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Comparing Emotional Adjustment of Living-donor and Deceased-donor Kidney Transplant Patients

Yousheng Lester Lai, BsocSci,¹ Hui Ling Michelle Neo, MPsyCh (Clinical),²
Anantharaman Vathsala, MD,³ and Konstadina Griva, PhD¹

Background. Kidney transplantation is regarded as the best treatment option for patients with end-stage renal disease. However, living-donor recipients (LDRs) and deceased-donor recipients (DDRr) still face challenges in transplant-specific emotional adjustment post-transplantation. Research distinguishing emotional adjustment between transplant groups has been limited to Western settings, with little attention given to Asian populations. As such, documenting and comparing the emotional adjustment of LDRs and DDRr in an ethnically diverse Asian setting in Singapore and identifying factors associated with emotional adjustment are of interest. **Methods.** One hundred eighty-two kidney transplant patients (106 LDRs and 76 DDRr) completed measures of generic distress (Depression, Anxiety, Stress Scale-21) and transplantation-specific emotional and behavioral outcomes (Transplant Effects Questionnaire). **Results.** LDRs were significantly younger ($P = 0.019$) and had higher education levels ($P = 0.007$), higher personal income ($P < 0.001$), shorter dialysis vintage ($P < .001$), and higher estimated glomerular filtration rates (eGFRs) ($P = 0.002$) compared with DDRr. Generic symptoms of depression and stress were very low; however, 29.2% of LDRs and 19.7% of DDRr experienced moderate to severe symptoms of anxiety. Similarly, 83.0% of LDRs and 72.4% of DDRr reported high levels of transplant-specific worry. Multivariate models showed younger patients expressing greater generic distress, and transplant-specific worry ($P < 0.01$), despite higher eGFRs ($P < 0.05$). ANCOVA controlling for casemix differences showed that LDRs experienced higher feelings of guilt ($P = 0.004$) and greater willingness to disclosure ($P = 0.041$). **Conclusions.** Clinicians should be vigilant of younger kidney transplant patients who have greater risk of poorer emotional adjustment. Future interventions should target alleviating anxiety and transplant-specific worry.

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Kidney transplantation is regarded as the choice treatment modality for patients with end-stage renal disease. This is attributed to improved quality of life, lower medical costs incurred, and lower mortality rates compared with dialysis.^{1,2}

Prevalence rates of successful kidney transplantations have increased over the past 2 decades. Reports from United States and United Kingdom have recorded increases in both living-donor transplantations by approximately 20%–55.8% and deceased-donor transplantations by 39%–77%.^{3,4} Regions in Asia have also reported similarly high prevalence rates

of kidney transplantations observed in Japan⁵ and Taiwan.⁶ These statistics show that both living- and deceased-donor transplantations have become increasingly accessible treatment options for end-stage renal disease worldwide.

However, despite kidney transplantation often being described as giving patients “a new lease of life,” kidney transplant patients (KTPs) are faced with new challenges related to emotional adjustment.

The initial optimism or relief KTPs may have about receiving a newly functioning kidney may be tinged by fears and uncertainties of unfavorable outcomes related to graft

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¹ Centre for Population Health Sciences, Lee Kong Chian School of Medicine, Imperial College and Nanyang Technological University, Singapore.

² Department of Psychological Medicine, National University Hospital, Singapore.

³ National University Centre for Organ Transplantation, National University Hospital, Singapore.

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Correspondence: Konstadina, Griva, PhD, A/P Konstadina Griva, Centre for Population Health Sciences, Lee Kong Chian School of Medicine, Nanyang Technological University, Clinical Sciences Bldg, Singapore 308232, Singapore. (konstadina.griva@ntu.edu.sg).

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function, such as the risk of infection or possibility of graft rejection episodes.⁷ Feelings of worry over the viability of transplanted grafts are key concerns for both living-donor recipients (LDRs) and deceased-donor recipients (DDRs), with younger patients worrying more about their graft compared with older patients.^{8–10} As graft survival rates decrease over time, these fears may be exacerbated as KTPs envisage the prospect of returning back to dialysis.¹¹ Transplant recipients may also feel a sense of indebtedness¹² and experience guilt toward their donors and their families for the donation, sacrifices made, and other costs incurred.¹³ These experiences of guilt are more pronounced for LDRs relative to DDRs.^{8,10} These transplantation-specific emotions may fuel distress and anxiety shown in prior qualitative studies.⁷

Thus far, research on emotional adjustment in LDRs and DDRs has been limited to Western settings with very limited work in Asian populations. Previous studies in Japan and China compared emotional functioning between KTPs and hemodialysis patients using health-related quality of life measures,^{14,15} but transplantation-specific emotional responses were not evaluated. The only study to assess transplantation-specific emotional outcomes in KTPs in Asia was conducted in South Korea,¹³ but no comparisons were conducted between LDRs and DDRs.

Culture can shape the expression of emotion.¹⁶ Asian populations place greater emphasis on maintaining relational harmony compared with the West. Potential changes in family roles following graft rejection and the knowledge of sacrifices made by donors may thus be perceived as inevitable threats to the Asian cultural norm of maintaining harmony. As such, patients in Asia may report intensified expressions of transplant-related worry and guilt compared with studies conducted in the West.

The present study set out to contextualize emotional outcomes of KTPs in an ethnically diverse Asian setting. The aims are 2-fold (a) to document and compare generic and transplantation-specific emotional outcomes between LDRs and DDRs focusing on both generic symptoms of stress, anxiety, and depression and transplantation-specific worry and guilt and (b) to identify factors associated with these emotional adjustment outcomes. To the knowledge of the authors, this is the first known study in an Asian setting comparing emotional responses of LDRs and DDRs. These findings may serve to inform the development of future interventions aimed at improving the emotional adjustment of KTPs in other ethnically diverse Asian or Western settings.

MATERIALS AND METHODS

Study Population

The present study was conducted at the National University Centre for Organ Transplantation in Singapore. All eligible participants were approached at National University Centre for Organ Transplantation's outpatient clinic via convenience sampling. Participants were subject to the following eligibility criteria: ≥ 21 years old, first-time transplant recipients with at least 6 months transplant vintage, had their transplant operation performed in Singapore, able to respond to questionnaires in English or Mandarin, and no recorded cognitive deficits or psychiatric diagnoses (ie, active psychosis) that would prevent informed consent and study participation. The study was approved by the institutional review board of the National Healthcare Group in Singapore.

Measures

Sociodemographic information collected included age, gender, education level, relationship status, employment status, and personal monthly income. The following clinical information collected from medical records included dialysis vintage, time since transplantation, donor type, creatinine levels, and estimated glomerular filtration rates (eGFRs).

Transplant Effects Questionnaire

Transplant-specific emotional adjustment was measured using the Transplant Effects Questionnaire (TxEQ).¹⁷ This scale was used to measure emotional adjustment of KTPs and comprised of 5 subscales measuring (a) feelings of worry (eg, worries about damaging my transplant), (b) feelings of guilt toward donor (eg, the donor suffered to make me feel better), (c) disclosure of transplantation (eg, I am uncomfortable with others knowing of my transplant), (d) perceived responsibility toward caregivers to do well (eg, responsibilities to the transplant team to do well), and (e) adherence to medication. However, the "adherence to medication" subscale was excluded from analyses because it was not a variable of interest. Subscale scores ranged from 1 to 5, with higher scores indicating more worry about the transplant, more guilt, more disclosure, and more perceived responsibility. TxEQ subscale scores higher than the midpoint (ie, 3) indicated greater emotional distress. The Cronbach's α s for subscales in this study were acceptable: Worry = 0.67; Guilt = 0.61; Disclosure = 0.83; and Responsibility = 0.60.

Depression, Anxiety, and Stress Scale-21

The Depression, Anxiety, and Stress Scale-21 (DASS-21)¹⁸ measured 3 dimensions of generic distress: depression, anxiety, and stress. Each subscale ranged from 0 to 21, with higher scores indicating greater distress. Total distress was calculated by summing scores from all 3 subscales and ranged from 0 to 63. Scores from each subscale could be categorized according to symptom severity: normal, mild, moderate, severe, and extremely severe.¹⁸ Few studies have validated the DASS-21 factor structure and cut-off scores for symptom severity in Asian settings. However, preliminary findings show that the 3-factor structure of the DASS-21 is still maintained with Asian samples.¹⁹ Although the authors suggested a DASS-18 which yielded better factorial structure, further replication studies are needed. As such, the DASS-21 and cut-off scores recommended by Lovibond and Lovibond¹⁸ were used. The Cronbach's α for this study was 0.92.

Adaptation of Study Material

The TxEQ and DASS-21 questionnaires were translated using a 3-stage process: forward translation, backward translation, and expert review.²⁰ As Singapore is predominantly populated by Chinese, questionnaires were translated to Mandarin to capture data from participants not fluent in the English language.

Statistical Analyses

Differences in sociodemographic, medical, and generic and specific emotional distress variables between LDRs and DDRs were analyzed using independent *t* tests for continuous variables and chi-square tests for categorical variables.

ANCOVA was used to compare group differences in DASS-21 and TxEQ subscales. Casemix differences

between transplant groups that were significant with outcomes of interest were included as covariates. These are fully listed in the Results section. Multivariate regression models using stepwise method were subsequently run to identify factors associated with emotional adjustment outcomes. Candidate variables selected for stepwise multivariate analyses were identified using univariate tests of associations among sociodemographic, medical, and emotional distress variables.

RESULTS

Sociodemographic Profile of LDRs and DDRs

Of the 201 eligible participants approached to participate, 16 participants declined, and 3 participants withdrew from the study midway due to time constraints and discomfort from answering the questionnaire. The final study sample comprised of 182 participants (response rate of 90.5%) and included 106 LDRs and 76 DDRs. Overall, 81.3% participants responded in English.

LDRs were significantly younger than DDRs (LDR: $M = 47.66$ y, $SD = 11.99$; DDR: $M = 51.58$ y, $SD = 9.55$; $F[1,182] = 5.58$; $P = 0.019$), had higher education levels ($\chi^2 = 7.21$; $P = 0.007$), and higher personal income ($\chi^2 = 13.14$; $P < 0.001$) compared with DDRs. LDRs also had higher eGFRs (LDR: $M = 62.47$, $SD = 20.55$; DDR: $M = 52.00$, $SD = 23.07$; $F[1,179] = 10.17$; $P = 0.002$), lower creatinine levels, and hospitalized less frequently than DDRs (Table 1). Dialysis vintage was significantly shorter for LDRs relative to DDRs (Table 1), which was shown in earlier studies,^{8,10} and attributed to the elective nature of living-donor transplantations,

which can shorten the time between dialysis initiation and transplantation.²¹

Age, education, questionnaire language, and duration on dialysis were associated with TxEQ outcomes and were subsequently controlled for in comparative analyses between transplant types. Covariates per outcome included age, questionnaire language for Worry; dialysis vintage, total number of comorbidities for Guilt; age for Disclosure; dialysis vintage, education level, employment status, questionnaire language for Responsibility; age for depression; age, employment status, questionnaire language for anxiety; and age, marital status for stress (Supplementary Tables 1 and 2, SDC, <http://links.lww.com/TXD/A237>).

Emotional Adjustment of LDRs and DDRs

Mean scores of generic distress were within the normal range for symptom severity of depression, stress, and anxiety (depression: $M = 6.14$; anxiety: $M = 6.36$; stress: $M = 8.37$). Only 13.6% and 6.6% of patients reported moderate and above symptom severity of depression and stress, respectively. However, anxiety symptoms were higher with 29.2% of LDRs and 19.7% of DDRs reporting moderate and above symptom severity of anxiety (Table 2). Majority of patients also expressed high levels of transplant-specific worry, with 83.0% of LDRs and 72.4% of DDRs reporting worry scores above the subscale midpoint. However, the expression of transplant-specific guilt was lower, with 37.7% of LDRs and 9.3% of DDRs reporting guilt scores above the subscale midpoint. Majority of patients reported greater willingness to disclose about their transplant to others and had higher perceived responsibility over their transplant (Table 2).

TABLE 1.
Characteristics of study population (N = 182)

	LD (n = 106)	DD (n = 76)	Total sample (n = 182)	P
Questionnaire language (English), n (%)	95 (89.6)	53 (69.7)	148 (81.3)	0.001 ^a
Age (y), mean \pm SD	47.7 \pm 12.0	51.6 \pm 9.55	49.3 \pm 11.18	0.019 ^b
Gender (male), n (%)	55 (51.9)	35 (46.1)	90 (49.5)	0.438
Race, n (%)				0.986
Chinese	70 (66.0)	51 (67.1)	121 (66.5)	0.880
Malay	20 (18.9)	13 (17.1)	33 (18.1)	0.761
Indian	10 (9.4)	7 (9.2)	17 (9.3)	0.959
Others	6 (5.7)	5 (6.6)	11 (6.0)	0.798
Marital status (married), n (%)	77 (72.6)	45 (59.2)	122 (67.8)	0.095
Education level, n (%)				<0.001 ^a
Primary	10 (9.4)	18 (23.7)	28 (15.6)	0.007 ^a
Secondary or ITE	31 (29.2)	42 (55.3)	73 (40.8)	<0.001 ^c
Pre-university and above	64 (60.4)	14 (18.4)	78 (43.6)	<0.001 ^c
Employment status (employed), n (%)	65 (61.3)	40 (52.6)	105 (58.7)	0.384
Personal monthly income (\geq \$2,000), n (%)	51 (51.0)	17 (23.6)	68 (39.5)	<0.001 ^c
Dialysis vintage (mo), mean \pm SD	16.34 \pm 34.10	98.17 \pm 45.25	50.82 \pm 56.28	<0.001
Length of transplantation (mo), mean \pm SD	78.50 \pm 67.25	93.71 \pm 79.79	84.85 \pm 72.93	0.178
No. of hospitalizations after transplantation, mean \pm SD	4.21 \pm 3.70	6.12 \pm 4.50	5.01 \pm 4.15	0.003 ^a
No. of rejection episodes after transplantation (mean \pm SD)	0.13 \pm 0.37	0.28 \pm 0.62	0.19 \pm 0.50	0.077
Creatinine level (μ mol/L), mean \pm SD	118.11 \pm 40.36	151.59 \pm 108.95	131.98 \pm 78.13	0.013 ^b
Estimated glomerular filtration rate (mL/min/1.73 m ²), mean \pm SD	62.47 \pm 20.55	52.00 \pm 23.07	58.14 \pm 22.18	0.002 ^a
Medication count, mean \pm SD	5.18 \pm 1.11	5.07 \pm 1.34	5.13 \pm 1.21	0.534
Total CCI, mean \pm SD	4.35 \pm 11.99	4.00 \pm 1.18	4.20 \pm 1.54	0.110

^aSignificant value $P < 0.01$.

^bSignificant value $P < 0.05$.

^cSignificant value $P < 0.001$.

CCI, Charlson Comorbidity Index; DD, deceased-donor; ITE, Institute of Technical Education; LD, living-donor; SD, standard deviation.

TABLE 2.
Emotional adjustment of LDRs and DDRs

Variables	LD (n = 106)	DD (n = 76)	Total (N = 182)	F	P	Adjusted P
TxEQ ^a						
Worry, mean (SD)	3.58 (0.65)	3.43 (0.69)	3.52 (0.67)	2.44	0.120	0.462
Worry scores >3, n (%)	88 (83.0)	55 (72.4)	143 (78.6)			
Guilt, mean (SD)	2.83 (0.71)	2.41 (0.52)	2.66 (0.67)	19.35	<0.001 ^d	0.003 ^d
Guilt scores >3, n (%)	40 (37.7)	7 (9.3)	47 (26.0)			
Disclosure, mean (SD)	3.76 (0.96)	3.58 (0.80)	3.68 (0.90)	1.67	0.198	0.041 ^f
Disclosure scores >3, n (%)	81 (76.4)	56 (73.7)	137 (75.3)			
Responsibility, mean (SD)	4.19 (0.56)	3.94 (0.59)	4.08 (0.59)	8.69	0.004 ^e	0.236
Responsibility scores >3, n (%)	100 (96.2)	65 (88.2)	167 (92.8)			
DASS-21 ^b						
Depression, mean (SD)	5.96 (5.81)	6.39 (7.33)	6.14 (6.47)	0.20	0.658	0.326
Normal (0–9), n (%)	76 (71.7)	57 (75.0)	133 (73.1)	0.25 ^c	0.620	
Mild (10–13), n (%)	17 (16.0)	7 (9.2)	24 (13.2)	1.80 ^c	0.179	
Moderate to severe (≥14), n (%)	13 (12.3)	12 (15.8)	25 (13.6)	0.46 ^c	0.496	
Anxiety, mean (SD)	6.98 (5.80)	5.50 (5.93)	6.36 (5.88)	2.84	0.094	0.512
Normal (0–7), n (%)	56 (52.8)	51 (67.1)	107 (58.8)	3.72 ^c	0.054	
Mild (8–9), n (%)	19 (17.9)	10 (13.2)	29 (15.9)	0.75 ^c	0.386	
Moderate to severe (≥10)	31 (29.2)	15 (19.7)	46 (25.2)	2.12 ^c	0.145	
Stress, mean (SD)	9.00 (6.42)	7.50 (7.00)	8.37 (6.69)	2.22	0.138	0.252
Normal (0–14), n (%)	89 (84.0)	65 (85.5)	154 (84.6)	0.00 ^c	0.992	
Mild (15–18), n (%)	8 (7.5)	6 (7.9)	14 (7.8)	0.00 ^c	0.960	
Moderate to severe (≥ 19), n (%)	7 (6.7)	5 (6.6)	12 (6.6)	0.00 ^c	0.968	

DASS-21 subscales categorized by symptom severity into normal, mild, and moderate to severe.

^aCovariates included for TxEQ ANCOVA: Worry = Age, questionnaire language; Guilt = dialysis vintage, number of comorbidities; Disclosure = age; Responsibility = dialysis vintage, education level, employment status, questionnaire language.

^bCovariates included for DASS ANCOVA: Depression = age; Anxiety = age, employment status, questionnaire language; Stress = age, marital status.

^cχ² values presented for DASS-21 categorical variables.

^dSignificant value $P < 0.001$.

^eSignificant value $P < 0.01$.

^fSignificant value $P < 0.05$.

DASS-21, Depression, Anxiety, Stress Scale-21 (subscale scores range from 0 to 21); DD, deceased-donor; DDR, deceased-donor recipient; LD, living-donor; LDR, living-donor recipient; SD, standard deviation; TxEQ, Transplant Effects Questionnaire (subscale scores range from 1 to 5).

Comparisons between the 2 transplant groups across generic and transplant-specific emotional responses indicated significant differences only in guilt and disclosure. LDRs were shown to have significantly higher feelings of guilt over their transplant compared with DDRs (LDR: $M = 2.83$, $SD = 0.71$; DDR: $M = 2.41$, $SD = 0.52$; $F[1,181] = 19.35$; $P < 0.001$). These remained significant after adjusting for casemix differences (ie, dialysis vintage and number of comorbid conditions) (Table 2). The effect size was medium to large ($d = 0.73$).

LDRs also reported higher scores in disclosure about their transplant to others compared with DDRs, after adjusting for the covariate of age (LDR: $M = 3.76$, $SD = 0.96$; DDR: $M = 3.58$, $SD = 0.80$; $F[1,181] = 4.23$; $P = 0.041$). The effect size was small ($d = 0.20$). There were no additional significant differences between transplant groups in the DASS-21 subscales and TxEQ “worry” and “responsibility” subscales (Table 2).

Associations Among Sociodemographic, Medical, and Emotional Adjustment Variables

Univariate analyses conducted across sociodemographic, medical, and emotional adjustment variables revealed only a handful of significant associations. Younger age was associated with higher eGFRs ($r = -0.16$; $P < 0.05$), greater transplant-specific worry ($r = -0.24$; $P < 0.01$), and greater symptom severity on all generic distress measures (ie, depression, anxiety, and stress). Higher guilt was associated with higher number of comorbid conditions ($r = 0.16$; $P < 0.05$) and shorter dialysis vintage ($r = -0.22$; $P < 0.01$) (Supplementary Table 1, SDC, <http://links.lww.com/>

TXD/A237). Responses from participants who opted to complete the questionnaire in Mandarin (referred to as “Mandarin-speaking respondents”) were also compared with responses from participants who opted to complete the questionnaire in English (referred to as “English-speaking respondents”). Mandarin-speaking respondents had lower transplant-specific worry (Mandarin-speaking: $M = 3.24$, $SD = 0.72$; $F[1,181] = 7.18$; $P = 0.008$; English-speaking: $M = 3.58$, $SD = 0.64$), lower perceived responsibility (Mandarin-speaking: $M = 3.70$, $SD = 0.62$; English-speaking: $M = 4.17$, $SD = 0.54$; $F[1,181] = 20.23$; $P < 0.001$), and lower generic symptoms of anxiety (Mandarin-speaking: $M = 3.59$, $SD = 3.47$; English-speaking: $M = 7.00$, $SD = 6.14$; $F[1,181] = 9.76$; $P = 0.002$). However, there was no association between race and other emotional adjustment outcomes (Supplementary Table 2, SDC, <http://links.lww.com/TXD/A237>).

Multivariate regression models to predict emotional adjustment outcomes based on these sociodemographic and clinical parameters replicated this pattern of associations. Younger age emerged as the only significant predictor for all distress indicators: transplant-specific worry ($\beta = -0.24$; $P = 0.001$; adjusted $R^2 = 0.052$), depression ($\beta = -0.22$; $P = 0.003$; $R^2 = 0.042$), anxiety ($\beta = -0.35$; $P < 0.001$; adjusted $R^2 = 0.119$), and stress ($\beta = -0.26$; $P = 0.001$; $R^2 = 0.061$). Transplant type (LDR) was the only significant predictor for transplant-specific guilt ($\beta = 0.32$; $P < 0.001$; $R^2 = 0.095$). None of the other parameters were significant in any of the models (Supplementary Table 3, SDC, <http://links.lww.com/TXD/A237>).

DISCUSSION

This article examined and compared the emotional adjustment of LDRs and DDRs post-transplantation. Patients in this study reported very low levels of depression and stress, with mean scores within the normal range, and only a handful of patients scoring moderate to severe symptoms of depression (13.6%) and stress (6.6%). Studies of transplant patients in China report even lower rates of generic symptoms of depression (4.1%),¹⁵ while work in Western settings typically report almost 1.5 times the prevalence rate of depression (19.1%¹⁰–22%²²) compared with the present study.

This could be attributed to cultural differences in the expression of emotional distress or social desirability biases which are more prominent in collectivistic settings.²³ Alternatively, patients in this sample may simply not experience depression post-transplantation. Instead, of greater concern is the presence of anticipatory anxiety manifested as worry over graft viability, with 1 in 3 LDRs, and 1 in 5 DDRs expressing moderate to above symptoms of generic anxiety, and majority of KTPs reporting high levels of transplant-specific worry.

No differences in generic distress and transplant-specific worry were observed between transplant groups, similar to previous studies.^{9,10} However, it was noted that our study indicated higher levels of transplant-specific worry in LDRs and DDRs compared with studies in Western settings.^{8,10} This can be attributed to intrinsic cultural differences of the populations studied. Collectivistic nations subscribe to an interdependent view of self, which entails a form of relational connectedness which bounds an individual to another, resulting in a stronger sense of group solidarity, and greater emphasis on maintaining group harmony.²⁴ This is in contrast to individualistic nations where there are relatively fewer obligations toward others.²⁵ Transplant patients from Asia may thus worry not only about how graft outcomes affect them personally, but also how it may impact others in their social network. These may include drastic changes in family roles if the patient undergoes dialysis which is a threat to group harmony. The present study population in Singapore is unique in that it comprises of 3 ethnically diverse collectivistic groups: Chinese, Malays, and Indians.²⁶ However, Singapore as a whole is also largely influenced by and endorses Western ideals of individualism and liberty.²⁷ It is thus plausible that while patients in this study value collectivistic beliefs of maintaining group harmony, effects of these beliefs are attenuated by Western influences. As such, transplant-specific worry expressed in the present study sample remains higher than in Western settings,^{8,10} but lower than more homogenous Asian populations.¹³

The evidence on cultural differences on emotional adjustment in our study is limited. While there were a few significant associations between language and study outcomes, with those opting to respond to Chinese-language questionnaires reporting lower transplant-specific worry, perceived responsibility, and anxiety compared with those opting to respond to English-language questionnaires, ethnicity was not associated with any of the study outcomes in either univariate or multivariate analyses; Chinese participants were found to have comparable outcomes to those of Malay or Indian ancestry.

Language is a rather crude measure of cultural identity, and in our context, the observed language difference may be more likely to reflect age and education. Education reforms institutionalizing English as a compulsory language were initiated in

1966,²⁸ hence those completing education earlier had a lower level of English command. Furthermore, it is important to note that only age was significant in regression models. More work is needed to delineate the nuanced effects of cultural identity, acculturation, language, and ethnicity on emotional outcomes post-transplantation so as to inform care.

Notably, the expression of both generic distress and transplant-specific worry was more pronounced in younger KTPs in this cultural setting, despite having better graft function as indicated by higher eGFRs. This shows that the presence of positive clinical outcomes related to graft functioning may not necessarily provide relief to the emotional distress experienced by KTPs. Rather, results suggest younger age as the main driver of generic symptoms of distress and transplant-specific worry. This may be attributed to the prospect of having reduced employability and decreased levels of physical and social functioning²⁹ at an unexpectedly young age if graft rejection occurs. Furthermore, as patient eGFR values may vary over time, KTPs cannot be certain that healthy eGFRs recorded at one visit would remain till their next. This may explain why younger patients have persisting experiences of emotional distress despite having healthier grafts. As such, healthcare providers should be vigilant of younger KTPs, who may be at greater risk of poorer emotional adjustment.

When compared between transplant groups, it was found that LDRs experienced stronger feelings of guilt compared with DDRs irrespective of dialysis vintage. This is consistent with earlier studies conducted with Western populations.^{8,10} Majority of LDRs have existing relationships with their donors before transplantation, unlike DDRs who typically have impersonal relationships with their donors due to limited contact information made available to the recipient. As such, LDRs may have greater awareness and sensitivity toward sacrifices made by their donors, such as putting their health at risk from having 1 kidney, and the medical costs incurred,³⁰ leading to greater feelings of guilt than DDRs.

Of note, few sociodemographic and medical variables emerged as significant predictors in multivariate regression models for generic and transplant-specific emotional distress. Furthermore, significant predictors (ie, age and donor type) explained low percentages of variance in their respective models (ranging from 5.2% to 11.9%). This is generally consistent with previous studies which report relationship status¹⁰ as the only significant sociodemographic predictor and age to account for only 15% of variance explained for psychologic distress.¹² These findings suggest that age and donor type remain key markers to identify patients at greater risk of poor emotional adjustment in the present study. However, other yet to be determined psychosocial factors such as social support¹⁰ may be even better predictors of poor emotional outcomes. Future studies should focus on identifying these variables to better inform intervention plans for at-risk patients.

LDRs showed greater willingness to disclose about their transplant to others compared with DDRs regardless of age, a difference not observed in previous studies comparing the 2 groups.⁸⁻¹⁰ As the decision to donate one's kidney is an act of sacrifice requiring donors to renegotiate multiple family and work-related roles,³¹ LDRs may demonstrate greater willingness to disclose about their transplant to others as a way of acknowledging the contributions of their donor. This could be more apparent in collectivistic societies due to the perception

of relational connectedness,²⁴ which may account for greater disclosure of LDRs compared with DDRs in our study.

The present study acknowledges several limitations. First, the cross-sectional nature of the study precludes determination of causality. As data were collected at only one timepoint, we cannot determine if distress levels were due to transplantation alone or pre-transplantation distress. Future longitudinal studies are warranted to evaluate the effects of pre-transplantation distress and the course of emotional outcomes post-transplantation. Second, as the study was conducted in an ethnically diverse setting, results cannot be readily generalized to more homogenous cultures. However, the study has highlighted potential cultural nuances in emotional adjustment outcomes of KTPs. Further work is needed to replicate these findings and delve into the underpinnings of worry and distress to better inform intervention and practice. Third, the Mandarin version TxEQ scale, albeit translated using standard forward-backward procedures, was not formally tested for linguistic validity. The sample size of KTPs completing the Mandarin version was insufficient to allow comparisons across 2 versions. Fourth, as few studies have used the DASS-21 to assess generic distress in KTPs, findings from this article are not directly comparable to existing literature. Findings should thus be interpreted with caution, while more work is needed to improve interpretability of findings. Fifth, culture-specific variables (eg, acculturation, cultural identity) were not explicitly measured. As such, conclusions cannot be made on cultural differences in distress of KTPs. While the present findings highlight the possibility of potential cultural nuances, more work is needed to draw conclusions. Finally, convenience sampling of participants may result in self-selection bias, where KTPs with better emotional adjustment are more willing to participate, hence skewing representations of emotional adjustment. However, the merits of this study are its documentation and comparison of prevalence rates of generic symptoms of anxiety in LDRs and DDRs, and highlighting younger age as a driver of generic distress and transplant-specific worry.

To conclude, clinicians and interventionists should be cognizant of younger KTPs who are at greater risk of developing generic symptoms of distress and worrying over graft viability. Future researchers should aim to include greater racial diversity in study samples to permit comparisons of transplant-specific emotional adjustment across cultures.

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