Quality of life and associated factors in patients with chronic kidney disease on hemodialysis

Fatores associados à qualidade de vida de
pacientes renais crônicos em hemodiálise

Raiana Lídice Mor Fukushima[1]
Ana Laura Costa Menezes[1]
Keika Inouye[1]
Sofia Cristina Iost Pavarini[1]
Fabiana de Souza Orlandi[1]

Corresponding author
Fabiana de Souza Orlandi
Highway Washington Luis, km 235,
13565-905, São Carlos, SP, Brazil.
fabi_ferreira@yahoo.com.br

Abstract

Objective: To identify sociodemographic and clinical factors associated with health-related quality of life of patients with chronic kidney disease on hemodialysis.

Methods: This was a descriptive, cross-sectional, quantitative study conducted with 101 patients with chronic kidney disease on hemodialysis. An instrument for subject characteristics, and the *Kidney Disease and Quality of Life - Short Form* were used. For multivariate analysis, logistic regression with *Stepwise* selection criteria variables was used.

Results: The sociodemographic and clinical factors found to be associated with a better health-related quality of life were: male gender, younger age, black skin color, having a partner, higher education, practicing a religion, high serum levels of albumin and hematocrit.

Conclusion: These factors are important for the improvement of care in patients with chronic kidney disease who are on hemodialysis.

Resumo

Objetivo: Identificar fatores sociodemográficos e clínicos associados à qualidade de vida relacionada à saúde de pacientes renais crônicos em hemodiálise.

Métodos: Trata-se de um estudo descritivo, de corte transversal, com abordagem quantitativa realizado com 101 pacientes renais crônicos em hemodiálise. Aplicou-se o instrumento de caracterização dos sujeitos e o *Kidney Disease and Quality of Life - Short Form*. Foi realizada regressão logística para análise multivariada, com critério *Stepwise* de seleção de variáveis.

Resultados: Os fatores sociodemográficos e clínicos associados à melhor QVRS encontrados foram: sexo masculino, menor idade, etnia negra, parceiro fixo, maior escolaridade, praticante de religião, altos níveis séricos de albumina e de hematócrito.

Conclusão: Estes fatores são importantes para a melhoria da assistência a pacientes renais crônicos em hemodiálise.

[1]Universidade Federal de São Carlos, São Carlos, SP, Brazil.
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Introduction

Among the prevalent chronic diseases in the elderly is chronic kidney disease (CKD). This is characterized by gradual and irreversible decrease in kidney function, in which the kidneys are no longer able to perform their function.[1] The 2012 Brazilian Chronic Dialysis Census reports that the number of patients on hemodialysis showed a gradual growth over a period of years, increasing from 97,586 in 2012[2] to a total of 112,004 patients in 2014.[3]

Patients who reach advanced stages may have physical, psychological and social limitations that affect their lifestyle. In addition, hemodialysis involves additional changes in daily life. Its impact on the functionality and health-related quality of life (HRQOL) becomes quite significant.[4,5]

Thus, it is important to identify the factors associated with HRQOL of patients with chronic kidney disease on hemodialysis. Some national and international studies have identified factors associated with HRQOL of patients with CKD, such as gender, age, education, socioeconomic status, occupation, duration of hemodialysis, comorbidity and malnutrition.[4,6-8]

In this context, this study aimed to identify the sociodemographic and clinical factors associated with HRQOL of patients with chronic kidney disease on hemodialysis.

Methods

This was a descriptive, cross-sectional, quantitative study. It was conducted in a Renal Replacement Therapy Unit of the city of San Carlos, located in the state of São Paulo, which serves patients of the Unified Health System (SUS) and those covered by other insurances.

The sample consisted of 101 patients with CKD on hemodialysis. The inclusion criteria were: 1) 18 years of age or older; 2) diagnosis of CKD; 3) receiving hemodialysis for at least three months.

The subjects who agreed to participate in the study, after signing the Terms of Free and Informed Consent Form, were individually interviewed to obtain their individual characteristics, and to administer the Kidney Disease Quality of Life-Short Form (KDQOL-SF). The subjects' characteristics instrument consisted of questions relating to their identification, sociodemographic data, and clinical conditions.

The KDQOL-SF was developed by the World Health Organization's Quality of Life Working Group (WHOQOL Group) in 1997, and was validated in Brazil in 2003. The KDQOL-SF measures HRQOL specifically in patients with kidney disease who are on dialysis. This instrument assesses the overall quality of life and integrates specific data, which provides a comprehensive analysis.[9-11] This research enables the identification of the actual deficits related to the health of patients, and the determination of which of these cause greater impact on quality of life.[10]

For the final score of the KDQOL-SF, data on each dimension were converted to a scale of 0 to 100. Higher scores reflected better quality of life.[12]

The collected data were uploaded into a Microsoft Office Excel™ spreadsheet by means of the Statistical Program for the Social Sciences (SPSS)™, and the analyses performed were: Kolmogorov-Smirnov, to verify the lack of data normality. Mann-Whitney test was used to compare the midpoints of HRQOL according to the categorical sociodemographic variables, Spearman correlation to analyze the relationship between the mean scores of HRQOL and sociodemographic, economic and numerical clinical variables; and logistic regression, for multivariate analysis with stepwise selection criterion variables used to describe the relationship between a dependent variable (HRQOL) and a simultaneous set of independent variables (education, gender, age, ethnicity, practicing a religion, marital status, and hematocrit). The significance level for the statistical tests was 5% (p ≤0.05).

All stages of this study met national and international standards on ethics in research involving human subjects. Data collection was initiated only after approval of the research project by the Ethics Committee of the Federal University of São Carlos, protocol number 85/2012.

Results

The results of the comparative statistical analysis of the HRQOL domains of CKD patients receiving hemodialysis, according to the categorical sociodemographic variables, are shown in Table 1. Significant differences were found among these sociodemographic and clinical factors: (a) male subjects had higher scores in the "symptoms/problems", "sexual function," "pain," "general health", "emotional well-being", "energy/fatigue" domains and "mental component of the SF 12 " ; (b) Black people presented higher satisfaction with the "sleep" domain; (c) respondents with a partner demonstrated lower satisfaction in the "sexual function" domain; (d) participants with a higher level of education (completed elementary school or more) had higher scores in the "symptoms/problems", "physical functioning", "pain", "social function", "energy/fatigue" domains and "physical component" of the SF-12; (e) those who were practicing any religion scored better on the "quality of social interaction" domain (Table 1).

Table 2 demonstrates that some dimensions of HRQOL measured by the KDQOL-SF were significantly correlated with sociodemographic and health

variables. Age showed a moderate relationship and was inversely proportional to "physical functioning" (rho=-0.513); there was a weak and inverse relationship with "sexual functioning" (rho=-0.403), "physical component of the SF-12" (rho=-0.304), "cognitive function" (rho=0.226) and "social function" (rho=-0.215); and there was a weak and direct relationship with "work status" (rho= 0.403). The per capita income showed a weak and directly proportional relationship with "burden of kidney disease" (rho=0.201) and "energy/fatigue" (rho= 0.219), and was inversely proportional to "sleep" (rho=-0.214). Finally, the concentration of plasma protein (albumin) had a weak relationship and was directly proportional to "physical functioning" (rho = 0.215).

Table 3 shows the results of logistic regression analysis of the possible factors associated with HRQOL of patients with chronic renal failure receiving hemodialysis. The respondents who had a higher risk of impairment of "physical functioning" were the oldest; for each year of age, the risk of impairment increased 9.9%. The risk of "pain" was 4.7 times greater for individuals with incomplete elementary education. Respondents who were white or of mixed skin color showed a 3.9 times greater risk of impairment in "emotional well-being." Respon-

Table 1. Comparative statistical analysis of the mean scores of the *Kidney Disease Quality of Life-Short Form* domains of patients with chronic kidney disease on hemodialysis, according to the categorical sociodemographic variables

Variables	SPro	QoSI	SeF	SI	SS	PhyF	Pain	GH	EF	SF	EF	PhyB	MeB
Sex													
Male	78.53	82.90	89.13	66.88	90.34	49.06	73.91	51.81	81.16	53.07	63.84	37.08	49.53
Female	70.83	83.12	69.94	66.41	84.90	41.56	58.83	44.06	60.42	51.95	53.28	34.71	45.15
*p-value**	0.041	0.997	0.020	0.933	0.065	0.230	0.030	0.029	0.008	0.413	0.005	0.324	0.026
Ethnicity													
White/mixed	75.93	81.81	81.77	63.98	87.65	46.60	67.53	48.52	75.72	53.24	60.06	36.06	47.83
Black	76.77	87.67	95.83	77.88	92.50	47.00	75.63	52.75	70.00	64.38	62.45	37.41	49.43
*p-value**	0.743	0.138	0.094	0.001	0.392	0.824	0.466	0.262	0.468	0.086	0.647	0.517	0.615
Marital status													
With partner	77.19	82.78	79.17	67.88	91.67	47.17	71.42	51.00	77.78	56.25	61.08	36.78	48.85
Without partner	74.49	83.25	97.22	65.06	84.15	45.98	65.79	46.95	69.92	54.27	59.63	35.67	47.12
*p-value**	0.467	0.977	0.024	0.312	0.051	0.838	0.390	0.223	0.592	0.693	0.934	0.663	0.266
Level of education													
IEE	67.21	82.72	75.00	65.28	87.65	32.78	55.46	45.00	67.90	41.20	54.44	32.74	46.38
CEE or more	79.34	83.06	86.98	67.26	88.96	51.76	74.12	50.95	77.03	60.64	62.70	37.63	48.79
*p-value**	0.001	0.913	0.181	0.559	0.458	0.006	0.008	0.132	0.278	<0.001	0.037	0.022	0.133
Religion													
Practicing	76.37	84.82	80.98	67.70	89.04	46.32	66.74	51.12	75.88	57.40	60.72	36. 67	48.49
Non-practicing	76.56	78.06	94.43	65.21	87.50	49.58	76.77	44.58	69.44	50.52	60. 63	35.77	46.92
*p-value**	0.613	0.002	0.097	0.639	0.880	0.630	0.121	0.121	0.755	0.230	0.884	0.513	0.578

IEE - Incomplete elementary education; CEE - Complete elementary education; SPro - Symptoms and problems; QoSI - Quality of social interaction; SeF - Sexual function; SI - Sleep; SS - Social support; PhyF - Physical functioning; GH - General health; EF - Emotional function; SF - Social function; EF - Energy and fatigue; PhyB - Physical behavior; MeB - Mental behavior; *Mann-Whitney test

Table 2. Correlational analysis between the *Kidney Disease Quality of Life-Short Form* domains and the sociodemographic and numeric clinical variables

Domains	Age	Income*	Time on HD	Hematocrit	Albumin
Burden of kidney disease					
rho	-0.048	0.201	0.041	0.126	-0.031
p-value	0. 631	0.042	0. 684	0.211	0.760
Work status					
rho	0.403	0.132	0.088	-0.035	-0.085
p-value	<.0001	0.205	0.384	0.725	0.399
Cognitive function					
rho	-0.226	-0.001	0.103	0.069	0.147
p-value	0.008	0.990	0.306	0.492	0.144
Sexual function**					
rho	-0.404	-0.066	0.156	0.040	0.183
p-value	0.027	0.749	0.411	0.833	0.333
Sleep					
rho	-0.161	-0.214	-0.028	-0.126	-0.068
p-value	0.108	0.039	0.779	0.208	0.499
Physical functioning					
rho	-0.513	0.052	-0.062	0.154	0.215
p-value	<.0001	0. 619	0.540	0.125	0.030
Social function					
rho	-0.215	-0.061	0.030	0.040	-0.068
p-value	0.031	0.557	0.767	0. 690	0.500
Energy /fatigue					
rho	-0.142	0.219	-0.086	0.084	0.041
p-value	0.157	0.034	0.395	0.402	0.681
Physical behavior					
rho	-0.304	0.042	0.109	0.128	0.028
p-value	0.002	0.688	0.276	0.200	0.783

*94 subjects reported income; HD- Hemodialysis; **30 subjects answered the question relating to sexual function, and of these, only 26 reported income; applied test: *Spearman* correlation test

Table 3. Logistic regression analysis of variables associated with *Kidney Disease Quality of Life-Short Form* domains

Domains of KDQOL-SF	Selected variable	Categories	p-value	OR*	CI 95% OR**
Symptoms/Problems	Education	Over IEE (ref.)	-	1.00	-
		Up to IEE	0.006	4.66	1.56 - 13.90
Work status	Age	continuous variable	<0.001	0.903	0.863 - 0.946
Cognitive function	Age	continuous variable	0.023	1.038	1.005 - 1.072
Quality of social interaction	Religion	Practicing(ref.)	-	1.00	-
		no Practicing	0.003	7.29	1.98 - 26.87
Sexual function	Ethnicity	Black (ref.)	-	1.00	-
		White/mixed	0.015	17.47	1.01 - 357.84
Sleep	Ethnicity	Black (ref.)	-	1.00	-
		White/mixed	0.030	3.49	1.13 - 10.80
Social support	Marital status	With partner (ref.)	-	1.00	-
		Without partner	0.038	2.55	1.05 - 6.18
Dialysis staff encouragement	Hematocrit	continuous variable	0.013	0.855	0.755 - 0.968
Physical functioning	Age	continuous variable	<0.001	1.099	1.051 - 1.149
Pain	Education	Over IEE (ref.)	-	1.00	-
		Up to IEE	0.004	4.67	1.65 - 13.24
Emotional Well-being	Ethnicity	Black (ref.)	-	1.00	-
		White/Mixed	0.042	3.93	1.05 - 14.72
Social function	Education	Over IEE (ref.)	-	1.00	-
		Up to IEE	0.005	4.27	1.56 - 11.71
Energy/fatigue	Sex	Male (ref.)	-	1.00	-
		Female	0.030	2.74	1.10 - 6.80
Physical functioning	Age	continuous variable	0.043	1.033	1.001 - 1.065

IEE - Incomplete elementary education; *OR - *Odds Ratio* - risk ratios for lowest score; CI 95%; O.R.** - 95% confidence interval for risk ratio. Stepwise selection criterion variables Ref.: level of reference

dents with incomplete elementary education had a 4.3 times greater chance of impairment in "social functioning". In the "energy and fatigue" domain, women showed 2.7 times more risk of impairment compared to men. For the "physical component of the SF-12", also evaluated by KDQOL-SF, participants who were of an older age had a lower risk of impairment in HRQOL (3.3% for each year).

For specific domains of the KDQOL-SF, it was observed that in "symptoms/problems," the subjects with incomplete elementary education had a risk of impairment that was 4.7 times higher than respondents with a higher level of education were. In "cognitive function", for each year of age, the risk of impairment increased by 3.8%. The subjects that did not practice any religion had a 7.3 times greater risk of impairment on "quality of social interaction." In terms of "sexual function", participants of white or mixed skin color showed a 17.5 times increased risk of impairment compared to black individuals. This result should be analyzed with caution due to the small sample size for analysis. (Table 3)

Individuals who were white or of mixed skin color showed a risk that was 4.5 times greater for impairment in "sleep", and participants without a partner had a 2.6 times greater risk of impairment in "social support". It appears that in the "dialysis staff encouragement" domain, the subjects with a lower hematocrit (HT) had a higher compromise in HRQOL, and with the reduction of each HT unit, the risk of injury increased by 14.5%. Finally, in terms of "work status", individuals with a lower age had an increased risk of difficulty, and for each year of age, that risk decreased by 9.7% (Table 3)

Discussion

The limits of the study results are related to the cross-sectional design that cannot establish cause and effect.

To identify factors associated with HRQOL of patients with chronic kidney disease is very important, as it can drive the care for patients in this condition, optimizing aspects associated with better HRQOL. Among the sociodemographic factors

associated with HRQOL presented by respondents to this survey, evaluated by the KDQOL-SF was gender: men showed better HRQOL than women, with statistically significant differences in the "symptoms/problems" "sexual function," "pain," "general health", "emotional function", "energy and fatigue" and "mental component of the SF-12" domains. Observational, national and international studies conducted with patients with chronic kidney disease receiving peritoneal dialysis and hemodialysis showed similar results.[6,7,13-16] Those of the female gender had a better perception of HRQOL in the dimension "quality of social interaction," but without a statistically significant difference. This finding is consistent with the results of a survey conducted with 100 patients receiving hemodialysis in Saudi Arabia, which identified that male gender, older age and duration of treatment emerged as predictors of a lower quality of life.[17]

Younger respondents showed worse HRQOL, with statistically significant differences in the domains "cognitive function", "physical functioning", and "physical component of the SF-12". This finding corroborates several investigations with patients with chronic renal failure receiving dialysis developed in South America and in the Middle East.[6,7,14,16,17] Another study conducted with 40 patients undergoing hemodialysis, in the city Mogi das Cruzes, noted that respondents from 20 to 40 years of age had the highest scores in the "physical functioning" domain.[15]

Regarding marital status, "sexual function" was the domain in which the participants without a partner showed a higher perception when compared to respondents with a partner. A study conducted in São Paulo, on the HRQOL of 200 women aged 50 or older with HIV/AIDS, found similar results, showing that women without a partner had a higher mean in that domain that women with partner.[18] Only on the "social support" domain, the subjects without a partner showed a greater risk of impairment. This result is consistent with a study of 362 patients on hemodialysis, developed in Iran, which reported better HRQOL in patients with a partner due to higher social support.[16]

With regard to education, participants with a higher level of education had better HRQOL than

subjects with an incomplete elementary education. This finding is similar to other studies of a cross-sectional design, developed in the capital of São Luís (n=306), Madrid (n=61) and Riyadh (n=100), in which the respondents with chronic disease receiving dialysis, and who had a higher educational level, reported having greater access to information, better economic conditions, and better capacity to evaluate traumatic phenomena.[14,17,19]

Participants who practiced some religion presented a better HRQOL than those who were non-practicing, with a statistical significance in the domain "quality of social interaction." Similar results were found in other international studies; the first research comprised 362 patients in Iran, and the second with 253 patients in Canada, in which patients with renal disease receiving peritoneal dialysis or hemodialysis who had any religious belief had a better perception of HRQOL.[16,20]

Regarding per capita income, respondents with a higher income showed a better HRQOL, with statistical significance in the domains "burden of kidney disease", "sleep", and "energy and fatigue." Another study conducted in Chile with 354 patients with renal disease receiving chronic hemodialysis showed similar results.[7] The same happened with albumin, which was correlated with "physical functioning", indicating better physical functioning for those with the highest level of albumin. Similar results were found in international studies in Chile and Japan composed of, respectively, 354 and 192 end stage renal disease patients undergoing hemodialysis.[7,21]

Finally, in the "dialysis staff encouragement" domain, the subjects with a lower hematocrit (HT) presented greater impairment in HRQOL. Research conducted in Chile, with 354 patients on regular hemodialysis and with 59,884 patients in a Brazilian analysis of the national database of individuals on renal replacement therapy, reported that anemia is among the leading causes of worsening HRQOL.[7,22]

Conclusion

Based on the results, and considering the aim of this research, the sociodemographic and clinical factors associated with better HRQOL were male gender, younger age, and black skin color, having a partner, higher level of education, those practicing a religion, high serum albumin and hematocrit. These factors are important for improvement of care for patients with chronic kidney disease receiving hemodialysis.

Collaborations

Fukushima RLM contributed to the research execution and article writing. Menezes ALC contributed to the article writing. Inouye K participated in the analysis, data interpretation and article writing. Pavarini SCI contributed to the article writing. Orlandi FS collaborated with study design, planning, analysis and data interpretation, article writing, relevant critical review of the intellectual content, and final approval of the version to be published.

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