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Time of diagnosis of chronic renal failure and assessment of quality of life in haemodialysis patients

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Abstract

Background. Time of diagnosis of chronic renal failure and predialysis care may be important factors related to the quality of life of patients on dialysis treatment.

Methods. We evaluated the quality of life of 113 haemodialysis patients who had a late ($\leqslant 1$ month before starting dialysis, $n=53$) or early ($\geqslant 6$ months, $n=60$) diagnosis of chronic renal failure. At the time of the survey patients had been on dialysis for a median duration of 55 days (range 1–109). Quality of life was measured by the Kidney Disease Questionnaire (KDQ), including five dimensions with scales ranging from 1.0 to 7.0 (1.0 = more impairment); the health and life satisfaction indices (higher score = more dissatisfied), functional status (Karnofsky scale), and the time trade-off technique.

Results. Mean scores of quality of life measures were worse in the late- than in the early-diagnosis group. A significant difference ($P<0.05$) was observed in the *depression* (4.46 ± 1.45 vs 5.23 ± 1.36), *relationships with others* (3.95 ± 1.31 vs 4.53 ± 1.31) and *frustration* (4.08 ± 1.51 vs 5.21 ± 1.34) dimensions of the KDQ, and in life satisfaction (4.11 ± 1.92 vs 3.32 ± 1.57). Functional status declined compared to 1 year before dialysis, particularly in the late-diagnosis group. Among the elderly patients, the magnitude of the difference was more pronounced, (including in the *physical symptoms* item of the KDQ).

Conclusions. Our findings demonstrate that late diagnosis of chronic renal failure and the consequent lack of predialysis care adversely affect the quality of life of haemodialysis patients. Early diagnosis and regular predialysis care should be encouraged to improve the quality of life during dialysis treatment.

Keywords: quality of life; dialysis; referral; chronic renal failure; predialysis management

Introduction

It has been suggested that late diagnosis of chronic renal failure and late referral of these patients to nephrology units are associated with an increase in morbidity and mortality during dialysis treatment [1–4]. In a prospective study, we recently showed that end-stage renal disease (ESRD) patients starting chronic dialysis programmes shortly after the diagnosis is made have more severe metabolic disorders and a higher mortality risk during the first months of maintenance dialysis than their counterparts who had been diagnosed earlier [5,6].

Assessing the quality of life in patients with ESRD treated by haemodialysis has been considered an important aspect of therapy [7]. It has been recognized that the objective of treatment of ESRD patients is to rehabilitate and not only increase their survival. Although some studies have suggested that patients without adequate care in the predialysis phase have a poorer short-term survival [2,6], none has explored the impact of time of diagnosis of chronic renal failure or the influence of predialysis management on their quality of life during the initial dialysis period.

The objectives of this study were to assess the quality of life of patients with ESRD, using multiple measures, in the first months of haemodialysis therapy and to compare it between patients who had a late or an early diagnosis of chronic renal failure.

Subjects and methods

Patients

All haemodialysis patients with ESRD receiving dialysis treatment for less than 4 months in four ambulatory units in São Paulo city were selected for the study. Patient exclusion criteria were: (1) being younger than 15 years of age, (2) returning to dialysis after the failure of a renal transplant, and (3) not being able to understand the questionnaire because of intellectual difficulties. At the beginning of the study there were 325 patients undergoing haemodialysis in these units. Of these, 44 met the inclusion criteria and were

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interviewed by one of us (MY). During the following months, these units were visited every 4–6 weeks and all eligible new patients were interviewed until the required sample size was obtained. A total of 117 patients were studied. We estimated that 108 patients would be needed (54 per group) to detect a 15% difference in quality of life scores, assuming $\alpha = 0.05$ and $\beta = 0.20$.

Information was collected using a standardized questionnaire concerning sociodemographic data, primary diagnosis, associated comorbid conditions, time of diagnosis of renal disease, predialysis attendance at nephrology out-patient clinics, control of hypertension, laboratory tests before the first dialysis, duration of hospitalization at the beginning of the dialysis programme, type of initial dialysis access, duration of dialysis therapy and use of erythropoietin. Some information was also obtained by reviewing patients' charts.

Before data collection we defined that patients whose diagnosis of chronic renal failure had been made 1 month or less before starting dialysis would be classified as having a late diagnosis. Patients with 6 or more months of diagnosis were classified as having an early diagnosis. In order to make the distinction between late and early diagnosis more precise, those patients whose diagnosis was made between 1 and 6 months ($n = 4$) were excluded from the study, thus leaving 113 subjects for the analysis. All patients gave their informed consent before enrollment in the study.

Quality of life assessment

We used the Kidney Disease Questionnaire (KDQ) developed by Laupacis *et al.* [8] for patients receiving haemodialysis. This contains 26 questions divided into five dimensions: *physical symptoms*, *fatigue*, *depression*, *relationship with others* and *frustration*. The questionnaire has been shown to have good construct validity, reproducibility and responsiveness. All questions are scored on a 7-point Likert scale (1 = a severe problem, 7 = no problem). A difference in mean score of 0.5 in each section represents the minimal clinically important difference, while, a mean difference of 1.0 represents a large clinical difference [9]. There were no major difficulties in the translation of the questionnaire into Portuguese. The construct validity of the KDQ was assessed by calculating the correlation coefficient between its dimensions and another instrument, the Self Reporting Questionnaire (SRQ) [10]. This is an instrument developed by the World Health Organization (consisting of 20 questions) and designed to screen mental disorders especially in developing countries. Its validity and reliability have already been demonstrated in our setting [11]. Additionally the scores of the KDQ dimensions were correlated with another outcome measure used—the life satisfaction scale. Reproducibility was assessed by determining the intraclass correlation coefficient when the questionnaire was readministered to 17 patients, 1 month apart. All questionnaires were applied by the same interviewer.

In addition other measures of quality of life were employed: (A) The Karnofsky activity scale [12] was used as an indicator of functional ability, with the following scores: 1, normal; 2, minor signs of disease; 3, normal activity with effort; 4, unable to carry on normal activity; 5, requires occasional assistance; 6, requires considerable assistance; 7, disabled; 8, severely disabled; 9, hospitalization is indicated; 10, moribund. (B) Ability to work. (C) Employment status. (D) Health satisfaction was evaluated in two questions: 'Compared to one year before starting dialysis, how would you rate your health in general now?' (linear scale ranging from 1, much better now to 5, much worse now); 'In general, would you say that your health now is:' (range from 1, excellent to 5, poor). (E) Life satisfaction was measured on a linear scale ranging from a low of 1 (completely satisfied) to 7 (completely dissatisfied). (F*)* The time trade-off approach [13], which is the ratio between years of full health which the patient would consider equivalent to a life time with ESRD (the score ranges from 0, death to 1.0, full health).

Statistical analysis

The Student *t* test was used for the comparison of continuous variables between the early- and late-diagnosis groups. When the distribution of the variables was non-parametric the Mann–Whitney test was employed. The paired *t* test was used for comparison of responses of the same group at two points in time. Pearson's product–moment correlation coefficient was computed to examine the relationship between continuous variables. Categorical variables were compared by the chi-square test. All *P* values are two-tailed. Analysis of covariance was used to investigate the influence of time of diagnosis of chronic renal failure in the quality of life measures, simultaneously considering the effect of age. The BMDP Statistical Software (Los Angeles, CA, 1992) was used to analyse the data.

Results

A total of 113 patients were surveyed; 53 were classified as having a late diagnosis and 60 as having an early diagnosis. Median duration of diagnosis was 24 months in the early-diagnosis group. Overall median duration of dialysis was 55 days (range 1–109).

Comparing late- and early-diagnosis groups, no statistically significant difference was found in mean age, gender, race, marital status, level of education, monthly income, and mean duration of dialysis (Table 1). Early-diagnosis patients tended to be older and a higher percentage were diabetics (27 vs 13%, $P = 0.08$). During the predialysis phase, among the 60 early-diagnosis patients, 50 had received nephrological follow-up for a median length of 19 months (range 6–312). Seven of the remaining 10 patients had been followed by general practitioners and six of these had received antihypertensive therapy. A greater percentage of the early-diagnosis patients had regularly received antihypertensive drugs compared to the late-diagnosis group and 65% ($n = 39$) used a low-protein diet (Table 1). Most of the late-diagnosis patients used a central venous catheter as the initial dialysis access. Eleven patients started treatment by peritoneal dialysis, but at the time of the interview all were on haemodialysis. In this subgroup, the median (range) time on peritoneal dialysis prior to haemodialysis was 24 days (2–92). The distribution of comorbid factors is shown in Table 2. At the start of the dialysis programme, median duration of hospitalization was longer in the late- than in the early-diagnosis group (7 vs 0 days, $P < 0.001$). Patients with a late diagnosis had significantly higher mean serum creatinine concentration and lower mean

Table 1. Characteristics of the patients grouped according to time of diagnosis

Characteristic	Late diagnosis ($n=53$)	Early diagnosis ($n=60$)
Age (years)		
Mean (SD)	46.0 (16.2)	51.1 (16.5)
<60 (n (%))	42 (80)	39 (65)
$\geqslant 60$ (n (%))	11 (20)	21 (35)
Female sex (n (%))	21 (40)	22 (37)
Race (n (%))		
White	36 (68)	36 (60)
Non-white	17 (32)	24 (40)
Marital status (n (%))		
Married	32 (60)	41 (68)
Unmarried‡	21 (40)	19 (32)
Education (n (%))		
Illiterate/primary	20 (38)	32 (53)
Middle/high-school/college	33 (62)	28 (47)
Median (range) income (US$/month)	530 (0–7500)	570 (77–6000)
Primary diagnosis (n (%))		
Glomerulonephritis	5 (9)	7 (12)
Hypertension	13 (25)	12 (20)
Diabetes	7 (13)	16 (27)
Polycystic kidney disease	1 (2)	7 (12)
Other/unknown	27 (51)	18 (29)
Predialysis		
Median duration of diagnosis (months (range))	0 (0–1)*	24 (7–312)
Median ambulatory follow-up (months (range))	0 (0–1)*	12 (0–312)
Receiving antihypertensive drugs (n (%))	24 (45)*	51 (85)
Initial dialysis access (n (%))	†	
Central venous catheter	46 (86)	22 (37)
Arteriovenous fistula	1 (2)	33 (55)
Peritoneal rigid catheter	3 (6)	4 (6)
Tenckhoff catheter	3 (6)	1 (2)
Mean duration of dialysis (days (SD))	59.5 (30.5)	51.6 (31.5)
Range	(1–105)	(1–109)

*$P<0.001$, †$P=0.01$ compared with the early-diagnosis group. ‡Unmarried = never married, widowed, separated.

Table 2. Comorbid illnesses and laboratory data at the beginning of dialysis, by diagnosis group

Parameters	Late diagnosis		Early diagnosis	
Co-morbid factors, n (%)	n§		n§	
Cardiac insufficiency	52	9 (17)	60	14 (23)
Angina pectoris	42	2 (5)	45	6 (13)
Obstructive pulmonary disease	51	5 (10)	60	6 (10)
Peripheral vascular disease	43	4 (9)	45	10 (22)
Cerebral vascular disease	42	4 (10)	45	2 (4)
Malignant disease	42	1 (2)	45	0 (0)
Hypertension	52	43 (83)	60	54 (90)
Visual deficit	43	10 (23)	47	11 (23)
Serum markers for hepatitis B or C	37	1 (3)	41	3 (7)
Wheelchair use	53	4 (8)	60	5 (8)
Hospitalization at start of dialysis				
Median (range) days	53	7 (0–70)*	60	0 (0–42)
Laboratory data				
Haematocrit, %	39	22.7 (4.7)	44	24.1 (4.7)
Haemoglobin, g/dl	39	7.4 (1.5)	44	8.0 (1.6)
Serum urea, mg/dl	53	166 (76)	60	175 (75)
Serum creatinine, mg/dl	53	11.2 (4.7)†	60	8.8 (4.3)
Creatinine clearance	12	4.3 (2.4)†	23	7.1 (3.9)
Serum albumin, g/dl	13	3.40 (0.79)‡	18	4.01 (1.11)
Use of erythropoietin, n (%)	53	4 (8)	60	1 (2)

For laboratory parameters, values are mean (SD).
§Number of patients with available information.
*$P<0.001$, †$P<0.05$, ‡$P=0.10$, for the comparison with the early-diagnosis group.

Table 3. Mean (SD) scores for indicators of quality of life according to time of diagnosis

Parameter	Late diagnosis $n=53$	Early diagnosis $n=60$
Kidney Disease Questionnaire*		
Physical symptoms	3.85 (1.45)	4.12 (1.31)
Fatigue	4.52 (1.39)	4.77 (1.19)
Depression	4.46 (1.45)[a]	5.23 (1.36)
Relationships	3.95 (1.31)[b]	4.53 (1.31)
Frustration	4.08 (1.51)[a]	5.21 (1.34)
Health satisfaction[#‡]	3.79 (1.32)[a]	2.97 (1.35)
Health state[‡]	3.77 (0.95)	3.72 (0.78)
Life satisfaction[§]	4.11 (1.92)[b]	3.32 (1.57)
Time trade-off[†]	0.67 (0.31)	0.71 (0.31)
Karnofsky score¶		
1 year prior to dialysis	1.96 (1.32)[b]	2.58 (1.34)
Current	3.60 (1.72)[c]	3.32 (1.41)[c]
Ability to work		
Full-time or part-time, n (%)	26 (49)	30 (50)
Employed		
Full-time or part-time, n (%)	8 (15)	11 (18)

Range of values: *1.0–7.0, where 1.0 indicates more impairment; †0–1.0, where 0 indicates more impairment; ‡1.0–5.0, where 5.0 indicates very dissatisfied; §1.0–7.0, higher scores indicate more dissatisfied; ¶1.0–10.0, higher scores indicate more impairment.
#Compared to 1 year before start of dialysis.
[a] $P<0.01$, [b] $P<0.05$, compared to early diagnosis.
[c] $P<0.01$, compared to 1 year prior to dialysis.

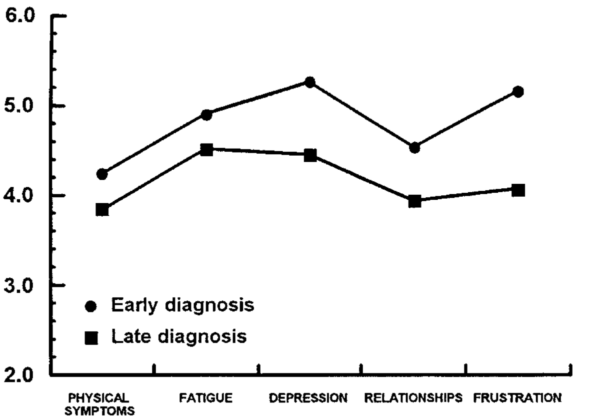

Fig. 1. Comparison of the Kidney Disease Questionnaire scores for late ($n=53$) and early diagnosis patients (including only those who received predialysis nephrological follow-up, $n=50$). Lower scores indicate more impairment.

serum albumin and creatinine clearance (4.3 vs 7.1 ml/min, $P=0.02$).

Table 3 summarizes the mean health-related quality of life scores in the two groups. Mean scores of almost all measures were worse in the late- than in the early-diagnosis group. A clinically and statistically significant difference was observed in the *depression*, *relationships,* and *frustration* dimensions of the KDQ. Health satisfaction compared to 1 year prior to dialysis and life satisfaction indices were significantly worse in the late-diagnosis group. Functional status (Karnofsky scale) declined compared to 1 year before dialysis in both groups, particularly in those with a late diagnosis. Mean time trade-off score tended to be slightly better in the early-diagnosis group. The analysis was repeated considering only the early-diagnosis patients who received predialysis care ($n=50$). The results were basically the same, as can be seen in Figure 1, where the mean scores of the KDQ items for both groups are shown.

In a further evaluation we examined the relationship between time of diagnosis and quality of life indices, stratifying the patients by age group (Table 4). A similar tendency to inferior health-related quality of life in the late-diagnosis group was observed both in the elderly and younger patients. Nevertheless, the magnitude of the difference in most scores was more pronounced among the elderly, reaching a higher level of statistical significance for the *physical symptoms*, *fatigue, depression,* and *relationships* items of the KDQ, and in the life satisfaction index. Using analysis of covariance, the effect of time of diagnosis on quality

Table 4. Mean (SD) scores for indicators of quality of life according to time of diagnosis and age group

Parameter	≥60 years		<60 years	
	Late dagnosis $n=11$	Early diagnosis $n=21$	Late dagnosis $n=42$	Early diagnosis $n=39$
Kidney Disease Questionnaire*				
Physical symptoms	2.65 (1.03)[b]	3.83 (1.38)	4.16 (1.39)	4.27 (1.26)
Fatigue	3.59 (1.42)[b]	4.68 (1.34)	4.78 (1.28)	4.81 (1.12)
Depression	3.76 (1.50)[a]	5.30 (1.39)	4.65 (1.40)[b]	5.20 (1.37)
Relationships	3.03 (1.14)[a]	4.47 (1.43)	4.19 (1.25)	4.57 (1.26)
Frustration	3.27 (0.91)[a]	5.30 (1.33)	4.29 (1.58)[a]	5.16 (1.36)
Health satisfaction[#‡]	4.00 (1.00)	3.24 (1.26)	3.74 (1.40)[a]	2.82 (1.39)
Health state[‡]	4.27 (0.47)	3.90 (0.70)	3.64 (1.01)	3.62 (0.81)
Life satisfaction[§]	4.82 (1.40)[a]	3.19 (1.60)	3.93 (2.00)	3.38 (1.57)
Time trade-off[†]	0.69 (0.32)	0.77 (0.32)	0.66 (0.31)	0.68 (0.31)

Range of values: *1.0–7.0, where 1.0 indicates more impairment; †0–1.0, where 0 indicates more impairment; ‡1.0–5.0, where 5.0 indicates very dissatisfied; §1.0–7.0, higher scores indicate more dissatisfied.
#Compared to 1 year before start of dialysis.
[a] $P<0.01$, [b] $P<0.05$ compared to early diagnosis.

of life indices remained significant after adjustment for age.

Performance characteristics of the Kidney Disease Questionnaire

Construct validity

The correlation coefficients between the five dimensions of the KDQ and the SRQ score were 0.65, 0.77, 0.74, 0.70 and 0.57 for the *physical*, *fatigue*, *depression*, *relationships,* and *frustration* dimensions respectively ($P < 0.001$ for all comparisons). Comparing the KDQ with the life satisfaction scale the corresponding figures were −0.42, −0.34, −0.64, −0.58 and −0.52 respectively ($P < 0.001$ for all comparisons).

Reproducibility

The intraclass correlation coefficients for the five dimensions, in patients assessed 1 month apart were: 0.90 (*physical*), 0.87 (*fatigue*), 0.81 (*depression*), 0.92 (*relationships*), and 0.95 (*frustration*).

Discussion

Delayed diagnosis, referral, and start of dialysis are common in developing countries and probably in developed nations too [1–3,5,14,15]. It has been suggested that these patients have a higher frequency of clinical complications, metabolic disturbances, long-term access problems and a higher mortality rate than patients with a regular follow-up [1–6]. Recently, in a prospective study we showed that, after 6 months on dialysis, late-diagnosis patients had a mortality risk 2.8 times that of early-diagnosis patients and their survival rate was 18% lower than in their counterparts [6]. No report has addressed the issue of quality of life of these patients in the early-dialysis period. Our data indicate that late-diagnosis patients did not receive adequate predialysis care. Almost all of them only learned that they had renal disease when they started dialysis, many had not received antihypertensive drugs in the predialysis period and presented considerably altered laboratory parameters, and their initial dialysis access was generally temporary. Although the frequency of comorbid conditions was approximately similar for late- and early-diagnosis patients, the longer duration of hospitalization in the former group probably reflects the greater severity of their clinical condition.

Because of the broad concept of quality of life, it has been recommended that measuring instruments should be able to evaluate multiple dimensions such as, psychiatric and psychosocial aspects, work and rehabilitation, and have multi-item assessments of each dimension [16]. We opted to use the KDQ because it meets these requirements and is a disease-specific questionnaire especially developed for haemodialysis patients. In addition, other measures were used (the Karnofsky index, the time trade-off technique, etc.). The KDQ contains five dimensions (*physical symptoms*, *fatigue*, *depression*, *relationship with others,* and *frustration*) and demonstrated construct validity, good reliability, and responsiveness. In our evaluation, we confirmed its reproducibility (the intraclass correlation coefficient ranged from 0.81 to 0.95), its validity when compared with another instrument (SRQ) already tested in our setting [10,11], and it was well accepted by our patients.

The assessment of the quality of life by the various parameters employed clearly revealed that late-diagnosis patients had a worse performance. This was evidenced in several aspects of patients' wellbeing including the psychosocial dimensions of the KDQ (*depression*, *relationships,* and *frustration* items) and the scales of health and life satisfaction (and functional status). Among the dimensions evaluated, our results show a greater impact in psychosocial aspects. The importance of patient's psychological condition on adjustment to chronic dialysis has been reported [17]. The influence of time of diagnosis on health-related quality of life scores was seen in disease-specific and in generic measures; their magnitude was clinically important and statistically significant. These findings are strengthened by the fact that the early-diagnosis group had a higher percentage of elderly and diabetic patients, factors that would tend to adversely affect quality of life [18,19]. It is possible that our results underestimate the real magnitude of the difference between the two groups since the participants were recruited at ambulatory dialysis units and some late-diagnosis patients may not have been available for assessment because of hospitalization at the start of the dialysis programme or because they had died during the initial dialysis period. The negative impact of late diagnosis on quality of life was noted in both elderly and younger patients. Although the number of elderly patients in the study was small, it was noteworthy that the effect of time of diagnosis was more substantial in this subgroup. In addition to the more pronounced difference in mean scores in most measures, elderly patients with a late diagnosis had significantly worse scores on the *physical symptoms* and *fatigue* dimensions of the KDQ.

The worse performance of late-diagnosis patients probably reflects the lack of an adequate predialysis care and is related to the more severe clinical conditions and metabolic disorders seen at the beginning of dialysis treatment, the common need for emergency dialysis, longer hospitalization, the absence of nutritional orientation, poor control of hypertension, and lack of a permanent dialysis access and psychological preparation for dialysis [1–6,20].

Re-evaluation of this cohort of patients after a longer follow-up should provide meaningful information in relation to the long-term consequences of the lack of adequate preparation for dialysis. In a prior study, in another sample of clinically stable patients after an average of 9 months on dialysis at the same units, we showed that if patients with a late diagnosis were able to overcome the initial dialysis period, when the results of the lack of predialysis care are more evident and severe, their inferior quality of life assessment will tend to become progressively less marked [21]. In fact, compared to the corresponding groups in the present evaluation, after an average of 9 months on dialysis, late-diagnosis patients ($n = 47$) had better mean scores in several dimensions of the KDQ (*physical*, 3.87 ± 1.32; *fatigue,* 4.60 ± 1.49; *depression,* 4.67 ± 1.52; *relationships,* 4.33 ± 1.44; and *frustration,* 4.33 ± 1.74) and health (3.42 ± 1.49) and life satisfaction (3.53 ± 1.74) indices; while early-diagnosis patients ($n = 54$) had worse scores in most of the KDQ items (3.53 ± 1.08; 4.45 ± 0.99; 4.80 ± 1.35; 4.51 ± 1.11, and 4.38 ± 1.50 respectively) and in the life satisfaction index (3.55 ± 1.36) [21].

Our findings demonstrate that lack of predialysis care and follow-up adversely affect the quality of life of haemodialysis patients. This negative effect was particularly notable in elderly patients. Starting dialysis earlier may have beneficial effects in the quality of life of haemodialysis patients. However, further studies that include more patients with creatinine clearances between 7 and 10 ml/min. at the start of dialysis are needed to clarify this issue.

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