Factors associated with the quality of life of adults subjected to hemodialysis in a city in northeast Brazil

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ABSTRACT

Introduction: There is a known association between low scores for quality of life (QOL) and higher rates of hospitalization, mortality in hemodialysis vascular access catheter, older age, lack of regular occupation, presence of comorbidities and hypoalbuminemia. There is still no agreement about the influence of sex, educational level, socioeconomic status and treatment time on the worst levels of QOL. **Objective:** Identify socioeconomic, demographic, clinical, nutritional and laboratory factors associated with worse QOL in adults undergoing hemodialysis in Sao Luís, Maranhão, Brazil. **Methods:** A cross-sectional study which evaluated the QOL of patients with chronic renal disease, aged 20-59 years, undergoing hemodialysis. Two instruments were used: the Kidney Disease Quality of Life - Short Form 1.3 (KDQOL-SF™ 1.3) and a questionnaire on socioeconomic, demographic, clinical, nutritional and laboratory data. The reliability of KDQOL-SF™ 1.3 was assessed by Cronbach's alpha. For the multivariable analysis a Poisson regression model with robust adjustment of the standard error was used. Results: The reliability assessment of KDQOL-SF™ 1.3 showed a Cronbach's alpha test greater than 0.8 in all areas. The areas with the worst levels of QOL were "work situation", "burden of kidney disease", "patient satisfaction", "physical function" and "general health". Having less than 8 years of schooling, coming from the countryside and having cardiovascular disease were associated to the areas with the worst levels of QOL. **Conclusions:** KDQOL-SF™ 1.3 is a reliable instrument to measure quality of life of hemodialysis patients. Demographic and clinical conditions can negatively influence QOL in chronic renal failure patients.

Keywords: kidney diseases; quality of life; renal dialysis.

INTRODUCTION

End-stage renal disease (ESRD) has been attaining global importance as a public health problem. It is estimated, according to data from the Brazilian Society of Nephrology, that in Brazil there are 91,314 patients undergoing dialysis treatment, with an increase of 114.4% in the number of cases from 2000 to 2011.[1]

ESRD is characterized by the presence of renal lesions associated or not with a decrease in the glomerular filtration rate to less than 60 mL/min/1.73 m^2 for a period of three months or longer. With the progression of the disease, renal replacement therapy is used,[2] dialysis or transplant, that provide relief from symptoms and preserve the life of the patient, but they are not curative.[3] Hemodialysis (HD) is the method most commonly used,[4] however, it produces a negative impact on the patient's quality of life (QOL).[5]

Ciconelli[6] stated that the assessment of QOL is based on the individual's perception their health, which is also influenced by the context. Studies have revealed association between various risk factors and poor QOL scores in patients with chronic renal failure. Lopes *et al.*[7] and Barbosa[8] observed worse QOL scores associated with vascular access catheter, presence of comorbidities, educational level and lack of regular occupation. In addition, sex and age were identified as factors associated with worse QOL in research of Barbosa[8] and Moreira[9].

Worth noting that some of these factors associated with worse QOL are

responsive to treatment when identified at the beginning of treatment, which can favorably influence the experience and the progress of the disease.[10]

This study aimed to identify socioeconomic, demographic, nutritional and laboratory factors associated with poor QOL in adults undergoing HD treatment in the city of São Luis, Maranhão, Brazil. The age group from 20 to 59 years old was chosen because it represents the productive age group that experiences a greater impact of the disease on their daily lives.

Methods

A cross-sectional study was conducted with chronic renal patients undergoing HD treatment in São Luís. The study was authorized by the Research Ethics Committee of the University Hospital of the Federal University of Maranhão (HUUFMA), and the participating patients were required to sign a consent form (Protocol 262/2008).

The study included adults of both sexes who had been undergoing HD treatment for at least three months at the HUUFMA or at the Maranhão Nephrology Center (CENEFRON). These two centers account for 85% of the total population on dialysis treatment in this city. The third center serves only 15% of patients, mostly elderly, and refused to participate in this study.

The minimum period of observation was determined to exclude patients at the beginning of the dialysis treatment, given the clinical instability and the psychological influences associated with the recent interruption in activities, which can affect the QOL assessment. This practice has been adopted in other studies.[11,12]

The total number of adults enrolled in a program of regular HD treatment in the two centers of this research was 332 individuals, 79 in HUUFMA and 253 in CENEFRON. Hospitalized subjects (n = 1), individuals that had an amputated limb (n = 2), severe visual impairment (n = 11), difficulties in communicating (n = 10) and/or severe neurological sequelae (n = 2) were not included in the study. Thus 306 patients were eligible for study. Of these, two were transferred to other states, six refused to participate in the study, two had temporary suspension of HD and five died, representing a loss of 5.9%. The total number of research participants was 291.

The outcome of interest was QOL. It was measured by a specific instrument for assessing QOL of people on dialysis (KDQOL-SF™ 1.3). It has 80 items and consists of a generic instrument (SF-36), plus 43 specific items for CKD.[13] Its analysis can be performed by the formation of 19 scales, 11 being specific to CKD (list of symptoms/problems, effects of kidney disease, professional role, cognitive function, quality of social interaction, sexual function, sleep, social support, encouragement by the dialysis staff and patient satisfaction) and eight referring to the SF-36 (physical functioning, physical function, pain, general health, emotional well-being, emotional function, social function, energy/fatigue)[7]. The questions of KDQOL-SF™ 1.3 were read by the researchers using a support material that allowed better visualization and easier for the patients to answer.

Two questions of KDQOL-SF™ 1.3 were analyzed separately, were not part of the formation of any domain and were only analyzed descriptively by the use of percentages: item number two, which refers to the comparison of current health to the health of the patient a year ago, and item number 22, a scale from zero to ten that evaluates current general health.[14] Thus, these items were not part of the risk factor analysis.

Each KDQOL-SF™ 1.3 domain varies from zero to one hundred, in which the higher scores are associated with better perceptions about QOL.[13,14] Values equal or below the median score for each domain (≤ 50) were considered low QOL.

A structured questionnaire developed for this study, which contained socioeconomic and demographic items, was administered to the participants. Skin color was self-reported according to the Brazilian Institute of Geography and Statistics (IBGE). Place of birth, marital status of the patient and number of inhabitants per household were also verified. Level of schooling was evaluated as the number of years during which school was attended; this was categorized as ≤ 8 and > 8 years. The patient was allocated to a specific class according to the socioeconomic situation based on the Brazil Criteria of Economic Classification (CCEB) of the Brazilian Association of Research Companies (ABEP); this was categorized as A - B class, C class and D -E class. Every patient that declared having smoked in the last six months was considered a smoker, and patients that had ingested alcoholic beverages in the last six months were included in the alcohol consumption group.

Data were collected from January to July of 2009. Both tools were administered during the HD session, a practice that was also adopted in other studies, specially due to the length of time that the patient remained in the treatment unit.[15,16]

Anthropometric examination was also conducted. Clinical and laboratory data were obtained from the patient's records. The exams are conducted monthly by the service routine. Only serum albumin is measured every three months. The exam results closest to the date in which the questionnaire was administered to the patients were used. The underlying disease, length of dialysis treatment, presence and number of comorbidities, weight (kg), height (m), serum albumin levels, and hemoglobin levels (g/dL) were determined. The length of dialysis treatment was evaluated in years. The cutoff points adopted for the serum albumin levels, and hemoglobin levels were < 4 g/dL and ≥ 4 g/dL[17] and < 11 g/dL and ≥ 11 g/dL, respectively.[18] The adequacy of the dialysis was evaluated by the Kt/V single pool according to a formula by Daugirdas.

The nutritional status was evaluated by the body mass index (BMI), which is the weight divided by the height squared. The weight used was the average weight registered in the last three sessions of HD. The cutoff points adopted were less than 18.5 kg/m² for low weight, between 18.5 kg/m² and 24.9 kg/m² for normal weight and ≥ 25 kg/m² for overweight/obesity.

In the descriptive analysis, the categorical variables were presented using frequencies and percentages and the quantitative variables using the mean and standard deviation (mean ± SD). The divisions of the KDQOL-SF™1.3 were presented by the median (Md), minimum and maximum because they did not show a normal distribution.

To identify factors associated with worse levels of QOL, a Poisson regression model, with robust adjustment of standard error was used. Socioeconomic, demographic, nutritional and laboratory data were included as explanatory variables. The following were selected for univariable analysis: sex, age, origin, marital status, schooling, number of inhabitants per household, alcohol consumption, length of HD treatment, BMI, hemoglobin, Kt/V, serum albumin and presence of cardiovascular disease (CVD), hypertension and diabetes mellitus (DM).

The reliability of KDQOL-SF™1.3 was assessed using the Crobach's alpha test. A 5% significance level was adopted. The variables that showed a *p*-value smaller than 0.20 in univariable analysis were considered in the multivariable model. Only variables with a *p*-value smaller than 0.05 remained in the final model. The prevalence rate (PR) and their respective 95% confidence intervals (CI) were also estimated. The data were analyzed using the statistical program STATA 10.0.

Results

Male patients (55.3%) in the 40 to 59 years old age group (63.9%) who were married (56.0%), of (60.5%) and who lived instate (63.6%) were predominant in the study. There was a greater prevalence of individuals with incomplete elementary school (1st to 8th grade; 69.4%), and belonging to the economic classes D and E (48.1%), while 39.2% belonged to class C. As for the number of inhabitants per household, 31.0% of the interviewees lived with up to three people. The percentage of smokers was 7.6%, and the percentage of those who had consumed alcohol within the last six months was 8.3% (Table 1).

The average length of HD treatment was 3.3 ± 3.3 years, and the main underlying disease was hypertension (33.7%), followed by DM (22.3%). Hypertension was the most frequent comorbidity (86.2%). The evaluation of the nutritional status revealed normal weight in 62.9% of the individuals, based on the BMI, and the laboratory exams revealed low levels of hemoglobin in 63.6% and low levels of albumin in 85.3% of interviewees. Patients with good levels of dialysis were predominant and had a Kt/V ≥ 1.2 (93.8%) (Table 1).

The reliability assessment of KDQOL-SF™1.3 showed a Cronbach's alpha test greater than 0.8 in all areas. All response options were considered by the patients in question two (question referring to the SF-36). The options "general current health much better now than a year ago" and "a little better now" had similar percentages (27.8%) and were more common. The items that referred to a worsening of the current health condition when compared to the year before, "a little worse now" (12.7%) and "a lot worse now" (10.0%), corresponded to close to one third of the response options. The absence of change in health condition was affirmed by 21.7% of patients.

When the scale of question 22 (specific scale for renal disease), which evaluates the current health state,

Table 1 Characteristics of patients subjected to hemodialysis in the city of São Luís - MA in 2009

Variable	Total (n = 291)		Mean ± SD
	n	%	
Sex			
Male	161	55.3	
Female	130	44.7	
Age (years)			
20-39	105	36.1	
40-60	186	63.9	
Origin			
Capital	92	31.6	
Countryside	185	63.6	
Other states	14	4.8	
Marital status			
Single	90	30.9	
Married/consensual union	163	56.0	
Separated/widowed	38	13.1	
Education (years)			
≤ 8	202	69.4	
> 8	89	30.6	
Brazilian criteria for economic classification			
Classes A-B	37	12.7	
Class C	114	39.2	
Classes D-E	140	48.1	
Inhabitants per household			
1	81	27.8	
2-3	90	30.9	
4-5	50	17.2	
≥ 6	70	24.1	
Alcohol consumption (in the last 6 months)			
Yes	24	8.3	
No	267	91.7	
Duration of hemodialysis (years)			3.3 ± 3.3
< 1	22	7.6	
≥ 1 and < 3	145	49.8	
≥ 3 and < 5	56	19.2	
≥ 5	68	23.4	
Comorbidity			
Hypertension	250	86.2	
Diabetes mellitus	70	24.2	
Cardiovascular Disease	61	21.0	
Other comorbidity	29	10.0	
Body mass index (kg/m²)			
< 18.5	39	13.4	
≥ 18.5 e < 25	183	62.9	
≥ 25	69	23.7	

Continued Table 1

Hemoglobin (g/dL)			10.2 ± 1.9
< 11	185	63.6	
≥ 11	106	36.4	
Albumin (g/dL)*			3.2 ± 0.6
< 4	237	85.3	
≥ 4	41	14.7	
Kt/V			1.5 ± 0.3
< 1.2	18	6.2	
≥ 1.2	273	93.8	

* n less than 291; BMI: body mass index; Kt/V: The dialyzer clearance of urea; MA: Maranhão.

was considered, 3.8% of patients answered "the worst possible" and 11.3% evaluated it as the best possible. An average state of health, between worst and best, was indicated by 84.9% of patients.

The median values of KDQOL-SF™ 1.3 domains are shown in Table 2. "working situation", "burden of kidney disease", "patient satisfaction", "physical function" and "general health" were the areas that showed lower levels of QOL.

Table 2 Scores of the variables of KDQOL-SF™ 1.3 for hemodialysis patients in the city of São Luís - MA in 2009

Variable	Median (n = 291)
List of symptoms/problems	81.2
Effects of renal disease	65.6
Burden of kidney disease	43.7
Work situation	0.0
Cognitive function	93.3
Quality of social interaction	80.0
Sexual function	100.0
Sleep	75.0
Social support	83.3
Incentive by the dialysis team	75.0
Patient satisfaction	50.0
Physical functioning	70.0
Physical function	50.0
Pain	70.0
General health	50.0
Emotional well-being	76.0
Emotional function	66.4
Social function	87.5
Energy/fatigue	65.0

Table 3 presents the unadjusted and adjusted analysis. It was observed that, after adjustment, worse levels of QOL in the domain "work situation" was statistically associated to schooling ≤ 8 years (PR = 1.26, CI = 1.09 to 1.45). "Physical function" was associated with "schooling ≤ 8 years" (PR = 1.30, CI = 1.04-1.64) and "origin from the countryside of MA" (PR = 1.47; CI = 1.06 to 2.03). Worst level in the domain "burden of kidney disease" was associated with "presence of CVD" (PR = 1.23; CI = 1.01 to 1.45) and in the domain "satisfaction patient" with 'origin from the countryside of MA' (PR = 1.47; CI = 1.06 to 2.03). The domain 'general health' did not show statistical associations with study variables after adjustment. Sex and duration of dialysis treatment were not associated with QOL.

Discussion

The areas with the lowest levels of QOL (Md ≤ 50) were employment status, burden of kidney disease, general health, patient satisfaction and physical function. Factors associated with "work situation" were "schooling ≤ 8 years" and "female sex". The "physical function" was associated with "schooling ≤ 8 years" and "presence of DM". The "burden of kidney disease" was associated with "presence of CVD" and "schooling ≤ 8 years".

Other studies that evaluated the QOL of renal patients undergoing HD in different regions of Brazil by KDQOL-SF™ 1.3 also showed a greater commitment in the domains 'work situation', 'burden of kidney disease' and 'physical function'.[9,19] Similar results were identified in international studies.[16,20]

The issues related to "physical function" evaluate the limitations and their intensity in the type and quantity of work performed or in execution of other activities. Studies have shown commitment in this dimension ranging from low to intermediate levels,[9,16] possibly due to the frequent complaints of physical weakness, fatigue, malaise and general discomfort with the treatment.[5]

Table 3 Variables of the KDQOL-SF™ 1.3 that showed significant relationships with socioeconomic, demographic, nutritional and laboratory characteristics of patients subjected to hemodialysis in the city of São Luís - MA in 2009

Variables		Non-adjusted (n = 291)			Adjusted (n = 291)		
		RP	95% CI	*p*-value	RP	95% CI	*p*-value
Burden of kidney disease							
Comorbidity - CVD	No						
	Yes	1.31	1.12-1.53	0.001	1.23	1.01-1.45	0.037
Work situation							
Education	> 8 years						
	≤ 8 years	1.37	1.19-1.59	< 0.001	1.26	1.09-1.45	0.001
Patient satisfaction							
Origin				0.033			0.053
	Capital	1.14	0.90-1.46		1.09	0.86-1.39	
	Countryside	1.57	1.11-2.21		1.47	1.06-2.03	
Physical function							
Education	> 8 anos						
	≤ 8anos	1.38	1.10-1.73	0.005	1.30	1.04-1.64	0.022
Origin							0.048
	Capital				1.22	1.00-1.50	
	Countryside				0.62	0.26-1.46	

CVD: Cardiovascular Disease; MA: Maranhao.

Carreira & Marcon[21] reported that after the hemodialysis, it took the patient approximately two hour to recover from the immediate symptoms resulting from treatment. These authors associate the presence of physical symptoms to the difficulty in maintaining employment, which can be extended to the limitations in activities related to paid informal job market. These limitations on job opportunities are also arising from the compulsory presence of patients at the dialysis center three times a week for a period of four hours per session, without prospect of suspension of dialysis.[22] The context of treatment alone or associated with physical symptoms may contribute to the perception of disease burden.

Van Manen *et al.*[20] point out that the biggest impact of HD on patients can be attributed to a strong sense of overload and frustration due to disease and the difficulty of maintaining a paid job.

Studies regarding the domain "general health" have found intermediate levels of QOL.[8,16,23] This study was also observed commitment of this domain. It seems that the patient in dialysis feels unhealthy all the time, determining the negative perception mentioned by half the population of this study. This may result from an extension of therapeutic care in addition to hemodialysis. It often involves dietary restrictions, medications and vascular access care.

The domain "patient satisfaction" showed lower level of QOL in this study, and was associated with patients' origin. Other studies showed higher levels.[9,23] The variable origin, although not included in many trials, here was studied taking into account the need to travel to the capital, given the limited availability of HD services within Maranhão state. It is likely that the need for continuous movement from the countryside to perform hemodialysis in the capital, three times a week, creates disorder on patients' lives. One should take into account the territorial dimension and geographical conditions of the Maranhão beyond the issues involved in this shift as type and conditions of transport, duration of travel, risk on the roads, change in diet, being away from family, feelings of anxiety and dissatisfaction. This condition may explain the impairment in domain "patient satisfaction" observed in this study.

Another risk factor that had a negative influence on QOL was to be low educational level. National[9,24] and international[25,26] studies identified this same association. Moreira *et al.*[9] suggest that the higher the level of education, the greater access to information and the better the economic conditions, thus these subjects more assertively assess traumatic events.

It is also assumed that people with higher education tend to develop activities that require more

intellectual functions over those that require greater physical effort, whether at home or work. Thus, the association observed in this study can be attributed to the fact that people on dialysis with less education probably feel more acutely the impact of CKD in the development of their activities.

The presence of comorbidities has also been implicated as being threatening to the QOL.[7,10] In the case of CVD, the association with lower scores of QOL has been reported.[7,22] Data from this study suggest that people with CVD are likely to face the context of CKD with greater difficulty and perceive it as a burden. Medeiros & Pinent[10] note that due to cardiovascular limitation, those with renal failure have physical difficulties to carry out their daily activities and to meet the requirements of treatment and self-care.

Strong points of this research were the population-based study design that evaluated the association between various factors and worse levels of QOL, so that specific therapeutic measures are outlined to mitigate the negative impact of CKD on the lives of these patients. The variation of the techniques used for laboratory analysis between the centers represented a difficulty, which is common in population studies.

Conclusion

KDQOL-SF™ 1.3 is an important issue to avaliable the QOL in patients with chronic kidney disease undergoing hemodialysis. The areas with the lowest levels of QOL were "work situation", "burden of kidney disease", "general health", "patient satisfaction" and "physical function". Schooling ≤ 8 years, residence in the countryside and presence of CVD was associated to areas with the worst levels of QOL. Demographic and clinical conditions can negatively influence QOL in chronic renal failure patients. Thus, the renal patient care should consider the comorbidities, the level of education, and conditions of access to treatment site, especially patients coming from the countryside of State.

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