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ORIGINAL ARTICLE

Depression and quality of life of hemodialysis patients living in a poor region of Brazil

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DESCRIPTORS:
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Abstract
Objective: To determine the correlation between depression and quality of life (QOL) of patients in hemodialysis (HD). *Method*: One hundred and sixty six patients over 18 years of age who had been in HD for at least three months and had no history of transplant. QOL was assessed using the SF-36. To categorize depression, a score ≥ 10 was used on the 10-item version of the Center for Epidemiologic Studies Depression Scale (CES-D). Comparisons between depressed and non-depressed patients were performed using the chi-square test, Student's t-test, and Mann-Whitney test. Multiple regression was performed to assess the predictive variables of patients' QOL. *Results*: Symptoms of depression were found in 13 (7.8%) patients. The only variable that differed among depressed patients was QOL. Depressed patients presented lower scores in vitality (40.7 *vs*. 57.3; p = 0.010), role-emotional (25.6 *vs*. 62.5; p = 0.006), and mental health (50.1 *vs*. 65.4; p = 0.023). Regression analysis demonstrated that depression was a predictor of role-emotional (OR = 0.981, CI = 0.967-0.996; p = 0.010) and mental health (OR = 0.970, CI = 0.946-0.996; p = 0.022). *Conclusion*: Depressed patients experience a poor QOL because, in addition to their chronically affected physical aspects, they also feel limited in the mental dimensions, which usually have the highest score among non-depressed HD patients.
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DESCRITORES:
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Depressão e qualidade de vida entre pacientes em hemodiálise de uma região pobre do Brasil

Resumo
Objetivo: Determinar a correlação entre depressão e qualidade de vida (QV) de pacientes submetidos à hemodiálise (HD). *Método*: Foram estudados 166 pacientes com idade superior a 18 anos, em HD por pelo menos três meses e sem transplante prévio. O nível de QV foi medido pelo questionário SF-36. Para categorizar depressão foi utilizada a versão de 10 itens do Center for Epidemiologic Studies Depression Scale (CES-D; escore ≥ 10). As comparações entre pacientes com e sem depressão foram realizadas pelos testes do qui-quadrado, *t* de *Student* e Mann-Whitney. Regressão múltipla foi realizada para testar variáveis preditivas de QV. *Resultados*: Sintomas depressivos estavam presentes em 13 (7,8%) pacientes. A única variável que diferiu entre os pacientes com depressão foi QV. Pacientes depressivos apresentaram menor pontuação referente a vitalidade (40,7 *vs*. 57,3; p = 0,010), aspectos emocionais (25,6 *vs*. 62,5; p = 0,006) e saúde mental (50,1 *vs*. 65,4; p = 0,023). A análise de regressão demonstrou que depressão foi preditiva de aspectos emocionais (OR = 0,981, IC = 0,967-0,996; p = 0,010) e de saúde mental (OR = 0,970, CI = 0,946-0,996; p = 0,022). *Conclusão*: Pacientes com depressão vivenciam um nível baixo de QV porque, além dos aspectos físicos afetados cronicamente, esses pacientes são afetados nas dimensões mentais que costumam ser as dimensões com melhores pontuações entre os pacientes em HD sem depressão.
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Introduction

Depression is the most common mental disorder found in the general population, affecting nearly 9% of women and about 3% of men.[1] Most studies report that depression is prevalent in 20% to 30% of patients in hemodialysis (HD).[2-4] In diagnosing depression, this discrepancy in prevalence can certainly be attributed to the use of different study populations and methods. One important variable influencing the prevalence of depression is the sociocultural environment. In Brazil, most studies on depression among HD patients originate from more developed regions of the country. Interactions between social backgrounds and depression in the general population, as well as between social backgrounds and quality of life (QOL), may influence HD patients.[5] Considering that the number of studies originating from underdeveloped Brazilian regions is rather limited, the issue at hand has not been settled. In contrast, considering that depressive symptoms can negatively interfere with treatment and quality of life levels, as well as increase morbidity among HD patients, the importance of screening for such symptoms is well established.[6-8] Additionally, Diefenthaeler et al.[9] presented depression in HD patients as a predictor of death during a follow-up of 24 months.

Chronic kidney disease has assumed epidemic proportions[10] and, considering the growing number of patients in dialysis, the task of diagnosing and treating depression in HD patients should not be fulfilled only by psychiatrists. Although in Brazil renal units are required by federal legislation to have nephrologists, nurses, one dietitian, and one psychologist on staff, they are not required to have a psychiatrist. Moreover, most renal units are satellite facilities and, therefore, not located inside hospitals, making it more difficult for psychiatrists to evaluate patients. Consequently, more often than it should, the screening and treatment of depression in patients attending a renal unit are performed by members of the dialysis staff instead of specialists.

Even though recent innovations in HD have reduced many unpleasant side effects, they have not diminished mortality, and the issue of a patient´s QOL has emerged. Aiming mainly at improving modifiable factors associated with QOL among low-income patients from a poor region in northeastern Brazil, we have been working on QOL using SF-36 since 2004. Our assumption is that social difficulties, combined with the usual stressors of therapy can aggravate the negative effects on patients' QOL, thereby favoring depression. As social factors are hard to change, our main focus has been placed on modifiable factors in an attempt to improve QOL.

Depression is a modifiable factor and its treatment is well established.[11] As stated previously, in the clinical setting, the management of depression is often led by a member of the renal unit staff concurrently with the treatment of other symptoms. With that in mind, it is our belief that we must resort to simple, short, and validated screening instruments. In addition to the SF-36, and similarly to other research groups in nephrology,[8,12] we chose to work with the short version of the Center for Epidemiologic Studies Depression Scale (CES-D).

We believe that HD patients are not only at risk of experiencing depressive symptoms, but also that such symptoms go undiagnosed. Moreover, we feel that diagnosis should not rely solely on specialists, and that symptoms are modifiable by therapy. Last but not least, we think that QOL is a main outcome and that it can be affected by depression. Based on the aforementioned facts, we aimed at establishing correlations between depressive symptoms and QOL in a sample of HD patients from a renal unit located in a low-income area in Brazil.

Method

Sample

End-stage renal disease (ESRD) patients undergoing HD at the only renal unit located in Brazil´s northeastern state of Ceará in October 2008. Inclusion criteria were age (over 18 years), on dialysis for at least three months, and no history of transplantation. One hundred sixty-six patients were included from a total of 193. Among the patients excluded, 12 had been in therapy for less than three months, 6 had been transplanted, 6 refused to participate, and 3 were under 18 years old. All patients were undergoing regular HD with polysulfone dialyzers (maximum number of reuses = 12) on three- or four-hour sessions per week. The study protocol and informed consent were approved by the Ethics Committee of the *Universidade do Vale do Acaraú*. Although previous treatment for depression was not listed as an exclusion criterion, we verified after the informed consent that none of the patients in the sample had been previously treated for depression. Data on alcohol consumption were not collected.

Measurement of quality of life

We used the validated Brazilian version of the Medical Outcomes Study 36-Item Short Form Health Questionnaire (SF-36) to measure the level of QOL.[13] This is a well-validated 36-item questionnaire covering eight domains of QOL, namely physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH). PF measures the patient's performance regarding daily activities; RP analyses the impact of physical health on life; BP evaluates pain level and its impact on normal daily activities; GH evaluates the subjective perception of the present and future health status and resistance to illness; VT measures the patient's feelings about his/her energy level, vitality, and moments of fatigue; SF measures the impact of health on routine social activities; RE measures the influences of emotional status on daily activities; and MH assesses humor and well-being, including depression and anxiety. The SF-36 generates scores ranging from 0 (worst) to 100 (best) for each of the eight domains.

Depression assessment

We used the 10-item version of the Center for Epidemiologic Studies Depression Scale (CES-D)[12] in which respondents rate items by recalling the past week using a three-point response scale, with higher scores indicating the presence and persistence of symptoms. A score ranging from 0 to 30 is calculated by adding the score of each item. We classified depression as a score ≥ 10, as validated by Andresen et al.[13] and Lopes et al.[8]

Patient data

Information on demographic data, length of time on dialysis, and underlying etiology of ESRD were collected from the medical records. The underlying kidney disease was classified according to the clinical criteria rather than histopathology. Classification according to economic background followed the criteria established by the Brazilian Association of Research Institutes.[14] This is a validated instrument used by marketing surveys and population censuses to divide different economic brackets into five groups, namely from the highest economic bracket (A) down to the lowest economic bracket (E). Its criteria include educational level of the head of the household and number of home appliances found in that household.

Each patient was assigned a low, medium or high risk index based on comorbidity, as described by Khan et al.[15]. Khan's comorbidity index takes into consideration the age and nine comorbidities: diabetes, myocardial infarction, angina pectoris, congestive heart failure, liver cirrhosis, obstructive pulmonary disease, systemic collagen disease, pulmonary fibrosis, and visceral malignancies.

Laboratory tests included those routinely required for HD patients, namely creatinine and albumin (markers of nutritional status and inflammation activity), hemoglobin (level of anemia, target = 11-12 g/dL), calcium and phosphorus (calcium and phosphorus levels above 55 mg^2/dL^2 indicate risk of tissue deposition), and Kt/V (index of the dialysis delivered dose, target ≥ 1.2). Kt/V was estimated using a second-generation Daugirdas formula.[16]

Statistical analyses

We performed a descriptive analysis (means ± SD for numerical variables, and percentages in parentheses for categorical variables) to assess the characteristics of the sample, and categorized a patient as depressive when the CES-D score was ≥ 10.

Comparisons between depressed and non-depressed patients related to gender, economic background (B+C *versus* D+E), and comorbidity (Low *versus* Medium + High) were carried out using the chi-square test. When indicated, the Student's t-test and the Mann-Whitney test were used to detect differences between depressed and non-depressed patients related to age, time on dialysis, laboratory data, and SF-36 scores.

We performed a multiple regression analysis to assess the predictive variables (depression, age, and gender) of the QOL domains (dependent variables). The small number of depressed patients made it difficult to use a model that included all the variables. For this reason, only the variables that statistically differed between depressed and non-depressed patients were included in the regression. In addition to comparisons made between depressed and non-depressed patients, crucial demographic variables such as age and gender were included in the model.

Statistical significance was considered a p value of < 0.05. All the statistical analyses were performed using the SPSS version 13.0 program package.[17]

Results

Depression symptoms were present in 13 (7.8%) patients. The causes of ESRD in patients were glomerulonephritis (42.9%), hypertension (23.6%), diabetes (9.9%), indeterminate (7.5%), polycystic kidney disease (6.8%), obstructive uropathy (4.3%), lupus (2.5%), and chronic pyelonephritis (2.5%). When comparing data from the depressed and the non-depressed

patients, no difference was seen in the demographic, clinical, and laboratory results, as shown in Table 1. In this comparison, QOL scores were lower regarding vitality [40.7 (1.8) *vs*. 57.3 (23.4), p = 0.010]; role-emotional [25.6 (43.3) *vs*. 62.5 (44.3), p = 0.006]; and mental health [50.1 (21.8) *vs*. 65.4 (21.7), p = 0.023] (Table 2).

When the model used age, gender, and depression as predictive variables, and vitality, role-emotional and mental health QOL domains as dependent variables, multiple regression demonstrated that depression was a predictor of role-emotional (OR = 0.981, CI = 0.967-0.996; p = 0.010) and mental health (OR = 0.970, CI = 0.946-0.996; p = 0.022) (Table 3).

Table 1 Depression according to demographic, clinical and laboratory variables

Variable	With depression	Without depression	p
Gender			
Male	5 (5.0%)	96 (95.0%)	0.153
Female	8 (12.3%)	57 (87.7%)	
Age	51.6 ± 12.7	43.8 ± 15.8	0.076
Economic class			
B+C	5 (10.6%)	42 (89.4%)	0.599
D+E	8 (6.7%)	111 (93.3%)	
Comorbidity			
Low	9 (6.9%)	122 (93.1%)	0.590
Medium+High	4 (11.4%)	31 (88.6%)	
Time on dialysis (months)	47.8 ± 46.7	52.7 ± 51.3	0.759
Hemoglobin (g/dL)	8.3 ± 1.3	8.5 ± 1.7	0.712
Creatinine (mg/dL)	12.3 ± 5.2	12.6 ± 3.5	0.870
Albumin (g/dL)	4.3 ± 0.3	4.3 ± 0.4	0.434
Calcium-phosphorus product (mg^2/dL^2)	50.9 ± 17.5	46.3 ± 13.0	0.519
Kt/V	1.7 ± 0.4	1.5 ± 0.5	0.470

Data are means ± SD; percentages (%) in parentheses.

Table 2 Comparison of quality of life scores between patients with and without depression

QOL Domains	Scores		p
	With depression	Without depression	
Physical functioning	54.2 ± 28.4	55.5 ± 25.3	1.000
Role-physical	25.0 ± 32.2	44.0 ± 42.6	0.100
Bodily pain	52.9 ± 32.2	60.2 ± 30.0	0.487
General health	38.3 ± 28.4	46.7 ± 20.6	0.171
Vitality	40.7 ± 17.8	57.3 ± 23.4	0.010
Social functioning	54.0 ± 31.1	70.4 ± 29.9	0.069
Role-emotional	25.6 ± 43.3	62.5 ± 44.3	0.006
Mental health	50.1 ± 21.8	65.4 ± 21.7	0.023

QOL: quality of life; means and standard deviation (in parentheses)

Table 3 Multiple regression for the QOL domains

QOL Domains	Variables	OR	95%CI	p
Vitality	Age	1.033	0.994-1.073	0.084
	Gender	2.802	0.799-9.760	0.099
	Depression	0.977	0.952-1.003	0.078
Role-emotional	Age	1.034	0.995-1.075	0.091
	Gender	3.293	0.933-11.617	0.064
	Depression	0.981	0.967-0.996	0.010
Mental health	Age	1.034	0.995-1.074	0.089
	Gender	2.905	0.831-10.156	0.095
	Depression	0.970	0.946-0.996	0.022

QOL: quality of life.

Discussion

The low prevalence of depression in the sample was unexpected. Our hypothesis was that difficulties arising from belonging to a low economic bracket, in association with the intrinsic stressors of dialysis therapy would predispose patients to suffer from depressive symptoms. Our finding is that the 7.8% prevalence of depression in HD patients is lower compared to that found in most studies in which the prevalence of HD patients experiencing depression is estimated at around 20% to 30%.[2-4] Nonetheless, our prevalence rate is close to the 9.9% rate of depression found in a Brazilian study that included patients from Porto Alegre, a city located in a richer region in southern Brazil.[18] Populations from regions with a higher socioeconomic level usually include a larger number of diabetic and elderly patients undergoing chronic hemodialysis. In contrast, our sample is typical of underdeveloped areas, characterized by the presence of fewer diabetics and a higher number of younger patients. While in the Porto Alegre sample diabetes and hypertension were the main causes of kidney failure and the mean age was above 50 years, in the Sobral sample, glomerulonephritis was the leading cause and the mean age of non-depressed patients was 43.8 years. The explanation for such discrepancy is that infectious diseases in underdeveloped areas represent a major public health problem, and the medical care provided to patients with chronic diseases is inappropriate. As a matter of fact, diabetics living in these areas die from cardiac complications even before they develop ESRD, which only appears many years after the onset of diabetes.

As previously stated, the prevalence of depression depends on the type of population studied. Any explanation as to why the prevalence of depression is low may be based on patients' characteristics. Our sample was comprised of young patients coming from a low economic background, some of which were diabetic. Consequently, this sample had low comorbidity and, according to laboratory results, showed no signs of active inflammatory status or malnutrition. This being the case, when compared to the typical HD samples from more developed areas, we see that our sample has a specific clinical profile in terms of protective factors. Furthermore, the following paradox was observed: our patients, who generally come from a very

low economic background, receive enough social support to minimize several kinds of stressors. Upon receiving the ESRD diagnosis, they are cared for by the multi-professional team working in the renal unit, they start using the general medical services available to them more frequently, and those who live far from the unit where HD treatment is provided are offered room and board by the hospital. Several studies show that social support positively affects depression.[19-21] The clinical profile of our patients also helps explain our results. Young age and low comorbidity are associated with less malnutrition and inflammatory activity, as revealed by albumin and creatinine results. Malnutrition and pro-inflammatory state mediate the behavioral, as well as the neuro-mechanical features of depression.[22,23] In addition, patients use polysulfone dialyzers, a biocompatible membrane that triggers less inflammatory response and is associated with lower prevalence of depression.[24]

Two dimensions related to the mental domain of QOL were associated with depression in our study, namely role-emotional and mental health. Our result is in line with a study that shows a lower SF-36 mental component summary score in depressed *versus* non-depressed HD patients, but no differences on the SF-36 physical component summary.[25] Nonetheless, other studies have found that mental and physical components are both affected.[26,27] The lower scores achieved by our depressed patients in the mental domains have an important implication. They indicate that depressed patients perceive that they have a very poor QOL since, besides the chronically affected physical domains, they are also limited in the mental dimensions, which are some of the best scored dimensions among non-depressed patients in our work and in other studies.[28]

We are aware of the possible overlapping between the depression and mental domains of QOL in terms of constructs.[29-32] It is beyond the scope of this article to discuss the conceptual aspects of constructs. Our main goal is to adopt an objective approach towards the clinical relevance of the QOL in HA patients. We are, therefore, seeking modifiable variables associated with QOL with the hope of proposing interventions. Instruments such as the CES-D are valuable screening aids and indicate patients at risk for poor QOL. More importantly, when we classify a patient as suffering from depressive symptoms affecting QOL, we try to intervene. In other words, depression indicates individuals whose QOL can be improved by specific interventions. Nephrologists are not only qualified to follow-up on the side effects of antidepressants, but also meet with patients on a more frequently basis (i.e., three times a week) compared to psychiatrists who only get to see these patients on an occasional basis. As stated in the introduction, psychiatrists are not part of a renal units' team. They are, instead, consulted through appointment only. Hence, in practice, psychiatry plays a more specific role, which consists of treating depressed patients or those suspected of suffering from bipolarity on a more consistent basis.

Our study had its limitations because only routine laboratory markers were analyzed instead of specific markers of inflammation such as the C-reactive protein and IL-6, both of which could have clarified the issue regarding the relation between biological and depressive symptoms. The usual limitations of cross-sectional studies favored a possible overlapping between the depression and mental domains of QOL, thus making it impossible to establish causal relationships. Nevertheless, the results and the limitations of this study have encouraged us to conduct future research on the effects of treating depression for achieving improved QOL.

Conclusion

In summary, depressed patients undergoing chronic hemodialysis feel that they have a very poor QOL because, besides being chronically affected in the physical domains, they are also limited in the mental dimensions, which are some of the best scored dimensions among non-depressed patients. For the time being, based on cross-sectional studies similar to ours, depressed patients should be seen as at risk for poor QOL and should, therefore, be treated for depression. In the future, randomized controlled studies will be necessary to confirm whether treating depression will really improve the level of QOL.

Disclosures

Paulo Roberto Santos

Employment: *Faculdade de Medicina de Sobral (FMS), Universidade Federal do Ceará (UFC), Brazil.*

* Modest

** Significant

*** Significant: Amounts given to the author's institution or to a colleague for research in which the author has participation, not directly to the author. For more information, see Instructions for Authors.

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