Int J Clin Exp Med 2015;8(12):22570-22576
www.ijcem.com /ISSN:1940-5901/IJCEM0014324

Original Article

Pilot feasibility research of Chinese version of kidney transplant questionnaire in recipients of living donor kidney transplantation

Yujian Niu[1*], Wenxin Zhang[2*], Sha Mao[1*], Yanhong Gao[3*], Jianli Wang[1], Jun Li[1], Letian Wang[1], Zhaojie Guan[1], Zhongyang Shen[1]

[1]Institute of Organ Transplantation, The General Hospital of Chinese People's Armed Police Forces, Beijing 100039, China; [2]Department of Nursing, The China-Japan Friendship Hospital, Beijing 100029, China; [3]Department of Nursing, The General Hospital of Chinese People's Armed Police Forces, Beijing 100039, China. [*]Equal contributors.

Received August 11, 2015; Accepted October 27, 2015; Epub December 15, 2015; Published December 30, 2015

Abstract: Objective: To explore the feasibility of the Chinese version of Kidney Transplant Questionnaire (KTQ) by evaluating the health-related quality of life (HRQoL) in Chinese recipients of living donor kidney transplantation. Methods: The English version of KTQ was translated into Chinese and underwent cultural adaptation to obtain the Chinese version of KTQ. HRQoL of 136 Chinese recipients of living donor kidney transplantation that met the inclusion criteria were evaluated to assess the validity and reliability of the questionnaire. Results: One hundred and thirty-six recipients (98 males and 38 females) of living donor kidney transplantation were included. The mean age of the recipients was 43.91 years. For each dimension of the questionnaire, the Cronbach's alpha coefficient was 0.7-0.9, test-retest reliability coefficient ≥0.7, goodness of fit index (GFI) >0.9, and comparative fitness index (CFI) >0.9. Conclusion: The validity and reliability of the Chinese version of KTQ is similar to the English version, suggesting that the Chinese version of KTQ could be applied as a disease-specific questionnaire to evaluate the HRQoL of the recipients of living donor kidney transplantation in China.

Keywords: Living donor kidney transplantation, kidney transplantation questionnaire, cross cultural adaptation, Chinese

Introduction

Chronic renal failure (CRF) is a life-threatening disease. The incidence of CRF is increasing by about 8% per year in recent years. Kidney transplantation is the one of the most effective treatments for patients with end-stage kidney disease [1]. However, there is a disproportional increase in the number of patients requiring a kidney transplant compared to the availability of deceased kidney transplantation donors. Therefore, recently, there has been a raise in the percentage of living donor kidney transplantation [2]. It is estimated that over 0.6 million patients have undergone kidney transplantation in the USA from January 1988 to February 2015 and 0.13 million of them were living donor kidney transplants [3]. In China, living donor kidney transplantation accounts for a substantial proportion. It is estimated that about 16000 patients underwent living donor kidney transplantation till March 3, 2015 in China [4]. Kidney transplantation could effectively improve the survival of recipients [5], which is more pronounced in recipients undergoing living donor kidney transplantation [6]. In addition, the renal function is better in living donor kidney transplantation than in deceased donor kidney transplantation, especially in the first year after the operation, which allows the recipients to resume routine activities better [7].

Health related quality of life (HRQoL) has been increasingly recognized as an important medical outcome in patients with CRF. Previous studies have suggested that assessing HRQoL is of great importance for the following reasons:

1) improve the process of making clinical decisions; 2) improve the determination of the efficacy of medical intervention; 3) evaluate the quality of care; 4) estimate the health care need of the general population; and 5) better understand the causes and consequences of the differences in health [8]. However, there are no validated measures to specifically assess HRQoL for Chinese recipients of living donor kidney transplantation to date.

Kidney Disease Quality of Life-Short Form Questionnaire (KDQoL-SF) has become one of the most widely used HRQoL measures for patients with chronic kidney diseases (CKD). However, recipients of kidney transplantation require life-time administration of immunosuppressants, which could affect the quality of life and thus make them different from patients with late-stage kidney diseases, and therefore, KDQoL-SF may not be a direct reflection of the HRQoL of the recipients after kidney transplantation. ReTransQol (RTQ) is another tool developed in 2007 to specifically assess the HRQoL of kidney transplantation patients [9]. Although the validity and reliability of RTQ has already been demonstrated, this tool has not been widely applied in clinical practice, and only the French version is available to date.

The Kidney Transplant Questionnaire (KTQ) was developed by Laupacis et al. to assess the quality of life of the recipients after kidney transplantation with specified questions from several aspects including transplantation-related symptoms, treatment efficacies, and other issues [10]. This questionnaire has been demonstrated to have good validity and reliability in various populations [11, 12]. However, this questionnaire has not been administered to a Chinese population. Cross-cultural adaptation is needed when applying a questionnaire designed for one population to another population [13]. Therefore, the present study aimed to perform cross-cultural adaptation for the KTQ, assess the validity and reliability of its Chinese version, and estimate the feasibility of this tool in evaluating the HRQoL of Chinese recipients of kidney transplantation.

Materials and methods

Cross-cultural adaptation of the KTQ

The Kidney Transplant Questionnaire developed by Laupacis et al. [13] has 25 items grouped in five dimensions: physical symptoms (6 items), uncertainty/fear (5 items), fatigue (4 items), appearance (4 items), and emotion (6 items). Each item has a Likert scale with 7 possible answers. Higher score of each item represents better health status or less transplantation-related health issues [13]. Previous studies have demonstrated the validity and reliability of the KTQ (Cronbach's alpha coefficient and internal consistency of 0.60-0.90) [11, 12].

The authors of the KTQ were contacted to obtain the English version of KTQ, and then the Chinese version of KTQ was developed according to the cross-cultural adaptation guidelines [12, 14]. The processes of development of the Chinese version of KTQ were as follows: 1) Forward translation: Two postgraduate students majoring in nursing were asked to translate all the items of the English version of KTQ into Chinese language. Disagreements were resolved by discussion. The translation was performed according to equivalence principles to ensure conceptual equivalence, semantic equivalence, technical equivalence, and scalar equivalence. 2) Back translation: Two medical professors who had never used the KTQ before were asked to translate the Chinese version into English based on the same equivalence principles. The Chinese version and the self-translated English version KTQs were evaluated by the translators and investigators, and disagreements were resolved by discussion. 3) Cross-cultural adaptation: A working group consisted of 2 chief physicians experienced in kidney transplantation, 3 professors of nursing, and 15 recipients of kidney transplantation performing cross-cultural adaptation of the Chinese version of KTQ. Each item of the KTQ was discussed among the investigators and the working group regarding the presentation and understanding of the content to obtain the final version of the Chinese KTQ.

SF-36 health survey

The SF-36 Health Survey (SF-36) is a generic HRQoL assessment tool for recipients after kidney transplantation [15-17], which includes 36 items categorized into 8 dimensions (physical functioning [10 items], role functioning-physical [4 items], bodily pain [2 items], general health [6 items], vitality [4 items], social functioning [2 items], role functioning-emotional [3 items], and mental health [5 items]) and two subscales

Table 1. Demographic characteristics of the recipients in the study (n=136)

Item	Category	N	%	Mean (Range)	SD
Age				43.91 (64-18)	11.38
Gender	Male	98	72.06		
	Female	38	27.94		
Marital status					
	Married	96	70.59		
	Divorced/single/Widowed	40	24.91		
Education status					
	Less than 9 years	33	24.26		
	At least 9 years	103	75.74		
Time since transplantation (month)				40.36 (3.27-179.73)	32.86
Living Donor type	Parents	75	55.14		
	Siblings	41	30.15		
	Others	20	14.71		

Table 2. Scores in the Chinese version of KTQ and SF-36 (n=136)

	Mean (Range)	SD
KTQ		
Physical symptom	4.90 (1-7)	1.56
Fatigue	4.55 (1-7)	1.52
Uncertainty/fear	4.18 (1-7)	1.40
Appearance	5.77 (2-7)	1.28
Emotion	4.76 (1-7)	1.42
SF-36		
PCS	48.07 (33.38-66.58)	5.77
MCS	44.98 (12.31-68.08)	10.40

PCS, physical component summary; MCS, mental component summary.

Table 3. Internal consistency and test-retest reliability of the Chinese version of KTQ

	Cronbach's alpha	Test-retest coefficient
KTQ		
Physical symptom	0.86	0.85
Fatigue	0.90	0.91
Uncertainty/fear	0.70	0.72
Appearance	0.73	0.70
Emotion	0.87	0.71

(physical component summary [PCS], and mental component summary [MCS]). The Chinese version of SF-36 has been demonstrated to have good validity, reliability, and response. Higher score of SF-36 indicates better HRQoL of the recipients after kidney transplantation [18, 19].

Assessing the Chinese KTQ

Recipients: A cross-sectional survey was performed to assess the validity and reliability of the Chinese version of KTQ. The inclusion criteria for the recipients were as follows: 1) ≥18 years of age; 2) were recipients of living donor kidney transplantation, and underwent kidney transplantation only once; 3) were recipients of a normally functioning kidney (free from dialysis); and 4) could read and write. Recipients with severe cardiac, cerebral, or pulmonary complications or psychiatric disorders were excluded. Finally, 145 Chinese versions of KTQ were distributed to the living donor kidney transplantation recipients in the Follow-Up Clinic of the Organ Transplantation Research Institute, Chinese Armed Police General Hospital, China from July 2014 to December 2014. One hundred and thirty-six valid questionnaires were obtained, while the other 9 recipients did not offer valid information. The present study was approved by the Ethics Committee of the Chinese Armed Police General Hospital, and written informed consents were obtained from all the patients.

Data collection: The Chinese version of KTQ was distributed to eligible recipients by trained investigators. The recipients were asked to complete the questionnaires within 10 to 15 minutes after they were invited. The investigators were allowed to explain any questions to the recipients. The questionnaires were retrieved and cross-checked with the recipients who were still available to avoid missing data. In

Table 4. Correlation between SF-36 and KTQ score

	Physical Symptom	Fatigue	Uncertainty/ Fear	Appearance	Emotion
Physical Symptom					
Fatigue	0.59**				
Uncertainty/Fear	0.46**	0.58**			
Appearance	0.45**	0.53**	0.54**		
Emotion	0.61**	0.77**	0.69**	0.58**	
PCS	0.22*	0.30**	0.33**	0.23**	0.19*
MCS	0.34**	0.57**	0.47**	0.37**	0.62**

**P<0.01 (2-sided); *P<0.05 (2-sided); PCS, physical component summary; MCS, mental component summary.

Table 5. Goodness-of-Fit for Confirmatory Factor Analysis Model of the KTQ

Model		df	*P* value	GFI	CFI	RMSEA
Final model	198.92	209	0.68	0.903	1.00	0.001

χ^2, Chi square; df, degree of freedom; GFI, goodness of fit index; CFI, comparative fit index; RMSEA, root mean square error of approximation.

addition, the investigators were also asked to contact with the recipients via telephone call to obtain information after the investigation if missing data were identified. Creatinine levels of the recipients were obtained from the online system in the follow-up clinic. The database was managed by two investigators, of whom one was in charge of data input and the other cross-checked with the original data.

The Chinese version of KTQ was used for all the recipients included to assess the validity and reliability of the KTQ. In addition, a proportion of the recipients were asked to complete the same KTQ again 2 weeks later to assess the test-retest reliability.

Statistical analyses

SPSS 21.0 and AMOS 21.0 software were used for the statistical analyses. Cronbach's alpha coefficient was calculated to assess the internal consistency. A Cronbach's alpha of ≥0.6 suggests that the subscale is applicable. Pearson's correlation test was used to assess the test-retest reliability, a coefficient >0.7 indicates acceptable reliability [20].

A group consisting of 6 experts including 2 professors of kidney transplantation, 3 professors of nursing familiar with the development of scales, and 1 professor of Medical English was asked to assess the validity of the Chinese version of KTQ. The concurrent validity of KTQ and SF-36 were analyzed by statistical comparison and correlation test, and a coefficient >0.4 indicated an acceptable concurrent validity [21]. Confirmatory factor analysis was used to assess the construct validity of the KTQ, Maximum likelihood method was used to estimate the goodness of fit index (GFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA; <0.05, good fit; 0.05-0.08, fair or reasonable; >0.08 unsatisfactory fit) to assess the fitness of the model [22, 23].

Results

One hundred and forty-five Chinese version of KTQ were distributed, and 136 valid questionnaires were retrieved, yielding a valid retrieval rate of 93.16%. Among the 136 recipients who returned valid questionnaires, there were 98 males (72.06%) and 38 females (27.94%), 70.59% (96/136) of them were married, 103 (75.74%) of them were with the education level of high school or higher. The donors of 55.14% of the recipients were parents, and 30.15% of them were siblings. The mean time since kidney transplantation of the recipients was 40.36 months (**Table 1**).

The highest score of the KTQ was found in the appearance dimension (5.77), while the lowest score was found in the uncertainty/fear dimension (4.18). While for the SF-36, the mean score of PCS and MCS was 48.07 and 44.98, respectively (**Table 2**).

The Cronbach's alpha coefficient of the physical symptoms, fatigue, uncertainty/fear, appearance, and emotion dimensions was 0.86, 0.90, 0.70, 0.73, and 0.87, respectively. The coefficient of the test-retest reliability of each dimension was between 0.70 and 0.91 (**Table 3**).

All the recipients could complete the KTQ within 15 minutes. The first 6 items in the KTQ were

completed under the guidance of the investigators. Five recipients could not correctly understand item 21 ("How often during the past two weeks have you felt protective of your transplant?"). After consulting with 6 experts, we found that the content validity index of the KTQ was >0.8. The correlation coefficients among the dimensions of the KTQ ranged between the maximum of 0.77 obtained for "Emotion" and "Fatigue", and the minimum of 0.45 for "Physical symptom" and "Appearance".

Concept validity, measured by the correlation coefficients between the KTQ and the SF-36 scores is presented in **Table 4**. The coefficients for the dimensions of the SF-36 were positive in all the cases. The coefficients between the KTQ dimensions and the PCS score were low (0.19-0.33) in all the dimensions, while the coefficient with the MCS score were high in all the dimensions (0.34-0.62). The construct validity of the KTQ was assessed by confirmatory factor analysis, and the goodness-of-fit suggested that the model was with good fitness (**Table 5**).

Discussion

A specific scale that could effectively assess the HRQoL of the recipients of living donor kidney transplantation is critical for both clinicians and patients, given the fact that an increasing number of living donor kidney transplantations are being performed in recent years. However, there is no such scale available for Chinese recipients till date. In the present study, the KTQ that has been widely applied in other countries was administered to Chinese transplant recipients after cross-cultural adaptation [12, 14] to assess the HRQoL. The results of the present study showed that the Chinese version of KTQ is a valid and reliable tool to assess HRQoL in Chinese kidney transplant recipients.

The Cronbach's alpha and Pearson's correlation coefficients were all higher than 0.7 for all the dimensions of KTQ, suggesting that the Chinese version of KTQ has good internal consistency and stability. The content validity of the KTQ was obtained after consulting the experts, and the results showed that the contents of the KTQ could effectively assess the quality of life of the recipients of living donor kidney transplantation. In addition, the criterion validity, which was assessed by the correlation between the dimensions of KTQ and the PCS/MCS of the SF-36, as well as the construct validity also demonstrated that the Chinese version of KTQ could specifically reflect the HRQoL of the Chinese recipients of living donor kidney transplantation.

The correlations between the dimensions of the KTQ and the PCS of the SF-36 were <0.3 in the present study, which was in agreement with the results reported by Rebollo et al. [7]. However, Chisholm-Burns et al. [24]. Reported no correlation between "Appearance" or "Emotion" and PCS, while the coefficients between the "Physical symptom" or "Fatigue" and PCS were >0.4. The correlation coefficients between the dimensions of the KTQ and MCS of the SF-36 in the present study were higher than the results reported by Marie et al. [24]. but lower than the results reported by Rebollo et al. [6]. These differences could be because of the differences in the study population. In the present study, all the subjects who were included, had undergone living donor kidney transplantation at least 3 months prior, while the time from transplantation was 5.1 years in the study performed by Rebollo et al. [7]. The functions of the transplanted will decrease with time, thus the renal functions of the recipients in the present study could be better. In addition, most of the recipients had received kidney from their parents or siblings in the present study, which could be different from the situations in other countries and affect the results. Furthermore, the differences in the health care environments between China and other countries could also affect the quality of life of the recipients.

The score for "Uncertainty/Fear" was the lowest among all the dimensions in the present study, which was different from the results reported by Rostami et al. [11]. This difference could also, at least partially, be caused by the differences in the selection of the subjects. For instance, most of the other studies did not describe the source of the graft kidney. Peng et al. [25] suggested that the recipients had complex feelings such as fear and anxiety about the donors, which could affect the understanding of the recipients regarding transplantation-related issues.

There are a few limitations of the present study. First, the sample size of the present study was

relatively small, and thus, the subjects could not be stratified by the time since transplantation, which could confound the results. Second, the percentage of male subjects was higher compared to that of female subjects, which is different from the overall patient population and thus, limits the extrapolation of the findings. Finally, the medication strategies and renal functions of the recipients were not investigated in the present study, which could bias the final results. Further studies with larger sample sizes are needed to verify our findings.

Acknowledgements

This study was partially supported by the National Natural Science Foundation of China (Grant No. 81450066, WZ 2011009, WZ 2013-0203, and WZ 2014016).

Disclosure of conflict of interest

None.

Address correspondence to: Zhaojie Guan and Zhongyang Shen, Institute of Organ Transplantation, The General Hospital of Chinese People's Armed Police Forces (GHCAPF), 69#, Yongding Road, Beijing 100039, China. Tel: +8601057976840; Fax: +8601057976840; E-mail: 13911723403@163.com (ZJG); 15001237526@163.com (ZYS)

References

[1] Laupacis A, Keown P, Pus N, Krueger H, Ferguson B, Wong C and Muirhead N. A study of the quality of life and cost-utility of renal transplantation. Kidney Int 1996; 50: 235-242.

[2] Horvat LD, Shariff SZ, Garg AX and Donor Nephrectomy Outcomes Research N. Global trends in the rates of living kidney donation. Kidney Int 2009; 75: 1088-1098.

[3] Dayican A, Unal VS, Ozkurt B, Portakal S, Nuhoglu E and Tumoz MA. Conservative treatment in intra-articular fractures of the distal radius: a study on the functional and anatomic outcome in elderly patients. Yonsei Med J 2003; 44: 836-840.

[4] Jupiter JB, Ring D and Weitzel PP. Surgical treatment of redisplaced fractures of the distal radius in patients older than 60 years. J Hand Surg Am 2002; 27: 714-723.

[5] Lei J. Social support, quality of life and inflammatory mediators for kidney transplanta patients. Central South University 2010.

[6] Davis CL and Delmonico FL. Living-donor kidney transplantation: a review of the current practices for the live donor. J Am Soc Nephrol 2005; 16: 2098-2110.

[7] de Groot IB, Veen JI, van der Boog PJ, van Dijk S, Stiggelbout AM, Marang-van de Mheen PJ; PARTNER-study group. Difference in quality of life, fatigue and societal participation between living and deceased donor kidney transplant recipients. Clin Transplant 2013; 27: E415-423.

[8] Rebollo P, Ortega F, Ortega T, Valdes C, Garcia-Mendoza M and Gomez E. Spanish validation of the "kidney transplant questionnaire": a useful instrument for assessing health related quality of life in kidney transplant patients. Health Qual Life Outcomes 2003; 1: 56.

[9] Rebollo P, Ortega F, Baltar JM, Badia X, Alvarez-Ude F, Diaz-Corte C, Naves M, Navascues RA, Urena A and Alvarez-Grande J. Health related quality of life (HRQOL) of kidney transplanted patients: variables that influence it. Clin Transplant 2000; 14: 199-207.

[10] Laupacis A, Pus N, Muirhead N, Wong C, Ferguson B and Keown P. Disease-specific questionnaire for patients with a renal transplant. Nephron 1993; 64: 226-231.

[11] Rostami Z, Tavallaii SA, Jahani Y and Einollahi B. Assessment of quality of life in a single-center transplantation population using the Kidney Transplant Questionnaire-25 questionnaire. Transplant Proc 2011; 43: 590-591.

[12] Tayyebi A, Raiesifar A, Najafi Mehri S, Ebadi A, Einolahi B and Pashandi S. Measuring health related quality of life (hrqol) in renal transplant patients: psychometric properties and cross-cultural adaptation of kidney transplant questionnaire (ktq-25) in persian. Nephrourol Mon 2012; 4: 617-621.

[13] Beaton DE, Bombardier C, Guillemin F and Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976) 2000; 25: 3186-3191.

[14] Guillemin F, Bombardier C and Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. J Clin Epidemiol 1993; 46: 1417-1432.

[15] Liem YS, Bosch JL, Arends LR, Heijenbrok-Kal MH and Hunink MG. Quality of life assessed with the Medical Outcomes Study Short Form 36-Item Health Survey of patients on renal replacement therapy: a systematic review and meta-analysis. Value Health 2007; 10: 390-397.

[16] Stavem K and Ganss R. Reliability and validity of the ESRD Symptom Checklist-Transplantation Module in Norwegian kidney transplant recipients. BMC Nephrol 2006; 7: 17.

[17] Barotfi S, Molnar MZ, Almasi C, Kovacs AZ, Remport A, Szeifert L, Szentkiralyi A, Vamos E, Zoller R, Eremenco S, Novak M and Mucsi I.

Validation of the Kidney Disease Quality of Life-Short Form questionnaire in kidney transplant patients. J Psychosom Res 2006; 60: 495-504.

[18] Li L, Wang H and Shen Y. Development and psychometric tests of a Chinese version of the SF-36 Health Survey Scales. Zhonghua Yu Fang Yi Xue Za Zhi 2002; 36: 109-113.

[19] Ren XS, Amick B 3rd, Zhou L and Gandek B. Translation and psychometric evaluation of a Chinese version of the SF-36 Health Survey in the United States. J Clin Epidemiol 1998; 51: 1129-1138.

[20] Wu M. Questionnaire statistical analysis-SPSS operation and application. Chongqing: Chongqing University Press 2010; 237-267.

[21] Ware JE Jr. and Gandek B. Methods for testing data quality, scaling assumptions, and reliability: the IQOLA Project approach. International Quality of Life Assessment. J Clin Epidemiol 1998; 51: 945-952.

[22] JM. W and CV. D. A cautionary note on the use of information fit indexes in covariance structure modeling with means. StructEqu Modeling: A Multidisciplinary J 2004; 11: 45-50.

[23] Wu M. Structural Equation Modeling-advanced application of AMOS. Chongqing: Chongqing University Press 2013; 151-201.

[24] Chisholm-Burns MA, Erickson SR, Spivey CA, Gruessner RW and Kaplan B. Concurrent validity of kidney transplant questionnaire in US renal transplant recipients. Patient Prefer Adherence 2011; 5: 517-522.

[25] Peng S, Tao X, Huang L and Liu J. Emotions of the recipients and donors of living-relative donor kidney transplantations. Journal of Nursing 2009; 16: 75-77.