Adaptation and validation of the Kidney Transplant Understanding Tool for the Brazilian context

Adaptação e validação do *Kidney Transplant Understanding Tool* para o contexto brasileiro

Adaptación y validación del *Kidney Transplant Understanding Tool* para el contexto brasileño

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Abstract

Objective: To perform a cross-cultural adaptation and content validation of the Kidney Transplant Understanding Tool for the Brazilian context.

Methods: A methodological study conducted in the city of Pernambuco, Brazil, which performed the five steps of a Canadian cross-cultural adaptation protocol. The pre-final version of the instrument was evaluated by 36 participants in renal replacement therapy and seven specialists in nephrology

Results: For each item, the Item Content Validity Index - I-CVI ≥ 0.85 was achieved; and 0.99 for the mean Scale Content Validity Index - S-CVI/Ave in conceptual and content equivalence. The binomial test showed a p-value ≥ 0.05 for all items; and the Kappa Coefficient of Agreement was 0.9.

Conclusion: The adapted instrument was found to be clear by the participants, and the content was validated by the experts. The Kidney Transplant Understanding Tool (K-TUT-Br) was validated for use in the context of kidney transplantation in Brazil. Its application may enable nurses to implement of strategic changes in technical and care structures using evidence-based practices focusing on knowledge and health literacy.

Resumo

Objetivo: Realizar a adaptação transcultural e validar o conteúdo do instrumento *Kidney Transplant Understanding Tool* para o cenário brasileiro.

Métodos: Estudo metodológico realizado na capital pernambucana, que executou cinco etapas de um protocolo canadense de adaptação transcultural. A versão pré-final do instrumento foi avaliada por 36 participantes em terapia renal substitutiva e sete especialistas em Nefrologia.

Resultados: Para cada item, atingiu-se o I-IVC ≥ 0,85; e 0,99 para a escala S-IVC/Ave em equivalência conceitual e de conteúdo. O teste binomial apresentou o p-valor ≥ 0,05 para todos os itens; e o Coeficiente de Concordância de Kappa foi de 0,90.

Conclusão: O instrumento adaptado foi considerado claro pelos participantes e o conteúdo foi validado pelos especialistas. O *Kidney Transplant Understanding Tool* (K-TUT-Br) foi validado para utilização no contexto do transplante renal no Brasil. A sua aplicação poderá instrumentalizar a enfermagem na implementação de mudanças estratégicas nas estruturas técnico-assistenciais em uso de práticas baseadas em evidências ressaltando o conhecimento e o Letramento em Saúde.

Resumen

Objetivo: Realizar la adaptación transcultural y validar el contenido del instrumento *Kidney Transplant Understanding Tool* para el escenario brasileño.

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Conflicts of interest: nothing to declare.

Métodos: Estudio metodológico realizado en la capital del estado de Pernambuco, donde se ejecutaron cinco etapas de un protocolo canadiense de adaptación transcultural. La versión preliminar del instrumento fue evaluada por 36 participantes en terapia de reemplazo renal y siete especialistas en Nefrología.

Resultados: En cada ítem se alcanzó el I-IVC ≥ 0,85; y 0,99 en la escala S-IVC/Ave en equivalencia conceptual y de contenido. La prueba binominal presentó el p-valor ≥ 0,05 en todos los ítems; y el coeficiente de concordancia de Kappa fue de 0,90.

Conclusión: El instrumento adaptado fue considerado claro por los participantes y el contenido fue validado por los especialistas. El *Kidney Transplant Understanding Tool* (K-TUT-Br) fue validado para su utilización en el contexto del trasplante renal en Brasil. Su aplicación podrá servir de instrumento para enfermeros en la implementación de cambios estratégicos en las estructuras técnico-asistenciales en uso de prácticas basadas en evidencia, destacando el conocimiento y la alfabetización en salud.

Introduction

Chronic kidney disease (CKD) is a public health problem belonging to the pillars of the plan to address chronic diseases.[1] They are classified according to the glomerular filtration rate (GFR) and albuminuria, which guides the management of the disease and the choice of treatment that evolves from the conservative method to replacement renal therapies (RRT), which can be hemodialysis (HD), peritoneal dialysis (PD), or transplantation (TX).[2,3] Among these modalities, renal TX is ideal for patients with advanced CKD or end-stage renal disease (ESRD), and those who have clinical conditions.

The CKD treatment is complex and the patient faces challenges associated with self-care and routine.[4] Transplantation is no different; multifaceted complexity related to treatment involves physical, psychological, and behavioral issues, requiring active participation of the patient who needs to self-manage.[2] This requires knowledge involving the use of immunosuppressants, hygiene care, infection prevention, and even identification of signs suggestive of graft rejection.[5] The patient's level of knowledge is a factor that can influence and compromise his/her adherence to renal TX, and its insufficiency negatively impacts the patient's ability to improve health outcomes through self-management.[6]

Knowledge is part of reading and writing and, together with individual skills and behaviors, constitutes what is called literacy.[7] This construct began to be discussed within the health education field in the 1970s under the term, health literacy (HL); it has become an object of interest in nursing since 2016.[8,9] Health literacy is found in the NANDA International (NANDA-I) Taxonomy II, as the nursing diagnosis, *Readiness for enhanced health literacy* (Code 00262). It is conceptualized as a guide for using and developing a set of skills and competencies that enable the individual to find, comprehend, evaluate, and use health information and concepts shared with him/her, to use them when making health decisions.[9]

Limited HL is common among patients with CKD; with prevalence between 5% and 60% in moderate or severe steps of the disease, associated with worsening prognosis and progression of CKD. In addition, there is a restriction in access to the transplant list due to a greater difficulty for these patients to perform the steps involved in the process, associated with a knowledge deficit about treatment. [10-12]

Health education strategies can be used to promote renal transplant candidates' self-management, increasing their knowledge about the procedure and post-transplant care, reducing doubts, while increasing their awareness about their health conditions and the necessary post-TX adaptations. [13-15] Adequate HL also provides greater knowledge about the disease, and consequently improves adherence to treatment by leading to the patient's behavioral change when confronted with his health situation.[11]

Rosaasen and colleagues, in 2017, needed a robust instrument to measure knowledge and measure the impacts of health education strategies, so they developed a specific instrument to assess patient knowledge about renal TX, the Kidney Transplant Understanding Tool (K-TUT). This instrument is composed of nine true-false questions and 13 multiple-choice questions. In total, 69 items address several aspects related to TX. Scores are based on the number of correct answers [YES/NO format].[14]

This study was motivated by the need within Brazil to manage this population and invest in

strategies that promote HL as an intermediate outcome among patients diagnosed with CKD who are eligible for renal transplantation, when the subject is at an early stage of approaching the health practices. By making this instrument available, the gaps related to the patient's understanding about this treatment option can be identified. Additionally, it is possible to promote the insertion of the HL theme in clinical practice, promoting self-management through knowledge, generating impacts on the reduction of costs with hospitalizations, medications, and other health care measures. Moreover, considering the role of nurses in all the transplant care process, from enrollment of the patient on the waiting list to the postoperative period, they can be qualified to develop new practices and health education interventions that represent strategic changes in the current care-technical models with the promotion of more sensitive practices to HL.

Therefore, this study aimed to perform a cross-cultural adaptation and content validation of the Kidney Transplant Understanding Tool for the Brazilian scenario.

Methods

The five steps of the protocol, translation, adaptation and validation were performed, recommended by Sousa and Rajjanasrirat: i) Translation of the original instrument into Brazilian Portuguese by two independent, bicultural translators, native speakers of Portuguese and fluent in English; ii) Comparison of the versions by an independent translator; iii) Blind back-translation of the preliminary version translated by two other independent and bicultural translators, with English as their native language, fluent in Portuguese; iv) Comparison of the back-translated versions by a committee of experts; v) Pilot test of the pre-final version: cognitive debriefing.[16]

The pilot test of the pre-final version of the instrument was performed in a Nephrology Service of the Hospital das Clínicas of Pernambuco, located in Recife-PE. The sampling was by convenience, non-probabilistic, and with replacement. For sample selection, the guidelines of Sousa and Rojjanasrirat were followed, which state that the ideal number of participants is from ten to 40 people within the target population, and between six to ten experts. [16]

Thirty-six patients older than 18 years, in renal replacement therapy (RRT) and enrolled on the waiting list for TX, and in post-transplant and outpatient follow-up, were interviewed and each item of the K-TUT was analyzed using a dichotomous scale: "clear" and "unclear". When the item was considered to be "unclear", the participant could suggest a re-writing of the item. Data were analyzed by assessing the frequency of clear items, using Microsoft Excel 2010. The items that obtained at least 80% of the evaluations as "clear" were maintained, as proposed in the protocol of Sousa and Rojjanasrirat.[16]

Seven nephrology specialists selected using a snowball strategy,[17] with a minimum experience of two years in specialized care and/or in validation of instruments, confirmed by means of articles published in this area in the last three years, were responsible for the conceptual and content equivalence analysis. Data collection occurred individually, via e-mail and a multiplatform instant messaging application for smartphones, by means of a form generated via Google Forms.

A Likert scale with scores from one to four points was used to analyze the conceptual equivalence (clarity) and content (relevance), scored respectively as: 1-"Not clear/Not relevant"; 2- "Unable to assess clarity"/"Relevant but needs moderate changes"; 3- "Clear, but needs minor changes"/"Relevant, but needs minor changes" and 4- "Very clear and succinct"/"Very relevant and succinct".

The Item Content Validity Index (I-CVI) and the Scale Content Validity Index (S-CVI) were used for the analysis, and the latter was identified by calculating the mean (S-CVI/Ave). An I-CVI greater than or equal to 0.78, and a S-CVI/Ave greater than or equal to 0.90 were considered acceptable. The Kappa coefficient considered the ratio of the proportion of times that the experts agreed with the maximum proportion of times that could be agreed, and a value of 0.60 was used as an acceptable reference for determining agreement. [16] In addition,

the binomial test was applied to ratify the values obtained using the CVI, aiming to reach a p-value $\geq 0.0.5$.

This was a methodological, quantitative research study, in which the cross-cultural adaptation and content validation of the Kidney Transplant Understand Tool were conducted,[14] after authorization by the authors of the tool, and approval by the Research Ethics Committee, CAEE: 50881621.7.0000.5208.

Results

The pre-final version of the instrument was validated by the target population and specialists, with no need for changes or exclusion of items. The steps of translation, back-translation, and synthesis occurred through consensus, with few divergences, which were related to the profile and experience of each participant. The results of the translation and adaptation steps will be presented as follows, according to the methodology of the study:

I.   Translation of the original instrument into Brazilian Portuguese: target language-TL1: performed by a nurse, provided a more technical language with expressions common to those used by health professionals; TL2: performed by a lay translator, with a degree in physics, not familiar with the instrument's theme; it was more literal and faithful to the original instrument, including more popular terminologies, approaching the vocabulary of the target population.

II. Comparison of the versions by an independent translator - Synthesis I: The synthesis of TLA1 and TLA2 resulted in the PI-TL version (preliminary initial version in the target language) in which the terms used in TL2 prevailed because it suggested more direct language, which the third translator considered closer to the experience of the target population.

III. Blind back-translation of the preliminary version: two independent translations of PI-TL: B-TL1 (back-translation of the initial preliminary) and B-TL2, which were very similar to the original version and coherent with each other.

IV. IV. Comparison of the back-translated versions by a committee of experts - Synthesis II: A committee composed of six experts was virtually convened to develop the P-FTL (pre-final target language) version of the instrument, evaluating the semantic, conceptual and content equivalences between the back-translations and the original instrument. All items were considered equivalent by consensus and by unanimity, adjusting some items to increase the clarity of the information contained in the instrument.

After the translation and adaptation of the instrument, step V began: the pilot test of the P-FTL - cognitive debriefing. This step includes two sub-steps according to the methodological precepts of this study: pilot test of the P-FTL version, Kidney Transplant Understanding Tool (K-TUT-Br), with the target population, and content evaluation with the experts. Thirty-six participants from the target population participated in the pilot test: 94.4% from the post-transplant outpatient clinic and 5.6% who were receiving renal replacement therapy (RRT) – Hemodialysis, and were enrolled on the TX list. The mean age of the sample was 47.72 years, predominantly male, brown skin, living with partner, family income up to two minimum wages, and between 10 and 12 years of education. The variables of family income, years of study, time in RRT, and time of TX did not show normal distribution by the Shapiro Wilk test, as described in Table 1.

All items in the Kidney Transplant Understanding Tool (K-TUT-Br) had more than 80% of the ratings identified as "clear" during the assessment of the items' clarity (Table 2); therefore no changes were needed in the text of this version.

The content evaluation with experts included seven nephrology specialists, with a mean age of 39.86 years. The sample was composed of female professionals, specialists in nephrology, among whom six had education in nursing and one in psychology. The mean time of experience in CKD was 11.86 years, two were focused on renal transplan-

Table 1. Sociodemographic and clinical characteristics of the 36 chronic renal failure patients

Variables	n(%)
Current RRT	
Hemodialysis	2(5.6)
Transplantation	34(94.4)
Sex	
Male	19(52.8)
Female	17(47.2)
Race/skin color	
Brown	17(47.2)
White	13(36.1)
Yellow	1(2.8)
Black	5(13.9)
Marital status	
With partner	24(66.7)
Without partner	12(33.3)
RRT before transplantation	
Hemodialysis	30(83.3)
Conservative treatment	5(13.9)
Hemodialysis and peritoneal dialysis	1(2.8)
Donor Type	
Living donor	20(58.8)
Deceased donor	14(41.2)

	Mean	Median	Standard deviation	Minimum value	Maximum value	p-value*
Age in years	45.72	45	10.14	22	65	0.504
Family income**	1.72	1	1.2	1	6	0
Years of education	10.36	10.5	4.12	4	23	0.014
Time in RRT***	48.53	35.5	43.37	2	180	0.001
Time after TX****	140.03	138	96.88	1	312	0.024

*p-value from Shapiro Wilk test; **Value in number of minimum wages; ***TRS: Renal Replacement Therapy; ***In months; **** Transplant

Table 2. Assessment of conceptual equivalence related to the clarity of the Kidney Transplant Understanding Tool (K-TUT-Br) by the target population (n=36)

Evaluated item	Clear n(%)	Not clear n(%)
Item 1	36(100)	-(-)
Item 2	36(100)	-(-)
Item 3	36(100)	-(-)
Item 4	34(94.4)	2(5.6)
Item 5	33(91.7)	3(8.3)
Item 6	35(97.2)	1(2.8)
Item 7	35(97.2)	1(2.8)
Item 8	33(91.7)	3(8.3)
Item 9	35(97.2)	1(2.8)
Item 10.1	33(91.7)	3(8.3)
Item 10.2	34(94.4)	2(5.6)
Item 10.3	33(91.7)	3(8.3)
Item 10.4	34(94.4)	2(5.6)
Item 11.1	36(100)	0(0)
Item 11.2	33(91.7)	3 (8.3)
Item 11.3	36(100)	-(-)
Item 11.4	34(94.4)	2(5.6)
Item 11.5	35(97.2)	1(2.8)
Item 12.1	35(97.2)	1(2.8)
Item 12.2	36(100)	-(-)
Item 12.3	34(94.4)	2(5.6)

Continue...

Continuation.

Evaluated item	Clear n(%)	Not clear n(%)
Item 12.4	33(91.7)	3(8.3)
Item 12.5	32(94.2)	4(0)
Item 13.1	35(97.2)	1(2.8)
Item 13.2	36(100)	-(-)
Item 13.3	36(100)	-(-)
Item 13.4	32(94.2)	4(0)
Item 13.5	34(94.4)	2(5.6)
Item 14.1	36(100)	-(-)
Item 14.2	35(97.2)	1(2.8)
Item 14.3	34(94.4)	2(5.6)
Item 14.4	36(100)	-(-)
Item 14.5	33(91.7)	3(8.3)
Item 14.6	35(97.2)	1(2.8)
Item 15.1	36(100)	-(-)
Item 15.2	34(94.4)	2(5.6)
Item 15.3	35(97.2)	1(2.8)
Item 15.4	35(97.2)	1(2.8)
Item 16.1	36(100)	-(-)
Item 16.2	36(100)	-(-)
Item 16.3	34(94.4)	2(5.6)
Item 16.4	34(94.4)	2(5.6)
Item 17.1	34(94.4)	2(5.6)
Item 17.2	34(94.4)	2(5.6)
Item 17.3	36(100)	-(-)
Item 17.4	36(100)	-(-)
Item 17.5	36(100)	-(-)
Item 18.1	34(94.4)	2(5.6)
Item 18.2	35(97.2)	1(2.8)
Item 18.3	34(94.4)	2(5.6)
Item 18.4	33(91.7)	3(8.3)
Item 19.1	35(97.2)	1(2.8)
Item 19.2	36(100)	-(-)
Item 19.3	35(97.2)	1(2.8)
Item 19.4	36(100)	-(-)
Item 19.5	33(91.7)	3(8.3)
Item 20.1	33(91.7)	3(8.3)
Item 20.2	35(97.2)	1(2.8)
Item 20.3	32(94.2)	32(94.2)
Item 20.4	36(100)	-(-)
Item 20.5	36(100)	-(-)
Item 21.1	35(97.2)	1(2.8)
Item 21.2	33(91.7)	3(8.3)
Item 21.3	34(94.4)	2(5.6)
Item 21.4	35(97.2)	1(2.8)
Item 22.1	34(94.4)	2(5.6)
Item 22.2	36(100)	-(-)
Item 22.3	36(100)	-(-)
Item 22.4	34(94.4)	2(5.6)

tation, and the others on dialysis; only one had experience in instrument validation. For the content validity assessment of the Brazilian version of the Kidney Transplant Understanding Tool, the results indicate a satisfactory I-CVI for all items, showing values greater than or equal to 0.85, both for clarity and relevance and an S-CVI of 0.99. The binomial

test was applied and presented satisfactory results and all items obtained p-value ≥ 0.05, as described in Table 3.

Table 3. Content validity evaluation of the Kidney Transplant Understanding Tool (K-TUT-Br) by the experts by means of the CVI calculation (n=07)

	Conceptual Equivalence (Clarity)		Content Equivalence (Relevance)	
	CVI	p-value	CVI	p-value
Item 1	1	1	1	1
Item 2	1	1	1	1
Item 3	0.85	0.857	0.85	0.857
Item 4	1	1	1	1
Item 5	1	1	1	1
Item 6	1	1	1	1
Item 7	1	1	1	1
Item 8	1	1	0.85	0.857
Item 9	1	1	1	1
Item 10.1	0.85	0.857	1	1
Item 11.5	1	1	1	1
Item 12.1	0.85	0.857	1	1
Item 12.2	1	1	1	1
Item 12.3	1	1	1	1
Item 12.4	1	1	1	1
Item 12.5	1	1	1	1
Item 10.2	1	1	1	1
Item 10.3	1	1	1	1
Item 10.4	1	1	1	1
Item 11.5	1	1	1	1
Item 12.1	0.85	0.857	1	1
Item 12.2	1	1	1	1
Item 12.3	1	1	1	1
Item 12.4	1	1	1	1
Item 12.5	1	1	1	1
Item 10.2	1	1	1	1
Item 10.3	1	1	1	1
Item 10.4	1	1	1	1
Item 11.1	1	1	1	1
Item 11.2	1	1	1	1
Item 11.3	1	1	1	1
Item 11.4	1	1	1	1
Item 13.1	1	1	1	1
Item 13.2	1	1	1	1
Item 13.3	0.85	0.857	1	1
Item 13.4	1	1	1	1
Item 13.5	1	1	1	1
Item 14.1	1	1	1	1
Item 14.2	1	1	1	1
Item 14.3	1	1	1	1
Item 14.4	1	1	1	1
Item 14.5	1	1	0.85	0.857
Item 14.6	1	1	1	1
Item 15.1	1	1	1	1
Item 15.2	1	1	1	1
Item 15.3	1	1	1	1
Item 15.4	1	1	1	1
Item 16.1	1	1	1	1
Item 16.2	1	1	1	1

	Conceptual Equivalence (Clarity)		Content Equivalence (Relevance)	
	CVI	p-value	CVI	p-value
Item 16.3	1	1	1	1
Item 16.4	1	1	1	1
Item 17.1	1	1	1	1
Item 17.2	1	1	1	1
Item 17.3	1	1	1	1
Item 17.4	1	1	1	1
Item 17.5	1	1	1	1
Item 18.1	1	1	1	1
Item 18.2	1	1	1	1
Item 18.3	1	1	1	1
Item 18.4	1	1	1	1
Item 19.1	1	1	1	1
Item 19.2	1	1	1	1
Item 19.3	1	1	1	1
Item 19.4	1	1	1	1
Item 20.1	1	1	1	1
Item 20.2	1	1	1	1
Item 20.3	1	1	1	1
Item 20.4	1	1	1	1
Item 20.5	1	1	1	1
Item 21.1	1	1	1	1
Item 21.2	1	1	1	1
Item 21.3	1	1	1	1
Item 21.4	1	1	1	1
Item 22.1	1	1	1	1
Item 22.2	1	1	1	1
Item 22.3	1	1	1	1
Item 22.4	1	1	1	1

According to the guidelines of Sousa and Rajjanasrirat, the Kappa Coefficient of Agreement was used, aiming to increase confidence in content validity, where 0.60 was the minimum acceptable; in this study a value of 0.90 for conceptual and content equivalence was achieved.

Discussion

The *Kidney Transplant Understanding Tool* (K-TUT) is an instrument to assess the understanding and knowledge of patients with CKD about renal transplantation. This study allowed the development of a process of translation, adaptation, and content validation of the K-TUT, resulting in the *Kidney Transplant Understanding Tool – Brazilian Portuguese* (K-TUT-Br).

The K-TUT can be used to measure the patient's knowledge on several topics associated with renal TX related to healthy lifestyle, adherence to

the therapeutic regimen, concepts related to TX, body adaptations and care after TX, use of immunosuppressants, traditional and alternative therapies, complications and infections, routine tests, and pregnancy. In addition, it allows the identification of health education needs aimed at this population.[14]

Although knowledge does not directly determine changes in behavior, self-efficacy, and patient adherence to treatment and self-care, because it is influenced by other determinants including the level of HL, its measurement may help identify patients at risk of inadequate self-care and detect and characterize misconceptions, guiding educational interventions to be provided by nurses.[16-18]

Considering this relationship between knowledge and HL, in Brazil 12 instruments are used to assess HL in RRT patients; only one of them, the *New Vital Sign* (NVS) is adapted to Portuguese for use in the TX population. However, it is focused only on understanding medical guidelines, and although it encompasses a construct that is also part of the HL, it does not incorporate knowledge of the disease.[19] A validated instrument to assess knowledge is essential for application in educational interventions, to identify themes to be addressed, as well as to measure the effects of actions.[20]

The process of cross-cultural adaptation is complex and requires planning and rigor in order to maintain the psychometric characteristics and the validity of the original instrument for the intended population.[21] Therefore, the guidelines proposed by Sousa and Rajjanasrirat, for contemplating a method that stands out for its clarity and reliability, were followed.[16-22]

The translations were equivalent to one another and to the original instrument, and no problems were identified during the synthesis steps, which is common in most studies.[21] Modifications are necessary during the first steps of cross-cultural adaptation studies; in this one, adjustments made were related to idiomatic and linguistic adaptations, changes in verb tenses, and in some cases, inclusion of terms to make the expressions more understandable by the target population.[23-25] In the next steps,

in which experts were present, the modifications made were ratified.

The pilot test with the target population showed the quality of the translation and cross-cultural adaptation, as all items were considered clear according to the criteria defined by the protocol used, with no need for changes in the text of the P-FTL version: Kidney Transplant Understanding Tool (K-TUT-Br). This was consistent with the study by Kang and Jeong, who translated the K-TUT into Korean and administered it to the target population and found that the degree of difficulty of response was easy to moderate.[5]

In this study, TX patients prevailed (94.4%), with a mean of 140 months in TX, which may have been determinant for the assessment of the clarity of the instrument, as most of the knowledge is acquired in the first months after TX and increases with time.[26] Therefore, more knowledge and similarity with the terms presented in the instrument may have made it clearer to the participants.

The content of the instrument was validated by experts, with no suggestions to remove any of the items, with only occasional changes in the written form; this fact was also found during the development and validation of K-TUT and its adaptation to the Korean language.[14,16]

The present study had the following limitations: in the translation steps, the selection of translators one and four did not include bilingual professionals working in the field of nephrology; other health professionals working with medical terminology participated; b) the pilot test was administered in only one specialized center, and the sample population was predominantly composed of TX patients, which may result in a research bias.

Conclusion

The *Kidney Transplant Understand Tool* was validated and adapted to the Brazilian version as the *Kidney Transplant Understanding Tool – Brazilian Portuguese* (K-TUT-Br). The 69 items of the original version were maintained in the Brazilian version, with only occasional changes in the written

form. The results demonstrate that the Brazilian version of the K-TUT obtained satisfactory psychometric properties for use within the reality of TX in Brazil. Further studies with K-TUT-Br must be conducted to prove its efficacy through feasibility and clinical trials, so that nursing can be prepared to implement strategic changes in technical and care structures using evidence-based practices by means of interventions in health education and assessment of the determinant factors in knowledge and health literacy. The K-TUT-Br can promote self-management and self-care by enhancing knowledge. It is expected to impact adherence to the therapeutic modality and outcomes after kidney transplantation.

Acknowledgments

Collaborations

Costa NFCG, Mendes SROL, Frazão CMFQ, Moraes KL, Sousa CN, Leal LP and Pessoa NRC contributed to the conception of the project, analysis and interpretation of data, writing of the article, relevant critical review of the intellectual content, and approval of the final version to be published.

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