Comparison of quality of life between hemodialysis patients waiting and not waiting for kidney transplant from a poor region of Brazil

Comparação da qualidade de vida entre pacientes em hemodiálise aguardando e não aguardando transplante renal em uma região pobre do Brasil

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ABSTRACT

Introduction: There are few data about the quality of life (QOL) level among patients undergoing hemodialysis (HD) and not eligible for kidney transplant. **Objective:** The QOL level was compared between HD patients waiting and not waiting for kidney transplant. **Methods:** We included 161 end-stage renal disease patients undergoing HD, during April, 2009. All patients were older than 18 years old, had been on HD at least three months, and had no previous transplantation. To measure QOL, the SF-36 was used. We also collected data about death and transplants in the 12 months after April, 2009. QOL scores were compared by analysis of variance with covariates. **Results:** Patients not awaiting transplantation were older (53.7 *versus* 36.3 years old; p < 0.001), more often had diabetes (15.8 *versus* 4.7%; p = 0.032) and hypertension (35.5 *versus* 12.9%; p < 0.001), and had no lupus (0 *versus* 4.7%; p = 0.001). They also presented lower creatinine levels (11.5 *versus* 13.5 mg/dL; p = 0.001) and were submitted to a lower dose of dialysis, estimated by Kt/V (1.6 *versus* 2.0; p = 0.026). Patients not awaiting transplant died more often in the following 12 months (21.1 *versus* 5.9%; p = 0.005). Adjusted mean scores were lower among patients not awaiting transplant regarding six dimensions of QOL: functional capacity (42.0 *versus* 53.4; p = 0.022), physical limitation (29.9 *versus* 49.2; p = 0.030); pain (45.0 *versus* 64.0; p = 0.003), social aspects (56.3 *versus* 75.9; p = 0.003), emotional aspects (45.1 *versus* 79.0; p

RESUMO

Introdução: Há pouca informação acerca do nível de qualidade de vida (QV) entre pacientes em hemodiálise (HD) não-elegíveis para transplante renal. **Objetivo:** Foi comparado o nível de QV entre pacientes em HD inscritos e não-inscritos na lista de espera para transplante renal. **Métodos:** Foram incluídos 161 pacientes portadores de doença renal crônica terminal, mantidos em HD durante abril de 2009, com mais de 18 anos, mais de três meses em HD e sem realização de transplante prévio. Para medida de QV, utilizou-se o SF-36. Também foram coletados dados sobre óbito e transplante ocorridos nos 12 meses seguintes a abril de 2009. As pontuações de QV foram comparadas pela análise de variância com covariáveis. **Resultados:** Pacientes que não aguardavam transplante eram mais velhos (53,7 *versus* 36,3 anos; p < 0,001), tinham mais diabetes (15,8 *versus* 4,7%; p = 0,032) e hipertensão (35,5 *versus* 12,9%; p < 0,001) e não apresentavam lúpus (0 *versus* 4,7%; p = 0,001). Esses pacientes também apresentavam creatinina mais baixa (11,5 *versus* 13,5 mg/dL; p = 0,001) e eram submetidos a menor dose de diálise, estimada pelo Kt/V (1,6 *versus* 2,0; p = 0,026). Pacientes que não aguardavam transplante evoluíram mais frequentemente para óbito no período de 12 meses (21,1 *versus* 5,9%; p = 0,005). As médias ajustadas das pontuações foram mais baixas entre os pacientes que não aguardavam transplante em seis dimensões da QV: capacidade funcional (42,0 *versus* 53,4; p = 0,022); limitação por aspectos físicos (29,9 *versus* 49,2; p = 0,030); dor (45,0 *versus* 64,0; p = 0,003); aspectos sociais (56,3 *versus* 75,9; p = 0,003); limitação

= 0.001), and mental health (50.1 *versus* 64.3; p = 0.004). **Conclusions:** Patients undergoing HD and not awaiting transplant are at risk of poor QOL level, mainly regarding role-emotional and role-physical aspects. We recommend psychological approaches and physical rehabilitation for this group of patients.
Keywords: renal insufficiency, chronic; renal dialysis; quality of life; kidney transplantation.

por aspectos emocionais (45,1 *versus* 79,0; p = 0,001) e saúde mental (50,1 *versus* 64,3; p = 0,004). **Conclusões:** Pacientes em HD que não aguardam transplante estão em risco de vivenciar baixa QV, principalmente no que se refere à limitação por aspectos emocionais e físicos. Recomenda-se suporte psicológico e reabilitação física para este grupo de pacientes.
Palavras-chave: insuficiência renal crônica, diálise renal; qualidade de vida; transplante de rim.

Introduction

Quality of life (QOL) is very low among end-stage renal disease (ESRD) patients undergoing hemodialysis (HD).[1] Kidney transplants offer better QOL and longer survival, but not all patients are eligible.[2-4] In the renal unit of Santa Casa de Misericórdia de Sobral, we do not have a transplant surgery team, and the majority of patients that receive kidney transplants are on the waiting list (WL) for a deceased-donor organ. When a kidney is available, patients on the list are notified and have to go to Fortaleza, the state capital, for transplant surgery. Fortaleza is 140 miles from Sobral, where the renal unit is located. This is the only renal unit in the Northern part of the state. This region has 1,600,000 inhabitants.

QOL has been studied among HD patients since 2005. We have been able to identify modifiable and nonmodifiable factors associated with QOL,[5] to show how QOL progresses over time,[6] and to validate it as a predictor of morbidity and mortality.[7] HD patients have always been studied as an entire group, excluding patients under 18 years old, on dialysis less than three months, or with previous transplantation. However, there are two distinct groups of patients on HD: those waiting and others that are not waiting for a kidney transplant. There is lack of information about HD patients without transplant perspective. Studies of HD patients generally focus on those awaiting for it.[8-15].

The medical reasons for not being eligible to transplant mainly involve critical organ function (advanced heart failure, liver cirrhosis, obstructive pulmonary disease, visceral malignancies, and coronariopathy). These conditions mainly affect old and diabetic patients.[16] These conditions can obviously affect QOL, and psychological stressors from not being eligible to transplant can be another comorbidity factor and can profoundly affect QOL. In addiction, the number of older and diabetic patients undergoing HD is increasing throughout the world, and, probably, a significant percentage of them has one or more contraindications making them ineligible to receive transplants. In the unit where the present study was performed, most patients are young, with low comorbidity, but the number of older and diabetic patients has been increasing in recent years. This means we are treating more HD patients ineligible for transplant, a trend that is believed to be prevalent in many other renal units in underdeveloped areas. This leads to a natural question: does this group deserve a special approach regarding their QOL? The answer to this question is crucial. QOL is becoming one of the most important outcomes among HD patients, since high mortality is well-established and seems to be stable.[17]

For these reasons, it is important to study HD patients that cannot expect a transplant, to compare their QOL against that of HD patients waiting for kidney transplants.

Methods

Sample

We included ESRD patients undergoing HD during April, 2009 in the only renal unit in the North of Ceará state, Northeast Brazil. The criteria for inclusion were: age older than 18, at least three months on dialysis, and no previous transplantation. Out of 191 patients being treated by our unit in that month, 161 were included. The reasons for exclusion were: 14 with less than three months on therapy, 8 with previous transplants, 5 refusals, and 3 under 18 years old. All patients were undergoing conventional HD with polysulfone dialysers. The dialysers were reused according to the Brazilian Health Ministry's recommendations. The study protocol and informed consent were approved by the Ethics Committee of Universidade Estadual Vale do Acarajú.

Measurement of QOL

The measurement tool was the validated Brazilian version of the Medical Outcomes Study 36-Item Short Form Health Questionnaire (SF-36).[18] It was applied through interviews during April 2009, conducted by three professionals that did not belong to the dialysis unit team. This is a well-validated 36-item questionnaire covering issues relating to physical, psychological, and social functioning. It generates scores from 0 (worst) to 100 (best) for eight sub-scales of QOL: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH).

Patient data

The demographic data (including patients waiting and not waiting for kidney transplant), time on dialysis, and underlying aetiology of ESRD were obtained from dialysis unit records. The underlying kidney disease was classified by clinical criteria, and not by histopathology. Classification of socioeconomic status (SES) was according to criteria of the form issued by the Brazilian Association of Research Institutes.[19] This validated instrument is used in marketing surveys and population censuses. It grades SES into five subgroups: A (best status) through E (worst status). Its criteria include educational level of the head of household and ownership of household appliances. For total monthly household income, Group A corresponds to higher than US$ 2,500; B to between US$ 840 and 2,500; C between US$ 500 and 840; D between US$ 200 and 500; and E for those under US$ 200 (these figures are only approximate, based on the exchange rate between Brazil's currency and the dollar at the time of the study). Each patient was assigned a low, medium, or high risk index based on comorbidity, as described by Khan *et al*.[20]. Khan *et al*. comorbidity index takes into consideration age in three classes and nine comorbidities: diabetes, myocardial infarction, angina pectoris, congestive heart failure, liver cirrhosis, obstructive pulmonary disease, systemic collagen disease, pulmonary fibrosis, and visceral malignancies. The laboratory results were those routinely measured in HD patients: creatinine, albumin, hemoglobin, calcium and phosphorus, and Kt/V. Kt/V was estimated using a second-generation Daugirdas formula.[21]

After gathering the above baseline data for 12 months, from the patients' medical records, we obtained data on death and transplants received in the next 12 months (April, 2009 through March, 2010).

Statistical analysis

A descriptive analysis to assess the characteristics of the sample was performed. The continuous variables were tested for normal distribution by the Shapiro-Wilk test. Variables normally distributed were presented as mean ± SD and without normal distribution as median [min-max]. Categorical variables were presented as percentages (in parentheses). The variables regarding sample characteristics were compared between patients waiting and those that were not waiting for transplant by the Fisher (categorical variables), Student's t (variables normally distributed) and Mann-Whitney (variables without normal distribution) tests.

The QOL scores, which were generated by the SF-36, were compared between patients waiting and not awaiting transplant, first by Student's t-test without adjustment and second by analysis of variance with covariates (ANCOVA), adjusted for age, sex, time on dialysis, comorbidity, hemoglobin, albumin, calcium-phosphorus product, and Kt/V index.

Statistical significance was considered to be a p-value of < 0.05. All the statistical analyses were performed using the SPSS, version 13.0, program package.

Results

There were 76 (47.2%) patients that were not awaiting kidney transplant. The main contraindication for transplant was advanced cardiovascular disease, without perspective of effective treatment. Patients not awaiting transplants were older (53.7 *versus* 36.3 years old; $p = 0.001$), more often suffered from diabetes (15.8 *versus* 4.7%; $p = 0.032$), and from hypertension (35.5 *versus* 12.9%; $p = 0.001$) as primary renal disease, received lower dialysis doses, as estimated by the KtV index (1.6 *versus* 2.0; $p = 0.026$), and had higher mortality during the period of 12 months (21.1 *versus* 5.9%; $p = 0.005$). Among the patients on the WL, 14 (16.5%) received a transplant in the next 12 months. During the study period, there were no living-donor transplants. Our renal unit draws patients from a very poor region of Northeast Brazil and, consequently, the majority of patients have low socioeconomic status, 72.1% being in classes D and E. The sample characteristics are shown in Table 1.

In the univariate analysis, the mean score was lower among patients not awaiting transplant regarding five dimensions: PF, RP, BP, RE and MH. In the multivariate analysis, besides the difference of these five dimensions' mean QOL scores – physical functioning (42.0 *versus*

Table 1 Sample characteristics

Variables	Not awaiting transplant	Awaiting transplant	Full sample	p
Sex				0.872
Male	47 (61.8)	51 (60.0)	98 (60.9)	
Female	29 (38.2)	34 (40.0)	63 (39.1)	
Age	53.7 ± 14.8	36.3 ± 11.2	44.5 ± 15.6	< 0.001
Socioeconomic status[a]				
B	4 (5.3)	3 (3.5)	7 (4.3)	
C	14 (18.4)	24 (28.2)	38 (23.6)	
D	46 (60.5)	48 (56.5)	94 (58.4)	
E	12 (15.8)	10 (11.8)	22 (13.7)	
Primary kidney disease				
Glomerulonephritis	20 (26.3)	49 (57.6)	69 (42.9)	0.117
Hypertension	27 (35.5)	11 (12.9)	38 (23.6)	< 0.001
Diabetes	12 (15.8)	4 (4.7)	16 (9.9)	0.032
Policystic kidney	8 (10.5)	3 (3.5)	11 (6.8)	0.117
Obstructive uropathy	3 (3.9)	4 (4.7)	7 (4.3)	0.123
Lupus	0	4 (4.7)	4 (2.5)	0.001
Chronic pyelonephritis	2 (2.6)	2 (2.4)	4 (2.5)	1.000
Indetermined	4 (5.3)	8 (9.4)	12 (7.5)	1.000
Time on dialysis (months)	27 [3-248]	44 [3-204]	36 [3-248]	0.063
Comorbidity[b]				0.379
Low	51 (67.1)	75 (88.2)	126 (78.3)	
Medium	18 (23.7)	10 (11.8)	28 (17.4)	
High	7 (9.2)	0	7 (4.3)	
Submitted to transplant	0	14 (16.5)	14 (8.7)	< 0.001
Death (follow-up 12 months)	16 (21.1)	5 (5.9)	21 (13.0)	0.005
Laboratory				
Creatinine (mg/dL)	11.5 ± 3.6	13.5 ± 3.5	12.6 ± 3.6	0.001
Hemoglobin (g/dL)	8.7 ± 1.9	8.3 ± 1.4	8.5 ± 1.7	0.124
Albumin (g/dL)	4.3 ± 0.4	4.4 ± 0.4	4.3 ± 0.4	0.125
Calcium-phosphorus product (mg^2/dL^2)	44.5 ± 13.4	48.6 ± 13.1	46.6 ± 13.4	0.104
Kt/V index	1.6 [0.5-2.7]	2.0 [0.5-2.5]	1.8 [0.5-2.7]	0.026

Data are means ± SD, median [in-max] or percentages (in parentheses); [a] Monthly total household income in US dollars: A > 2,500; B = 840 to 2,500; C = 500 to 2,499; D = 200 to 499; E < 200; [b] Khan index.

53.4; p = 0.022), role-physical (29.9 *versus* 49.2; p = 0.030); bodily pain (45.0 *versus* 64.0; p = 0.003), role-emotional (45.1 *versus* 79.0; p = 0.001), and mental health (50.1 *versus* 64.3; p = 0.004) – social functioning (56.3 *versus* 75.9; p = 0.003) were also lower. All SF-36 mean scores are shown in Table 2.

Discussion

Patients undergoing HD and not awaiting transplant had lower QOL levels than those on the WL, regarding six of the eight dimensions included in the SF-36 instrument. Both physical (PF, RP, BP) and mental (SF,

Table 2 Comparison of adjusted and nonadjusted SF-36 scores between patients not waiting and waiting for transplant

QOL	Non adjusted scores				Adjusted scores[a]		
	All sample	Not waiting	Waiting	p	Not waiting	Waiting	p
PF	55.6	47.1	63.2	< 0.001	42.0	53.4	0.022
RP	43.5	35.6	50.5	0.013	29.9	49.2	0.030
BP	59.3	49.3	68.3	< 0.001	45.0	64.0	0.003
GH	45.9	46.0	45.9	0.986	43.6	44.3	0.893
VT	55.8	51.7	59.4	0.064	46.4	53.3	0.173
SF	69.2	66.0	72.0	0.306	56.3	75.9	0.003
RE	58.9	45.6	70.9	0.001	45.1	79.0	0.001
MH	63.7	58.0	68.8	0.004	50.1	64.3	0.004

[a]Adjusted values for age, sex, time on dialysis, comorbidity, hemoglobin, albumin, calcium-phosphorus product, and Kt/V index; PF = physical functioning; RP = role-physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role-emotional; MH = mental health.

RE, MH) dimensions were lower among them. This result is not obvious. In the present experience, older age interferes in few domains of QOL and only advanced comorbidities decrease QOL. Therefore, age difference between groups and presence of only seven patients with high comorbidity among those not waiting for transplants could not predict the sample difference found between the groups.

Although all the differences for these six dimensions were statistically significant, we should stress the clinical relevance of the great difference between the mean scores of two dimensions: RE (33.9 points) and RP (19.3 points). This finding clearly indicates the need for psychological approaches and physical rehabilitation among HD patients not eligible for transplants.

It will be important in the psychological field to find out the main factors of such a poor QOL: are they caused by hopelessness because of no perspective for transplant or are they more directly related to clinical aspects, such as associated diseases and old age? There is no answer in the literature. In contrast, there are data on anxiety and depression among HD patients that are waiting for transplants.[10] For them, the main stressors are well-known and are psychological: uncertainty of organ availability, possible adverse outcome of the transplant, fear of being overlooked by the transplant staff, mistrust, and anger when other candidates receive an organ.[22]

RP scores measure the impact of physical health on life. In this respect, rehabilitation programs can be valuable to improve muscular strength, increase ability for daily activities, and encourage independent living.

The differences in demographic and clinical characteristics between patients waiting and not waiting for transplant were predictable. Those precluded from transplant are frequently older, diabetic and hypertensive patients, and as such have higher mortality rates. High mortality in patients excluded from the WL is hard to counteract, but approaches aiming to improve QOL are possible. However, the literature mainly focuses on mortality among WL patients.[8,9]

The laboratory differences between the two groups are also related to conditions precluding transplant: sicker patients excluded from WL probably have lower creatinine, because of malnutrition and inflammation, and lower Kt/V may deal with hemodynamic instability, leading to slower blood pumping and shorter hemodialysis sessions, both of which can diminish the dialysis dose.

In the 12-month study period, we observed the highest number of transplants performed in recent years. Ceará state is becoming a leader in the number of deceased-donor transplants, therefore, we strongly encourage all eligible patients to complete all preparatory routines to be eligible for the WL. In the context of a renal unit in a very poor region, far from the state capital, and with all patients treated by the Brazilian Public Health System (SUS), we consider the fact that 16.5% of the patients on the WL received transplant in the following 12 months to be a good result.

National statistics for 2008 from the Brazilian Nephrology Society show that 7% of patients on regular dialysis had previously received failed kidney transplants.[23] In April 2009, there were only eight patients undergoing hemodialysis with previous transplant. Although they were excluded from this study, we can suppose, based on the increasing number of

transplants, that, in the near future, there will be a significant number of HD patients who have received unsuccessful transplants. Thus, it will be valuable to conduct a future study focusing QOL among HD of patients after unsuccessful transplant.

One limitation of the present study is the typical characteristics of patients from underdeveloped areas: a large number of young patients with low-comorbidity scores. These results may not hold for samples with more diabetic and older patients. Another limitation is the cross-sectional design, which makes it impossible to know about changes in QOL over time. Finally, we were not able to identify specific factors related to not waiting for transplant that are involved in the low QOL. But we plan to conduct a future study to identify the main stressors among them.

Despite the limitations, we think the present study is important. First, it is a pioneer study of QOL among Brazilian patients not eligible for transplant. Second, even in the international nephrology area, there is a lack of information on QOL (main outcome) among this group of HD patients, a group that is increasing all over the world. We have identified one more variable negatively associated with QOL among HD patients, one about which health professionals working with such patients should be aware. We can conclude that along with established variables, ineligibility for transplant can be another variable associated with poor QOL.

Conclusions

The patients in this sample, who were undergoing HD and were not eligible for transplant, had a lower QOL level than the ones awaiting for a transplant. We cannot comment on the associated factors, such as morbidity conditions precluding transplant or psychological stress, due to the lack of perspective of transplantation. Future studies in nephrology must address this question. However, we can firmly recommend that special attention be paid to HD patients not eligible for transplants, and suggest psychological approaches and physical rehabilitation for this group since they are at risk of poor QOL level, mainly regarding role-emotional and role-physical aspects.

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