Does knowledge and attitude of healthcare professionals working in critical care areas affect their willingness to offer the option of organ donation? Results of a tertiary hospital survey

Jea Sheng Ong, MB BCh BAO[1], James William Foong, MB BCh BAO[1], Wei Loon Oo, MB BCh BAO[1], Manoj Kalikkothu Valappil, FRCPath[2], Mohammad Moshaddeque Hossain, PhD[3], Hasdy Haron, MBBS[4], Nirmala Devi Baskaran, MRCP[5], Raghu Varadarajan, FRCSEd[1]

[1]Department of Surgery, Perdana University-Royal College of Surgeons in Ireland, Selangor, Malaysia, [2]Department of Clinical Microbiology, Perdana University-Royal College of Surgeons in Ireland, Selangor, Malaysia, [3]Department of Public Health, Faculty of Health Sciences, Hamdard University, Bangladesh, [4]National Transplant Resource Centre, Hospital Kuala Lumpur, Jalan Pahang, Wilayah Persekutuan Kuala Lumpur, [5]Specialist Clinic (Gleaneagles Kuala Lumpur), 6th Floor, Block B, 286 & 288 Jalan Ampang, Kuala Lumpur, Malaysia

ABSTRACT

Introduction: Organ donation (OD) rates in Malaysia have remained suboptimal for decades. Healthcare professionals (HCPs) working in critical care areas are responsible for diagnosing brain death (BD) and initiating the OD process. Impact of their knowledge and attitudes on willingness to offer the option of OD to families of potential donors is unknown.

Methods: Knowledge and attitudes about BD, OD, and organ transplantation (OT) of critical care HCPs in a Malaysian transplant centre were studied using a validated questionnaire. Responses were analysed using multivariable analysis with willingness to offer the option of OD to families of potential donors as dependent variable.

Results: Age (p = 0.04), profession (doctors > nurses, p < 0.001), religion (Buddhists > others, p = 0.013) [but not ethnicity], higher knowledge scores for Brain Death Test, Brain Death Knowledge, Organ Donation and Transplantation, and overall knowledge score (p < 0.001) were associated with greater odds of offering OD to families. Belief in the reliable diagnosis of BD, confidence in explaining BD, and belief that OD will not affect religious services were significantly associated with willingness to offer OD, while HCPs who were willing to personally donate organs had greatest odds (p < 0.001). Other factors that significantly influenced HCPs' willingness to offer included their perception about families' willingness to donate, body disfigurement, and confidence in OT.

Conclusions: Overall, HCPs had highly positive attitudes. However, potential barriers in offering OD to families were identified. Proven interventions from international experience could help address these issues and likely improve OD rates in Malaysia.

KEYWORDS:
Brain Death; Tissue and Organ Procurement; Transplantation; Critical Care; Health Personnel

INTRODUCTION

Although the first successful renal transplant in Malaysia was performed in 1975, transplantation rates in this country have remained low over the last four decades. In 2020, the deceased organ donation (DOD) in Malaysia was only 0.9 per million population (pmp), compared to 38.03 and 18.68 pmp in the United States and United Kingdom, respectively. In Southeast Asia, Singapore and Thailand achieved DOD rates of 2.03 and 4.51 pmp respectively, in the same year.[1] With over 20,044 patients on the transplant waiting list (personal Correspondence, National Transplant Resource Centre), the gap between supply and demand of organs in Malaysia has reached a critical point, where many are likely to die before they receive a transplant.

Suboptimal DOD in Malaysia has been suggested as a determinant of low transplantation rates.[2] Previous studies have shown that cultural-religious-ethnic beliefs and attitudes, a lack of awareness of DOD in the general population, and inadequate trust in the medical system are associated with the low organ donation (OD) rates.[3-8] The Malaysian Ministry of Health in collaboration with the Malaysian Islamic Development Department released a joint statement declaring the permissibility of OD and transplantation, consolidating the Islamic position in this field.[9] In addition, Malaysia follows an 'opt-in' OD policy (explicit consent needed).[10] Failure of healthcare professionals (HCPs) to identify donors, obtain their consent, and procure organs may be another contributory factor for low DOD rates.[11-13]

Brain death (BD) is defined as the irreversible loss of brain function and is recognised legally as death. Globally, the diagnosis of BD is based on strict fulfilment of all the components of the diagnostic criteria based on the mandatory preconditions, exclusions, and the recommended bedside neurological tests. In special circumstances, ancillary tests may be used to confirm the diagnosis. Consistent with the international consensus, the Malaysian Consensus Statement on Brain Death 2003 was published jointly by the

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Corresponding Author: Jea Sheng Ong
Email: jeashengong@hotmail.com

Ministry of Health, Academy of Medicine of Malaysia, and the Malaysian Society of Neurosciences, outlining the details of the procedures and technical instructions. Related Malaysian Medical Council guidelines were issued in 2006.[14-17]

Early identification of potential donors by diagnosing BD is crucial in initiating the OD process. HCPs working in critical care areas are the first to come in contact with such donors.[18] They are responsible for facilitating BD declaration when suspected, commencing discussions regarding OD with families and referring potential donors.[19] The donor conversion rate in Malaysia (percentage of organ procurements actually performed on potential donors) was only 9.46% in 2019 (presentation by Dr H Haron, 20th May 2020, unreferenced).[20] This has been attributed to failure to conduct brain death tests (BDT),[2] which may be a consequence of HCPs having poor knowledge about BD and BDT and negative attitudes towards handling the OD process.[3] It was reported that HCPs were reluctant to offer OD to families as they believed that families may not accept the diagnosis of BD.[2,5] Therefore HCPs working in critical care areas require the knowledge and skills to approach families at a time of grief.[3,11,12,21] Previous studies have focused on factors influencing family consent rates[22,23] and strategies to initiate discussions with families about OD.[24-26] Few have studied the impact of knowledge and attitudes of HCPs working in critical care areas in Malaysia. In this study, we explored the association of the knowledge and attitudes related to BD, OD, and organ transplantation (OT) of HCPs working in critical care areas with their willingness to offer the option of OD to families of potential donors.

MATERIALS AND METHODS

The study was registered with the National Medical Research Register (NMRR-14-1790-23450 S5 R0) and was approved by the Hospital Kuala Lumpur Clinical Research Centre, Malaysian Research Ethics Committee (MREC) and the Perdana University Institutional Review Board (PUIRB-HR0090).

A cross-sectional survey was conducted amongst HCPs working in selected critical care areas of a tertiary referral hospital in Malaysia according to the recommendations from the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.[27] HCPs at or above the rank of Medical Officer or Registered Nurse working in General ICU, Neurosurgical ICU, Emergency Department, and Neurology Ward were included in this study. The study tool, derived from existing literature[16,28-33] and investigators' clinical experience, was subjected to face and content validation and has been described in related publications.[34,35]

In brief, it contained 51 items including demographics (10 items) and questions on knowledge (25 items) and attitudes (16 items) related to BD, OD, and OT (Supplement 1). HCPs were categorised as willing to offer the option of OD if they had responded 'Probably Yes' or 'Definitely Yes' to the question: 'Would you offer the option of organ donation to the family of a brain dead patient once brain death has been confirmed?'. The responses for knowledge and attitudes were dichotomised into 'correct/incorrect' and 'Yes and No/Unsure', respectively. Each 'correct' and 'incorrect' answer for the knowledge questions was given a score of one and zero, respectively, with a maximum possible score of 25. Respondents who answered 'Unsure' to attitude questions were regarded as being doubtful towards BD, OD, or OT, hence were taken as negative responses. Responses submitted with less than 33 of 41 items in the BD, OD, and OT section answered (less than 80% completed) were excluded from the statistical analysis.

Descriptive statistics were computed for demographics and knowledge of the respondents. Pearson's chi-square tests were performed to assess whether associations between demographics and various attitudes were statistically significant. Pairwise correlation was assessed using Kendall's tau-b and Spearman's rho. All analyses were done taking HCPs' willingness to offer the option of OD to the families of potential organ donors as the dependent variable. Univariable logistic regression analysis was performed for all independent variables. For categorical variables, the odds ratios were computed relative to the reference group identified in the tables. Statistical tests used were two-tailed, and p-values <0.05 were considered significant. Multivariable regression analyses were done separately for different clusters of independent variables, including sociodemographic, knowledge, attitudes, and religious beliefs. To develop the most parsimonious multivariable regression model, only variables that were significant in univariable analysis were included in multivariable analyses. When analysing the sociodemographic variables, ethnicity was selected over religion. Our clinical and community experience in Malaysia indicates that communication channels between HCPs and potential donors are more effective and efficient along the lines of ethnicity, given the overarching socio-cultural and language homogeneity within ethnic groups.

RESULTS

Socio-Demographics

Of the 565 eligible staff, 420 available during the recruitment period were contacted. Seven HCPs declined to participate and one incomplete submission was excluded from the analysis, leaving a total eligible population response rate of 72.9% (412/565). The demographics of this cohort of HCPs and their willingness to donate organs themselves were reported previously.[34,35] In brief, the mean age of respondents was 29.4 years, with females being the majority (77.2%). Participants included 249 nurses (60.4%) and 163 doctors (39.6%). Most of the respondents were Malays (n=293, 71.1%) followed by Indians (n = 60, 14.6%), Chinese (n =50, 12.1%), and others (n = 9, 2.2%, Table I).

Out of 412 respondents, 411 answered the question on willingness to offer the option of OD, of which 312 (75.9%) expressed their willingness to offer. The proportion of willingness to offer the option of OD according to different sociodemographic characteristics is detailed in Table I.

In univariable logistic regression analysis, age, gender, ethnicity, and profession were significantly associated with willingness to offer. Since religion was highly correlated with ethnicity in Malaysia (all Malays are Muslims, Kendall's tau-

b = 0.951), position was correlated with profession (Kendall's tau-b = 0.874), and gender was correlated with profession (most of the nurses are females, Kendall's tau-b = 0.471); religion, position, and gender were excluded from the multivariable logistic regression model. In the multivariable model including age, profession, and ethnicity, only age and profession remained significantly associated with willingness to offer, while ethnicity became non-significant. Every one-year increase in age reflected 1.06 greater odds of offering OD to families (aOR = 1.06; 95% CI 1.00–1.11; p = 0.047, Table I).

Association with Beliefs

After adjusting for attitude towards religious services in multivariable logistic regression analysis, compared with Muslims, all other religious groups were more willing to offer the option of OD (range of ORs: 2.00–6.35), although this association was significant only for Buddhists and Hindus (Table II).

Most HCPs (74.0%) believed that their religion permitted OD (Table II). There was no significant correlation between this belief and willingness to offer the option of OD (p = 0.286). HCPs who believed that OD will not affect religious services had greater odds of offering OD. After adjusting for religion, HCPs who believed that OD will not affect religious services were more likely to offer OD compared with those who believed otherwise (aOR 2.70; 95% CI 1.68–4.34; p < 0.001).

Association with Knowledge and Profession

Of the three knowledge scores, BDT sub score had the strongest association with willingness to offer, followed by BD knowledge and ODT knowledge subscores. Knowledge and profession were computed in a single multivariable logistic regression. Every point increase in the overall knowledge score was associated with 1.14 times greater odds of offering the option of OD (Table III). Doctors were more likely to offer compared to nurses. The association between doctors and willingness to offer, compared with nurses, remained significant in the multivariable regression model (aOR = 12.10; 95% CI 4.64–31.56; p<0.001, Table III).

Association with Attitudes

HCPs who believed in BD, who were convinced that doctors could reliably diagnose BD, and who were confident in explaining BD were more likely to offer the option of OD compared with those who did not possess these attitudes. These variables were included in a single multivariable logistic regression model with willingness to offer the option of OD as the dependent variable. Being convinced that doctors could reliably diagnose BD (aOR = 2.34; 95% CI 1.13–4.82; p = 0.022) and confidence in explaining BD (aOR = 5.04; 95% CI 3.01–8.43; p<0.001) remained significant, while the attitude of being convinced of BD became non-significant (aOR = 1.22; 95% CI 0.59–2.49; p = 0.592). Confidence in explaining BD had the strongest association among all BD attitudes (Table IV).

Of seven OD attitudes tested, (Table V) five attitudes, which were significant in univariable logistic regression, were included in the same multivariable logistic regression model. Attitudes towards willingness to personally donate (aOR = 14.35; 95% CI 5.08–40.56; p<0.001) and the belief that OD will not cause body disfigurement (aOR = 3.63; 95% CI 1.63–8.09; p = 0.002) remained significant with willingness to offer OD.

In the multivariable logistic regression model including three attitudes addressing confidence in OT (Table VI), belief that OT was a good form of treatment had the strongest association to offer the option of OD (aOR =2.49; 95% CI 1.44–4.31; p = 0.001), followed by the belief that transplantation had high success rates when performed by trained staff (aOR = 2.30; 95% CI 1.37–3.86; p = 0.002) and willingness to accept an organ for transplantation themselves, if indicated (aOR 1.84; 95% CI 1.10–3.08; p = 0.020).

DISCUSSION

To our knowledge, this is the first study in Malaysia, exploring the knowledge and attitudes of critical care HCPs towards OD and OT and their intention to offer the option of OD to families of potential donors. Overall, this cohort had mostly positive attitudes towards BD, OD, and OT; ethnicity was not a negative predictor.

HCPs who believed that OD would not affect any religious services after death were more likely to report their willingness to offer OD. HCPs may presume that families will not consent for OD due to concerns about potential delays in completing religious rituals. However, the OD process can be planned and completed without affecting religious services and facilitated by a faith representative in the multidisciplinary team (MDT).[24,26,36,37] In a multi-faith country like Malaysia, it is important to ensure that HCPs hold no preconceptions about the religious beliefs of the donor family. All potential donor families must be approached.

Compared with nurses, doctors were found to be more likely to offer the option of OD, even after adjusting for knowledge. In many countries, the ODT process has evolved into a MDT effort where bedside nurses work collaboratively with doctors and play an important role in suspecting BD and leading discussions with families.[18,24,38] The 'Specialist Nurse for Organ Donation' and 'Donor Coordinator Nurses' are examples of nursing roles successfully integrated into OD programmes.[18,38,39] OD protocol in Malaysia seems to underutilise nursing resources and could benefit from better empowerment and integration of nurses into the OD MDTs.

HCPs with suboptimal knowledge about BD and BDT are likely to have difficulties in initiating the OD process.[13,26] BD is underdiagnosed in Malaysia, with far less cases referred for OD than expected for the number of ICU deaths.[40,41] HCPs should complete confirmatory tests for BD irrespective of the families' intention to donate and ensure that all BDs are diagnosed and reported. Families are more likely to consent if they accept the diagnosis of BD before discussing OD.[22,24]

HCPs' positive attitudes towards donating their own organs correlated strongly with their willingness to offer OD. However, those who perceived that OD may result in body disfigurement were less likely to offer. There is a paucity of literature about HCPs' perceptions regarding body

Table I: Association between socio-demographics of HCPs and willingness to offer the option of organ donation to families of potential organ donors

	Respondents		Willingness to Offer*							
	Individuals	Percentages	Yes (312)	No/Unsure (99)	Univariable Analysis			Multivariable Analysis††		
	(n)	(%)	n (%)	n (%)	cOR†	95% CI§	p-Value	aOR‡	95% CI§	p-Value
Socio-demographics										
Gender										
Male	94	22.8	86 (91.5)	8 (8.5)	4.33	(2.02–9.30)	< 0.001			
Female	318	77.2	226 (71.3)	91 (28.7)	1	-	-			
Profession										
Doctor	163	39.6	156 (95.7)	7 (4.3)	13.14	(5.91–29.25)	< 0.001	7.90	3.33–18.79	< 0.001
Nurse	249	60.4	156 (62.9)	92 (37.1)	1	-	-	1	-	-
Position										
Consultant	12	2.9	11 (91.7)	1 (8.3)	6.76	(0.86–53.26)	0.070			
Specialist	30	7.4	29 (96.7)	1 (3.3)	17.81	(2.38–133.15)	0.005			
Medical Officer	123	30.1	118 (95.9)	5 (4.1)	14.50	(5.70–36.90)	< 0.001			
Matron¶	1	0.2	1 (100)	0 (0)	-	-	-			
Sister	15	3.7	12 (80.0)	3 (20.0)	2.46	(0.67–8.96)	0.173			
Registered Nurse	227	55.6	140 (61.9)	86 (38.1)	1	-	-			
No answer	4		1	3						
Ethnicity										
Malay	293	71.1	204 (69.9)	88 (30.1)	1	-	-	1	-	-
Chinese	50	12.1	48 (96.0)	2 (4.0)	10.35	(2.46–43.54)	0.001	3.18	0.69–14.66	0.136
Indian	60	14.6	54 (90.0)	6 (10.0)	3.88	(1.61–9.36)	0.003	2.13	0.83–5.48	0.109
Others	9	2.2	6 (66.7)	3 (33.3)	0.86	(0.21–3.53)	0.837	0.46	0.09–2.31	0.349
	Mean (SD)‖				OR	95% CI	p-Value	OR	95% CI	p-Value
Age **	29.4 (6.082)				1.15	(1.08–1.22)	< 0.001	1.06	(1.00–1.11)	0.047

*One participant did not respond to the question on willingness to offer, total = 411.
†cOR, crude odds ratio.
‡aOR, adjusted odds ratio.
§95% CI, 95% confidence interval.
‖SD, Standard deviation.
¶Matron was excluded in logistic regression analyses due to its extremely small sample size; four respondents did not respond to the item on Position.
**All values represent number of respondents except those for age, which represents mean age (standard deviation).
††Multivariable regression analysis was done for Profession and Ethnicity. Gender and Position are highly correlated variables to profession, hence were not included in the analyses.

Table II: Association between religious belief and willingness to offer the option of organ donation to families of potential donors

	Willingness to Offer*							
	Yes	No/Unsure	Univariable Analysis			Multivariable Analysis‡		
	n (%)	n (%)	cOR†	95% CI§	p-Value	aOR‡	95% CI§	p-Value
Religion (n=408)								
Muslim	207 (70.2)	88 (29.8)	1	-	-	1	-	-
Buddhist	33 (94.3)	2 (5.7)	7.01	(1.65–29.87)	0.008	6.35	(1.48–27.35)	0.013
Christian	22 (84.6)	4 (15.4)	2.34	(0.78–6.98)	0.128	2.00	(0.66–6.10)	0.221
Hindu	39 (90.7)	4 (9.3)	4.15	(1.44–11.95)	0.008	4.12	(1.41–12.04)	0.010
Others	8 (88.9)	1 (11.1)	3.40	(0.42–27.60)	0.252	2.91	(0.35–24.28)	0.323
No answer	3	0						
Religious belief does not object to deceased donor organ donation‖								
Yes	235 (77.3)	69 (22.7)	1.32	(0.79–2.18)	0.286	-	-	-
No/Unsure	75 (72.1)	29 (27.9)	1	-	-			
No answer	2	1						
Organ donation will not affect any religious services performed after death								
Yes	215 (83.3)	43 (16.7)	2.92	(1.83–4.64)	< 0.001	2.70	(1.68–4.34)	< 0.001
No/Unsure	96 (63.2)	56 (36.8)	1	-	-			
No answer	1	0						

*One participant did not respond to the question on willingness to offer, total = 411.
†cOR, crude odds ratio.
‡aOR, adjusted odds ratio.
§95% CI, 95% confidence interval.
‖Belief that religion does not object to deceased donor organ donation was not included in the multivariable regression model as it was found to be not significantly associated with willingness to approach.

Table III: Association between profession, knowledge,* and willingness to offer the option of organ donation to families of potential organ donors

	Willingness to Offer†					
	Univariable Analysis			Multivariable Analysis**		
	cOR§	95% CI‖	p-Value	aOR¶	95% CI‖	p-Value
Brain Death Tests (BDT) Score‡	1.79	(1.38–2.31)	< 0.001	-	-	-
Brain Death Knowledge (BDK) Score	1.36	(1.23–1.50)	< 0.001	-	-	-
Organ Donation and Transplantation (ODT) Knowledge Score	1.28	(1.12–1.46)	< 0.001	-	-	-
Overall Knowledge Score*	1.25	(1.16–1.35)	< 0.001	1.14	(1.05–1.24)	0.002
Profession						
Doctors	13.14	(5.91–29.25)	< 0.001	12.10	(4.64–31.56)	< 0.001
Nurses	1			1		

*Maximum score for overall knowledge based on correct responses was 25, including 5 for BDT, 10 for BD knowledge, and 10 for ODT knowledge.
†One participant did not respond to the question on willingness to offer, total = 411.
‡BDT scores are a subcategory of BDK scores.
§cOR, crude odds ratio.
‖95% CI, 95% confidence interval.
¶aOR, adjusted odds ratio.
**Multivariable logistic regression analysis was performed for willingness to offer with Overall Knowledge Scores and Profession as independent variables in the model. BDT, BDK, and ODT scores are a subset of overall knowledge scores, hence were not included in the model.

Table IV: Association between brain death attitudes and willingness to offer the option of organ donation to families of potential organ donors

	Willingness to Offer*							
	Yes (312)	No/Unsure (99)	Univariable Analysis			Multivariable Analysis		
	n (%)	n (%)	cOR†	95% CI§	p-Value	aOR‡	95% CI§	p-Value
How convinced are you of the existence of a clinical state called brain death?								
Yes	264 (81.5)	60 (18.5)	2.98	(1.61–5.50)	< 0.001	1.22	0.59–2.49	0.592
No/Unsure	47 (54.7)	39 (45.3)	1	-	-	1	-	-
No answer	1	0						
Do you feel confident to explain what brain death is to a patient's family member?								
Yes	237 (81.7)	53 (18.3)	3.23	(1.71–6.11)	< 0.001	2.34	1.13–4.82	0.022
No/Unsure	75 (62.0)	46 (38.0)	1	-	-	1	-	-
In your opinion, can doctors reliably diagnose brain death?								
Yes	249 (82.2)	54 (17.8)	5.87	(3.61–9.55)	< 0.001	5.04	3.02–8.43	< 0.001
No/Unsure	63 (58.3)	45 (41.7)	1	-	-	1	-	

*One participant did not respond to the question on willingness to offer, total = 411.
†cOR, crude odds ratio.
‡aOR, adjusted odds ratio.
§95% CI, 95% confidence interval.

Table V: Association between organ donation attitudes and willingness to offer the option of organ donation to families of potential organ donors

	Willingness to Offer*							
	Yes	No/Unsure	Univariable Analysis			Multivariable Analysis‖		
	n (%)	n (%)	cOR†	95% CI§	p-Value	aOR‡	95% CI§	p-Value
Organ Donation Attitudes								
Do you have an organ donation card?								
Yes	97 (88.2)	13 (11.8)	2.81	(1.49–5.30)	0.001	1.39	(0.59–3.240)	0.449
No/Unsure	202 (72.7)	76 (27.3)	1	-	-	-		
No answer	13	10						
Do you feel that in the interest of society at large, you will donate your own organs after death for the purpose of transplanting into others in need?								
Yes	243 (87.1)	36 (12.9)	6.15	(3.767–10.055)	< 0.001	14.35	(5.08–40.56)	< 0.001
No/Unsure	68 (52.3)	62 (47.7)	-	-	-			
No answer	1	1						
If you are willing to donate your organs, is your family aware about your decision to donate your own organs after death for the purpose of transplantation?								
Yes	160 (87.4)	23 (12.6)	2.609	(1.423–4.781)	0.002	1.71	(0.81–3.62)	0.16
No/Unsure	80 (72.7)	30 (27.3)	1	-	-			
No answer	72	46						
Disfigurement will not occur to the deceased donor's body during or after the process of donation.								
Yes	151 (82.1)	33 (17.9)	1.899	(1.183-3.050)	0.008	0.28	(0.12 –0.61)	0.002
No/Unsure	159 (70.7)	66 (29.3)	1	-	-	-		
No answer	2	0						
In your opinion, will families consent to have their relative's organs donated after brain death has been confirmed?								
Yes	167 (82.3)	36 (17.7)	2.02	(1.27–3.21)	0.003	1.75	(0.85–3.61)	0.132
No/Unsure	145 (69.7)	63 (30.3)	1	-	-	-		
If a patient has pledged to donate their organs without their families' consent, families do not have the right to refuse donation after the patient's death.								
Yes	100 (80.0)	25 (20.0)	1.38	(0.825-2.300)	0.221	-	-	-
No/Unsure	212 (74.4)	73 (25.6)	1	-	-			
No answer	0	1						
Deceased organ donation rates are low in this country. Do you think this is because of a lack of counselling to families of patients who are certified brain dead?								
Yes 272 (77.3)	80 (22.7)	1.656	(0.907-3.025)	0.101	-	-	-	
No/Unsure	39 (67.2)	19 (32.8)	1	-	-			
No answer	1	0						

*One participant did not respond to the question on willingness to offer, total = 411.
†cOR, crude odds ratio.
‡aOR, adjusted odds ratio.
§95% CI, 95% confidence interval.
‖All attitudes with statistically significant cOR were analysed in a multivariable logistic regression model. Attitudes that were not significantly associated with willingness to offer were excluded from the model.

Table VI: Association between confidence in transplantation and willingness to offer the option of organ donation to families of potential organ donors

	Willingness to Offer*							
	Yes (312)	No/Unsure (99)	Univariable Analysis			Multivariable Analysis		
	n (%)	n (%)	cOR†	95% CI§	p-Value	aOR‡	95% CI§	p-Value
Do you believe that organ transplantation, when indicated, is a good form of treatment for patients with end-stage organ disease?								
Yes	264 (81.5)	60 (18.5)	3.65	(2.20–6.07)	< 0.001	2.49	1.44–4.31	0.001
No/Unsure	47 (54.7)	39 (45.3)	1	-	-	1	-	-
No answer	1	0						
Would you accept a deceased donor organ for transplantation if you had end-stage organ failure?								
Yes	237 (81.7)	53 (18.3)	2.74	(1.71–4.40)	< 0.001	1.84	1.10–3.08	0.020
No/Unsure	75 (62.0)	46 (38.0)	1	-	-	1	-	-
In your opinion, is the success rate of transplantation high when performed by trained personnel?								
Yes	249 (82.2)	54 (17.8)	3.29	(2.03–5.34)	< 0.001	2.30	1.37–3.86	0.002
No/Unsure	63 (58.3)	45 (41.7)	1	-	-	1	-	

*One participant did not respond to the question on willingness to offer, total = 411.
†cOR, crude odds ratio.
‡aOR, adjusted odds ratio.
§95% CI, 95% confidence interval.

disfigurement and its implications in this setting, which needs to be explored.

A majority of the HCPs believed that the families had the right to refuse OD even if their loved ones had pledged to donate their organs and also perceived the lack of adequate family counselling as the cause of low DOD rates. However, these beliefs were not significantly associated with their willingness to offer. Traditionally, Malaysia has large, closely knit families, which often come together at the time of grief and offer support. When offered the option of OD, there could be conflicting opinions if multiple decision-makers are involved.[42] Several countries have issued legally binding guidance on next of kin hierarchy to facilitate collaborative decision-making for OD.[38,43,44] Additionally, routine 'opt-out' OD policy (which presumes that everyone consents to donating their organs unless they explicitly register their choice not to donate) has been implemented in other countries. Although the pros and cons of such a policy have been debated,[45] it is likely to help increase the willingness of HCPs to offer OD in the Malaysian context. These policies would give clarity and confidence to HCPs in providing targeted counselling to relevant family members and offering them the option of OD. Applicability of such strategies in the Malaysian setting should be explored.

HCPs with positive attitudes towards OT, especially those who believed in the success of OT when performed by trained staff, were most likely to offer OD. Amongst other factors, a successful transplantation programme requires a critical number of transplants to be undertaken each year. Currently, HCPs in Malaysia involved in OD and OT continue to fulfil other responsibilities. Having dedicated transplantation teams will help increase OT numbers and HCPs' experience and expertise in this field. This will not only help further improve the OT outcomes and increase the HCPs' and general public's confidence in the process but also benefit the growing number of patients on the OT waiting list.

LIMITATIONS AND FUTURE DIRECTION

This is a single-centre study; therefore, generalisation of our findings should be done with caution. Exploring the experiences and expectations of the families of potential donors may help identify other interventions to increase HCPs' willingness to offer the option of OD. The degree to which the expressed willingness of HCPs to offer OD translates into actual practice needs to be assessed.

CONCLUSION AND RECOMMENDATIONS

In this study, we observed a high overall willingness of HCPs to offer OD to potential donor families. Age, profession, religious beliefs, higher knowledge scores, and certain positive attitudes were significantly associated with higher willingness to offer. However, several modifiable factors that negatively influenced this willingness were also identified.

Mandating completion of BDT and reporting all BDs, empowering and integrating nurses into OD MDTs, formulating legal definition of the next of kin responsible for OD, including faith representatives in OD MDTs, and establishing dedicated transplantation teams and targeted training for HCPs are some examples of possible interventions identified from successful international experience. Applicability of these strategies in the Malaysian context may be considered to increase HCPs' willingness to offer OD and improve the overall OD rates in Malaysia.

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