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# Cultural adaptation and validation of the “Kidney Disease and Quality of Life - Short Form (KDQOL-SF™ 1.3)” in Brazil

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## Abstract

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The objective of the present study was to translate the Kidney Disease Quality of Life - Short Form (KDQOL-SF™ 1.3) questionnaire into Portuguese to adapt it culturally and validate it for the Brazilian population. The KDQOL-SF was translated into Portuguese and back-translated twice into English. Patient difficulties in understanding the questionnaire were evaluated by a panel of experts and solved. Measurement properties such as reliability and validity were determined by applying the questionnaire to 94 end-stage renal disease patients on chronic dialysis. The Nottingham Health Profile Questionnaire, the Karnofsky Performance Scale and the Kidney Disease Questionnaire were administered to test validity. Some activities included in the original instrument were considered to be incompatible with the activities usually performed by the Brazilian population and were replaced. The mean scores for the 19 components of the KDQOL-SF questionnaire in Portuguese ranged from 22 to 91. The components “Social support” and “Dialysis staff encouragement” had the highest scores (86.7 and 90.8, respectively). The test-retest reliability and the inter-observer reliability of the instrument were evaluated by the intraclass correlation coefficient. The coefficients for both reliability tests were statistically significant for all scales of the KDQOL-SF ( $P < 0.001$ ), ranging from 0.492 to 0.936 for test-retest reliability and from 0.337 to 0.994 for inter-observer reliability. The Cronbach’s  $\alpha$  coefficient was higher than 0.80 for most of components. The Portuguese version of the KDQOL-SF questionnaire proved to be valid and reliable for the evaluation of quality of life of Brazilian patients with end-stage renal disease on chronic dialysis.

### Key words

- Kidney dialysis
- Portuguese version of KDQOL-SF
- End-stage renal disease
- Health-related quality of life
- KDQOL-SF
- Test validation

## Introduction

Despite the enormous advances in dialysis therapy for increasing the life expectancy of patients with end-stage renal disease (ESRD), the negative impact of the disease

and its treatment affect the perception of patients regarding their health-related quality of life (HRQOL) (1), a factor that can interfere with treatment outcome.

Many efforts have been made to reduce this problem and to increase the quality of

life of those who depend on dialysis. Among these, particularly important is the role of assessment of HRQOL by the application of generic and specific measures that are used to examine which dimensions or areas of life of the patients are impaired and need to receive an appropriate intervention.

Generic questionnaires are used in general populations to assess different types of disease, permitting research about health status and comparison of the data obtained with those for the general population. Specific questionnaires assess a particular disease, population or specific problem. They are useful to determine the specific effects of a disease on daily patient life and to obtain separate scores for each dimension assessed (2,3).

The increasing use of these instruments in multinational studies has resulted in the translation of an original questionnaire into different languages, and publications about the translation process have led to equivalence between the original version and the translated versions (4,5). Moreover, guidelines have been provided to allow appropriate testing of the properties, reliability and validity of the instrument on target populations (6).

Our choice of the Kidney Disease and Quality of Life - Short Form (KDQOL-SF™) (7) was based on the need to obtain a specific instrument to evaluate patients on dialysis with kidney disease, since a specific instrument applicable to all types of dialysis treatments has not been available in Brazil. The KDQOL-SF is derived from the KDQOL (8), the long-form of the questionnaire, whose use is limited by its length (134 items). The KDQOL-SF was developed in the US by Ron Hays and was translated into Spanish, Italian, German, Japanese, French, Chinese, and Dutch. It is a self-administered instrument that includes the MOS 36 Item Short-Form Health Survey (SF-36) (9) as a generic measure and the questions targeted at particular health-related concerns for patients

on dialysis. The questionnaire has been used in the United States Renal Data System - Annual Data Report (10) and is one of the most complete instruments currently available to assess the HRQOL of patients because it includes general and specific aspects of health, allowing a more complete evaluation of HRQOL dimensions that are relevant for the patients (11). Furthermore, it has been tested on different populations with ESRD (12,13).

The aim of the present study was to translate the KDQOL-SF into Portuguese, to adapt it culturally to Brazil, and to determine the psychometric properties, reliability and validity of dimensions for the assessment of HRQOL of patients on dialysis therapy in Brazil.

## Subjects and Methods

The study protocol was approved by the Ethics Committees of Universidade Federal de São Paulo, Escola Paulista de Medicina, and of Faculdade de Medicina de São José do Rio Preto, São José do Rio Preto, SP, Brazil. The sample was obtained at the Faculdade de Medicina de São José do Rio Preto.

### Structure of the KDQOL-SF

The KDQOL-SF is a self-reported measure that assesses the functioning and well-being of people with kidney disease and on dialysis (8). The questionnaire consists of 80 items divided into 19 dimensions: SF-36 (8 dimensions/36 items): physical functioning (10 items), role limitations caused by physical problems (4 items), role limitations caused by emotional problems (3 items), pain (2 items), general health perceptions (5 items), social functioning (2 items), emotional well-being (5 items), energy/fatigue (4 items), and 1 item about health status compared to one year ago; kidney-disease-targeted items (11 dimensions/43 items): symptom/prob-

lem list (12 items), effects of kidney disease (8 items), burden of kidney disease (4 items), cognitive function (3 items), quality of social interaction (3 items), sexual function (2 items), sleep (4 items), social support (2 items), work status (2 items), overall health rating (1 item scored separately), patient satisfaction (1 item), and dialysis staff encouragement (2 items). The scores on each dimension range from 0 to 100, with higher scores reflecting better HRQOL. The change in health (question 2) of SF-36 and the 0-10 overall health rating items (question 22) are scored as single items (7).

### Cultural adaptation

Permission to translate the KDQOL-SF into Portuguese was obtained from the principal author, Ron D. Hays, who authorized its use in Brazil. The first translation step was carried out according to specifications established by the KDQOL Working Group (14) and consisted of preparing a translated version of the questionnaire which was linguistically and conceptually equivalent to the original English version. Two translations into the Portuguese language were done (one by the investigators and another by a certified translator). Both versions were revised by a specialized translator who evaluated the level of difficulty for translation using a scale from 0 (“not at all difficult”) to 100 (“most difficult”) and the equivalence of each item and response scale according to a scale from 0 (“not at all equivalent”) to 100 (“exactly equivalent”). The translators compared their translations, reconciled discrepancies and established a Portuguese version to be applied to patients with ESRD. Thirty patients undergoing dialysis in the city of São José do Rio Preto were randomly selected for this phase of the study.

The feasibility of the instrument and the difficulties found by the patients were evaluated by a panel including experts in kidney disease and two patients of different educa-

tional levels. Changes were made based on the difficulties of the patients to understand, and a dictionary of synonyms was used to establish a simpler vocabulary for the overall population.

Subsequently, two back-translations were done by US native translators and compared to the original English version. The discrepancies between the back-translations were resolved. A memo summarizing these steps was submitted to the KDQOL Working Group that authorized the investigators to proceed with the validation of the questionnaire.

### Reliability

Reliability or reproducibility is defined as the capacity of an instrument to yield similar results after repeated application to stable patients (15). Inter-observer reliability is the degree of agreement of results obtained by different observers, and intra-observer reliability is the degree of agreement of results obtained by the same observers at different times (16).

The reliability of the Portuguese version of the KDQOL-SF was tested in two interviews. Ninety-four patients with ESRD were randomly selected from dialysis unit in the city of São José do Rio Preto, in the interior of São Paulo State, and evaluated by two interviewers at different times. Two assessments were made independently by observers No. 1 and No. 2 on the same day (inter-observer reliability). Seven days after the first assessment, another interview (N = 93) was done by interviewer No. 1 (intra-observer reliability). One patient included in the study died during the time between the first and second interview.

### Validity

Validity analyzes if the instrument measures what it purports to measure (15). To evaluate the validity a sample of 74 patients

was selected at random. Sociodemographic, clinical and laboratory parameters were collected during the initial patient interview and after revision of the data available in the medical records. The clinical parameters investigated were type of dialysis treatment and co-morbidities (cardiovascular diseases, chronic obstructive lung disease, peripheral vascular disease, diabetes mellitus, cerebrovascular disease, liver disease, hypertension, visual deficit, ambulation deficit, and cancer). The laboratory parameters analyzed were hematocrit and Kt/V.

To evaluate the construct validity, the KDQOL-SF was compared with the following questionnaires already translated into Portuguese, the Nottingham Health Profile (NHP) and the Karnofsky Performance Scale (KPS) and validated in Brazil, the Kidney Disease Questionnaire (KDQ).

The NHP (17) is an instrument for global assessment that contains 38 items divided into 6 dimensions: level of energy, pain, emotional reactions, sleep, social isolation, and physical capacity. The scores range from 0 to 100 (0 = better health status, 100 = worse health status). The NHP has been used in studies on renal patients (12).

The KPS (18) is a clinician-assessed scale consisting of 11 categories that range from normal functioning (100) to death (0). Scores ranging from 80 to 100 indicate capacity to exert normal activities and to work, scores from 50 to 70 indicate that the patients are able to take care of themselves but not to work, and scores <50 indicate that the patients need continued assistance and medical care. The application of the KPS to renal patients has been reported in some studies (19).

The KDQ (20) is a specific questionnaire for chronic kidney disease and contains 26 questions divided into 5 dimensions: physical symptoms, fatigue, depression, relationships with others, and frustration. The items are scored on a 7-point Likert scale (1 = a serious problem, 7 = no problem), with high

scores indicating a better health status. The KDQ was translated and validated in Brazil by Sesso and Yoshihiro (21,22).

### Statistical analysis

Descriptive statistical analysis was used for the sociodemographic, clinical and laboratory data of patients assessed in the various stages of this study.

The intra-class correlation coefficient and the Cronbach's  $\alpha$  coefficient (23) were used to assess intra-observer (test-retest) and inter-observer agreement. The values for the interpretation of the intraclass correlation coefficient were: <0.4, weak agreement; 0.4 to 0.75, good agreement;  $\geq 0.75$ , excellent agreement. The  $\alpha$  value used as a criterion of adequate internal consistency reliability was 0.70 or higher (24).

The validity of the KDQOL-SF was assessed using Pearson's correlation coefficient between the sociodemographic, clinical and laboratory results obtained with it and those obtained with the questionnaires NHP, KPS and KDQ.

The Statistical Package for the Social Sciences (SPSS), version 10.0 for Windows was used for the analyses. The tests were two-tailed and  $P < 0.05$  was considered to indicate statistical significance.

### Results

We did not observe translation difficulties and found equivalence between the original version and the Portuguese version of the KDQOL. However, some activities in the original version had to be replaced: "vacuum" was replaced with "sweep the floor", and "play golf" was replaced with "walking for over an hour" (the latter modification was also made in the Spanish version) since these are not regular activities for the Brazilian population. For a few items, it was suggested to include an explanation in parentheses to facilitate the understanding

of patients of lower educational level. We conclude that the guidelines established by the authors' group facilitated this stage and that the participation of patients in the panel group was fundamental for a better cultural adaptation of the original KDQOL-SF to our setting.

Of the 94 patients who participated in the validation process, 55% were males, mean patient age was  $49 \pm 13$  years (23-82 years), most were Caucasians (74%), had incomplete elementary school (1st to 8th grade; 56%), and lived in towns surrounding São José do Rio Preto (55%). Forty-six percent of the patients were retired.

The most common primary causes of renal failure were glomerulonephritis (31%), hypertension (25%), and diabetes (8%). The co-morbid conditions most frequently found were hypertension (66%), difficulty to walk (14%), and liver disease (7%). Fifty-seven percent of the patients were receiving hemodialysis and 43% were on peritoneal dialysis. The mean number of hours of treatment for patients on hemodialysis was 12 h/week, and 50% had an arteriovenous fistula as vascular access for dialysis. The median time of ESRD among the patients was 2 years and 14% had previously received a kidney transplant that had functioned during a median time of  $63 \pm 43$  months (9-132 months).

The mean hematocrit was  $34 \pm 5\%$  (16-47%) and mean Kt/V (for patients on hemodialysis) in the last two months was  $1.33 \pm 0.36$ .

When the Portuguese version of KDQOL-SF was applied the mean values obtained for each dimension of the questionnaire ranged from 22 to 91; the dimensions "Social support" and "Dialysis staff encouragement" had the highest values, and the dimensions "Work status", "Sexual function" and "Burden of kidney disease" had the lowest values (Table 1).

### Reliability

The reliability of intra- and inter-observer

evaluations was statistically significant for all 19 scales of the KDQOL-SF. High values for the Cronbach's  $\alpha$  coefficient were obtained for most of the dimensions evaluated. Intra-observer reliability assessed by the Cronbach's  $\alpha$  coefficient ranged from 0.65 (Patient satisfaction) to 0.96 (Work status), and inter-observer reliability ranged from 0.71 (Cognitive function) to 0.99 (Sexual function), with the exception of the dimension "Patient satisfaction" ( $r = 0.50$ ), which had a lower value, although statistically significant, when evaluated by the intra-class correlation coefficient. These results are presented in Table 2.

### Validity

Table 3 shows the correlation coefficients between the dimensions of the KDQOL-SF and the sociodemographic, clinical and laboratory parameters. Educational level and number of co-morbidities showed the most

Table 1. Scores obtained for the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form questionnaire applied to end-stage renal disease patients.

Dimension	Mean $\pm$ SD	Minimum-Maximum
General health	59 $\pm$ 27	0-100
Physical functioning	61 $\pm$ 27	0-100
Physical role	59 $\pm$ 38	0-100
Emotional role	71.28 $\pm$ 38.37	0-100
Pain	67.45 $\pm$ 26.45	0-100
Social function	76.65 $\pm$ 26.89	0-100
Emotional well-being	66.18 $\pm$ 24.88	4-100
Energy/fatigue	60.64 $\pm$ 25.57	0-100
Burden of kidney disease	46.68 $\pm$ 31.24	0-100
Cognitive function	78.44 $\pm$ 24.23	0-100
Quality of social interaction	80.92 $\pm$ 20.45	20-100
Symptom/problem list	81.25 $\pm$ 15.66	29-100
Effects of kidney disease	73.37 $\pm$ 16.21	25-100
Sexual function	35.64 $\pm$ 43.53	0-100
Sleep	75.56 $\pm$ 21.01	5-100
Social support	86.70 $\pm$ 22.87	0-100
Work status	22.34 $\pm$ 35.63	0-100
Patient satisfaction	72.69 $\pm$ 18.59	33-100
Dialysis staff encouragement	90.82 $\pm$ 17.98	0-100

Values for all dimensions vary from 0 to 100 (best quality of life). The questionnaire was completed by 53 hemodialysis patients and by 41 peritoneal dialysis patients. The data were obtained in the first application of the questionnaire.

Table 2. Intra- and inter-observer reliability of each dimension of the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form evaluated by the intraclass correlation coefficient (ICC) and the Cronbach's  $\alpha$  coefficient ( $C\alpha$ ).

Dimensions of the KDQOL-SF	ICC (intra-observer)	$C\alpha$	ICC (inter-observer)	$C\alpha$
General health	0.7174*	0.8354	0.8633*	0.9265
Physical functioning	0.8952*	0.9433	0.9614*	0.9795
Physical role	0.6407*	0.7786	0.8139*	0.8941
Emotional role	0.6164*	0.7618	0.6853*	0.8125
Pain	0.6658*	0.7989	0.7995*	0.8881
Social function	0.5982*	0.7459	0.5805*	0.7329
Emotional well-being	0.7647*	0.8666	0.7121*	0.8297
Energy/fatigue	0.7141*	0.8313	0.7938*	0.8848
Burden of kidney disease	0.8651*	0.9277	0.9191*	0.9561
Cognitive function	0.6370*	0.7729	0.5532*	0.7115
Quality of social interaction	0.6944*	0.8170	0.7678*	0.8686
Symptom/problem list	0.8495*	0.9158	0.8999*	0.9436
Effects of kidney disease	0.7672*	0.8683	0.7058*	0.8261
Sexual function	0.8148*	0.8979	0.9940*	0.9970
Sleep	0.7355*	0.8473	0.8586*	0.9238
Social support	0.6246*	0.7689	0.8792*	0.9140
Work status	0.9363*	0.9671	0.9664*	0.9829
Patient satisfaction	0.4916*	0.6584	0.3365*	0.5035
Dialysis staff encouragement	0.7442*	0.8484	0.9230*	0.9591

The intra-observer test was carried out with 93 patients and inter-observer test with 39 patients. The test-retest interval was 7 days. ICC of 0.4 = weak agreement; 0.4 to 0.75 = good agreement;  $\geq 0.75$  = excellent agreement.  $C\alpha$  ranges from 0 to 1 with values above 0.70 considered as satisfactory (or good/excellent) reliability (Ref. 24).

\*P < 0.001 comparing the two evaluations of each dimension (ICC or  $C\alpha$ ).

Table 3. Pearson's correlation coefficients between the mean value of each dimension of the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form and the sociodemographic, clinical and laboratory parameters of the patients (N = 94).

Dimensions of the KDQOL-SF	Age	Educational level	Time of treatment	Number of co-morbidities	Hematocrit
General health	-0.173	0.149	0.021	-0.144	-0.031
Physical functioning	-0.505*	0.286*	-0.036	-0.376*	-0.204*
Physical role	-0.239*	0.167	0.063	-0.305*	0.146
Emotional role	-0.136	0.196	0.197	-0.253*	-0.016
Pain	-0.140	0.171	0.086	-0.329*	-0.103
Social function	-0.183	0.267*	0.064	-0.365*	-0.076
Emotional well-being	-0.161	0.294*	0.101	-0.315*	0.012
Energy/fatigue	-0.270*	0.293*	-0.067	0.218*	-0.170
Burden of kidney disease	-0.180	0.288*	0.182	-0.146	-0.030
Cognitive function	-0.181	0.265*	-0.194	-0.152	0.088
Quality of social interaction	-0.070	0.186	0.164	-0.143	-0.003
Symptom/problem list	-0.302*	0.248*	0.095	-0.289*	-0.039
Effects of kidney disease	-0.032	0.323*	0.140	-0.176	0.042
Sexual function	-0.303*	0.046	-0.070	-0.191	-0.256*
Sleep	-0.110	0.030	0.107	-0.009	0.204*
Social support	0.103	0.034	-0.019	-0.014	0.004
Work status	-0.052	0.127	-0.008	-0.131	-0.056
Patient satisfaction	0.037	0.139	0.030	0.069	0.100
Dialysis staff encouragement	-0.017	0.053	0.111	0.145	0.221*

\*P < 0.05 for the correlation.

significant correlations with most of the KDQOL-SF dimensions. Time of treatment did not correlate significantly with the dimensions.

Table 4 presents the correlation coefficients between the dimensions of the KDQOL-SF and the dimensions of the NHP. The best correlations were observed between Physical functioning (KDQOL-SF) and Physical capacity (NHP), and between the two dimensions of KDQOL-SF, Emotional well-being and Quality of social interaction with the dimension of NHP, Emotional reactions. Some dimensions of the KDQOL-SF presented statistically significant correlations with only one of the NHP dimensions: Sexual function (KDQOL-SF) and Physical capacity (NHP), Social support and Social isolation, and Dialysis staff encouragement and Pain, respectively.

The correlation coefficients between the dimensions of the KDQOL-SF and most dimensions of the KPS were statistically significant, except for Cognitive function, Sleep, Social support, Patient satisfaction, and Dialysis staff encouragement (Table 5).

In the comparison with the KDQ dimensions, correlation coefficients were statistically significant for the following KDQOL-SF dimensions: Physical functioning, Physical role, Emotional role, Pain, Social function, Emotional well-being, Energy/fatigue, Burden of kidney disease, Cognitive function, Quality of social interaction, Symptom/problems, Effects of kidney disease, Sleep. The best correlation coefficients were obtained between Emotional well-being (KDQOL-SF) and Depression (KDQ) and between Energy/fatigue and Fatigue (KDQ), respectively. Sexual function, Patient satisfaction and Dialysis staff encouragement did not correlate with the components of the KDQ (Table 6).

## Discussion

The methods used to translate and validate

Table 4. Pearson's correlation coefficient between the mean values of the dimensions of the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form and the mean values of the dimensions of the Nottingham Health Profile (N = 74).

Dimensions of the KDQOL-SF	Level of energy	Pain	Emotional reactions	Sleep	Social isolation	Physical capacity
General health	-0.259*	-0.429*	-0.317*	-0.183	-0.249*	-0.205
Physical functioning	-0.611*	-0.484*	-0.465*	-0.347*	-0.370*	-0.715*
Physical role	-0.440*	-0.317*	-0.442*	-0.341*	-0.320*	-0.412*
Emotional role	-0.424*	-0.274*	-0.589*	-0.441*	-0.356*	-0.329*
Pain	-0.304*	-0.566*	-0.376*	-0.255*	-0.376*	-0.334*
Social function	-0.528*	-0.262*	-0.614*	-0.309*	-0.538*	-0.558*
Emotional well-being	-0.506*	-0.381*	-0.778*	-0.444*	-0.601*	-0.304*
Energy/fatigue	-0.633*	-0.480*	-0.594*	-0.422*	-0.460*	-0.471*
Burden of kidney disease	-0.426*	-0.409*	-0.554*	-0.446*	-0.488*	-0.371*
Cognitive function	-0.423*	-0.346*	-0.633*	-0.339*	-0.575*	-0.389*
Quality of social interaction	-0.401*	-0.466*	-0.729*	-0.387*	-0.639*	-0.385*
Symptom/problem list	-0.562*	-0.581*	-0.475*	-0.410*	-0.437*	-0.457*
Effects of kidney disease	-0.260*	-0.271*	-0.255*	-0.231*	-0.232*	-0.224
Sexual function	-0.214	0.070	-0.094	-0.001	-0.221	-0.240*
Sleep	-0.376*	-0.255*	-0.546*	-0.690*	-0.420*	-0.279*
Social support	-0.082	0.083	-0.222	0.076	-0.373*	0.027
Work status	-0.344*	-0.154	-0.301*	-0.425*	-0.166	-0.203
Patient satisfaction	-0.151	-0.030	-0.080	-0.064	0.064	0.017
Dialysis staff encouragement	-0.178	-0.262*	-0.186	-0.084	-0.130	-0.058

The questionnaire Nottingham Health Profile is described in Ref. 17.

\*P < 0.05 for the correlation.

the quality of life questionnaires used in Nephrology are often inadequate. Additional problems are the wrong choice of questionnaire or problems with its utilization. The KDQOL-SF has many advantages compared to other instruments because it has been tested in several populations with kidney disease, it has both general and specific modules to assess chronic kidney disease, it can be used both for patients on hemodialysis and peritoneal dialysis, it has questions about the sexual area and professional rehabilitation, and can be self-applied or applied by an interviewer (7).

The SF-36 had already been translated into Portuguese by Ciconelli et al. (25), and was translated again in the present study, as part of the translation of the KDQOL-SF questionnaire as a whole. Some items and activities were modified, but the patients did not have difficulties in understanding the activity "bowling", in contrast to patients with rheumatoid arthritis. Nevertheless, we

Table 5. Pearson's correlation coefficient between the mean values of the dimensions of the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form and the mean values of the dimensions of the Karnofsky Performance Scale (KPS, N = 74).

Dimensions of the KDQOL-SF	KPS
General health	0.287*
Physical functioning	0.465*
Physical role	0.348*
Emotional role	0.274*
Pain	0.359*
Social function	0.308*
Emotional well-being	0.261*
Energy/fatigue	0.357*
Burden of kidney disease	0.439*
Cognitive function	0.151
Quality of social interaction	0.311*
Symptom/problem list	0.307*
Effects of kidney disease	0.248*
Sexual function	0.289*
Sleep	0.210
Social support	0.163
Work status	0.254*
Patient satisfaction	-0.027
Dialysis staff encouragement	0.213

The Karnofsky Performance Scale is described in Ref. 18.

\*P < 0.05 for the correlation.

do not rule out the possibility of changing this activity if future studies with renal patients from other regions of the country show that they do not understand this item.

Even though the KDQOL-SF has been translated into various languages, its psychometric properties have been published only in Japan (26) and in Holland (27).

In our study we observed mean scores for the dimensions of the Portuguese version of the KDQOL-SF ranging from 22.3 (Work status) to 90.8 (Encouragement by dialysis staff), in agreement with the results of the Dutch study (27) (range: 21.7 to 82.9, respectively). A higher mean value for the latter dimension (82.3) was encountered also in the Japanese study among patients who received assistance to fill out the questionnaire. However, a survey by Bakewell et al. (28) using the KDQOL revealed that patients undergoing dialysis tend to obtain lower

scores on this dimension with a longer treatment time.

The evaluation of intra-observer and inter-observer reliability of the Portuguese version of the questionnaire revealed excellent correlation with all dimensions. The same results were obtained in the evaluation of the dimensions by the Cronbach's  $\alpha$ , which showed correlation coefficients higher than 0.80.

In the evaluation of internal consistency reliability, the dimension "Quality of social interaction" obtained lower values in Japan and Holland ( $r = 0.35$  and  $r = 0.39$ , respectively) (26,27). For this reason, these investigators suggest caution when this dimension is evaluated since the reliability of the original US version was higher (0.61). This problem did not occur in the present study ( $r = 0.81$  for intra-observer reliability and  $r = 0.86$  for inter-observer reliability).

The clinical validity of the Portuguese version of the KDQOL-SF was demonstrated by the significant correlations with the comorbidity parameter. The sociodemographic parameter showed statistically significant correlations with generic and disease-targeted dimensions. The time of treatment parameter, however, did not correlate with the dimensions of the questionnaire. It is possible to assume that for these clinically stable patients the time of treatment did not interfere with their regular activities at the time of evaluation. The co-morbidity parameter showed the highest negative correlation with the dimensions, suggesting that this parameter indeed compromises the HRQOL.

In general, the components of the Portuguese version of the KDQOL-SF correlated significantly with the components of the NHP (17). The best correlations occurred between Emotional well-being and Emotional reactions ( $r = -0.778$ ); Physical functioning and Physical capacity ( $r = -0.715$ ); Quality of social interaction and Emotional reactions ( $r = -0.729$ ), and between Sleep and Sleep ( $r = -0.690$ ). These data confirm that the

Table 6. Pearson's correlation coefficient between the dimensions of the Brazilian Portuguese version of the Kidney Disease and Quality of Life - Short Form and the dimensions of the Kidney Disease Questionnaire (KDQ, N = 74).

Dimensions of the KDQOL-SF	Physical symptom	Fatigue	Depression	Relationship with others	Frustration
General health	0.218	0.416*	0.439*	0.285*	0.311*
Physical functioning	0.488*	0.577*	0.383*	0.501*	0.314*
Physical role	0.443*	0.504*	0.461*	0.481*	0.319*
Emotional role	0.379*	0.406*	0.447*	0.559*	0.375*
Pain	0.483*	0.467*	0.358*	0.394*	0.312*
Social function	0.330*	0.460*	0.496*	0.593*	0.506*
Emotional well-being	0.400*	0.453*	0.708*	0.672*	0.611*
Energy/fatigue	0.355*	0.679*	0.643*	0.506*	0.457*
Burden of kidney disease	0.361*	0.503*	0.486*	0.607*	0.476*
Cognitive function	0.296*	0.431*	0.558*	0.538*	0.459*
Quality of social interaction	0.284*	0.500*	0.662*	0.623*	0.570*
Symptom/problem list	0.549*	0.624*	0.435*	0.467*	0.365*
Effects of kidney disease	0.430*	0.422*	0.233*	0.378*	0.275*
Sexual function	0.098	0.079	0.098	0.184	-0.059
Sleep	0.364*	0.406*	0.406*	0.465*	0.387*
Social support	0.045	0.282*	0.365*	0.381*	0.230*
Work status	0.132	0.257*	0.246*	0.276*	0.244*
Patient satisfaction	0.028	0.130	-0.044	0.106	0.080
Dialysis staff encouragement	0.075	0.222	0.084	0.075	0.142

The Brazilian Portuguese version of the Kidney Disease Questionnaire is described in Refs. 21 and 22.

\*P < 0.05 for the correlation.



items were correspondents and are measuring what they propose to measure. The absence of significant correlations between NHP dimensions and the dimension “Patient satisfaction” can be attributed to the fact that there are no items in the NHP that measure patient satisfaction with treatment.

As expected, the best correlation between the KDQOL-SF and the KPS (18) was obtained with the dimension Physical functioning ( $r = 0.465$ ) because both scales evaluate physical capacity.

In the comparison between the KDQOL-SF and the KDQ, most dimensions presented statistically significant correlations, with the best correlation being observed between the Emotional well-being and Depression ( $r = 0.708$ ), respectively.

Overall, the psychometric properties of the Portuguese version of the KDQOL-SF were very good and similar to those obtained in the US population (7), because the mean values in both populations positioned be-

tween 60 and 70 and the internal consistency between the questionnaires (original version and Portuguese version) for most of dimensions was higher than 0.80.

This study is the third one reporting the complete process of translation and validation of the KDQOL-SF (26,27). Since our results demonstrate high reliability and validity of this questionnaire for Brazilian patients with ESRD, we conclude that the Portuguese version of the KDQOL-SF can be used by health care professionals interested in assessing patients' health-related quality of life for clinical and investigative purposes. We believe that it will be important to assess the longitudinal validity of the KDQOL-SF dimensions in future studies by determining if this questionnaire is able to reflect clinical changes over time. It will also be important to determine whether the self-applied procedure or application of the questionnaire by an interviewer is best.

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