorities         |             |     |     |              |       |
| Profession         |             |     |     |              |       |
| Nursing student (Ref) | 0.93    | 4.65| 2.53| 1.59 4.03    | 0.000 |
| Medical student    |             |     |     |              |       |
| I have a family member that has a donor card No (Ref) | 1.25 | 5.46| 3.48| 1.44 8.38    | 0.006 |
| Yes                | 1.60        | 7.03| 4.96| 3.13 7.87    | 0.000 |
| Constant           | −1.66       | 0.19|     |              | 0.000 |

aOR = adjusted odds ratio, CI = confidence interval, cOr = crude odds ratio, Ref = reference.

**DISCUSSION**

Although MaNS’ contribution to the deceased donations pool as donors is important, their role (as future health professionals) in facilitating organ donation process is of greater significance in increasing deceased donations rates.6–9 With 55.6% of MaNS willing to donate organs, it could be said that they have a moderate attitude toward deceased organ donation. However, MaNS’ willingness is higher than that of the Malaysian public (44%), 11,12 and of Malaysian health professionals (47.8%).5 On the other side, the fact that only 44 (8.8%) of total respondents were donor card holders shows a low level of commitment toward organ donation among MaNS, especially compared with the level of commitment among healthcare students in the United Kingdom (43%–74%),7 Germany (25%–43%),6 and the United States (61%).21 The critical importance of MaNS (as future health professionals) in organ donation and transplantation6–9 urges intervention policies to enhance their attitude and behavior toward organ donation.

Our results revealed that ethnicity is a significant predictor of MaNS’ willingness to donate organs upon death. This accords with previous research on Malaysian healthcare professionals5 and the Malaysian public.10,11 Similarly, ethnicity was found to be significantly associated with willingness in the United States.22,23 These findings imply that strategies for improving MaNS’ willingness to donate organs should be ethnic-specific and should target the Malay ethnic group most hindered by health professionals’ attitude toward organ donation both directly by their own donations and indirectly as they are the key in facilitating others’ donations.6–9 Hence, any effort to change the organ donation system in Malaysia should take MaNS’ perspective in consideration. Consequently, future research should focus on MaNS’ attitude toward the presumed consent system.
healthcare professionals which would, in turn, indirectly improve deceased donations among the public. A study from the US21 and another from Germany31 showed that by exposing MaNS to educational programs on organ donation, their attitude could be significantly improved. In the light of our results, we suggest that educational programs for enhancing MaNS’ willingness to donate organs are needed. These programs should focus on Malay and nursing students as well as approach MaNS’ families. The crucial message of these educational programs should be the religious permissibility of deceased organ donation.

REFERENCES

1. NTRC. National Transplant Resource Centre, Ministry of Health Malaysia. 2015. http://www.dermatorgan.gov.my/en/statistics/. Accessed September 7, 2015.
2. Goh BL, Ong LM, Lim YN, eds. 21th Report of the Malaysian Dialysis and Transplant Registry 2013. Kuala Lumpur: National Renal Registry, Malaysian Society of Nephrology; 2014.
3. IRODaT. International registry of organ donation and transplantation. 2014. http://www.irodat.org/. Accessed October 28, 2014.
4. Hakeem AR, Dave R, Prasad KR, et al. An imperative need to improve deceased donations among the public. A study from the US21 and another from Germany31 showed that by exposing MaNS to educational programs on organ donation, their attitude towards organ donation among medical students and physicians. Transplantation. 2004;77:1714–1718.
5. Abidin ZLZ, Ming WT, Loch A, et al. Are health professionals responsible for the shortage of organs from deceased donors in Malaysia? Transpl Int. 2013;26:187–194.
6. Schaeffner ES, Windisch W, Freidel K, et al. Knowledge and attitude regarding organ donation among medical students and physicians. Transplantation. 2004;77:1714–1718.
7. Cantwell M, Clifford C. English nursing and medical students’ attitudes towards organ donation. J Adv Nurs. 2000;32:961–968.
8. Cebeci F, Sucu G, Karayeybek E. The roles of nurses to augment organ donation and transplantation: A survey of nursing students. Transplant Proc. 2011;43:412–414.
9. Ali NF, Qureshi A, Jilani BN, et al. Knowledge and ethical perception regarding organ donation among medical students. BMC Med Ethics. 2013;14:38.
10. Rasiah R, Manikam R, Chandarsekaran SK, et al. The influence of socioeconomic and demographic variables on willingness to donate cadaveric human organs in Malaysia. Medicine (Baltimore). 2014;93:e126.
11. Loch A, Hilmi IN, Mazam Z, et al. Differences in attitude towards cadaveric organ donation: Observations in a multiracial Malaysian society. Hong Kong J Emerg Med. 2010;17:236–243.
12. Tumin M, Noh A, Jajri I, et al. Factors that hinder organ donation: Religio-cultural or lack of information and trust. Exp Clin Transplant. 2013;11:207–210.
13. Tumin M, Tafran K, Zakaria RH, et al. Do family members of dialysis patients have a positive attitude toward organ donation? Ann Transplant. 2015;20:752–756.
14. Tumin M, Mohd Satar N, Zakaria RH, et al. Determinants of willingness to become organ donors among dialysis patients’ family members. Urol J. 2015;12:2245–2250.
15. Tumin M, Zakaria RH, Tafran K, et al. Brain death and organ donation: a comparison of three influential groups of Muslim professionals. The Journal of Health and Translational Medicine (JUMMEC). 2015;8:5–11.
16. Tumin M, Tafran K, Mutalib M, et al. Demographic and socioeconomic factors influencing public attitudes toward a presumed consent system for organ donation without and with a priority allocation scheme. Medicine (Baltimore). 2015;94:e1713.
17. Dattalo P. Determining Sample Size: Balancing Power, Precision, and Practicality New York: Oxford University Press; 2008.
18. Peduzzi P, Concato J, Kemper E, et al. A simulation study of the number of events per variable in logistic regression analysis. J Clin Epidemiol. 1996;49:1373–1379.
19. Babyak MA. What you see may not be what you get: a brief, nontechnical introduction to overfitting in regression-type models. Psychosom Med. 2004;66:411–421.
20. Population Distribution and Basic Demographic Characteristics. Kuala Lumpur: Department of Statistics Malaysia; 2010. www.statistics.gov.my/portal/download_Population/files/census2010/Taburan_Penduduk_dan_Ciri-ciri_AsasDemografi.pdf. Accessed November 13, 2015.
21. Kurz JM. Impact of organ donation education on US undergraduate nursing students. Prog Transplant. 2014;24:211–217.
22. Sinimoff LA, Burant CJ, Ibrahim SA. Racial disparities in preferences and perceptions regarding organ donation. J Gen Intern Med. 2006;21:995–1000.
23. Regalia K, Zheng P, Sillau S, et al. Demographic factors affect willingness to register as an organ donor more than a personal relationship with a transplant candidate. Dig Dis Sci. 2014;59:1386–1391.
24. Oliver M, Woywodt A, Ahmed A, et al. Organ donation, transplantation and religion. Nephrol Dial Transplant. 2011;26:437–444.
25. Sharif A. Organ donation and islam—challenges and opportunities. Transplant J. 2012;94:442–446.
26. Curlin FA, Lawrence RF, Chin MH, et al. Religion, conscience, and controversial clinical practices. N Engl J Med. 2007;356:593–600.
27. Symvoulakis EK, Rachiotis G, Papagiannis D, et al. Organ donation knowledge and attitudes among health science students in Greece: emerging interprofessional needs. Int J Med Sci. 2014;11:634–640.
28. Irving MJ, Tong A, Jan S, et al. Factors that influence the decision to be an organ donor: a systematic review of the qualitative literature. Nephrol Dial Transplant. 2012;27:2526–2533.
29. Ge F, Kaczmareczyk G, Biller-andorno N. Attitudes toward live and postmortem kidney donation: a survey of chinese medical students. Exp Clin Transplant. 2014;12:506–509.
30. Zhang L, Liu W, Xie S, et al. Factors behind negative attitudes toward cadaveric organ donation: a comparison between medical and non-medical students in China. Transplantation. 2014;98:e56.
31. Radunz S, Juntermanns B, Heuer M, et al. The effect of education on the attitude of medical students towards organ donation. Ann Transplant. 2015;17:140–144.