

Demographics of healthcare professionals' knowledge and attitude toward deceased organ donation: Survey of critical care areas in a tertiary hospital

James William Foong, MB BCh BAO¹, Ong Jea Sheng, MB BCh BAO¹, Oo Wei Loon, MB BCh BAO¹, Mohammad Moshaddeque Hossain, PhD^{2,3}, Nirmala Devi Baskaran, MRCP⁴, Hasdy Haron, MBBS⁵, Manoj Valappil, FRCPATH (London)⁶, Raghu Varadarajan, FRCSEd¹

¹Department of Surgery, Perdana University – Royal College of Surgeons in Ireland School of Medicine, Serdang, Selangor, Malaysia, ²Department of Epidemiology and Public Health, Perdana University – Royal College of Surgeons in Ireland School of Medicine, Serdang, Selangor, Malaysia, ³Faculty of Public Health and Health Sciences, Hamdard University Bangladesh, Hamdard City of Science, Education, and Culture, Gazaria, Munshiganj, Bangladesh, ⁴Nephrology Department - Hospital Kuala Lumpur, Jalan Pahang, Wilayah Persekutuan Kuala Lumpur, Malaysia, ⁵National Transplant Resource Centre, Wisma Sejarah, Wilayah Persekutuan Kuala Lumpur, Malaysia, ⁶Department of Microbiology, Perdana University – Royal College of Surgeons in Ireland School of Medicine, Serdang, Selangor, Malaysia

ABSTRACT

Introduction: Organ donation rate in Malaysia is amongst the lowest in the World. Healthcare professionals (HCPs) working in critical care areas play an important role in the deceased organ donation (DOD) process. This study seeks to identify the demographics of HCPs working in the critical care areas and their knowledge and attitudes toward the DOD process.

Method: A cross-sectional survey on the demographics, knowledge and attitudes of the doctors and nurses working in critical care areas was undertaken by the random sampling method, using a validated, structured questionnaire. HCP's knowledge and attitudes towards brain death (BD), DOD, organ transplantation (OT), and possession of organ donor card were compared against their demographics.

Results: Four hundred and twelve (72.9%) out of the total 565 HCPs in critical care areas responded of whom 163 (39.6%) were doctors and 249 (60.4%) were nurses. After adjusting for other factors, department of work and profession were highly correlated with the overall knowledge score ($p < 0.001$ and $p = 0.003$ respectively) and knowledge about BD ($p < 0.001$ and $p = 0.013$ respectively). HCPs from the neurosurgical intensive care unit ($p < 0.001$) and doctors ($p < 0.001$) had higher mean knowledge scores compared to their counterparts. Profession was most significantly correlated with having a positive attitude towards BD ($p < 0.001$) and OT ($p < 0.001$).

Conclusion: Department, profession and ethnicity were the demographic characteristics that correlated with knowledge and attitudes of HCPs on organ donation. Efforts to improve DOD rates in Malaysia should include targeted interventions to address the knowledge and attitudes of HCPs working in critical care areas.

INTRODUCTION

Organ transplantation (OT) is the best form of treatment for patients with end stage organ disease. Improved survival rates and a better quality of life are among the considerable benefits of this form of treatment. Despite OT being available in Malaysia since 1975, there were only 86 transplants carried out and a mere 35 deceased organ donations (DOD) made in 2017.¹ In the meantime, the number of patients requiring transplant has increased with over 21,000 currently on the waiting list.² Several factors can contribute to the suboptimal DOD and transplantation rates. These include lack of awareness, public belief and attitudes, the consent process, and insufficient investment in areas such as transplantation infrastructure and workforce development.^{3,4} Although some studies have shown that people in Malaysia are generally supportive of DOD, their willingness to donate can vary depending on a number of factors such as ethnicity and religion.^{5,6}

In Malaysia, the process for DOD has been outlined by the National Transplant Resource Centre (NTRC). In an effort to improve DOD rates, Tissue Organ Procurement (TOP) teams were established in hospitals throughout Malaysia.^{5,7} Hospital staff specifically identified for this purpose are HCPs including those working in critical care areas (doctors responsible for donor detection, diagnosis of brain death (BD), referral and consent; nurses to reinforce the above and support the family) and other staff responsible for the transport of organs and speedy return of the donor's remains to the next of kin.⁷ Timely diagnosis of brain death using validated criteria is the crucial early step in instigating the donation process.

In spite of these efforts, the reported number of referrals of patients suspected to be brain-dead is considerably lower than worldwide estimations of the incidence of BD.^{8,9} The 2014 National Transplant registry report from Malaysia showed that brainstem tests were not completed for 53% of

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Corresponding Author: Dr James William Foong

Email: jameswfoong@hotmail.com

patients suspected of brain death.¹⁰ Therefore, those involved in the care of the potential donors may be at least partly responsible for the poor conversion rates.

Knowledge and attitudes of health care professionals (HCPs) can influence the identification of potential donors and instigation of the donation process.^{5,11-13} Two Malaysian studies found that an overwhelming majority of general HCPs accepted the need for organ transplantation.^{5,6} Most HCPs in those studies also recognised the criteria for brain death but provided no statistically significant difference between various religious groups. Another study from Malaysia reported that most HCPs were supportive of a DOD programme but 51% thought there was insufficient evidence to support the concept of brain death (BD), and 30% did not accept BD based on religious belief.⁵ Willingness of HCPs to be an organ donor was reported to be less than 50%, similar to that of the general population;^{5,6} doctors and Chinese HCPs had the highest willingness to donate their organs.⁶

HCPs working in critical care areas play a decisive role in the organ donation process.^{14,15} They perform multiple roles such as caring for potential organ donors, identifying patients with brain death, initiating discussions with the families, obtaining family consent, effectively following up on their needs and public education.^{16,17} Their responsibilities during discussion about organ donation include creating an atmosphere of trust and facilitating effective communication, both of which are important factors for successful DOD.^{18,19} As these HCPs work in areas with higher brain death rates, their knowledge and skills required for early donor identification and referral to organ procurement organisations are vital to the organ donation process.²⁰ Although previous studies have reported on the knowledge and attitudes of general healthcare workers towards DOD and transplantation in Malaysia,^{5,6} no such studies have been undertaken in this country among HCPs working in critical care areas.

This study seeks to identify the demographics of HCPs in critical care areas and their knowledge and attitudes toward the DOD process. This is part of a larger study that examined their knowledge of brain death and attitudes towards organ donation and organ transplantation.

MATERIALS AND METHODS

This study was conducted in Hospital Kuala Lumpur (HKL), the largest tertiary hospital in Malaysia in collaboration with Perdana University-Royal College of Surgeons in Ireland and the National Transplant Resource Centre (NTRC).

Study design and sampling

A cross-sectional survey was carried out among doctors and nurses working in four critical care areas within HKL: The General Medical intensive care unit (ICU), Neurosurgery ICU, Neurology department and Emergency & Trauma unit. Simple random sampling was used to target the 565 HCPs working in these areas.

The questionnaire used in the study was drafted based on existing literature and clinical experience. It included a section each on demographics (10 items), knowledge (25

items) and attitudes (16 items). The knowledge section had 15 questions specific to knowledge about brain death and ten questions on DOD and transplantation. Section on attitude assessed HCPs a) being convinced of the state of brain death, b) possession of organ donor card and c) willingness to accept an OT for themselves, if the need arose.

Each question used a 5-point Likert scale with 'Definitely not', 'Probably not', 'Unsure', 'Probably yes' and 'Definitely yes' as responses. The Likert scale responses for knowledge questions were collapsed into a right or wrong answer with every right answer given a score of one.

The questionnaire was subject to face and content validation by professionals working in the field of medicine, surgery, psychology and transplantation at the NTRC and Perdana University. The English versions of the participant information sheet (PIS), consent form and questionnaire were translated into Malay. Validation of the back translation was performed and a choice of either version was offered to our study population. PIS and consent form were provided prior to obtaining written consent. The questionnaire and PIS were separated to ensure confidentiality and anonymity. No incentive was provided for participation.

Data analysis

HCPs' demographics were correlated with:

- their knowledge about BD and overall knowledge about DOD and OT
- three key attitudes: being convinced of the state of brain death, possession of an organ donor card and willingness to accept a deceased donor organ themselves. These were used as separate dependent variables.

Since the absolute numbers for some Likert scale responses were too few to allow for appropriate statistical analysis, 'Definitely yes' and 'probably yes' were collapsed into 'yes' while 'definitely not', 'probably not' and 'unsure' were collapsed into 'no/unsure'. 'Unsure' responses were also collapsed into 'no/unsure' because being unsure showed a tendency to support a negative attitude compared to a positive one for each question.

Data obtained was coded into Statistical Package for the Social Sciences (SPSS) and was analysed using SPSS version 22 (SPSS Inc, Chicago, IL, USA) and Stata version 14 (StataCorp, College Station, TX, USA) statistical packages. Descriptive statistics including percentages, means, standard deviations and 95% confidence intervals were used to summarise the variables. Cross tabulations were used to examine associations between variables. Statistical tests used were two-sided and p-values that were ≤ 0.05 were considered significant. Univariable logistic regression analysis was used to identify correlations between demographics and knowledge or attitudes. Multivariable logistic regression analysis was also used to assess the odds for each significant independent variable adjusted for other possible confounding factors. As profession, sex and ethnicity, religion was highly confounding, profession and ethnicity respectively were used in the multivariable analysis based on expert judgement. Results of the univariable and multivariable analyses were displayed as regression coefficients when knowledge was the

dependent variable and odds-ratios when attitude was the dependent variable with 95% confidence intervals. For categorical variables, the odds-ratios were relative to the reference population. When data was missing, it was treated as a separate category and the available collected data was analysed as usual. Questionnaires that were less than 80% complete were excluded from analysis.

Ethical review

This study was given ethical approval by Perdana University's Institutional Review Board (PUIRB-HR0090) and by Malaysia's Medical Research and Ethics Committee (NMRR-14-1790-23450). All ethical requirements including informed consent and respondent's confidentiality were consistently observed throughout this study.

RESULTS

General demographics

General demographics of the study population is listed in Table I. Study questionnaires were distributed to 420 of the 565 HCPs in the areas studied. Seven HCPs declined to participate and one response was excluded as the questionnaire was inadequately completed, leaving 412 responses suitable for analysis. The contacted population response rate was 98.1% and the total eligible population response rate was 72.9%. Most respondents (60.4%) were nurses. Ninety-four (22.8%) participants were males and 318 (77.2%) were females.

Knowledge of HCPs (brain death, organ donation and transplantation)

Table II shows the demographics of HCPs compared with their overall knowledge score. HCPs in the neurosurgical ICU had the highest overall knowledge score compared to those in emergency department ($p < 0.001$). Doctors had greater overall knowledge score than nurses ($p < 0.001$). Male HCPs scored higher overall compared to their female counterparts ($p < 0.001$) but sex was no longer statistically significant after adjusting for department, profession, ethnicity and age ($p = 0.846$). Department and profession maintained their association with overall knowledge score in multivariable analysis. Christian HCPs had higher overall knowledge score compared to Muslim HCPs ($p < 0.001$). Although Chinese HCPs had higher overall knowledge score ($p < 0.001$) compared to Malay HCPs, after adjusting for department, profession, sex, and age, ethnicity was no longer statistically significant. Increased age was positively associated with higher overall knowledge scores with approximately four years contributing to each additional score (coef. 0.3, $p < 0.001$) and remained significant in multivariable analysis (coef. 0.1, $p < 0.001$).

Attitude of healthcare professionals toward brain death

The demographics of HCPs compared to them being convinced of the existence of brain death is shown in Table III. Doctors had 7.04 times greater odds of being convinced of brain death compared to nurses (95% CI 2.73-18.15). After adjusting for age in multivariable models, doctors had higher odds of being convinced of brain death than nurses (aOR 5.77; 95%CI 2.14-15.54). There was no statistically significant association between HCPs of different religions or ethnicities

Table I: General demographics

	n (%)
Department	
General ICU	154 (38.6)
Neurology Ward	63 (15.8)
Emergency & Trauma	120 (30.1)
Neurosurgical ICU	62 (15.5)
Profession	
Doctor	163 (39.6)
Nurse	249 (60.4)
Sex	
Male	94 (22.8)
Female	318 (77.2)
Religion	
Muslim	296 (72.4)
Buddhist	35 (8.6)
Christian	26 (6.4)
Hindu	43 (10.5)
Others	9 (2.2)
Ethnicity	
Malay	293 (71.1)
Chinese	50 (12.1)
Indian	60 (14.6)
Others	9 (2.2)
Age	408 (100)

and being convinced of brain death. Increased age was positively associated with being convinced of brain death (cOR 1.11; 95% CI 1.04-1.20) but after adjusting for profession in multivariable models, it was no longer statistically significant (aOR 1.04; 95% CI 0.98-1.11).

Healthcare professionals and organ donor card

Table IV displays the relationship between the demographics of HCPs and having an organ donor card. HCPs in the general ICU had 2.56 times greater odds of possessing an organ donor card compared to those in the neurology ward (95% CI 1.23-5.26). Doctors had 2.02 times greater odds of having an organ donor card compared to nurses (95%CI 1.29-3.16). Male HCPs had 1.94 times higher odds of possessing an organ donor card compared to their female counterparts (95%CI 1.18-3.19). The odds of possessing an organ donor card were 4.75 times higher in Buddhist HCPs compared to Muslims (95%CI 2.25-10.01). Chinese HCPs had 3.68 times greater odds of having an organ donor card compared to Malays (95%CI 1.94-6.97). After adjusting for department, profession, ethnicity and age, profession had no statistically significant association with having an organ donor card whereas Chinese (aOR 2.94, 95%CI 1.47-5.89) and Indian (aOR 2.16, 95%CI 1.14-4.09) HCPs had greater odds of having an organ donor card compared to Malay HCPs. Similarly, HCPs in the neurology department had lesser odds of possessing an organ donor card (aOR 0.40, 95%CI 0.19-0.86).

Attitude of healthcare professionals toward transplantation

The department, profession and sex of HCPs compared to their willingness to accept an organ themselves is displayed in Table V. The odds of accepting a donated organ among

Table II: Demographics and their overall knowledge scores

	Overall knowledge scores					
	Mean	SD	Univariable		Multivariable	
			Coef.	95% CI	Coef.	95% CI
Department						
General ICU	15.9	3.6	1.6	0.8–2.5	1.7	1.0–2.4
Neurology Ward	15.0	3.5	0.7	-0.4–1.9	1.4	0.5–2.3
Emergency & Trauma	14.3	3.4	reference		reference	
Neurosurgical ICU	16.4	3.4	2.2	1.1–3.3	2.9	2.0–3.8
Profession						
Doctor	17.4	3.1	3.5	2.8–4.1	2.9	2.1–3.7
Nurse	13.9	3.3	reference		reference	
Sex						
Male	16.9	3.2	2.0	1.2–2.9	0.1	-0.7–0.9
Female	14.9	3.6	reference		reference	
Religion						
Muslim	14.8	3.6	reference			
Buddhist	17.3	3.4	2.5	1.2–3.8		
Christian	17.9	3.0	3.1	1.7–4.5		
Hindu	15.4	3.2	0.6	-0.6–1.7		
Others	16.8	3.4	2.0	-0.4–4.3		
Ethnicity						
Malay	14.8	3.6	reference		reference	
Chinese	17.8	3.1	3.0	1.9–4.1	0.8	-0.1–1.8
Indian	16.0	3.3	1.2	0.2–2.2	0.1	-0.7–1.0
Others	15.9	3.3	1.1	-1.2–3.5	0.2	-1.8–2.3
Age	29.4	6.1	0.3	0.20–0.31	0.1	0.1–0.2

SD, standard deviation; Coef, coefficient; CI, confidence interval
Overall knowledge scores out of 25 questions

Table III: Demographics of being convinced of the state of brain death

	Convinced of the state of brain death					
	Yes n (%)	No/Unsure n (%)	Univariable		Multivariable	
			cOR	95% CI	aOR	95% CI
Department						
General ICU	136 (88.3)	18 (11.7)	1.00			
Neurology Ward	56 (90.3)	6 (9.7)	1.24	0.47–3.28		
Emergency & Trauma	101 (84.2)	19 (15.8)	0.70	0.35–1.41		
Neurosurgical ICU	56 (91.8)	5 (8.2)	1.48	0.53–4.19		
Profession						
Doctor	158 (96.9)	5 (3.1)	7.04	2.73–18.15	5.77	2.14–15.54
Nurse	202 (81.8)	45 (18.2)	1.00		1.00	
Sex						
Male	90 (95.7)	4 (4.3)	3.83	1.34–10.95		
Female	270 (85.4)	46 (14.6)	1.00			
Religion						
Muslim	257 (87.4)	37 (12.6)	1.00			
Buddhist	30 (85.7)	5 (14.3)	0.86	0.32–2.37		
Christian	25 (96.2)	1 (3.8)	3.60	0.47–27.36		
Hindu	36 (83.7)	7 (16.3)	0.74	0.31–1.79		
Others ^a	9 (100.0)	0 (0.0)	–			
Ethnicity						
Malay	254 (87.3)	37 (12.7)	1.00			
Chinese	45 (90.0)	5 (10.0)	1.31	0.49–3.52		
Indian	52 (88.3)	7 (11.7)	1.10	0.47–2.61		
Others	8 (88.9)	1 (11.1)	1.17	0.14–9.59		
Age	356 (87.7)	50 (12.3)	1.11	1.04–1.20	1.04	0.98–1.11

cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval
^aOthers excluded in univariable analysis due to absence of dichotomous data

Table IV: Demographics of having an organ donor card

	Possess an organ donor card					
	Yes	No/Unsure	cOR	95% CI	aOR	95% CI
	n (%)	n (%)				
Department						
General ICU	52 (35.6)	94 (64.4)	1.00		1.00	
Neurology Ward	11 (17.7)	51 (82.3)	0.39	0.19–0.81	0.40	0.19–0.86
Emergency & Trauma	27 (23.7)	87 (76.3)	0.56	0.32–0.97	0.59	0.33–1.06
Neurosurgical ICU	17 (30.9)	38 (76.3)	0.81	0.42–1.57	0.95	0.48–1.91
Profession						
Doctor	58 (36.9)	99 (63.1)	2.02	1.29–3.16	1.28	0.75–2.19
Nurse	52 (22.5)	179 (77.5)	1.00		1.00	
Sex						
Male	35 (39.3)	54 (60.7)	1.94	1.18–3.19		
Female	75 (25.1)	224 (74.9)	1.00			
Religion						
Muslim	62 (22.2)	217 (77.8)	1.00			
Buddhist	19 (57.6)	14 (42.4)	4.75	2.25–10.01		
Christian	8 (33.3)	16 (66.7)	1.75	0.72–4.28		
Hindu	18 (45.0)	22 (55.0)	2.86	1.45–5.67		
Others	3 (33.3)	6 (66.7)	1.75	0.43–7.20		
Ethnicity						
Malay	61 (22.1)	215 (77.9)	1.00		1.00	
Chinese	24 (51.1)	23 (48.9)	3.68	1.94–6.97	2.94	1.47–5.89
Indian	23 (41.1)	33 (58.9)	2.46	1.34–4.49	2.16	1.14–4.09
Others	2 (22.2)	7 (77.8)	1.01	0.20–4.97	0.93	0.19–4.66
Age	110 (28.6)	275 (71.4)	1.04	1.01–1.08	1.02	0.98–1.06

cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval

Table V: Demographics of being willing to accept an organ themselves

	Willing to accept an organ themselves					
	Yes	No/Unsure	cOR	95% CI	aOR	95% CI
	n (%)	n (%)				
Department						
General ICU	113 (73.4)	41 (26.6)	1.00			
Neurology Ward	44 (69.8)	19 (30.2)	0.84	0.44–1.60		
Emergency & Trauma	76 (63.3)	44 (36.7)	0.63	0.37–1.05		
Neurosurgical ICU	48 (77.4)	14 (22.6)	1.24	0.62–2.49		
Profession						
Doctor	134 (82.2)	29 (17.8)	2.71	1.68–4.36	2.56	1.57–4.17
Nurse	157 (63.1)	92 (36.9)	1.00		1.00	
Sex						
Male	80 (85.1)	14 (14.9)	2.90	1.57–5.35		
Female	211 (66.4)	107 (33.6)	1.00			
Religion						
Muslim	203 (68.6)	93 (31.4)	1.00			
Buddhist	27 (77.1)	8 (22.9)	1.55	0.68–3.53		
Christian	22 (84.6)	4 (15.4)	2.52	0.84–7.52		
Hindu	28 (65.1)	15 (34.9)	0.86	0.44–1.68		
Others	8 (88.9)	1 (11.1)	3.67	0.45–29.73		
Ethnicity						
Malay	201 (68.6)	92 (31.4)	1.00			
Chinese	41 (82.0)	9 (18.0)	2.09	0.97–4.47		
Indian	42 (70.0)	18 (30.0)	1.07	0.58–1.96		
Others	7 (77.8)	2 (22.2)	1.60	0.33–7.86		
Age	290 (71.1)	118 (28.9)	1.05	1.01–1.09	1.01	0.97–1.06

cOR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence interval

doctors were 2.71 times greater than that of nurses (95%CI 1.68-4.36). Male HCPs had 2.90 times greater odds of being willing to accept an organ themselves compared to their female counterparts (95%CI 1.57-5.35). There was no statistically significant association between religion or ethnicity and willingness to accept an organ themselves. Age was positively associated with willingness to accept an organ (cOR 1.05, 1.01-1.09). After adjusting for age in the multivariable models, doctors had greater odds of being willing to accept an organ themselves compared to nurses (aOR 2.56, 95%CI 1.57-4.17).

DISCUSSION

This study is an attempt to identify the demographic factors that are associated with knowledge and attitudes of HCPs towards DOD. While knowledge and attitudes of HCPs have been shown to be an important aspect of the organ donation process,^{5,12,13} there is paucity in the evidence surrounding HCPs in critical care areas in Malaysia. This is the first study to examine their knowledge and attitudes in depth.

Department of work and profession were the most highly correlated demographics with knowledge about BD and overall knowledge score about DOD and OT. Although the higher mean knowledge score for doctors and HCPs from the neurosurgical ICU were not entirely unexpected, the mean brain death knowledge score of 8.39 out of a possible total score of 15 is low for HCPs in critical care areas. This could be a contributing factor to many potential organ donors being unrecognized. HCPs in the emergency department had the lowest overall knowledge score about BD, DOD and OT. Emergency department can play an important role in identifying potential brain dead patients for the limited organ donor pool; early identification and referral of brain dead patients from ED is associated with a higher conversion.^{21,22} There were no significant differences in the overall knowledge scores between different ethnicities but Chinese HCPs compared to Malay HCPs had higher brain death knowledge scores. It has been reported that brain stem tests were not completed in more than half of the patients with suspected brain death. Inability to stabilise the patient and to correct the parameters which are required for accurate diagnosis of brain death due to lack of brain death specific knowledge could be an important contributory factor.^{10,23,24} Hence, improving the knowledge about BD, DOD and OT of HCPs in critical areas should be a priority.

We found that HCPs profession was most significantly correlated with having a positive attitude towards brain death and organ transplantation. Doctors had more positive attitudes than nurses, consistent with other international studies.^{25,26} This may be due to higher medical qualifications which may in turn favour positive attitudes towards organ donation.^{6,27} However, nurses in the critical care areas arguably spend the most time with potential brain-dead patients. They are fundamental to the donation process as they are a source of information for families regarding the irreversibility of the patient's condition and provide a supportive environment to facilitate the organ donation process.^{14,15,17} Therefore, professional development programmes for nurses targeted at improving their

knowledge and promoting positive attitudes towards BD and DOD are urgently required to improve DOD rates.

While other studies in Malaysia examined organ donation attitudes with willingness to donate,^{5,6} this study utilised having an organ donor card as a dependent variable. Department of the HCPs and ethnicity were found to be associated with possessing an organ donor card. HCPs in the general ICU and Chinese HCPs had significantly greater odds of having an organ donor card than HCPs in the neurology ward and Malay HCPs respectively. Possession of an organ donor card was associated with better overall knowledge of the HCP which is consistent with previous reports.²⁷ Patients are likely to view organ donation more positively if they know that doctors are willing to donate organs themselves.²⁸ Therefore, creating a positive attitude towards DOD and BD amongst HCPs in critical care area is vital. Focused interventions based on HCPs' department of work may improve knowledge and attitudes towards brain death and organ transplantation and willingness to donate their organs.

Age, male gender and doctors were the demographics associated with willing to accept OT. It is interesting to note that there was no difference in willingness to accept OT between ethnicities, although ethnicity was associated with the knowledge about brain death and likelihood of carrying a donor card. Therefore, it is likely that increasing the knowledge about BD could significantly improve the attitude towards DOD and registering for organ donation.

Although the overall knowledge score of the HCPs increased with age, their attitude did not change significantly. There is evidence to suggest that targeted educational programmes can improve the attitudes and knowledge of HCPs²⁹ especially in the context of brain death and intent to register for donation. Incorporation of knowledge of brain death and organ donation in the medical and nursing curricula with more formal training in identifying brain death are possible educational interventions. Other interventions to increase the willingness to refer a potential donor³⁰ and donation rates³¹ have also been reported in the literature. A repository of resources³² covering all aspects of the donation process and an education video³³ have been developed and are freely available for public access online. These tools could potentially be used as part of education programmes for doctors and nurses working in critical care areas.

DOD relies on HCPs identifying potential donors and initiating the process with the diagnosis of BD. This study identified some of the barriers in this pathway. Hence changes to facilitate the successful DOD conversion rates are required. Several countries have implemented opt-out DOD programmes, with the increase in DOD rates of up to 30%.⁴ Although the success of presumed consent in opt-out programmes may vary between countries, due to the fundamental difference in the initiation and consenting process with the opt-out DOD programme, it is plausible to make it easier for the HCPs in critical care areas to initiate the DOD process.

One of the strengths of this study was that it was conducted in the largest tertiary hospital in Malaysia with a relatively large population of HCPs in critical care areas who are from geographically diverse regions of Malaysia and approximately representative of Malaysia's ethnic and religious demographics. However, a multicentre study would provide a true representation of the knowledge and attitudes of HCPs throughout Malaysia. Conducting an initial pilot study to determine the Cronbach's alpha would also be helpful in increasing the validity of the result. Additional studies to evaluate the practice of identifying brain death, explaining brain death to families and exploring the perspective of families of potential donors will provide insight into other possible barriers for DOD in Malaysia.

CONCLUSION

This study confirms and extends previous findings in knowledge and attitudes of HCPs to critical care areas. Department, profession and ethnicity were the demographic characteristics that correlated with the knowledge and attitudes of HCPs. Reasons for the current low DOD rates in Malaysia are likely to be multifactorial and a multipronged approach will be needed to tackle this issue. Adequately trained HCPs who support and can facilitate the DOD process are vital to a successful OT programme. Therefore, targeted efforts to improve the knowledge and attitudes of the HCPs working in critical care areas should be a priority. Initiatives such as an opt-out DOD system are likely to help further improve the DOD rates in Malaysia.

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