LONGITUDINAL CHANGES IN HEALTH-RELATED QUALITY OF LIFE SCORES IN BRAZILIAN INCIDENT PERITONEAL DIALYSIS PATIENTS (BRAZPD): SOCIO-ECONOMIC STATUS NOT A BARRIER

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◆ **Background and Objectives:** A large proportion of the patients on peritoneal dialysis (PD) in Brazil have low levels of education and family income. The present study assessed whether education level and family income are associated with baseline and longitudinal changes in health-related quality of life (HRQOL) scores during the first year of PD therapy.

◆ **Methods:** We evaluated 1624 incident patients from the Brazilian Peritoneal Dialysis Multicenter Study (BRAZPD) at baseline, and 486 of them after 12 months. The SF-36 was used to determine HRQOL and the Karnofsky index (KI), physical performance.

◆ **Results:** At baseline, patients received high KI scores compared with scores on the SF-36. The means of the mental and physical components at baseline and after 12 months were 39.9 ± 10.5 compared with 38.7 ± 11.7 and 41.8 ± 9.6 compared with 40.7 ± 9.8 respectively, which were not statistically different. A multivariate regression analysis showed that age, sex, diabetes, and cardiovascular disease were predictors of the mental component (respectively, $\beta = 0.12$, $p < 0.001$; $\beta = 0.11$, $p < 0.001$; $\beta = -0.08$, $\beta = 0.007$; and $\beta = -0.07$, $p = 0.007$) and that age, sex, diabetes, cardiovascular disease, hemoglobin, glucose, and creatinine were predictors of the physical component (respectively, $\beta = -0.28$, $p < 0.001$; $\beta = 0.06$, $p = 0.009$; $\beta = -0.09$, $p = 0.002$; $\beta = -0.09$, $p = 0.001$; $\beta = 0.07$, $p = 0.004$; $\beta = -0.05$, $p = 0.040$; and $\beta = 0.05$, $p = 0.040$). Education level and family income were not significantly associated with HRQOL (mental and physical components) in the multivariate regression.

◆ **Conclusions:** The results indicate that, as predictors, family income and education level have no impact on HRQOL, supporting the idea that socio-economic status should not be a barrier to the selection of PD as a treatment modality in Brazil.

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Health-related quality of life (HRQOL) is an important outcome and a parameter for monitoring the quality of care delivered to maintenance dialysis patients. To optimize outcomes for these patients, it is necessary to improve both their HRQOL and their survival. In keeping with the importance of HRQOL in the dialysis setting, an increasing number of studies have been examining HRQOL, with most focusing on patients receiving maintenance hemodialysis (HD) (1,2). In peritoneal dialysis (PD), few studies have been published, and most compare PD with HD, with many of the differences between the two populations reflecting the different policies in place for starting patients on PD (3–6). Patients who opt for PD tend to have a better clinical status (physical, emotional, autonomous, and social), and they maintain residual renal function longer, experiencing the positive clinical implications of such preservation (5,6). The foregoing studies have contributed to the identification of patient characteristics and potentially modifiable factors associated with poorer HRQOL.

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The impact of chronic kidney disease (CKD) on HRQOL was assessed by Chow *et al.* (7) using the Australian Medical Outcomes Study Questionnaire 36. In CKD patients, the authors observed significant impairment in HRQOL for all SF-36 scales except Vitality and Mental Health. Adjusting for comorbidity, scores for Physical Functioning, Role Physical, General Health, Vitality, and Role Emotional were significantly lower (7). Patients with CKD not on dialysis experience a decline of HRQOL over time (8) as a result of a variety of factors, including age, comorbidities (7), and hemoglobin level (9).

End-stage renal disease patients experience reduced HRQOL physical and social functioning because of the underlying disease and various treatment-related complications (10). Compared with a healthy general population, patients on HD have a lower HRQOL (11), and a recent systematic HRQOL review by Boateng and East found no differences between PD and HD patients (6). Concerning factors that influence HRQOL in PD patients specifically, Bakewell *et al.* showed a decline of HRQOL over time that was associated with poorer clinical outcomes (12). Other factors affecting this group of patients are low residual renal function (13,14), malnutrition, and inflammation (15). Depression and anxiety have also been reported as being a problem in PD patients, affecting their assessment of their own HRQOL (16–18).

Education level and family income may also have a significant impact on HRQOL in end-stage renal disease patients. Those factors were independently and significantly negatively associated with lower physical or mental component scores on the Kidney Disease Quality of Life Short Form in HD patients who participated in the Dialysis Outcomes and Practice Patterns Study (DOPPS) (19). In another DOPPS study that evaluated HRQOL in HD patients in the United States, France, Germany, Italy, Spain, and the United Kingdom, the authors concluded that the effect of HD on HRQOL is different for the various countries. Those differences might partly be explained by the different distribution of socio-economic factors and major comorbid conditions (20).

Socio-economic status has been reported as an important factor negatively associated with HRQOL in HD patients in Brazil (21) and Serbia (22). It is interesting to note that, in a study performed in the Netherlands (23), social factors were used by the doctors as contraindications to the adoption of PD by end-stage renal disease patients. Chow and Wong (24) reported that, after a concerted educational intervention by nurses, HRQOL was observed to improve.

The Brazilian Peritoneal Dialysis Multicenter Study (BRAZPD) is a large prospective cohort study launched in December 2004 (25), which has prospectively been

collecting nationally representative data monthly, providing a continuous snapshot of the PD reality in the country. The BRAZPD data provide a substrate for exploratory analyses expanding overall knowledge of the therapy and consequently improving quality of care for PD patients. As an introduction to the present paper, it is worth mentioning that, among the BRAZPD findings already published, the standard of care delivered to PD patients accords with those recommended internationally (26) and that poor socio-economic status is independently associated neither with the risk for a first peritonitis episode (27) nor with outcomes (technique and patient survival) (28).

The present study set out to evaluate whether levels of education and family income are associated with baseline and longitudinal HRQOL scores during 1 year of follow-up in incident Brazilian PD patients.

METHODS

Between December 2004 and October 2007, 6198 patients from 114 renal replacement therapy (RRT) centers participating in BRAZPD were evaluated. Of 3439 incident patients enrolled during that period, 867 were excluded because they did not complete 90 days on therapy; 202, because their HRQOL form was incomplete; 331, because they did not reach 180 days; and 415 patients, because their HRQOL data was not collected at baseline. The first evaluation of HRQOL was performed 180 days after PD start, which was considered baseline for the present study. At baseline, 1624 incident patients were evaluated, and at 12 months, 486 of those patients were assessed again. The latter patients are the main focus of the present study (Figure 1).

The inclusion criteria were

- age greater than 18 years,
- survival to the end of the first 90 days of PD,
- registered to BRAZPD within the first 90 days of therapy, and
- SF-36 assessed at baseline.

A central web-based database (PDnet) was developed for the purpose of the BRAZPD study, and a doctor and a nurse at each center were trained in how to enter patient data monthly. Patients are followed until recovery of renal function, renal transplantation, transfer to HD, or death. Physical performance is assessed using the Karnofsky index, a questionnaire administered by health professionals (29), and HRQOL is assessed using the SF-36, a self-report questionnaire (30).

The Karnofsky index (29) is administered once each month by the nursing staff, beginning at inclusion of

Figure 1 — Flowchart of the study.

the patient into the study. The maximum score of 100 points indicates good physical performance (100 = good general state, no complaints, no evidence of the disease; 90 = able to perform daily activities, minimal signs and symptoms of the disease; 80 = performs daily activities with effort, has some signs and symptoms of the disease; 70 = unable to perform normal activities or to do active work; 60 = requires occasional help, but able to care for most basic personal needs; 50 = requires help with almost every activity and the support of a medical team; 40 = disabled, requires help with all activities and the support of a medical team; 30 = severely disabled, requires sporadic hospital admission; 20 = very sick, hospital admission is necessary; 10 = moribund, serious risk of imminent death; 0 = dead).

The self-report SF-36 is completed by all PD patients every 6 months. The first questionnaire (baseline) is collected 180 days after PD initiation, because a mental and physical “steady state” is desired before the questionnaire is completed. The SF-36 assesses the domains of Physical Functioning, Physical Role Functioning, Body Pain, General Health Perception, Vitality, Social Role Functioning, Emotional Role Functioning, and Mental Health. Each area receives a score ranging from 0 to 100. Scores closer to 0 and 100 correspond to worse or better HRQOL respectively. The validated Portuguese version of

the SF-36 was used in the present study (30). We used the Ware algorithm (31) to transform the 8 domains of the SF-36 into two main components: physical and mental.

Socio-economic data are based on information from the Brazilian Institute of Geography and Statistics (32), which is the government agency responsible for the Brazilian census. Family income was used as a measure of economic status. Income is categorized according to the number of minimum wages (MWs) received per month. The MW is the national reference salary in Brazil. Six possible responses were available to describe the monthly number of MWs: no income, income less than 2 MW, income between 2 MW and 5 MW, income between 5 MW and 10 MW, income between 10 MW and 20 MW, and income more than 20 MW. The questionnaire from the Brazilian Institute of Geography and Statistics also provides a choice of four education levels: illiterate, elementary school, high school, college.

All the variables analyzed in BRAZPD have previously been described (25). Using the 1624 patients with a baseline HRQOL assessment, the present study analyzed the impact of the following variables on HRQOL: age, race (white vs non-white), sex, comorbidities, family income, education level, distance (in kilometers) between residence and RRT center, cause of CKD (according to the European Dialysis and Transplant Association), and

pre-dialytic care by nephrologist (if the patient received nephrology follow-up before dialysis), PD modality (automated PD or continuous ambulatory PD), and laboratory data.

The study was approved by the National Ethics Committee on Human Research (approval no. 448). Written informed consent was obtained from all participants before inclusion in the study.

STATISTICAL ANALYSIS

All the statistical analyses were performed using the Stata statistical software package (version 12.1: StataCorp LP, College Station, TX, USA). Non-normally distributed variables are expressed as medians and ranges, and normally distributed variables are expressed as mean $\pm$ standard deviation. Between-group comparisons for nominal variables were assessed using the chi-square test, the Mann-Whitney test, and the Kruskal-Wallis test. Within-groups analyses were assessed using the Wilcoxon test. Multivariate linear regression analysis was used to assess predictors of physical and mental health. To create complete datasets for the multivariate linear regression model, missing values (including all the variables in the model: age, sex, RRT, diabetes, cardiovascular disease, education level, income, hemoglobin, creatinine, calcium, phosphate, and glucose) for potential predictors of the mental and physical components at baseline (1624 patients) and at 12 months (486 patients) were imputed using a multiple imputation technique (5 repetitions) for variables with 10% or more missing values. When applying this technique, missing data are imputed using a prediction based on the patient's available characteristics, under the condition of "missing at random." "Missing at random" means that the probable value of a missing variable depends on other observed patient characteristics. Multiple imputation results in unbiased estimates of study associations and correctly estimated standard errors and confidence intervals (33). A sensitivity analysis was performed with and without imputation for missing data. A two-sided *p* value of less than 0.05 was considered statistically significant.

RESULTS

The 486 incident patients with two completed HRQOL questionnaires were included in all analyses; the 1624 patients with a completed baseline questionnaire were included in the multivariate regression analysis. We emphasize that this is a dynamic cohort study, and patients therefore entered the study at different times, with a consequent decline in the number of patients who

had completed 12 months after admission at the closing of data collection. Of 1624 patients with baseline data, 674 did not have complete information for HRQOL, and 464 had not completed 12 months by the end of the study. Table 1 shows the demographics and clinical characteristics of the patients at baseline and 12 months.

Median follow-up in the study was 15 months (range: 3–32 months). Of 517 drop-outs from therapy during the study period, 271 were because of death, and 246 were for other reasons. Among patients who did not complete 180 days of PD (time needed for the first SF-36 evaluation), 36 died and 24 dropped out for other reasons.

TABLE 1
Demographics and Clinical Characteristics
of the Patients

Variable	Time on PD	
	Baseline	12 Months
Patients (<i>n</i>)	1138	486
Mean age (years)	58 $\pm$ 15.3	58 $\pm$ 15.1
>60 Years (%)	44	42
Women (%)	55	54
White (%)	60	60
Education (%)		
Illiterate	10	11
Elementary school	56	56
High school	25	24
College	8	9
Income (%)		
Up to 2 times minimum wage	37	34
2–5 Times minimum wage	42	39
5–10 Times minimum wage	17	22
10–20 Times minimum wage	4	4
>20 Times minimum wage	0.7	0.2
Distance up to 25 km (%)	58	58
Cause of CKD (%)		
Diabetic nephropathy	36	36
Hypertensive nephrosclerosis	23	24
Chronic glomerulonephritis	11	12
Unknown	14	10
Other	16	19
Pre-dialysis care (%)	56	59
Comorbidities (%)		
Systemic hypertension	90	90
Heart failure	25	26
Peripheral vascular disease	26	27
Left ventricular hypertrophy	44	48
Diabetes	40	38
Others	5	5
None	2	0.4

CKD = chronic kidney disease.

Among the 486 patients with both baseline and 12-month data, the Karnofsky index scores for most were high: 75% of patients had scores higher than 90 and 50% of patients had scores higher than 80 at baseline. After 12 months, 75% had scores higher 90 and 50% had scores higher than 80. No statistical differences were observed.

Overall, the baseline and 12-month assessments of HRQOL by SF-36 showed low scores and no statistically significant differences in all domains: Physical Functioning (49 ± 31 vs 50 ± 30), Physical Role Functioning (43 ± 44 vs 41 ± 44), Mental Health (47 ± 16 vs 47 ± 15), General Health (48 ± 20 vs 49 ± 20), Emotional Role Functioning (50 ± 46 vs 48 ± 45), Vitality (53 ± 20 vs 54 ± 21), Pain (68 ± 24 vs 68 ± 24), and Social Role Functioning (74 ± 28 vs 71 ± 27). The means of the mental and physical

components at baseline and after 12 months were 39.9 ± 10.5 versus 38.7 ± 11.7 and 41.8 ± 9.6 versus 40.7 ± 9.8 respectively, with no statistical differences.

In univariate analysis, education level at baseline was significantly inversely associated with Physical Functioning ($p = 0.004$), with illiterate patients having the poorest scores at baseline (Table 2). At the 12-month assessment, education level was significantly inversely associated with Physical Functioning ($p = 0.0001$), General Health ($p = 0.007$), Vitality ($p = 0.006$), Social Role Functioning ($p = 0.005$), and Emotional Role Functioning ($p = 0.005$, Table 2). There was no significant association between family income and any HRQOL domain at baseline or at 12 months (Table 3).

No values for age, sex, RRT, diabetes, cardiovascular disease, education level, or income were missing. The

TABLE 2
Relationship Between Education and Quality of Life in 486 Patients

SF-36 domain	Baseline				<i>p</i> value ^a	12 Months				<i>p</i> value ^a
	Illiterate	Elementary school	High school	College		Illiterate	Elementary school	High school	College	
Physical functioning	38±31	49±31	53±31	59±31	0.004	44±28	47±29	56±30	63±31	<0.001
Physical role functioning	40±47	41±44	42±43	54±56	0.360	33±42	39±42	51±45	43±46	0.061
Pain	64±22	66±24	70±23	73±23	0.211	61±23	69±24	69±22	69±23	0.150
General health	43±18	48±18	50±22	51±19	0.167	42±17	49±20	52±21	47±19	0.007
Vitality	47±21	54±20	54±21	54±20	0.097	45±19	54±20	56±21	54±20	0.006
Social role functioning	65±30	75±27	77±29	72±28	0.091	58±28	72±26	74±28	74±28	0.005
Emotional role functioning	42±46	49±46	51±45	59±46	0.320	34±43	46±47	58±44	53±43	0.005
Mental health	44±17	47±16	48±16	48±17	0.317	44±16	47±16	49±16	47±15	0.282

^a Comparing the four groups using ANOVA.

TABLE 3
Relationship Between Income and Quality of Life in 486 Patients

SF-36 domain	Baseline				<i>p</i> Value ^a	12 Months				<i>p</i> Value ^a
	Up to 2×MW	2–5 ×MW	5–10 ×MW	>10 ×MW		Up to 2×MW	2–5 ×MW	5–10 ×MW	>10 ×MW	
Physical functioning	47±32	51±29	48±31	50±33	0.707	46±29	54±28	48±30	56±32	0.055
Physical role functioning	41±43	42±44	43±44	49±47	0.911	38±43	43±43	38±42	59±48	0.208
Pain	68±23	67±23	67±25	63±21	0.734	66±25	71±23	66±22	60±20	0.055
General health	48±18	47±18	48±21	45±24	0.854	47±19	49±19	50±21	47±19	0.593
Vitality	53±20	54±19	52±20	48±23	0.459	52±20	53±20	55±20	50±26	0.650
Social role functioning	72±27	67±27	72±26	68±38	0.348	68±27	72±27	73±26	70±28	0.461
Emotional role functioning	45±44	54±46	57±44	53±47	0.165	46±45	48±44	54±44	57±46	0.617
Mental health	46±15	46±17	48±16	44±15	0.585	45±13	48±17	49±16	44±15	0.124

MW = minimum wage (national minimum salary).

^a Comparing the four groups using ANOVA.

percentage of missing values was 1.5% for hemoglobin, 10% for creatinine, 2% for calcium, 2% for phosphate, and 16% for glucose. Looking at baseline values in all 1624 patients, multivariate regression analysis showed that age, sex, diabetes, and cardiovascular disease were predictors of the mental and physical components in all four models (Table 4). Hemoglobin, glucose, and creatinine were predictors of the physical component in model 4.

The multivariate regression analysis for education level and family income showed no significant results for those particular parameters as predictors of HRQOL. The same multivariate regression analysis was performed for the 486 patients who had completed two HRQOL evaluations (at baseline and at 12 months), and it similarly showed no differences. For the mental component,

model 4 ($r^2 = 0.07$) produced these results: age, $\beta = -0.17, p < 0.001$; sex, $\beta = 0.14, p = 0.005$; RRT, $\beta = -0.01, p = 0.70$; diabetes, $\beta = 0.10, p = 0.09$; cardiovascular disease, $\beta = -0.10, p = 0.04$; education, $\beta = 0.09, p = 0.12$; income, $\beta = 0.03, p = 0.12$; hemoglobin, $\beta = -0.01, p = 0.75$; glucose, $\beta = 0.01, p = 0.12$; creatinine, $\beta = -0.02, p = 0.67$; calcium, $\beta = 0.006, p = 0.9$; and phosphate, $\beta = -0.08, p = 0.14$. For the physical component, model 4 ($r^2 = 0.21$) produced these results: age, $\beta = -0.25, p < 0.001$; sex, $\beta = 0.09, p = 0.03$; RRT, $\beta = 0.06, p = 0.16$; diabetes, $\beta = -0.11, p = 0.02$; cardiovascular disease, $\beta = -0.19, p < 0.001$; education, $\beta = -0.02, p = 0.7$; income, $\beta = 0.05, p = 0.34$; hemoglobin, $\beta = 0.48, p = 0.03$; glucose, $\beta = 0.78, p = 0.01$; creatinine, $\beta = 0.10, p = 0.07$; calcium, $\beta = 0.08, p = 0.06$; and phosphate, $\beta = -0.12, p = 0.02$. After imputing values for missing

TABLE 4
Multivariate Linear Regression Models for Mental and Physical Components in
Incident Peritoneal Dialysis Patients ($n = 1624$)

Predictors of Mental Component	Model 1 ($r^2=0.03$)		Model 2 ($r^2=0.04$)		Model 3 ($r^2=0.04$)		Model 4 ($r^2=0.05$)	
	β	p	β	p	β	p	β	p
Age	-0.15	<0.001	-0.13	<0.001	-0.12	<0.001	-0.12	<0.001
Sex	0.11	<0.001	0.11	<0.001	0.11	<0.001	0.11	<0.001
Renal replacement therapy			0.02	0.371	0.02	0.262	0.03	0.271
Diabetes			-0.06	0.008	-0.06	0.009	-0.08	0.007
Cardiovascular disease			-0.05	0.021	-0.05	0.021	-0.07	0.007
Education					0.01	0.562	0.02	0.372
Income					0.001	0.962	-0.005	0.85
Hemoglobin (g/dL)					0.03	0.211	0.02	0.281
Glucose (mg/dL)							-0.01	0.501
Creatinine (g/dL)							-0.01	0.602
Calcium (g/dL)							-0.02	0.340
Phosphate (g/dL)							-0.06	0.030

Predictors of Physical Component	Model 1 ($r^2=0.11$)		Model 2 ($r^2=0.13$)		Model 3 ($r^2=0.14$)		Model 4 ($r^2=0.14$)	
	β	p	β	p	β	p	β	p
Age	-0.33	<0.001	-0.29	<0.001	-0.29	<0.001	-0.28	<0.001
Sex	0.08	<0.001	0.09	<0.001	0.08	<0.001	0.06	0.009
Renal replacement therapy			0.02	0.352	0.03	0.140	0.04	0.060
Diabetes			-0.09	<0.001	-0.11	<0.001	-0.09	0.002
Cardiovascular disease			-0.11	<0.001	-0.09	<0.001	-0.09	0.001
Education					0.01	0.692	0.01	0.640
Income					-0.01	0.541	0.03	0.251
Hemoglobin (g/dL)					0.04	0.072	0.07	0.004
Glucose (mg/dL)							-0.05	0.040
Creatinine (g/dL)							0.05	0.040
Calcium (g/dL)							-0.008	0.731
Phosphate (g/dL)							-0.04	0.073

data among the predictors of HRQOL, we observed no statistically significant differences (data not shown).

Sensitivity analyses were performed for the study group ($n = 1624$), for the group of patients who did not complete 90 days ($n = 867$), and for the group of the patients who did not complete 180 days ($n = 331$). In those analyses, we observed no statistically significant differences in regard to socio-demographic and clinical characteristics. Demographic, clinical, educational, and economic parameters were not different between the 1624 patients included in the multivariate regression analysis and the 415 patients excluded from the study because they lacked an SF-36 evaluation at baseline.

DISCUSSION

The most important findings of this study are that family income and education level did not significantly affect HRQOL in a large cohort of PD patients in Brazil. In addition, the results of the present study indicate that HRQOL, as evaluated by SF-36 scores in all incident PD patients, was low at baseline and remained unchanged 12 months after the initiation of PD therapy.

Compared with people in the general population, patients with CKD (dialysis and pre-dialysis) experience reduced HRQOL. The present study assessed whether education level and family income were associated with baseline and longitudinal changes in HRQOL scores during the first year of PD therapy. Differences in the assessment of physical performance were observed when the two study instruments were used. The physical performance of patients, as assessed by health professionals using the Karnofsky index, was scored higher than was a self-assessment of HRQOL using the SF-36. These findings emphasize the importance of incorporating patient-reported outcomes into assessments of HRQOL. The HRQOL is defined as an individual's perception of their position in life within the context of the cultural and value systems in which they live and in relation to personal goals, expectations, and concerns. It involves a consideration of issues such as subjectivity and multidimensionality, and also the presence of positive and negative dimensions (34). It is therefore a multifactorial and subjective concept, which should be evaluated by the individual rather than by a health care provider.

The results of the present study raise the question of whether differences in the appraisal of HRQOL may be inversely related to the depth of the relationship between the health professional and the patient and also to the quantity and manner in which CKD and RRT information is conveyed to patients.

In univariate analysis, a lower education level was negatively associated with one of the eight SF-36 domains at the beginning of the PD and with five of those domains after 1 year on PD. In multivariate analysis, those differences disappeared, and no changes in HRQOL were attributed to differences in education status. In addition, economic status did not correlate with any HRQOL measure in either univariate or multivariate analysis.

In another BRAZPD publication with incident PD patients, Martin *et al.* (27) reported that education level was associated with risk for a first peritonitis episode, independent of socio-economic status, PD modality, and comorbidities. Thus, the education level of patients may be important in how training programs are presented to patients, but not in the perception patients have of their quality of life. Earlier studies from BRAZPD have also suggested that patient and technique failure are both unaffected by the economic status of the patient (28). The present study suggests that the HRQOL of PD patients is also unaffected by economic status.

Finally, as predictors, family income and education level did not significantly affect HRQOL. In the DOPPS, which considered HD patients from the United States, Japan, and Europe, lower education and income were significantly associated with reduced scores for the physical and mental components of HRQOL (20). In Brazil, Sesso *et al.* (21) evaluated a single center and concluded that socio-economic status was an important factor associated with HRQOL in patients on HD. Recently, de Andrade Bastos *et al.* (28) reported that family income is not a determining factor for either the selection of dialysis technique or patient survival among incident PD patients of the BRAZPD cohort. The DOPPS cohort showed important sociodemographic and cultural differences from our Brazilian PD cohort and from the Brazilian single-center study (21) with only HD patients. Future studies that pool data from racially, socio-demographically, and culturally different dialysis populations may help to better illuminate the causes of these ambiguities.

The main limitation of the present study is the decrease in the number of patients who completed 12 months of observation. This difficulty is in part related to the intrinsic design of the study, which was a dynamic cohort. In addition, patients died or dropped out of the study for a variety of other reasons; it is possible that the patients remaining in the study were those who were doing well, which may therefore contribute to the lack of change in HRQOL noted in the patients 12 months after they started PD. The latter concern is not a specific limitation of the study, because few published studies have evaluated HRQOL in PD patients more than once (12,14). Bakewell *et al.* (12) analyzed HRQOL in 88 PD

patients during a follow-up period of 36 months, but only 20 patients could be evaluated at 36 months (the end of the study period). Termorshuizen *et al.* (14), in a study performed in the Netherlands that enrolled 413 patients at baseline, showed the same type of course. At 24 months of study, 122 patients were evaluated for HRQOL, and at 36 months, only 31 patients were evaluated for HRQOL. In fact, of 413 patients enrolled at baseline, only 31 completed all three HRQOL evaluations over the 36 months of the study.

A strength of the present study is the number of patients followed, and the fact that sensitivity analyses did not show differences in a comparison of sociodemographic and clinical data between the patients who were included and not included.

CONCLUSIONS

An important and novel finding of the present study is that, as predictors, family income and education level did not significantly affect HRQOL, supporting the idea that socio-economic status should not be a barrier to the selection of PD as a treatment modality in Brazilian patients.

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