Sonia Faria Mendes Braga[I]

Sérgio Viana Peixoto[I,II]

Isabel Cristina Gomes[II]

Francisco de Assis Acúrcio[II]

Eli Iola Gurgel Andrade[II]

Mariângela Leal Cherchiglia[II]

Factors associated with health-related quality of life in elderly patients on hemodialysis

ABSTRACT

OBJECTIVE: To identify factors associated with health-related quality of life in elderly patients on hemodialysis.

METHODS: Cross-sectional study including 223 patients aged ≥ 60 years on hemodialysis conducted in dialysis centers in the city of Belo Horizonte, southeastern Brazil, in 2008. Health-related quality of life was measured with the Kidney Disease Quality of Life Short Form (KDQOL-SF) and the Medical Outcomes Study 36-Item Short-Form Health Survey (MOS SF-36). The three KDQOL-SF component scores measured were: kidney disease component summary (11 subscales), physical component summary (four subscales) and mental component summary (four subscales).

RESULTS: Significant independent negative associations were found between the kidney disease and mental components and number of chronic diseases and treatment duration. A lower physical component was seen among women, those with more advanced age, more hospital admissions, and three or more chronic diseases.

CONCLUSIONS: The finding that health-related quality of life was consistently associated with chronic diseases points to the importance of the morbidity profile in elderly patients on hemodialysis. The associated factors identified including advanced age, female gender, number of hospital admissions and treatment duration can provide input for planning health actions that can more adequately meet this populations' needs.

DESCRIPTORS: Aged. Quality of Life. Renal Dialysis. Sickness Impact Profile. Kidney Failure, Chronic. Comorbidity.

INTRODUCTION

Improvements in dialysis therapy have increased survival of patients with end-stage renal disease (ESRD). Despite that, the level of health-related quality of life (HRQoL) for these patients is much lower than that for the general population. HRQoL is a major factor that needs to be investigated as dialysis is intended not only to prolong survival but also improve quality of life (QoL) of patients.[3,13,19]

HRQoL has recently become a major indicator of health and well-being of patients with kidney disease. HRQoL is often assessed to determine the effectiveness of health care and treatment provided, as well as resource allocation and development of health policies.[19] Hemodialysis is a treatment modality for an increasing number of patients with ESRD in Brazil[9,23] with many factors associated that can affect HRQoL in this population.

[I] Centro de Pesquisas René Rachou. Fundação Oswaldo Cruz. Belo Horizonte, MG, Brasil

[II] Universidade Federal de Minas Gerais. Belo Horizonte, MG, Brasil

Correspondence:
Sonia Faria Mendes Braga
Avenida Alfredo Balena, 190
30130-100, Belo Horizonte, MG, Brasil
E-mail: sonia.fm.braga@gmail.com

An increase in life expectancy has been seen in Brazil in parallel to the worldwide trend. Improvements in the treatment of ESRD and dialysis care have promoted an ongoing growth of elderly patients undergoing dialysis as well as increased survival of dialysis patients. Besides, the number of patients transitioning from dialysis to kidney transplantation in Brazil is still very low.[9,23]

According to the Brazilian Society of Nephrology, today nearly 30% of patients on dialysis are elderly.[23] The elderly patients on hemodialysis have unique clinical characteristics that require to be addressed. In general, these patients have more comorbid conditions and higher rates of hospital admissions, require more drug treatment and utilize health services proportionally more than younger populations.[11] Despite the increasing number of elderly patients on hemodialysis and their increased survival, the data available on their QoL is scarce in Brazil. There is a need for studies that address the main variables of HRQoL in this group of patients that can guide interventions to improve health in this population.

The current study aimed to identify factors associated with HRQoL of elderly patients on hemodialysis.

METHODS

A cross-sectional study was conducted with data collected from all 12 dialysis units of the Brazilian National Health System (*Sistema Único de Saúde* – SUS) in the city of Belo Horizonte, southeastern Brazil. This substudy is part of a large study entitled "An Economic and Epidemiological Assessment of Renal Replacement Therapies in Brazil – TRS Project," conducted by the Research Group on Health Economics at Universidade Federal de Minas Gerais (UFMG).[1]

The primary study included all patients over 18 years of age who initiated dialysis between January 1st, 2006 and December 31, 2007, and received treatment for at least three months and had no history of prior kidney transplant. There were excluded form the study patients who were not capable of answering the study questionnaire (difficulty understanding the questions; visual or hearing impairment); patients who refused to participate; patients who were not found after three attempts; hospitalized patients; patients who no longer required dialysis (diagnosed with acute renal failure); those who moved to another city or were lost to follow up; and patients who completed less than 50% of the questionnaire.

Of all patients approached (n = 707), 29 did not meet the inclusion criteria and 678 were interviewed, of which 223 were elderly (60 years and older).

The patients were interviewed during their hemodialysis session, and a questionnaire was used to collect demographic, socioeconomic and clinical information. The following instruments were used for assessing quality of life: Kidney Disease Quality of Life Short Form (KDQOL-SF)[4] and the Short Form-36 Health Survey (SF-36).[2] These instruments were translated into Brazilian Portuguese and validated for Brazilian population.[2,4] All interviews were conducted between February and April 2008.

The study variables included: gender; age/age group (years); skin color (white / nonwhite); marital status (married / not married); children (yes / no); level of education (years of schooling); current employment status (yes / no); living alone (yes / no); health insurance (yes / no); treatment coverage (SUS – public / private insurance); personal and per capita household income (in quartiles); duration of treatment (months); number of hospital admissions in the previous year; number of drugs used; selected self-reported comorbidities; and kind of vascular access at baseline (arteriovenous fistula / venous catheter).

The KDQOL-SF[6] consists of generic and specific measures for patients with kidney disease. The generic part was based on the SF-36 questions[25] and comprised eight dimensions: physical functioning; role-physical (role limitations as a result of physical health problems); bodily pain; overall health rating (patient's perception of their physical health status); role-emotional (limitations due to emotional problems); social functioning; emotional well-being; and vitality (fatigue/energy) as a result of the patient's mental status. The SF-36 scores were used to construct the physical component summary (PCS) and mental component summary (MCS) measures based on the manual and program developed by the instrument's authors.[a]

The patients' scores in the specific part of KDQOL-SF allowed to determining the kidney disease component summary (KDCS) by averaging the instrument's 11 dimensions. These dimensions are related to kidney disease and dialysis: list of symptoms/problems; effects of kidney disease on daily life; burden of kidney disease; work status; cognitive function; quality of social interactions; sexual function; sleep; social support; dialysis staff encouragement; and patient satisfaction. The questionnaire was coded following the Manual for Use and Scoring of the Kidney Disease Quality of Life – Short Form (KDQOL – SF 1.3).[b] For the evaluation of results, each item (or question) is scored and then converted into a 0 to 100 scale, where 0 indicates the worst QoL and 100 the best QoL.

[a] Hays RD, Kallich JD, Mapes DL, Coons SJ, Amin N, Carter WB, et al. Kidney Disease Quality of Life Short Form (KDQOL-SF™), version 1.3: a manual for use and scoring. Santa Monica: RAND; 1997 [cited 2011 Aug 17]. Available from: http://www.rand.org/pubs/papers/2006/P7994.pdf
[b] Ware JE, Snow KK, Kosinski M, Gandex B. SF 36 health survey: manual and interpretation guide. Boston: The Health Institute, New England Medical Center Hospital; 1993.

Table 1. Characteristics of elderly patients on hemodialysis. Belo Horizonte, Southeastern Brazil, 2006–2007.

Variable	n	%
Age group (years)		
60–69	123	55.2
70–79	77	34.5
80 or more	23	10.3
Gender		
Male	126	56.5
Female	97	43.5
Marital status		
Married	132	59.2
Not married	91	40.8
Self-referred skin color		
White	86	39.5
Nonwhite	132	60.5
Children		
Yes	205	91.9
No	18	8.1
Living alone		
Yes	24	10.7
No	199	89.3
Current employment status		
Employed	21	9.4
Unemployed	202	90.6
Level of education (years of schooling)		
0	33	14.8
1-4	106	47.5
≥5	84	37.7
Personal income (quartiles) (R$)		
First (≤415.00)	63	34.0
Second (415.01–710.00)	30	16.2
Third (710.01–1,470.50)	46	24.9
Fourth (≥ 1,470.51)	46	24.9
Per capita household income (quartile) (R$)		
First (≤278.93)	34	25.0
Second (278.94–470.83)	34	25.0
Third (470.84–965.00)	34	25.0
Fourth (≥965.01)	34	25.0
Type of vascular access (at baseline)		
Arteriovenous fistula	67	30.5
Venous catheter	153	69.5
Health insurance		
Yes	111	50.0
No	111	50.0
Treatment coverage		
SUS– public	145	67.1
Private	71	32.8

To be continued

Table 1 continuation

Variable	n	%
Number of hospital admissions in the last year		
0	118	55.1
1	56	26.2
≥2	40	18.7
Number of drugs used		
≤3	50	26.3
4–6	82	43.2
≥7	58	30.5
Number of chronic diseases		
0–1	50	23.7
2	70	33.2
3	52	24.6
≥4	39	18.5
Self-reported chronic diseases		
Hypertension	196	88.3
Diabetes	108	48.9
Heart disease	57	25.8
Depression	42	18.9
Stroke	23	10.4
Arthritis	19	8.5
Duration of treatment (months)		
4–12	82	36.8
13–24	108	48.4
25-34	33	14.8

The study variables were described as frequencies for categorical variables (demographic/socioeconomic and clinical) and measures of central tendency (mean and median), variability (standard deviation, SD) and position (minimum and maximum) for generic and specific dimensions of quality of life.

The association between each factor and summary scores (PCS, MCS and KDCS) were analyzed using simple linear regression models. The variables with $p < 0.20$ were included in the multiple linear regression model and those that were significantly associated ($p < 0.05$) were retained in the model. The variables age, gender and duration of treatment were included in all models regardless of their statistical significance because of the relevance of these factors in determining QoL of patients. The quality of fit of the model was assessed using the adjusted coefficient of determination, F-statistic and residual analysis. For all three models, the residual analysis showed that regression was fit to the data given the assumptions of homoskedasticity and linear relationship between variables. All analyses were performed in R software version 2.7.2.

Table 2. Generic and specific dimension of the Kidney Disease Quality of Life – Short Form in elderly patients on hemodialysis. Belo Horizonte, Southeastern Brazil, 2006–2007.

Dimension	Mean	Standard deviation	Median	Minimum	Maximum
Specific					
List de symptoms/problems	78.94	16.75	83.33	27.08	100.00
Effects of kidney disease on daily life	71.00	19.56	71.87	3.12	100.00
Burden of kidney disease	40.95	28.60	43.75	0.00	100.00
Work status	25.11	31.79	0.00	0.00	100.00
Cognitive function	84.78	20.72	93.33	6.66	100.00
Quality of social interaction	84.72	18.63	93.33	0.00	100.00
Sexual function[a]	84.84	24.99	100.00	25.00	100.00
Sleep	71.16	22.21	75.00	5.00	100.00
Social support	88.19	23.35	100.00	0.00	100.00
Dialysis staff encouragement	78.64	27.13	87.50	0.00	100.00
Patient satisfaction	67.04	18.68	66.66	16.66	100.00
KDCS	69.27	11.82	71.37	16.72	97.08
Generic (SF-36)					
Physical functioning	45.73	30.13	45.00	0.00	100.00
Role-physical	40.58	39.21	25.00	0.00	100.00
Bodily pain	69.64	30.85	77.50	8.00	100.00
Overall health rating	60.89	21.80	65.00	0.00	100.00
Emotional well-being	74.99	21.43	80.00	8.00	100.00
Role-emotional	63.82	42.17	100.00	0.00	100.00
Social role	70.85	29.00	75.00	0.00	100.00
Energy/fatigue	64.08	24.55	70.00	0.00	100.00
PCS	38.28	9.11	38.12	15.38	57.57
MCS	41.45	9.88	42.84	11.73	61.00

[a] n = 47

KDCS: kidney disease component summary; PCS: physical component summary; MCS: mental component summary.

The study was approved by the Research Ethics Committee of UFMG (protocol #492/06) and René Rachou Research Center at Oswaldo Cruz Foundation (CPqRR/FIOCRUZ) (protocol #11/2008).

RESULTS

Table 1 shows the main demographic/socioeconomic and clinical characteristics of the 223 elderly patients who completed the questionnaire. Their mean age was 69.5 years (SD = 7.1). Most were male, married, nonwhite and had 1 to 4 years of schooling. Most patients were initiated on hemodialysis using a venous catheter and had more than one chronic disease, and hypertension, diabetes and heart disease were the most common conditions.

Table 2 shows the mean, SD, median, minimum and maximum scores in the generic and specific dimensions of the KDQOL-SF as well as KDCS, PCS and MCS measures. In the specific dimensions of the KDQOL-SF the lowest mean scores were: burden of kidney disease

(40.95; SD 28.60); work status (25.11; SD 31.79) and patient satisfaction (67.04; SD 18.68). In the generic dimensions (SF-36) the lowest scores were: physical functioning (45.73; SD 30.13); role-physical (40.58; SD 39.21) and overall health rating (60.89; SD 21.80). The mean KDCS score was 69.27 (SD 11.82), much higher than the mean PCS (38.28; SD 9.11) and MCS scores (41.45; SD 9.88).

Table 3 presents mean summary scores (KDCS, PCS and MCS) and the results of the simple linear regression analysis. The following variables were significantly associated with HRQoL: age, gender and schooling in the model for PCS; number of hospital admissions in the KDCS and PCS, number of drugs used in the PCS; number of chronic diseases for the three components and duration of treatment in the KDCS model.

Table 4 shows the results of the factors associated with the summary components in the multiple linear regression analysis. QoL related to the specific dimensions of kidney disease decreased as the number of self-reported

Table 3. Mean component summary scores of HRQoL according to demographic, socioeconomic and clinical characteristics of elderly patients on hemodialysis. Belo Horizonte, Southeastern Brazil, 2006–2007.

Variable	Component summary					
	Kidney disease	p-value	Physical	p-value	Mental	p-value
Age group (years)		0.555		0.023		0.202
60¬–69	68.87		38.90		40.81	
70–79	69.60		38.94		41.85	
80 or more	70.23		32.66		43.54	
Gender		0.235		0.001		0.496
Male	70.09		40.06		41.85	
Female	68.19		35.96		40.94	
Marital status		0.168		0.227		0.359
Married	70.17		38.89		41.96	
Not married	67.95		37.39		40.72	
Self-referred skin color		0.074		0.267		0.805
White	70.95		32.20		41.10	
Nonwhite	68.01		37.79		41.44	
Children		0.871		0.338		0.110
Yes	69.30		38.10		41.77	
No	68.83		40.25		37.88	
Living alone		0.220		0.274		0.341
Yes	72.06		40.20		39.63	
No	68.93		38.04		41.67	
Current employment status		0.056		0.078		0.298
Employed	73.96		41.62		43.59	
Unemployed	68.78		37.93		41.23	
Level of education (years of schooling)		0.145		0.035		0.995
0	68.09		35.18		40.45	
1–4	67.70		38.34		42.07	
>5	71.30		39.40		41.06	
Personal income (quartiles) (R$)		0.314		0.052		0.649
First (≤ 415.00)	69.04		36.76		41.29	
Second (415.01–710.00)	70.19		40.08		43.17	
Third (710.01–1,470.50)	69.46		39.64		41.70	
Fourth (≥1,470.51)	71.63		40.08		40.44	
Per capita household income (quartile) (R$)		0.136		0.570		0.908
First (≤278.93)	68.66		39.16		41.82	
Second (278.94–470.83)	69.93		39.11		39.40	
Third (470.84–965.00)	68.11		38.88		41.37	
Fourth (≥965.01)	73.88		40.59		40.86	
Type of vascular access (at baseline)		0.350		0.093		0.162
Arteriovenous fistula	70.32		39.91		42.79	
Venous catheter	68.70		37.67		40.76	
Health insurance		0.388		0.093		0.162
Yes	69.94		38.76		41.47	
No	68.57		37.90		41.35	
Treatment coverage		0.362		0.150		0.914
SUS–public	68.72		37.69		41.33	
Private	70.30		39.60		41.17	

Table 3 continuation

Variable	Component summary					
	Kidney disease	p-value	Physical	p-value	Mental	p-value
Number of hospital admissions in the last year		0.044		0.003		0.373
0	70.06		39.58		41.52	
1	71.43		39.84		42.59	
≥2	64.54		33.85		39.27	
Number of drugs used		0.622		0.001		0.920
≤3	70.72		41.43		42.09	
4–6	70.73		39.11		42.34	
≥7	69.70		35.79		41.92	
Number of chronic diseases		<0.001		<0.001		0.015
0–1	73.10		41.86		42.53	
2	71.29		40.03		43.50	
3	65.67		37.22		38.47	
≥4	66.16		34.03		39.34	
Duration of treatment (months)		0.001		0.769		0.067
4–12	71.52		38.55		42.86	
13–24	68.97		37.85		41.35	
25–34	64.66		39.02		38.33	

SUS: Brazilian National Health System

diseases and duration of treatment increased. Lower QoL on the physical dimensions was associated with older age, female gender, history of two or more hospital admissions in the previous year and three or more self-reported chronic diseases. The final mental dimension model showed that reporting three or more chronic diseases and longer duration of treatment were significantly associated with lower QoL scores.

DISCUSSION

The profile of the patients studied is similar to that found in other studies involving elderly patients with ESRD on dialysis in Brazil and other countries.[5,9,10,12,18,20,24] The specific dimensions of KDQOL-SF with the lowest mean scores were effects of kidney disease on daily life, burden of kidney disease, work status and patient satisfaction. The generic dimensions of SF-36 with the lowest scores were physical functioning, role-physical, and overall health rating. Other studies with elderly in Brazil[9,20] and in other countries[5,20,12,18,24] also found lower mean scores on both generic and specific dimensions.

The mean PCS score found in the current study was higher than that reported in other studies with elderly patients,[5,12,18,24] while the MCS score was lower. With regard to the KDCS score, Harris et al[5] found better QoL when compared to the elderly in the current study. Studies in adult populations (≥18 years old) found lower PCS and KDCS scores than those seen in among the elderly living in Belo Horizonte. These results show that QoL differs greatly between populations and is consistently different between younger and older elderly patients and among elderly populations from different geographical areas.[12,15-18,20,24] Lower scores were seen with increasing age in some populations[12,15-17,24] and QoL tended to increase among more older patients.[18,20]

A major finding of the current study was that the score difference between PCS and MCS was small (38.28 [SD 9.11] vs. 41.45 [SD 9.88], respectively), which contrast with that found in literature, much higher MCS than PCS scores in elderly on hemodialysis.[5,12,13,17,24] However, the elderly in this study were initiating dialysis (85% were on dialysis for less than 24 months), suggesting that MCS was more affected during this period.

DeOreo[3] compared PCS and MCS scores in dialysis patients older than 18 of both sexes and in the general US population. After stratification by age, the PCS scores in dialysis patients were much lower than in the general population, especially among those over 60 years. According to that author, patients with a mean PCS score below 34 have great impairment such as difficulty walking and climbing stairs. However, there were no major differences between dialysis patients and the general population of same age regarding mean MCS scores. A mean MCS score below 47 indicates impaired mental health of patients. The elderly in the current study had a slightly higher mean PCS score while their MCS score was relatively lower than the literature.

Several studies, including DeOreo study,[3] have showed that the physical component is a strong predictor of mortality in dialysis patients. Knight et al[8] reported a relationship between PCS scores and mortality in patients with ESRD. Mapes et al[15] concluded that the PCS was the component of QoL most strongly associated with mortality. According to Kutner,[10] although physical health status is compromised in elderly patients on dialysis, their mental health status is relatively preserved. There are no studies in Brazil on the impact of PCS and MCS on mortality in elderly patients on hemodialysis and further studies are needed to explore this relationship.

The literature shows that several sociodemographic and clinical factors are associated with HRQoL of patients on dialysis. In the current study, only PCS showed an independent negative association with increasing age and female gender. Despite inconsistencies in the literature regarding the effect of age on QoL of patients on dialysis, the current study showed worsening of the physical component with age, indicating it is a major factor causing limitations in elderly patients. As for gender, QoL tends to be worse among women,[14] a finding that was corroborated in the current study. Women on hemodialysis generally have lower QoL than men due to factors other than clinical ones including difficulty coping with kidney disease, more susceptibility to anemia, anxiety and depressive symptoms with

an association between psychological and social factors. In addition, women on hemodialysis usually continue performing their traditional roles of home making and child caring and thus are exposed to higher levels of physical and mental stress, resulting in lower QoL than men.[14] Some studies have reported more impaired QoL among those with lower income and education,[13,15,22] but this finding was not corroborated in the study population, suggesting that social factors have little influence in determining QoL in this population group.

In addition to sociodemographic factors, there are some clinical characteristics associated with lower QoL including use of multiple drugs, higher rate of hospital admissions and reporting of multiple chronic diseases.[3,15] In the current study, greater number of hospital admissions was associated with lower PCS score, higher number of comorbidities was consistently associated with reduced scores in the three components and longer treatment duration significantly reduced KDCS and MCS scores. The literature suggests that low scores in the three components, especially in PCS, are associated with high risk of death and hospital admission in patients with hemodialysis.[3,15] It is noteworthy that in the study population most patients were not hospitalized (55.1%), suggesting that those with greater number of hospital admissions and lower PCS scores may also be at increased risk of death and should be carefully monitored at dialysis units.

Table 4. Factors associated with quality of life of elderly patients on hemodialysis. Belo Horizonte, Southeastern Brazil, 2006–2007.

Variable	Component summary					
	Kidney disease		Physical		Mental	
	Coefficient	95%CI	Coefficient	95%CI	Coefficient	95%CI
Age (≥80 years old)	-0.05	-0.27; 0.17	-0.33	-0.50; -0.17	0.08	-0.11; 0.27
Gender						
Male	Reference	-	Reference	-	Reference	-
Female	-0.33	-3.52; 2.86	-2.52	-4.88; -0.15	-0.38	-3.13; 2.36
Number of hospital admission						
0	-	-	Reference	-	-	-
1	-	-	-0.48	-3.23; 2.27	-	-
≥2	-	-	-6.71	-9.88; -3.55	-	-
Number of chronic diseases						
0–1	Reference	-	Reference	-	Reference	-
2	-2.37	-6.47; 1.74	-2.18	-5.20; 0.84	0.77	-2.76; 4.30
3	-7.93	-12.37; -3.50	-4.13	-7.44; -0.82	-4.09	-7.91; -0.84
≥4	-8.44	-13.40; -3.48	-7.32	-11.07; -3.56	-3.52	-7.78; -0.74
Duration of treatment (months)	-5.06	-7.67; -2.45	0.08	-1.88; 2.05	-2.25	-4.50; -0.01
Constant	83.95	67.71; 100.20	67.49	55.23; 79.75	40.38	26.42; 54.33
Sample size	211		204		211	
Adjusted r² (%)	10.86		20.35		4.17	
p-value*	< 0.001		< 0.001		0.022	

*p-value for F-statistics

Comorbidities are defined as the occurrence of other conditions in addition to ESRD that consequently affect other organs but can also be causing renal failure such as hypertension and diabetes. This overlapping of conditions have a negative impact on the survival of patients in renal replacement therapy.[7] Most patients studied had hypertension, followed by diabetes and heart disease, and 76.3% had more than two chronic diseases. Consistent with the literature, the presence of other chronic diseases strongly affects QoL of patients on dialysis.[3,5,12,15,17,18,20,24] It is thus crucial to appropriately treat other concomitant conditions as it could help improve QoL of elderly patients on dialysis.

With respect to duration of dialysis treatment, the elderly of this study showed reduced KDCS and MCS scores with increasing treatment duration. Unruh et al[24] in the HEMO Study did not find significant reductions in QoL component scores in the three-year follow-up, suggesting that duration of hemodialysis has little influence on these scores. On the other hand, other studies[3] reported reduced PCS in more elderly patients on hemodialysis while the MCS remained stable after the 5th decade of life, indicating that, compared to younger ones, older patients are more able to adapting themselves to adverse situations because of their life experience.[20] Similarly, Merkus et al[16] in the Netherlands Cooperative Study on the Adequacy of Dialysis showed that hemodialysis patients older than 18 showed reduced physical scores and a trend of stable mental scores over time. A study conducted in Brazil by Santos & Pontes[21] followed up a group of patients aged 18 or more on hemodialysis for a year. They found improvement in the emotional aspects of this population. However, shorter treatment was significantly associated with worsening of the MCS score measured. This findings confirms that found in

our study as the elderly studied were in the beginning of treatment (mean duration of 16 months), suggesting that the mental component is probably reduced in the beginning of dialysis and then improves over time. The KDCS has been little investigated and other studies are needed to further explore the impact of duration of treatment time on this component.

One of the limitations of cross-sectional studies conducted in the elderly is that of survival bias; i.e., patients with more severe disease may have died and those survivors may have been included in the study population. On the other hand, studies on QoL in elderly on hemodialysis are rare and the results from a sample of elderly living in a large Brazilian city can provide a better understanding of factors associated with QoL in this population.

In conclusion, the study results showed that factors such as older age, female gender and number of hospital admissions were significantly associated with lower physical component scores, which is consistent with that reported in the literature. The presence of self-reported chronic diseases was a factor consistently associated with lower QoL in all components evaluated, stressing the importance of knowing the morbidity profile of elderly patients on dialysis to minimize the impact of these conditions on their QoL. Another major finding was the negative impact of duration of treatment on the mental component of QoL, suggesting these aspects are reduced in the beginning of dialysis and then improve over time, which corroborates the literature. The knowledge of factors affecting HRQoL of elderly patients on hemodialysis can help planning adequate health actions and provide better care to this growing population group.

REFERENCES

1. Cherchiglia ML, Guerra Júnior AA, Andrade EIG, Machado CJ, Acúrcio FA, Meira Júnior W et al. A construção da base de dados nacional em Terapia Renal Substitutiva (TRS) centrada no indivíduo: aplicação do método de linkage determinístico-probabilístico. *Rev Bras Estud Popul*. 2007;24(1):163-7. DOI:10.1590/S0102-30982007000100008

2. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Tradução para a língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF 36). *Rev Bras Reumatol*. 1999;39(3):143-50.

3. DeOreo PB. Hemodialysis patient -assessed functional health status predicts continued survival, hospitalization, and dialysis-attendance compliance. *Am J Kidney Dis*. 1997;30(2):204-212.

4. Duarte PS, Miyazaki MCOS, Ciconelli RM, Sesso R. Tradução e adaptação cultural do instrumento de avaliação de qualidade de vida para pacientes renais crônicos (KDQOL-SF™). *Rev Assoc Med Bras*. 2003;49 (4):375-81.DOI:10.1590/S0104-42302003000400027

5. Harris SAC, Lamping DL, Brown EA, Constantinovici N. Clinical outcomes and quality of life in elderly patients on peritoneal dialysis versus hemodialysis. *Perit Dial Int*. 2002;22(4):463-70.

6. Hays RD, Kallich JD, Mapes DL, Coons SJ, Carter WB. Development of the Kidney Disease Quality of Life (KDQOL™) instrument. *Qual Life Res*. 1994;3(5):329-38. DOI:10.1007/BF00451725

7. Khan IH. Comorbidity: the major challenge for survival and quality of life in end renal disease. *Nephrol Dial Transplant*. 1998;13 Suppl 1:76-9. DOI:10.1093/ndt/13.suppl_1.76

8. Knight EL, Ofsthun N, Teng M, Lazarus JM, Curhan GC. The association of mental health, physical function and hemodialysis mortality. *Kidney Int*. 2003;63(5):1843–51. DOI:10.1046/j.1523-1755.2003.00931.x

9. Kusumota L, Marques S, Haas VJ, Rodrigues RAP. Adultos e idosos em hemodiálise: avaliação da qualidade de vida relacionada à saúde. *Acta Paul Enferm.* 2008;21No Espec:152-9. DOI:10.1590/S0103-21002008000500003

10. Kutner NG. Promoting functioning and well-being in older CKD patients: review of recent evidence. *Int Urol Nephrol.* 2008;40(4):1151-8. DOI:10.1007/s11255-008-9469-x

11. Lima-Costa MF, Veras R. Saúde publica e envelhecimento. *Cad Saude Publica.* 2003;19(3):700-1. DOI:10.1590/S0102-311X2003000200038

12. Loos C, Briançon S, Frimat L, Hanesse B, Kessler M. Effect of end-stage renal disease on the quality of life of older patients. *J Am Geriatr Soc.* 2003;51(2):229-33. DOI:10.1046/j.1532-5415.2003.51062.x

13. Lopes AA, Bragg-Gresham JL, Goodkin DA, Fukuhara S, Mapes DL, Young EW, et al. Factors associated with health-related quality of life among hemodialysis patients in the DOPPS. *Qual Life Res.* 2007;16(4):545-57. DOI 10.1007/s11136-006-9143-7

14. Lopes GB, Martins MTS, Matos CM, Amorim JL, Leite EB, Miranda EA, Lopes AA**.** Comparações de medidas de qualidade de vida entre mulheres e homens em hemodiálise. *Rev Assoc Med Bras.* 2007;53(6):506-9. DOI:10.1590/S0104-42302007000600017

15. Mapes DL, Lopes AA, Satayathum S, McCullough KP, Goodkin DA, Locatelli F, et al**.** Health-related quality of life as a predictor of mortality and hospitalization: The Dialysis Outcomes and Practice Patterns Study (DOPPS). *Kidney Int.* 2003;64(1):339–49. DOI:10.1046/j.1523-1755.2003.00072.x

16. Merkus MP, Jager KJ, Dekker FW, De Haan RJ, Boeschoten EW, Krediet RT. Quality of life over time in dialysis: The Netherlands Cooperative Study on the Adequacy of Dialysis. *Kidney Int.* 1999;56(2):720-8. DOI:10.1046/j.1523-1755.1999.00563.x

17. Molsted S, Prescott L, Heaf J, Eidemak I. Assessment and clinical aspects of health-related quality of life in dialysis patients and patients with chronic kidney disease. *Nephron Clin Pract.* 2007;106(1):c24-33. DOI:10.1159/000101481

18. Rebollo, P, Ortega F, Baltar JM, Álvarez-Ude F, Navascués RA, Álvarez-Grande J**.** Is the loss of health-related quality of life during renal replacement therapy lower in elderly patients than in young patients? *Nephrol Dial Transplant.* 2001;16(8):1675-80. DOI:10.1093/ndt/16.8.1675

19. Saban KL, Stroupe KT, Bryant FB, Reda DJ, Browning MM, Hynes DM. Comparison of health-related quality of life measures for chronic renal failure: quality of well-being scale, short-form-6D, and the kidney disease quality of life instrument. *Qual Life Res.* 2008;17(8):1103-15. DOI 10.1007/s11136-008-9387-5

20. Santos PR**.** Relação do sexo e da idade com nível de qualidade de vida em renais crônicos hemodialisados. *Rev Assoc Med Bras.* 2006;52(5):356-9. DOI:10.1590/SO104-4-42302006000500025

21. Santos PR, Pontes LRSK. Mudança do nível de qualidade de vida em portadores de insuficiência renal crônica terminal durante seguimento de 12 meses. *Rev Assoc Med Bras.* 2007;53(4):329-34. DOI:10.1590/S0104-42302007000400017

22. Sesso R, Rodrigues-Neto JF, Ferraz MB. Impact of socioeconomic status on quality of life of ESDR patients. *Am J Kidney Dis.* 2003;41(1):186-95. DOI:10.1053/ajkd.2003.50003

23. Sesso R, Lopes AA, Thomé FS, Bevilacqua JL, Romão Júnior JE, Lugon J. Relatório do Censo Brasileiro de Diálise, 2008. *J Bras Nefrol.* 2008;30(4):233-8.

24. Unruh ML, Newman AB, Larive B, Dew MA**,** Miskulin DC, Greene T, et al. The influence of age on changes in health-related quality of life over three years in a cohort undergoing hemodialysis. *J Am Geriatr Soc.* 2008;56(9):1608-17. DOI:10.1111/j.1532-5415.2008.01849.x

25. Ware JE, Sherbourne CD. The MOS 36-item short form health survey (SF-36). I. Conceptual framework and item selection. *Med Care.* 1992;30(6):473-83.