Psychological predictors for health-related quality of life in patients on peritoneal dialysis

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ABSTRACT

Introduction: It is currently recognized the impact of different clinical and sociodemographics variables on the health-related quality of life (HRQL) of patients undergoing peritoneal dialysis (DP), albeit the influence of psychological variable has not been thoroughly studied. The objective of this study is to identify the psychological predictors of HRQL in patients under DP. **Method:** 53 patients on DP participated in the study (49.54±17.03 years, 54.7% women) in whom HRQL was evaluated by the Kidney Disease Quality of Life Short Form and it was obtained information related with psychological variables (depressive and anxious symptoms , alexithymia, health-related locus of control and coping strategies) besides socio-demographic and clinical variables. **Results:** Patients on DP presented a worse HRQL than general population, particularly in the physical dimension. The comorbility, the number of visits to urgency department, previous hospital admissions, serum albumin and previous treatment with hemodialysis showed a negative impact on several dimensions of HRQL, but depressive symptoms, alexithymia and particularly anxious symptoms were the main determinants of the variability of HRQL in DP patients. We did not obtain a significant relationship between HRQL and the locus of control or the coping strategies. **Conclusions:** Among patients undergoing DP, anxiety, depression and alexithymia are important determinants of HRQL and they should be considered both in the evaluation and the treatment of this population of patients.

Key words: Anxiety. Depression. Health-related quality of life. Peritoneal dialysis. Alexithymia. Locus of control. Coping.

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Predictores psicológicos de la calidad de vida relacionada con la salud en pacientes en tratamiento de diálisis peritoneal

RESUMEN

Introducción: *Actualmente se reconoce el efecto de distintas variables clínicas y sociodemográficas en la calidad de vida relacionada con la salud (CVRS) de los pacientes en diálisis peritoneal (DP), pero la influencia de los factores psicológicos no ha sido suficientemente explorada. El objetivo de este estudio es identificar los predictores psicológicos de la CVRS en pacientes en DP.* ***Método:*** *Participaron 53 pacientes en tratamiento en DP (49,54 ± 17,03 años, 54,7% mujeres) en los que se evaluó su CVRS mediante el Kidney Disease Quality of Life Short Form y se recogió información de variables psicológicas (síntomas depresivos y ansiosos, alexitimia, locus de control relacionado con la salud y estrategias de afrontamiento), así como de variables sociodemográficas y clínicas.* ***Resultados:*** *Los pacientes en DP presentaron peor CVRS que la población general, particularmente en las dimensiones físicas. La comorbilidad, el número de visitas a urgencias, las hospitalizaciones previas, la albúmina, y el tratamiento previo en HD mostraron un efecto negativo en algunas dimensiones de la CVRS, pero los síntomas depresivos, la alexitimia y particularmente los síntomas ansiosos fueron los principales determinantes de la variabilidad en la CVRS de los pacientes en DP. No se encontraron relaciones significativas entre la CVRS y el locus de control o las estrategias de afrontamiento.* ***Conclusiones:*** *En los pacientes en DP, la ansiedad, la depresión y la alexitimia son importantes determinantes de la CVRS, por lo que deberían ser consideradas tanto en la evaluación como en el tratamiento de esta población de enfermos.*

Palabras clave: *Ansiedad. Depresión. Calidad de vida relacionada con la salud. Diálisis peritoneal. Alexitimia. Locus de control. Afrontamiento.*

INTRODUCTION

In recent years, peritoneal dialysis (PD) has become one of the therapies of choice for end-stage renal disease (ESRD). In the treatment of this population of patients, the health-related quality of life (HRQL) is considered to

be an important outcome measure of the results obtained, and the highest level of HRQL possible, along with patient survival, is considered to be one of the primary treatment objectives.

HRQL is a complex process in which socio-demographic, clinical, and psychological factors are involved.[1] Therefore, one of the main goals of research in this field is to determine the specific contribution of each type of variable on HRQL in ESRD patients on PD. Until now, a large number of publications have dealt with the effect of distinct socio-demographic and clinical factors, demonstrating that variables such as sex and age, albumin concentrations, residual kidney function, and comorbidities can all have significant effects.[2-4]

However, only a small number of studies have focused on establishing the relationship between HRQL and psychological variables such as symptoms of depression and anxiety, coping strategies, and the health locus of control (HLOC). HLOC is a construct that refers to the expectations held by the individual regarding the relationship between health behaviours and their consequences, according to which two dimensions can be established: internal (people believe that they can influence their level of health) and external (they believe that their health is determined by external agents, such as health professionals, luck, and destiny).

The results from past studies that researched these psychological variables have demonstrated that symptoms of depression and anxiety are important variables in the majority of dimensions regarding HRQL,[5-7] while coping strategies used by the patient, as well as HLOC, could act as moderators of the psychological and physical components of HRQL, respectively.[6,8]

Alexithymia (a personality trait characterised by difficulty in identifying and describing emotions, as well as in being able to distinguish between feelings and bodily sensations that accompany emotional activity[9]) has only barely been studied in patients with kidney disease, and only one study has investigated the influence of this condition on the HRQL of patients on PD.[10] This is in spite of the fact that this personality trait has been linked to poorer clinical results and reduced HRQL in other chronic diseases.[11-13]

Until now, no study has considered all of these psychological variables together, and so it is impossible to determine the different contributions of each factor in the various dimensions that make up the HRQL of patients on PD.

The objective of this study is to indentify the associations between psychological variables (symptoms of depression and anxiety, HLOC, coping strategies, and alexithymia) and HRQL in ESRD patients on PD treatment, controlling the effects of clinical variables, age, and sex.

MATERIAL AND METHODS

Patients

In this cross-sectional study, we selected consecutive outpatient cases with ESRD receiving continuous ambulatory PD (CAPD) or automatic peritoneal dialysis (APD) in two Spanish hospitals: *Complejo Hospitalario Xeral-Calde de Lugo* (Xeral-Calde de Lugo Hospital) and the *Complejo Hospitalario Universitario de Santiago de Compostela* (Santiago de Compostela University Hospital). To be included in the study, the patients had to be over 18 years, have received PD treatment for a minimum length of 3 months, and have no cognitive problems that might have impeded them from filling out the questionnaires correctly.

Measurements

We surveyed each patient using a questionnaire which covered socio-demographic and clinical data. Information was collected in this questionnaire on socio-demographic characteristics: age, sex, place of residence, level of study, living situation, occupation, and social class; and medical characteristics: type of PD (manual or automatic), time spent on PD, existence and duration of previous treatment on haemodialysis, number of failed transplants, frequency of hospitalisations and emergency room visits during the last year, and episodes of peritonitis last year. We also included the following laboratory values: haematocrit, haemoglobin, albumin, Kt/V, C-reactive protein (CRP-us), and residual kidney function. In each patient, we also evaluated the level of comorbidity using a modified Charlson index.[14]

In order to evaluate HRQL, we used the Kidney Disease Quality of Life Short Form (KDQOL-SF[15]), which is made up of a central generic section with the 36 items from the Short Form Health Survey (SF-36)[16] distributed in eight scales: Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Function, Role-Emotional, and Mental Health, which can also provide two summarised point scores: the Physical Component Summary and the Mental Component Summary. The questionnaire is completed with another 43 specific items for kidney disease distributed among 11 scales: Symptoms, Effects of kidney disease, Burden of kidney disease, Work status, Cognitive function, Quality of social interaction, Sexual function, Sleep, Social support, Dialysis staff encouragement, and Patient satisfaction. Each scale has a range of 0-100 (higher values indicate better HRQL).

For the estimation of symptoms of anxiety and depression, the Hospital Anxiety and Depression Scale (HADS[17]) was used. This scale is made up of 14 items that create the anxiety and depression scales. The total point score of each

scale ranges from 0 to 21, and is obtained from the sum of the values corresponding to the answers selected by the patient for each item. A score greater than 11 in either scale indicates a clinical problem for depression or anxiety.

In order to measure alexithymia, we used the Toronto Alexithymia Scale (TAS-20[18]), made up of 20 items that are scored in accordance to a 5-point Likert scale. The total score, obtained from the sum of the values that correspond to each answer, is placed on a level between 20 and 100. A score equal to or greater than 61 was considered as the cut-off point for a patient to be considered as suffering from alexithymia.

HLOC was evaluated using the Health Locus of Control scale.[19] This scale is made up of 11 items with a score range of 11–66 (higher scores indicate the existence of an HLOC characterized by external health components).

Coping strategies were evaluated using the COPE scale.[20] This scale is made up of 60 items, each of which is scored between 1 and 4 (higher score indicates greater frequency of use). The COPE provides information on three types of coping: Problem-Focused Coping, Emotion-Focused Coping, and Escape-Avoidance.[21,22]

Each of these tools had been previously shown to possess adequate psychometric properties.[15,19,20,23,24] Each tool was used in its adapted version to the Spanish population.[25-32]

Procedure

Data collection took place during the routine check-up days for each patient. All patients that complied with the inclusion criteria were given the opportunity to participate in the study. Those that accepted signed an informed consent, and held an interview with a psychologist in order to compile all the socio-demographic data. The questionnaires were then handed out in a random order to be filled out in a self-administered format. Only those patients that had difficulties in reading and writing received interviews in order to fill out the questionnaires. The clinical data were collected by the nephrologist caring for the patient.

Statistical design

The data were expressed as frequencies and percentages for qualitative variables, and mean and standard deviation for quantitative variables. In order to control the effects of age and sex on the estimates for generic dimensions of HRQL, we standardized the scores using population reference values from the Spanish population and following the instructions given by the SF-36 Spanish validation group.[33]

The bivariate correlations between clinical and psychological variables and the KDQOL-SF scales were evaluated using the Mann-Whitney U-test and Spearman's correlation coefficient. In order to determine the variables associated with HRQL, we performed a multiple linear regression analysis for each facet of the KDQOL-SF. The independent variables included were the clinical and psychological variables that showed a significance of $P<.05$ in the results from the bivariate analysis. We used a backward procedure to select variables, with the criteria of $P< .05$ to accept statistical significance. The colinearity that was detected was corrected by eliminating the variables of CRP-us (given the high correlation of this factor with albumin) and haematocrit (given the high correlation of this factor with haemoglobin); in the case of symptoms of depression and anxiety, scores were expressed as the distance to the sample mean.[34] $P<.05$ was set as the level of statistical significance for all variables. SPSS statistical software, version 15.0 for Windows, was used for all analyses (SPSS Inc., Chicago, IL, USA).

RESULTS

We identified a total of 64 patients that complied with all inclusion criteria, of which 11 declined to participate. There were no significant differences in age, sex, type of PD, or duration of treatment between participants and non-participants. The sample that was finally included in the study was made up of 53 patients. The socio-demographic, clinical, and psychological characteristics of these patients are summarised in Table 1.

A total of 16 patients (31.4%) obtained a point score greater than 11 in depression, and 18 patients (35.3%) scored higher than 11 in anxiety, which indicated a suspected clinical problem of depression and anxiety, respectively.[17] According to the TAS-20 scoring criteria for alexithymia, 6 patients (11.3%) were alexithymic.

We found no significant differences between patients on CAPD and those on APD in any of the socio-demographic, clinical, or psychological variables studied.

The impact analysis of kidney disease and PD treatment on the generic and specific dimensions of HRQL is summarized in Table 2.

The standardized scores corresponding to the generic KDQOL-SF scales indicated that the HRQL of patients on PD were lower on all of the scales used than the values from the reference population (Figure 1).

We found no significant differences between patients on CAPD and those on APD in any of the generic or specific dimensions of the KDQOL-SF.

Table 1. Socio-demographic, clinical, and psychological characteristics of the sample

Socio-Demographic Variables		Clinical Variables		Psychological Variables	
Age		Type of PD		Depression	
• Mean (SD)	49.54±17.03	• Manual N (%)	19 (35.8%)	• Mean (SD)	5.09±4.71
		• Automatic N (%)	34 (64.2%)		
Sex		- With supplementary exchange N (%)	4 (11.76%)		
• Males N (%)	24 (45.3%)	- Without supplementary exchange N (%)	30 (88.24%)	Anxiety	
• Females N (%)	29 (54.7%)			• Mean (SD)	6.15±4.63
Place of residence					
• Rural N (%)	25 (47.2%)	Duration of treatment on PD (months)	27.96±24.38	Locus of control	
• Urban N (%)	28 (52.8%)	• Mean (SD)		• Mean (SD)	40.16±7.74
Level of education		Previous treatment on HD			
• No education or only primary school N (%)	29 (54.7%)	• Yes N (%)	14 (26.4%)		
• Secondary School or university studies N (%)	24 (45.3%)	• No N (%)	39 (73.6%)	Alexithymia	
				• Mean (SD)	46.46±11.24
Marital Status					
• Married or living with partner N (%)	34 (64.2%)	Duration of HD treatment (months)			
• Single. divorced. or widowed N (%)	19 (35.8%)	• Media±DT	13±12.87	Coping	
				• Problem-focused coping	
Work status				- Mean (SD)	2.21±0.38
• Active N (%)	17 (32.07%)	Previous kidney transplant			
• Not active N (%)	36 (67.93%)	• None N (%)	41 (77.4%)	• Emotion-focused coping	
		• 1 or more N (%)	12 (22.6%)	- Mean (SD)	2.30±0.52
Social class					
• High N (%)	-	No. of hospitalizations in the previous year		• Escape-avoidance	
• Middle N (%)	49 (92.5%)	• None N (%)	33 (62.3%)	- Mean (SD)	2.00±0.37
• Low N (%)	4 (7.5%)	• 1 or more N (%)	20 (37.7%)		
		No. of emergency room visits in the past year			
		• None N (%)	28 (52.8%)		
		• 1 or more N (%)	25 (47.2%)		
		Episodes of peritonitis last year			
		Mean (SD)	0.45±0.66		
		% Haematocrit			
		Mean (SD)	33.46±3.63		
		Haemoglobin (g/dl)			
		Mean (SD)	11.45±1.27		
		Albumin (mg/dl).			
		Mean (SD)	3.71± 0.30		
		Weekly Kt/V urea			
		Mean (SD)	2.53±0.67		
		CRP-us (mg/dl)			
		Mean (SD)	0.85±0.51		
		Residual kidney function (creatinine clearance ml/min /1.73 m^2).			
		Mean (SD)	4.51±3.87		
		Comorbidity index. Mean (SD)	4.51±2.35		

The analysis of the relationship between clinical and psychological variables and the KDQOL—SF scales revealed the existence of significant correlations (P<.05) between the number of hospitalizations during the previous year and Role-emotional (r=—0.281), Bodily pain (r=—0.315), and Effects of the Kidney Disease (r=—0.324) scales; between the number of emergency room visits in the past year and Role-physical (r=—0.281), Social Function (r=—0.279), and Burden of kidney disease (r=—0.272); between episodes of peritonitis last year and the Physical Component Summary (r=—0.312); between albumin levels and the scale for Patient satisfaction (r=0.295); between Kt/V values and the Symptoms scale (r=0.320); between the level of CRP-us and scales for Dialysis staff encouragement (r=0.352) and Effects of the kidney disease (r=—0.272); between residual kidney function and Vitality (r=0.302), Effects of the kidney disease (r=0.312), Sexual function (r=0.339), Work status (r=0.290), and Physical Component

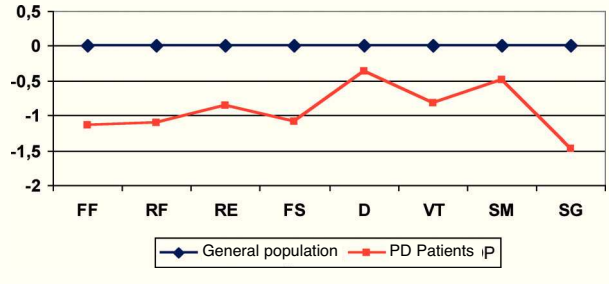
Table 2. Measures of dispersion and central tendency and internal consistency coefficients for KDQOL-SF scales

KDQOL-SF Scale	Alpha	Mean	SD	Range
Generic				
Physical Functioning	0.918	63.77	28.04	0.00-100
Role-Physical	0.892	48.11	43.81	0.00-100
Role-Emotional	0.879	63.52	43.49	0.00-100
Social Function	0.627	70.28	25.26	12.5-100
Bodily Pain	0.804	67.40	29.62	0.00-100
Vitality	0.870	50.00	26.65	0.00-100
Mental Health	0.863	63.24	23.45	20.0-100
General Health	0.708	37.73	20.51	0.00-90
Physical Component Summary	40.09	9.57	24.29-57.95	
Mental Component Summary		43.92	13.18	17.63-64.65
Specific				
Burden of Kidney Disease	0.792	43.87	28.97	0.00-100
Cognitive Function	0.727	77.73	18.72	33.33-100
Symptoms	0.767	77.43	14.55	29.16-97.92
Effects of Kidney Disease	0.872	65.86	25.15	3.13-100
Sexual Function	0.944	75.24	32.03	0.00-100
Sleep	0.872	60.66	24.85	15.00-100
Social Support	0.542	81.13	18.50	0.00-100
Work Status	0.604	41.50	38.89	0.00-100
Quality of Social Interaction	0.596	77.99	18.28	26.67-100
Patient Satisfaction	NA	88.98	13.47	50.00-100
Dialysis Staff Encouragement	0.297	93.71	11.19	50.00-100

NA: not applicable

Summary (r=0.311); and between comorbidity and scales for Role-physical (r=—0.392) and Burden of kidney disease (r=—0.355). The patients that had received a kidney transplant were significantly different from those that had not in the scales for Role-physical (U=151) and Effects of the kidney disease (U=145). Significant differences also existed between patients who received HD treatment and those that remained on PD in the scales for Bodily pain (U=169) and Dialysis staff encouragement (U=191).

We found significant correlations between anxiety level and all KDQOL-SF scales (range of r=—0.460 for Bodily pain to r=—0.802 for Mental health), except for Social support, Work status, Patient satisfaction, and Dialysis staff encouragement. Anxiety level was also significantly correlated with the Physical and Mental Component Summaries (r=—0.419 and r=—0.696, respectively). We found significant correlations between depression and all KDQOL-SF scales (range of r=—0.288 for Social support to r=—0.696 for Mental health) except for Role-physical, Patient satisfaction, and Dialysis staff encouragement. Depression was also significantly correlated with Physical and Mental Component Summaries (r=—0.413 and r=—0.646, respectively). The comparison between HRQL of alexithymic and non-alexithymic patients revealed significant differences in the generic scales of Social function (U=34), Mental health (U=52.5), General health (U=49), and Mental Component Summary (U=52), and in the specific scales of Burden of kidney disease (U=54),



PF: Physical Functioning; RP: Role-Physical; RE: Role-Emotional; SF: Social Function; BP: Bodily Pain; VT: Vitality; MH: Mental Health; GH: General Health.

Figure 1. Standardised scores for the generic KDQOL-SF scales

Table 3. Results of the multiple linear regression analysis for each of the generic KDQOL-SF scales

Dimension	Predictive variables	Ajd. Mult. R^2	B	β	95% CI (B)		p
Physical Functioning		0.205					
	Anxiety		–0.139	–0.469	–0.214	–0.064	0.001
Role-Physical		0.384					
	Anxiety		–0.135	–0.406	–0.212	–0.058	0.001
	No. of emergency room visits		–0.513	–0.279	–0.940	–0.086	0.020
	Comorbidity		0.241	0.359	0.089	0.394	0.003
Role-Emotional		0.288					
	Anxiety		–0.164	–0.433	–0.256	–0.072	0.001
	No. of hospitalizations		–0.745	–0.310	–1.326	–0.164	0.013
Social Function		0.515					
	Anxiety		–0.167	–0.534	–0.234	–0.099	<0.001
	Alexithymia		–1.246	–0.280	–2.190	0.301	0.011
	No. of emergency room visits		–0.346	–0.200	–0.702	0.010	0.057
Bodily Pain		0.244					
	Anxiety		–0.099	–0.410	–0.159	–0.039	0.002
	No. of hospitalizations		–0.423	–0.278	–0.803	–0.044	0.030
Vitality		0.350					
	Anxiety		–0.180	–0.603	–0.249	–0.111	<0.001
Mental Health		0.670					
	Anxiety		–0.147	–0.567	–0.208	–0.086	<0.001
	Depression		–0.086	–0.322	–0.149	–0.023	0.008
General Health		0.328					
	Anxiety		–0.145	–0.584	–0.204	–0.087	<0.001
Physical Component Summary		0.212					
	Anxiety		–0.820	–0.403	–1.334	–0.305	0.002
	Episodes of peritonitis last year		–6.237	–0.315	–11.249	–1.225	0.016
Mental Component Summary		0.547					
	Anxiety		–1.389	–0.514	–2.132	–0.647	<0.001
	Depression		–0.822	–0.295	–1.588	–0.057	0.036

Cognitive function (U=56), and Sexual function (U=59.5). Problem-Focused Coping was significantly correlated with Social function (r=0.294), Bodily pain (r=0.312), and Burden of kidney disease (r=0.286).

For each KDQOL-SF scale, the clinical and psychological variables that were identified in the bivariate analysis with a value of $P<.05$ were introduced as possible predictive factors in the multivariate regression analysis. The results from these analyses for generic and specific dimensions are summarized in Tables 3 and 4, respectively.

For all KDQOL-SF scales, the characteristics that were selected displayed an acceptable proportion of variance (R^2), falling within a range of 20% (Physical functioning scale) and 67% (Mental health). Thus, it was always close to or above the value of 25%, considered to be the minimum value to consider the model acceptable.[34] Only Work status, Patient satisfaction, Dialysis staff encouragement, and Social support were below this level. This shows that the clinical and psychological variables selected for these four KDQOL-SF scales have little or no explanatory power.

The only clinical variables that were found to be significant predictors for a worse HRQL in some dimensions evaluated were: comorbidity, number of hospitalizations and number of emergency room visits

Table 4. Results of the multiple linear regression analysis for each of the specific KDQOL-SF scales

Dimension	Predictive variables	Ajd. Mult. R^2	B	β	95% CI (B)		p
Burden of kidney disease		0.446					
	Anxiety		–3.226	–0.525	–4.630	–1.823	<0.001
	Alexithymia		–20.749	–0.236	–41.111	–0.387	0.046
	Comorbidity		–5.014	–0.367	–8.026	2.003	0.002
Cognitive function		0.562					
	Anxiety		–2.136	–0.535	–3.215	–1.058	<0.001
	Depression		–1.163	–0.282	–2.275	–0.051	0.041
Symptoms		0.415					
	Anxiety		–1.841	–0.653	–2.454	–1.228	<0.001
Effects of kidney disease		0.408					
	Anxiety		–3.367	–0.648	–4.515	–2.218	<0.001
Sexual function		0.244					
	Anxiety		–3.243	–0.510	–4.848	–1.638	<0.001
Sleep		0.498					
	Anxiety		–3.746	–0.712	–4.805	-2.687	<0.001
Social support		0.000	-	-	-	-	-
Work status		0.061					
	Depression		–2.351	–0.283	–4.642	–0.060	0.045
Quality of social interaction		0.325					
	Anxiety		–2.314	–0.581	–3.244	–1.385	<0.001
Patient satisfaction		0.055					
	Albumin		11.954	0.271	0.035	23.874	0.049
Dialysis staff encouragement		0.085					
	Previous treatment on HD		–8.036	–0.320	–14.735	–1.337	0.020

during the last year, previous episodes of peritonitis, albumin levels, and previous HD treatment. On the other hand, symptoms of anxiety were correlated with a worse HRQL in 15 of the KDQOL-SF scales, and the Physical and Mental Component Summaries. Symptoms of depression were negatively correlated with the generic scale for Mental health, the Physical Component Summary, and the specific scales for Cognitive function and Work status. Alexithymia was correlated with worse HRQL in the generic scale for Social function, and the specific scale for Burden of kidney disease. These psychological variables had the highest standardized regression coefficients in all cases.

DISCUSSION

The results from this study show that kidney disease and its treatment with PD has a major impact on the HRQL of kidney disease patients, with psychological variables, particularly symptoms of anxiety, being the main determinants of HRQL in this population of patients.

The data obtained in the generic dimensions of the KDQOL-SF reveal that the HRQL of patients on PD is lower than in the general Spanish population: the physical dimensions were the most affected, whereas mental dimensions were more preserved. In the specific KDQOL-SF scales, we

observed a greater impact on the scales for Burden of kidney disease and Work status. Our data coincide with previous studies of patients on PD,[7,8] both in terms of the overall profile and level of impact, and show that the deterioration of HRQL continues to be an important issue for these patients.

Psychological characteristics of the patients appear to explain the impact of kidney disease and its treatment with PD on the different dimensions of HRQL evaluated with the KDQOL-SF better than the effect of clinical variables. The results from the multivariate analysis coincide with previous studies in showing the importance of comorbidity, the duration of treatment, and albumin levels as predictors for a reduced HRQL, in transplant recipients, as well as in patients on HD and patients on PD.[2-4,35-37] However, these variables have a limited effect and affect only a small number of scales. On the other hand, psychological variables such as alexithymia, symptoms of depression, and especially, anxiety, are important predictors for a wide number of generic and specific scales. As we expected, symptoms of anxiety and depression explain the variance in the scales related to emotional well-being (especially Mental health), and in the Mental Component Summary. However, it is important to keep in mind that symptoms of anxiety also contributed to explaining the patient's self-perception of physical state (Physical functioning, Bodily pain, Vitality, General health, and Symptoms), functional capacity (Role-physical, Burden of kidney disease, and Effects of the kidney disease), and social function (Social function and Quality of social interaction). These results are in line with the previously referenced data on populations of patients on HD[38-40] and PD.[5-7] Given the high prevalence of these psychological symptoms in our sample (31.4% and 35.3%, respectively), which agrees with the results obtained in other studies with patients on HD and PD,[6,41-44] an assessment of these psychological symptoms should be carried out when evaluating and performing the HRQL of patients on PD.

The data from our study also show that other psychological variables, such as alexithymia, are also significant predictors for the generic scale of Social function and the specific scale of Burden of kidney disease. It is important to point out that although the number of KDQOL-SF scales that were correlated with alexithymia was not high, it does appear to be a relevant variable in that it stands out as a significant predictor for scales that show a high level of impact on the patient. In previous studies, a higher level of alexithymia was associated with a reduced perception of social support in patients on PD.[10,45] These results fall in line with the data obtained from our study, which identified alexithymia as a predictor of reduced Social function. However, Pucheu et al.[10] have shown that the relationship between alexithymia and social dimensions of HRQL would be modulated by the level of comorbidity observed in the patients; such that only in the subset of patients on PD with low comorbidity, those with high alexythimia showed a lower perception of social support with respect to those with low alexithymia. The differential effect that can be observed with alexithymia in terms of some patient characteristics (such as level of comorbidity) has not been approached in this study. We therefore believe it to be of interest to continue researching the predictive value of this variable in the HRQL of patients on PD.

In our study, we found no relationship between the HLOC and HRQL, unlike the results from previous studies in patients on PD.[6,8] These discrepancies with other results could be partially attributed to the different types of intruments employed for patient evaluation, and the fact that we only used a global score for the locus of control, without taking into count the various aspects that make up this component. Given that in previous studies,[8] only some dimensions of HLOC have been shown to correlate with HRQL, it would make sense for future studies to perform a multi-dimensional evaluation of HLOC.

With respect to the absence of significant results for coping strategies, it is possible that, given the close relationship with anxiety and depression symptoms,[20] these are represented, ultimately, in the relevant explanatory variables, as shown in the results from the multivariate analyses conducted in this study. In fact, when Pucheu et al.[8] analyzed the relationship between coping strategies and the generic dimensions of HRQL, they did not take into account the symptoms of anxiety and depression which could explain the significant relationship found for some of the coping strategies and the mental dimensions of HRQL.

This study has some limitations. Firstly, the sample size was relatively small, and so these results must be confirmed using a larger sample. Also, the small sample size limited the number of variables that could be included in the multivariate analysis, and so we had to resort to strict statistical criteria that could have excluded potentially relevant variables. Finally, this was a cross-sectional study that only allowed us to establish relationships between variables, but it did not allow us to define any causal factors.

In conclusion, this study shows that symptoms of anxiety and depression and alexithymia are significant predictors of HRQL in patients on PD. Therefore, patients with these psychological characteristics could benefit from psychological procedures which act upon these potentially modifiable factors being added to their medical treatment.

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