

Awareness, attitude and willingness regards cadaveric organ donation and awareness of brain death among Sarawakians in Kuching, Malaysia

Kean Ghee Lim¹, Aaron SK Tan¹, Sai Chin Wong¹, Elaine GT Tee¹, Ismail AS Burud¹

Introduction

Organ transplantation is lifesaving treatment, proven to improve quality of life with economic benefit, and is more cost-effective for end-stage organ failure patients [1]. Despite advances in healthcare globally, the rate of organ transplantation around the world differs markedly. Cadaveric organ donation remains in shortage [2]. In Malaysia, organ transplantation began in the 1970s but total donors remain less than 500 annually [3].

According to Ministry of Health statistics, as of September 2019, 431,833 (1.3%) of Malaysians have pledged as organ donors after death. This number is low compared with other countries [4]. In 2020, Malaysia's cadaveric organ donation rate stood at 0.93pmp (per million population) which pales in comparison to countries such as Turkey (3.16 pmp), South Korea (9.22 pmp), and Spain (37.4 pmp). Worldwide, actual deceased organ donors rank Spain highest at (49.61pmp) in 2019 [5].

Studies done between 2008 and 2010 by Tumin (44.3%) [6] and Loch (43.6%) [7] revealed willingness to donate organs for transplantation to be below 50% in Kuala Lumpur and was even lower in the neighbouring state of Negeri Sembilan (32.6%) [3]. The National Health and Morbidity Survey (NHMS) of 2006 that included 34,208 respondents nationwide found 69.6% of those surveyed had received information on organ donation but only 1.5% had pledged their organs at death [8]. The NHMS did not determine willingness to donate.

Many factors influence one's willingness to donate. Common basis like demographic factors such as religion, ethnicity, and age are often cited [9]. Contrary to popular belief of religion and culture being the main determinants of decision making, a survey done among Malaysian Muslims showed that the main reasons for unwillingness to organ donation were information scarcity on the topic and dubiety in the government's ability to properly administer organ donation procedures [6]. In the context

of trust, the "overrule right" where family members of the deceased can overrule the individual's wish, causes the potential donor to lack trust in authorities to fulfill their wish as a donor [9]. Visceral factors, namely instinctive, superstitious and subconscious beliefs especially regarding death that differ from religious beliefs were also determinants [3]. Posthumous mutilation remains a fear despite clerics declaring that religions do not prohibit organ donation [10].

Age was an important factor. Even though attitudes of young adults towards organ donation are encouraging and they are more willing to donate, their wishes often cannot be fulfilled as their family members are reluctant to provide consent to donate after death [9]. Socioeconomic status which is influenced by education and income also plays a major role. Higher education level is strongly associated with an increased organ donation rate [10].

The low rate of willingness to donate organs for cadaveric transplant has been a major roadblock towards the development of a larger transplant program in Malaysia. However, the focus has always been on West Malaysia which has a larger population and larger health facilities. The situation regarding attitudes to organ donation in Sarawak remains largely unexplored. As the population has increased and health services developed, it is reasonable to ask if a transplant program may be sustainable there.

Other countries in the region have reported some encouraging results [11,12] regarding the willingness of the population to donate organs and Sarawak has its distinct character, thus ought to be surveyed. There have not been any published surveys of attitudes towards organ donation in Sarawak.

Sarawak has a population of 2.76 million, and Kuching its capital has a population of 620,000 in 2020 [13]. In the census of 2010, adults 15-64 years formed 67.8% of the population. Those 20-29 years formed 17.8%,

Ceylon Medical Journal 2022; **67**: 113-120

DOI: <http://doi.org/10.4038/cmj.v67i3.9699>

¹IMU School of Medicine, Malaysia.

Correspondence: KGL, e-mail: <keanghee_lim@imu.edu.my>. Received 11 June 2022 and revised version 30 August 2022 accepted 05 September 2022



This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

30-39 years formed 13.6%, 40-49 years formed 12.0% and those above 50 years formed 17.7% [14]. Malays and Other Bumiputera form 61.8% (Malays 45.1%, Other Bumiputera 14.7%) [15] of the population in Kuching, while Chinese form 37.3%. Other Bumiputeras who include Ibans, Bidayuh, Penan, Kayans and many other tribal groups and also called Indigenous Sarawakians.

While Sarawakians may share many cultural and religious beliefs with West Malaysians, they have their own unique cultures which may result in different attitudes towards organ donation. In terms of actual organ donations, the numbers have been slowly growing. The 13th Report of the National Transplant Registry 2016 noted Sarawak had no donors for cadaveric organs or tissue from the year 1997 to 2012. Between 2013 and 2016 there were 9 Sarawakians cadaveric organ donors. Selangor recorded 142 donors between the year 1997-2016 representing 24% of all the cadaveric tissue and organ donors in Malaysia throughout the years [16]. This increase in cadaveric organ donation in Sarawak between 2012 till 2016 warrants study regards the current awareness and willingness to donate organs in Sarawak.

Hence this study was conducted with the objective to determine the awareness, attitude and the prevalence of willingness to donate and the factors that affect the willingness and the perception of cadaveric organ donation among indigenous Sarawakians in Kuching.

Materials and methods

Sample

A cross-sectional study was adopted from October 2020 to February 2021 about the willingness of Sarawakians in Kuching regarding organ donation and factors that affect it. Raosoft Sample Size Calculator software was used to calculate the sample size based on the population of Kuching, Sarawak and the minimum sample size obtained was 383. However, we have 488 participants. The sample was collected face to face by trained enumerators through a survey administered to volunteers from different locations such as residential areas, shopping malls, hospitals, and universities. This was to ensure that the sample collected included different demographic groups of Kuching, Sarawak. Sarawakians were identified by the code in their National Registration Identity Card (NRIC) indicating they were born in Sarawak. Residents in Kuching but born elsewhere were excluded. The sampling method used was non-probabilistic convenience sampling where the enumerators approached the interviewee willing to answer the questionnaire

Instruments

The survey consisted of 18 questions divided into 3 parts, adapted from published literature [3]. The first eight questions included socio-demographic details. The next binary question elicited the awareness of organ donation. Participants with the answer yes would proceed to part

three. Participants who answered no would be asked one last question about whether they ever considered being an organ donor. In part three nine questions also determined willingness to donate as well as factors that affect willingness including awareness of brain death. There were binary as well as multiple-choice questions. The sample of some of the options in the questionnaire were: (1) fear of doctors not doing their best to treat due to knowledge of patient being a donor, (2) organ donated will not bring any benefit to society, (3) goes against my religious/cultural believes, (4) family will not agree, (5) fear of body mutilation, (6) delay in burial of the deceased, (7) experiencing pain after death and (8) others. The other half of the questionnaire evaluated the knowledge of respondents about brain death. Respondents were asked to select the correct statement (the brain fails to function and requires machines to continue life) from among multiple choices [3].

The survey was conducted by trained multi-ethnic students. The questions were in Bahasa Malaysia and English. Participants may answer the survey by scanning a QR code or questionnaire paper. Informed consent was obtained. Participants were assured that their responses were confidential. Ethical approval was obtained from the International Medical University (R 245/2020).

Analyses

SPSS v26 statistical software was used for data analysis. Chi-square test was used to determine the differences between different variables. Besides that, z test was used to determine the statistical differences between each demographic group. A p-value of less than 0.05 was considered as significant difference. Logistic regression was done to determine the statistically significant relations, and quantify the relationship of the sociodemographic factors on the questions that were asked in the survey.

Three individuals of 'other' ethnicity could not be clumped to any other group and because of their small number were excluded from statistical analysis.

Results

Four hundred and eighty-eight participants answered the questionnaire. Their demographic data are given in Table 1. Most of our sample were females (68.4%) and young adults (60.5%). The ethnicity reflected the total population of Kuching [14]. Religion reflected ethnicity, Malays being Muslim and indigenous Sarawakians and Chinese accounting for Christians. Some Chinese were also Buddhists. Among the 122 indigenous Sarawakians, 77 were Iban, 19 Bidayuh, 15 Melanau, and 11 of other indigenous groups. Those with tertiary education formed a large group (73.2%) of whom quite a number were still students (25.6%).

Of the participants surveyed, 44 (9%) were registered organ donors, while 258 (52.9%) were willing to be organ donors.

Table 1. Demographic characteristics of the population in Kuching surveyed for organ donation

	<i>n</i>	(%)	Willing to donate (%)	Registered as organ donors (%)
Age				
18-30	295	60.5	176 (59.7)	28 (9.5)
31-40	80	16.4	40 (50.0)	6 (7.5)
41-50	39	8.0	14 (35.9)	4 (10.3)
>50	74	7.4	28 (37.8)	6 (8.1)
Gender				
Females	334	68.4	187 (56)	35
Males	154	31.6	71 (46.1)	9 (5.8)
Ethnicity				
Chinese	175	35.9	114 (65.1)	22
Malay	188	48.5	97 (51.6)	17 (9)
Indigenous Sarawakian	122	25.0	45 (36.9)	5 (4.1)
Others	3	0.7	2 (66.7)	0 (0)
Level of Education				
None	2	0.4	1 (50)	0 (0)
Primary	21	4.3	4 (19)	0 (0)
Secondary	108	22.1	29 (26.9)	5 (4.6)
University/College	357	73.2	224 (62.7)	39 (10.9)
Occupation				
Government employee	61	12.5	34 (55.7)	10
Housewife	36	7.4	10 (27.8)	0 (0)
Private sector	189	38.7	108 (57.1)	17 (9)
Retiree	18	3.7	6 (33.3)	2 (11.1)
Student	125	25.6	79 (63.2)	13
Unemployed	51	10.5	21 (41.2)	2 (3.9)
Volunteer	8	1.6	0 (0)	0 (0)
Religion				
Buddhist	57	11.7	39 (68.4)	7 (12.3)
Christian	210	43.0	107 (51)	19 (9)
Muslim	206	42.2	101 (49)	17 (8.3)
Other	15	3.1	11 (7.3)	1 (6.7)
Marital status				
Single	308	63.1	186 (60.3)	32 (10.4)
Married	166	34.0	69 (41.5)	11 (6.6)
Widow	14	2.9	3 (21.4)	1 (7.1)
Monthly income				
Less than RM1000	201	41.2	96 (47.8)	13 (6.5)
RM1001-2000	73	15	34 (46.6)	3 (4.1)
RM2001-3000	72	14.8	34 (47.2)	4 (5.6)
More than RM3000	142	29.1	94 (66.2)	24 (16.9)

Awareness of organ donation

Only 425 (87%) were aware of organ donation. Of the 63 who were unaware, 31 (49%) were indigenous Sarawakians ($p<0.001$), 31 (49%) were above the age of 40 years ($p<0.001$), 17 (26.0%) had primary school education or less ($p<0.001$) and 16 (25.4%) were unemployed ($p<0.001$). However, 39 (62%) of them had heard of organ transplantation. Of the remaining 24, 4 (17%) of them would allow their organs to be taken at death, but the remainder (20) would not and were excluded from the rest of the survey. The 425 aware of organ donation formed the sample for which we explored reasons for why they were willing or reluctant.

The internet was the most common source of information on organ transplantation (164 [33.6%]), followed by awareness campaigns (108 [22.1%]) radio/television (95 [19.5%]), family/friends (57 [11.7%]), newspapers (32 [6.6%]) and other sources (12 [2.5%]). Source of information impacted willingness to donate organs. For example, those who found out about this topic from the awareness campaigns were 2.4 times more likely to be willing to donate their organs as compared to those who found out from newspapers.

Willingness to donate organs

Two hundred and fifty six individuals (55.1%) were willing to donate their organs. Younger individuals aged 18-30 years were 2.18 times more likely to be willing to donate their organs as compared to those aged 41-50 years ($p=0.012$). (Table 2) However, they were not as likely to translate that intention into action as in actually being registered donors, those aged 41-50 years had a higher proportion. Female respondents were also more likely to be willing ($p=0.038$). Students were the most willing occupational group and housewives the least willing. Correspondingly, those who attained university and college education were more willing than those with less education ($p=0.009$). Married and widowed individuals were less likely to be donors compared to singles ($p=0.036$). Buddhists were more willing to donate their organs ($p=0.002$). Chinese were the ethnic group most willing ($p<0.001$). Those who earned more than RM3000 monthly were statistically more willing to become organ donors ($p=0.003$). Conversely, housewives were more likely to be unwilling as organ donors ($p=0.03$).

Table 2. Multivariate logistic regression on sociodemographic factors on willingness to donate organs

Parameter		Odds ratio	95% C.I. for odds ratio		p-value (Chi-square test)
			Lower	Upper	
Age	Category				
	18-30 years	1			
	31-40 years	1.450	.877	2.398	0.148
	41-50 years	2.180	1.059	4.492	0.034
	above 50 years	2.017	1.170	3.478	0.012
Occupation	Government employee	1			
	Housewife	2.746	1.106	6.821	0.03
	Private Sector	.908	.504	1.637	0.749
	Retired	2.397	.784	7.334	0.125
	Student	.764	.407	1.434	0.402
	Unemployed	1.432	.656	3.129	0.368
Education	Primary School and below	1			
	Secondary School	.977	.316	3.025	0.968
	University / College	.242	.083	.703	0.009
Marital Status	Widowed	1			
	Married	.462	.118	1.808	0.267
	Single	.236	.061	.909	0.036
Religion	Buddhist	1			
	Christian	2.303	1.193	4.445	0.013
	Islam	2.497	1.294	4.819	0.006
	Others	.932	.260	3.435	0.932
Ethnicity	Chinese	1			
	Malay	1.773	1.153	2.727	0.009
	Indigenous Sarawakian	2.933	1.789	4.810	<0.001
Monthly income	<RM1000	1			
	RM1001-2000	1.064	.609	1.859	0.828
	RM2001-3000	1.124	.650	1.941	0.676
	>RM3000	.505	.321	.796	0.003
Gender	Female	1			
	Male	1.518	1.024	2.251	0.038

Awareness of brain death

Three hundred and fifty-five individuals were aware of brain death (77.0%). Of this number, 238 (66.5%) were aged 18-30 years ($p=0.001$). More females were aware of brain death as compared to males ($p<0.001$). University students were more aware of the concept of brain death as compared to other groups of different education levels ($p<0.001$). Students are again more aware of this concept as compared to other occupation groups ($p<0.001$). More individuals are not aware of brain

death among those earning RM1001-2000 per month ($p=0.002$).

Multivariate logistic regression (Table 3) shows that respondents aged 18-30 years were more likely to know about brain death as compared to other age groups. Those with primary school education or lower were more likely to be unaware of brain death. Those who earned RM1001 - 2000 were less likely to be aware of this concept. Those who earned below RM1000 were mostly students, who were mostly aware of brain death.

Table 3. Multivariate logistic regression on sociodemographic factors on awareness of brain death

Parameter		Odds ratio	95% C.I. for odds ratio		p-value (Chi-square test)
Age	Category		Lower	Upper	
	18-30 years	1			
	31-40 years	1.754	.976	3.151	0.06
	41-50 years	1.983	.893	4.406	0.093
	above 50 years	3.173	1.772	5.687	0.001
Occupation	Government employee	1			
	Housewife	2.471	.987	6.184	0.053
	Private Sector	.866	.439	1.710	0.679
	Retired	1.250	.378	4.133	0.715
	Student	.389	.174	.872	0.022
	Unemployed	1.889	.813	4.386	0.139
	Volunteer	.429	.049	3.773	0.445
Education	Primary School and below	1			
	Secondary School	.246	.080	.755	0.014
	University / College	.084	.029	.248	<0.001
Marital Status	Widowed	1			
	Married	.867	.242	3.096	0.001
	Single	.367	.104	1.299	<0.001
Religion	Buddhist	1			
	Christian	1.321	.633	2.756	0.459
	Islam	1.084	.516	2.281	0.831
	Others	.977	.234	4.076	0.975
Ethnicity	Chinese	1			
	Malay	.950	.561	1.591	0.846
	Indigenous Sarawakian	1.656	.959	2.858	0.07
Monthly income	<RM1000	1			
	RM1001-2000	2.259	1.230	4.149	0.009
	RM2001-3000	1.594	.858	2.962	0.140
	>RM3000	.708	.398	1.258	0.239
Gender	Female	1			
	Male	2.273	1.455	3.551	<0.001

Only 66 individuals (14.1%) were able to select the accurate definition of brain death, which is “an irreversible loss of brain function.” The majority of respondents (54.9%) believe that brain death is where the brain loses function, and the person would require machines to assist with living. Two hundred and forty seven individuals (52.8%) correctly believe that their family members can withdraw their pledge to be organ donors when they pass away.

Willingness to donate organs

Sixty four individuals (13.7%) would not receive a donated organ even if they required one. Those who were above 50 years were unwilling to receive donated organs ($p=0.005$). University or college graduates were more willing to receive organs as compared to individuals from other education levels ($p<0.001$).

We asked those willing to donate to choose which organs they were willing to donate. They were allowed to select more than one organ. Respondents were most willing to donate their kidneys (240[93%]), followed by liver (210 [81%]), eyes (197 [76%]), heart and lungs (196 [76%]), pancreas (190 [74%]) and intestines (184 [71%]). People were least willing to donate their skin (180 [70%]).

Reasons for being unwilling to donate

Those who were not willing to donate their organs, a total of 209, were asked for their reasons. They were allowed to choose more than one reason. The most common reason was “family disapproval” (85 [40.7%]), followed by “fear of body mutilation” (48 [23.0%]), “fear doctors will not do their best knowing patient is an organ donor (31 [14.8%]), “delay in burial” (26 [12.4%]), “against religion/culture” (21 [10.0%]), “is of no benefit to society” (15 [7.2%]), “deceased experience pain after death” (12 [5.7%]). Thirty one respondents gave other or no reasons (14.8%). A greater proportion of indigenous Sarawakians (29/66, 43.9%) cited their reason as “family disapproval”, as compared to Malays and Chinese ($p=0.56$). More Malays (15/86, 17.4%) stated delay of burial of the deceased as their reason for unwillingness as compared to Chinese and indigenous Sarawakians ($p=0.55$). A greater proportion of indigenous Sarawakians (21/66, 31.8%) were more fearful of body mutilation ($p=0.09$).

Discussion

We limited our survey to Kuching because metropolitan areas are more likely to be able to sustain organ transplant services. It is among the urban and educated that knowledge and attitudes for organ donation can influence society as a whole and lead the movement to develop organ transplant services.

Our survey population is younger on average than the total adult population of Kuching but reflected the ethnic mix fairly well. Older individuals are more likely to stay at home and young adults often have more business or activities that take them to public places where the survey was conducted. We have found a higher rate of willingness to be organ donors than previous studies in the Klang Valley and Negeri Sembilan, in Peninsula Malaysia. However, the characteristics of our population, in comparison, need to be noted [3,6,7]. There were more young adults and those with tertiary education, compared to the only other survey with demographic data which was in Negeri Sembilan, which was among relatives and patients in hospital settings and might be expected to be older [3]. However, among indigenous Sarawakians the rate of willingness is comparable to Negeri Sembilan, due to a higher rate of unawareness towards organ donation.

The fact that young adults are more willing to be organ donors bodes well for the future. Their larger representation in the sample is likely to have pushed the overall rate of willingness to donate higher. Nevertheless even those above 50 years in Kuching are more willing to donate their organs compared to counterparts in West Malaysia [3,6,7]. The Malays in particular are more willing than in the Klang valley [3,6,7].

Besides age, we found that ethnicity, education level, and income correlated to the willingness to donate, which has been a consistent finding [6,7]. Findings were similar when pledged organs were studied. Riyanti *et.al.* found that ethnicity, age group, education level, and household income were factors associated with not pledging as an organ donor [8]. In that study, on multiple logistic regression, Malays were 3.5 times less likely to pledge as organ donors, followed by other Bumiputeras (aOR 2.5) and Chinese (aOR 1.9) compared with Indians [8]. Those with no formal education were 3.9 times less likely to pledge as organ donors. The aOR among those with monthly incomes of less than RM1000 and RM1000-RM2999 were 1.9 and 1.4, respectively, compared with the aOR of those who earned RM5000 and above per month [8]. Other studies have also shown gender and age group demonstrated no significant differences [3,7]. But in our study, females were more likely to be willing donors. Buddhists were more willing than Muslims and Christians.

Indigenous Sarawakians are most likely to be unaware of organ donation and correspondingly, the least willing to donate. Proper awareness of organ donation and brain death is therefore important if a transplantation program is to be pursued. The internet, we have found, is most useful, but awareness campaigns can have a significant role, similar to West Malaysia [3,17]. As noted in this study the younger age group are more willing to donate organs and this could be because they are technology savvy and use the internet and social media more often [18]. The role of the internet and social media has a positive impact on organ donation [18].

The demographic factors that correspond to the knowledge of brain death, such as younger age, education, and higher income are to be expected, although the quality of knowledge about brain death indicates there is a need for better education on the topic. Family disapproval was also noted to be high in other studies in Malaysia.

The concept of brain death among the population is not well understood. As seen in our study less than 15% properly understand the concept of brain death. Studies done earlier in Malaysia 3 and elsewhere in Spain 19 and Saudi Arabia 20 have reported little to moderate understanding regarding the concept of brain death, reinforcing the proposition that a positive attitude towards brain death could facilitate organ donation and transplant. Awareness and educating the population on the concept of brain death by conducting seminars can have a positive impact on the pledges to donate organs.

However, even if knowledge of brain death is overcome, resistance to donation occurs because of visceral fears and societal pressure as noted in “family disapproval” and “fear of body mutilation”. In that regard, engaging the population as families [21], giving non-governmental voluntary organizations a role and media promotions by celebrities and influencers has the potential in advancing willingness to donate organs further.

Limitations

The survey was conducted in public places, such as residential areas, shopping malls, hospitals, and universities, and on an opportunistic basis and favoured the possibility of attracting younger adults as seen. As this study carried out in 2020 corresponded to the COVID-19 pandemic older adult groups stayed away from public places in greater numbers.

The sampling method in our study was not ideal and a participant’s unwillingness to participate would confound any sampling method. Giving incentives for participation was not practiced, but only willing subjects were enrolled. Some participants were illiterate and enumerators helped them with the questionnaire which may affect their answers

Strengths

Using logistic regression in analysis enable us to note the effect of age on the overall rate of willingness to donate, even though we sampled a larger number of young individuals (aged 18-30 years) as compared to older individuals. Logistic regression was able to reduce misconceptions. Multivariate regression allowed us to analyse demographic subgroups that we have collected data from, and compare them accurately.

Conclusion

Fifty-five percent of the population in the survey were willing to donate their organs at death and young

adults have greater willingness than others. They are influenced by the internet which can play a greater role to promote organ donation. However, 13% of the sample were unaware of organ donation, especially indigenous Sarawakian. They need to be reached. Knowledge of brain death needs to be addressed.

Acknowledgements

The National Kidney Foundation of Malaysia sponsored the research with a grant.

References

1. Gomez MP, Perez B, Manyalich M. International Registry in Organ Donation and Transplantation 2013. *Transplant Proc.* 2014; **46**(4): 1044-8. doi:10.1016/j.transproceed.2013.11.138
2. Rudge C, Matesanz R, Delmonico FL, Chapman J. International practices of organ donation. *BJA Br J Anaesth* 2012; **108**(suppl_1): i48-i55. doi:10.1093/bja/aer399
3. Ismail ASB, Lim KG, Mahadevan DT. Knowledge, attitude and factors influencing public willingness towards organ donation among hospital patients and relatives in Negeri Sembilan, Malaysia. *Med J Malaysia* 2020; **75**(3): 260-5.
4. Organ donation cases: 80pc rejected by family members | Malaysia | Malay Mail. Accessed May 17, 2021. <https://www.malaymail.com/news/malaysia/2019/10/06/organ-donation-cases-80pc-rejected-by-family-members/1797767>
5. IRODaT – International Registry on Organ Donation and Transplantation. Accessed May 17, 2021. <https://www.irodat.org/?p=database&c=ES#data>
6. Tumin M, Noh A, Mohd Satar N, Chong CS, Lim SK, *et al.* Organ donation in Muslim countries: the case of Malaysia. *Ann Transplant* 2013; **18**: 671-6. doi:10.12659/AOT.889194
7. Loch A, Hilmi IN, Mazam Z, Pillay Y, Choon DSK. Differences in Attitude towards Cadaveric Organ Donation: Observations in a Multiracial Malaysian Society: *Hong Kong J Emerg Med* Published online December 11, 2017. doi:10.1177/102490791001700306
8. Riyanti S, Hatta M, Norhafizah S, Balkish MN, Siti ZM, *et al.* Organ Donation by Sociodemographic Characteristics in Malaysia. *Asian Soc Sci* 2014; **10**(4): 264. doi:10.5539/ass.v10n4p264
9. Naghavi N, Mubarik MS, Rasiah R, Sharif Nia H. Prioritizing Factors Affecting Deceased Organ Donation in Malaysia: Is a New Organ Donation System Required? *Int J Gen Med* 2020; **13**: 641-51. doi:10.2147/IJGM.S253372
10. Rasiah R, Manikam R, Chandrasekaran SK, *et al.* Deceased Donor Organs: What Can Be Done to Raise Donation Rates Using Evidence From Malaysia? *Am J Transplant Off J Am Soc Transplant Am Soc Transpl Surg* 2016; **16**(5): 1540-7. doi:10.1111/ajt.13603

11. Hai TB, Eastlund T, Chien LA, *et al.* Willingness to Donate Organs and Tissues in Vietnam. *J Transpl Coord* 1999; **9**(1): 57-63. doi:10.1177/090591999900900109
12. Danguilan RA, De Belen-Uriarte R, Jorge SL, *et al.* National survey of Filipinos on acceptance of incentivized organ donation. *Transplant Proc* 2012; **44**(4): 839-42. doi:10.1016/j.transproceed.2012.01.100
13. The Official Portal of the Sarawak Government. Accessed May 24, 2021. https://sarawak.gov.my/web/home/article_view/240/175/
14. Kuching (District, Malaysia) – Population Statistics, Charts, Map and Location. Accessed May 24, 2021. https://www.citypopulation.de/en/malaysia/admin/sarawak/1301__kuching/
15. Kuching. In: Wikipedia. 2021. Accessed May 24, 2021. <https://en.wikipedia.org/w/index.php?title=Kuching&oldid=1024458648>
16. National Transplant Registry. Accessed June 15, 2021. http://www.mst.org.my/ntrSite/publications_13thReport2016.htm
17. Williams ME. Internet Organ Solicitation, Explained. *Adv Chronic Kidney Dis* 2006; **13**(1): 70-5. doi:10.1053/j.ackd.2005.10.003
18. Henderson ML, Clayville KA, Fisher JS, *et al.* Social media and organ donation: Ethically navigating the next frontier. *Am J Transplant Off J Am Soc Transplant Am Soc Transpl Surg* 2017; **17**(11): 2803-9. doi:10.1111/ajt.14444
19. Rios A, Lopez-Navas AI, Martinez-Alarcon L, *et al.* Knowledge of the Concept of Brain Death Among the Latin-American Population Residing in Spain. *Exp Clin Transplant Off J Middle East Soc Organ Transplant* 2018; **16**(4): 473-80. doi:10.6002/ect.2017.0009
20. AlQahtani BG, Mahfouz MEM. Knowledge and awareness of brain death among Saudi population. *Neurosci Riyadh Saudi Arab* 2019; **24**(3): 207-13. doi:10.17712/nsj.2018.3.20180031
21. Siminoff LA. Factors Influencing Families' Consent for Donation of Solid Organs for Transplantation. *JAMA* 2001; **286**(1): 71. doi:10.1001/jama.286.1.71