Chronic Dialysis in Brazil - Report of the Brazilian Dialysis Census, 2011

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Submitted on: 05/31/2012.
Approved on: 08/02/2012.

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ABSTRACT

Introduction: National data on maintenance dialysis are important for treatment planning. **Aim:** To describe the results of the dialysis census of the Brazilian Society of Nephrology for 2011 and observed trends from 2000 to 2011. **Methods:** A survey was conducted using questionnaire filled online by the dialysis units, with July as reference month for estimates. From a total of 645 units, 353 (54.9%) responded to the survey. **Results:** The estimated number of patients on dialysis in Brazil was 91,314 in 2011 (42,629 in 2010; 92,091 in 2011). For approximately 85% of the patients the treatment was provided by the Brazilian Unified Health Care System. The estimated prevalence and incidence rates in 2011 were 475 and 149 maintenance dialysis patients per million population, respectively. For prevalent patients, 90.6% were on hemodialysis, 31.5% 65 years of age or older, 28% diabetic and 35.5% (n = 32,454) on waiting list for transplantation in 2011. The estimated number of patients starting dialysis in 2011 was 28,680 (18,972 in 2010) and annual mortality rate 19.9% (17.9% in 2010). **Conclusions:** The data indicate pronounced increase in the dialysis population across the years in Brazil with a trend for stabilization in the last two years. The reason for the increase in incidence and mortality in 2011 deserves investigation. A large number of patients were on waiting list for renal transplantation. By providing a picture of the situation and trends on maintenance dialysis treatment in Brazil the census is useful to guide resources allocation and interventions to improve treatment quality.

Keywords: Brazil, censuses, dialysis, epidemiology, renal insufficiency, chronic.

INTRODUCTION

For over 10 years, the Brazilian Society of Nephrology (BSN) has organized an annual national census of patients with chronic renal disease on a chronic dialysis program. This information has enabled a better understanding of various epidemiological aspects of chronic dialysis patients in the country, facilitated dialogue among the various sectors involved in providing this treatment, and guided the planning of care for these patients. This fundamental society accomplishment occurred with the voluntary cooperation of dialysis units across the country. In this report, we present data concerning patients on dialysis as of July 1, 2011.

METHODS

In July 2011, a survey of patients with chronic kidney disease in an outpatient dialysis program was conducted in all 687 dialysis units in the country registered in the BSN. During the second semester of 2011, a questionnaire was published on the BSN website (http://www.sbn.org.br/index.php?censoAdmAtual&menu=24), and all dialysis units in the country were asked to complete it online. A reminder was sent monthly until the end of the data collection period (December 2011) to all units not responding to the survey. When necessary, data were confirmed by a BSN secretary via telephone call to the unit in question. This occurred in approximately 15% of the units. Questions on the sociodemographic, clinical, laboratory, and treatment aspects referred to patients undergoing dialysis as of July 1, 2011. The

data regarding mortality and entry of new dialysis patients were collected till the month of July 2011, and were then estimated for the rest of the year.

Of the 687 dialysis units registered in the BSN in July 2011, 643 had an active program for chronic dialysis treatment and 353 (54.9%) of these units completed the survey (Table 1). Data were collected from 50,128 patients undergoing treatment in the 353 dialysis units that participated in this survey. The units presented the data as group answers, i.e., the answers were given by indicating the number of patients in the unit that corresponded to the characteristics questioned. Therefore, the data should be interpreted as representative of the average characteristics of patients and treatment practices in each dialysis unit. The national data were estimated by considering the expected numbers in the centers that did not respond to the survey according to its regional location. The average number of patients expected in the region was assigned to each of these units. Population estimates from Brazil and every region of the country used in the calculations of prevalence and incidence rates were made from updated estimates of the Brazilian Institute of Geography and Statistics for July 2011. Using the pooled data, we estimated the percentage of patients outside the recommended target indices[1,2] for dialysis dose (for Kt/V or urea reduction ratio) and serum albumin, phosphorus, parathyroid hormone (paratohormônio) (PTH), and hemoglobin.

Table 1 General data from the dialysis unit responses to the census regarding patients on chronic dialysis (2011 census)

Number of units with a chronic dialysis program	643
Units with a chronic program that responded to the survey, N (%)	353 (54.9)
Type of unit, %	
Private/nonprofit/public	71/20/9
Satellite/hospital	49/51
University/non-university	17/83
Unit occupancy rate, %	82
% of units that treat patients with Acute renal lesion	72
Chronic kidney disease on dialysis	82
Number of patients in the 353 units	50,128
Estimated total number of dialysis patients in the country	92,091
Brazilian population in January 2011 (IBGE) in millions	190.73

IBGE: Brazilian Institute of Geography and Statistics.

Results

Figure 1 shows the distribution of the units that responded to the census by region. The proportion of units that responded compared to the total number of units was similar between the various regions of the country, mostly located in the Southeast, followed by the South and Northeast. Of the 353 units with chronic dialysis programs that responded to the questionnaire, 91.5% had an agreement with the Brazilian Unified Health Care System (SUS) (*Sistema Único de Saúde*) and 75.6% had agreements with other private healthcare insurance organizations. Of this patient population, 84.9% was reimbursed by the SUS and 15.1% was reimbursed by private health insurance companies.

Figure 1. Dialysis units that responded to the 2011 census (n = 353) divided by region: South - Southeast - Northeast - Midwest - North.

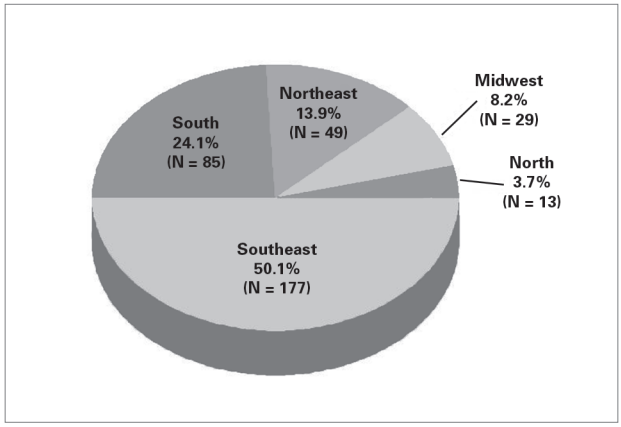


Figure 2 shows the estimated total number of patients on dialysis in Brazil per year from 2000 to 2011. The number has increased gradually over the years, from 42,695 in 2000 to 91,314 in 2011, the latter of which was constant with 2010. More than half of these patients were located in the southeast region of Brazil. The prevalence rate of dialysis in 2011 was 475 patients per million population (pmp) and varied by region from 279 patients pmp in the northern region to 583 patients pmp in the southeast region (Figure 3). An estimated 26,680 patients started this treatment in Brazil in 2011, corresponding to an incidence rate of 149 patients pmp (Figure 4). Approximately 50% of patients (n = 14,622) started treatment in the southeast region. The annual incidence of treatment ranged from 68 pmp in the northern region to 201 pmp in the midwest region (Figure 5). These estimates are substantially

higher than those observed in 2010, during which period 18,972 patients started treatment (100 patients pmp).[3]

Figure 2. Estimated number of patients on dialysis in the country per year (2011 census).

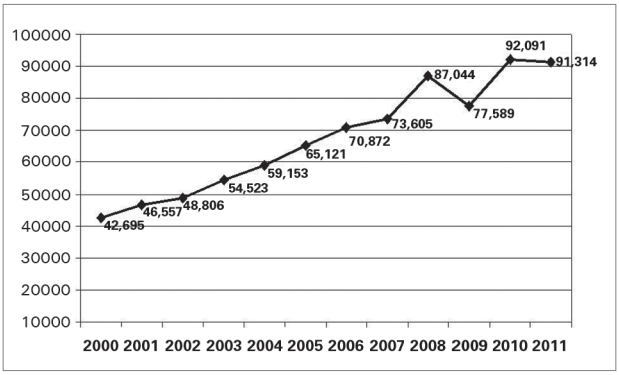


Figure 3. Estimated prevalence of dialysis patients in Brazil by region (2011 census).

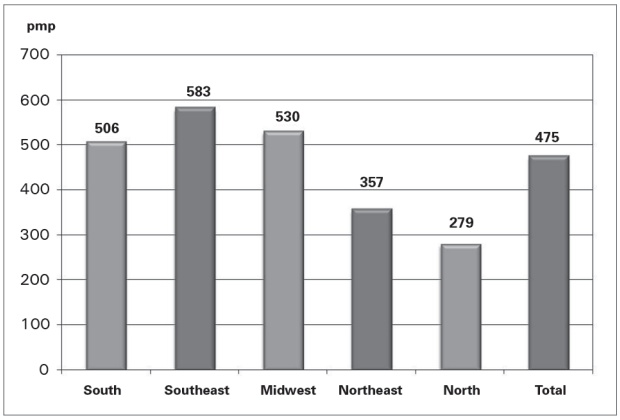
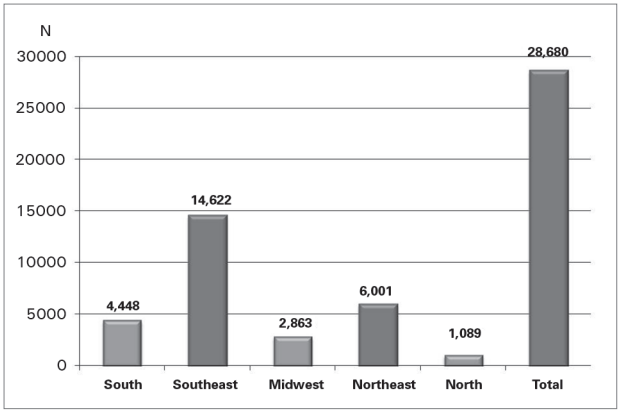


Figure 4. Estimated absolute number of new patients in Brazil by region (2011 census)



The percentages of dialysis patients aged ≤ 18 years, between 18 to 64 years, 65–80 years, and >80 years were 1.6%, 66.9%, 27.2%, and 4.3%, respectively. Fifty-seven percent of these patients were male.

In July 2011, 90.6% of chronic dialysis patients were being treated with hemodialysis and 9.4% were treated with peritoneal dialysis, and automated peritoneal dialysis (APD) was the predominant treatment. Table 2 shows the patient distribution according to dialysis type and paying agency. A higher percentage of patients reimbursed by private health insurance underwent daily hemodialysis and peritoneal dialysis treatments, particularly APD, compared with those reimbursed by the SUS. A total of 8.7% of the SUS patients underwent peritoneal dialysis compared to 12.7% of the patients covered by private health insurance.

Figure 5. Estimated incidence of patients on dialysis in Brazil by region (census 2011).

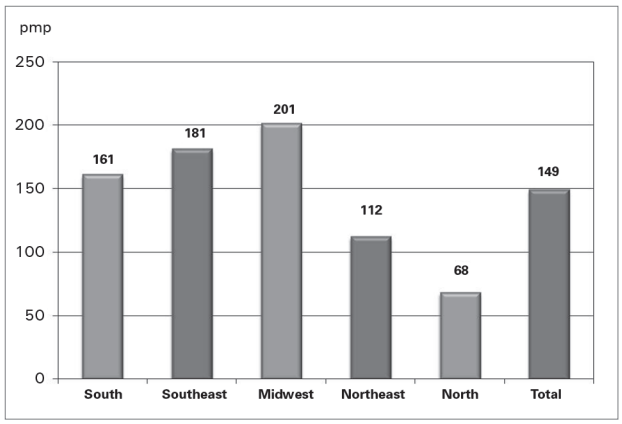


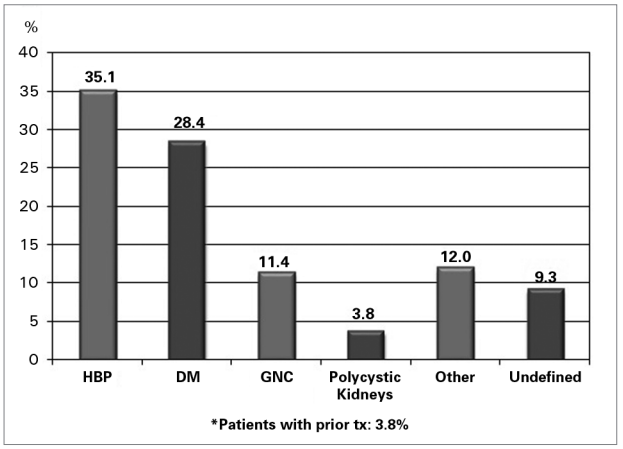
Table 2 Patient distribution according to dialysis type and payment source (2011 census)

Modality	SUS N (%)	Non-SUS N (%)	Total N (%)
Conventional HD	38.703 (91.0)	6.475 (85.3)	45.178 (90.1)
Daily HD (> 4×/week)	113 (0.3)	144 (1.9)	257 (0.5)
CAPD	1.703 (4.0)	307 (4.0)	2.010 (4.0)
APD	1.967 (4.6)	654 (8.6)	2.621 (5.2)
IPD	54 (0.1)	8 (0.1)	62 (0.1)
Total	42.540 (100)	7.588 (100)	50.128 (100)

The most frequent causes of the renal disease were hypertension (35%) and diabetes (28%) (Figure 6).

The prevalence of positive serology for hepatitis B and C in patients on chronic dialysis in Brazil was 5.5% and 1.1%, respectively; for human immunodeficiency virus (HIV), the rate was 0.8%. In 2010, the prevalence of positive serology for hepatitis C, hepatitis B, and HIV was 5.8%, 1.1%, and 1.2%, respectively.

Figure 6. Underlying diagnosis of patients on dialysis (census 2011): HBP - DM - GNC - Polycystic Kidneys - Other - Undefined.



The estimated percentage of patients on hemodialysis with central venous access (temporary or permanent) was 14.2%. The monthly rate of hospitalization was 6.1% in the patients studied (n = 50,128) in July 2011. With regard to the recommended laboratory indices for patients on dialysis,[1,2] among the hemodialysis patients, 20% had a Kt/V < 1.2 or urea reduction ratio < 65%, 14.8% had serum albumin < 3.5 g/dL, 34.9% had serum phosphorus > 5.5 mg/dL, 30.6% had PTH > 300 pg/mL, and 16.8% had PTH < 100 pg/mL, and 39.3% had hemoglobin < 11 g/dL (Figure 7).

Figure 7. Percentage of patients whose examinations did not conform with the recommended indices, 2010–11 (census 2011).

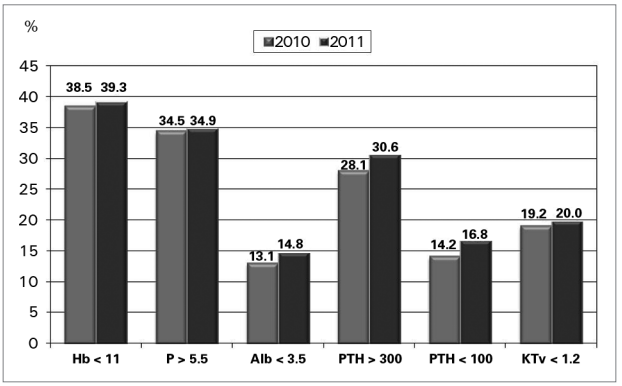
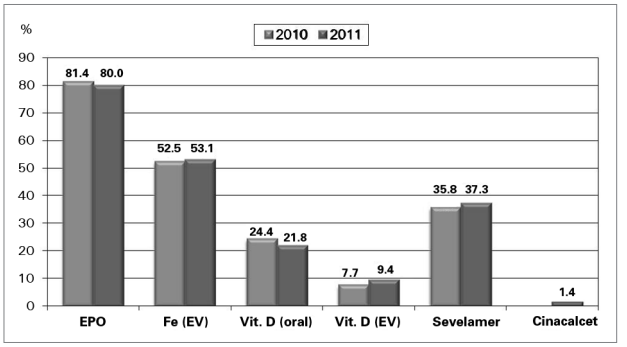


Figure 8 shows the breakdown of medications prescribed for these patients: erythropoietin, 80%; intravenous iron, 53%; vitamin D, 31%; sevelamer, 37%; and cinacalcet, 1.4%.

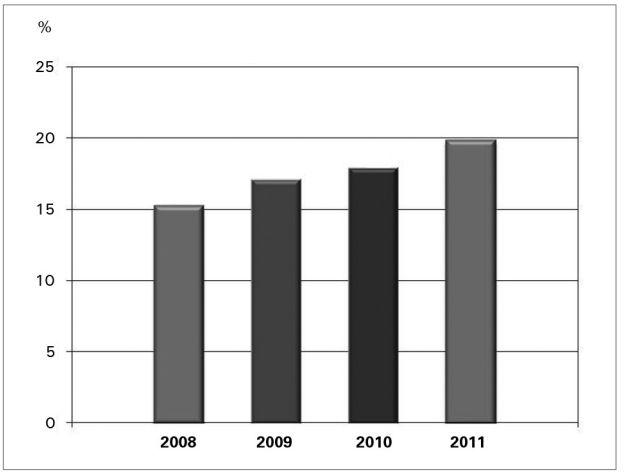
The estimated number of patients registered on the transplant waiting list in July 2011 was 32,454 (35.5%).

Figure 8. Percentage of patients with selected prescription medications, 2010–11 (census 2011).



The estimated number of deaths in 2011 was 18,187, corresponding to a crude mortality rate (with the dialysis population as of July 2010 in the denominator) of 19.9% during the year. This rate is reduced to 15.2% when the value for all patients at risk in the year (who underwent dialysis during the year) is in the denominator. Figure 9 shows the crude mortality rates in the years 2008–2011.

Figure 9. Crude mortality rates, 2008–2011.



Discussion

In this report, we discuss the status of dialysis units and the patients undergoing dialysis treatment in Brazil using data from the Brazilian dialysis census from July 2011. The results are based on data from the units that completed the questionnaires, representing approximately 55% of the dialysis units in the country. The percentage of responses in 2011 was similar to that in 2010 and lower than that in 2009, when approximately 66% of the centers responded to the census.[3] This highlights the need to improve

the data collection methodology, which became exclusively "online" in 2010, and the continuing search for greater unit collaboration. The distribution of units that responded is similar to the distribution of the total dialysis units by country region, allowing us to make inferences about the national generalizability of the results. The estimates suggest an increase in the number of new patients and a stabilization of the prevalence rate of dialysis treatment in 2011 compared to 2010. Considering the history of the census, this trend line does not allow us to define a real decrease in the growth rate of the dialysis population in Brazil. Our annual estimates should be interpreted with caution due to the variable percentage of responses from the units and the differences in some of the questionnaire answers that require further validation. In recent years, studies in the United States and other developed countries in Europe and Asia reported a steady increase in the prevalence rate of dialysis, although the incidence of new patients on dialysis has grown little or shown a tendency to stabilize.[4]

The overall prevalence rate of dialysis (475 pmp) should be added to the rate of transplanted patients to obtain the actual rate of renal replacement therapy, which can rise to 650–700 pmp depending on the number patients with a functioning renal graft. The rate of renal replacement therapy in Brazil is lower than that in countries such as Chile, Uruguay, and developed countries in Europe, which is approximately 1000 pmp, and in the US, which was 1,750 pmp in 2008.[4] In addition, there are large regional variations in Brazil, and the rate in the southeast region, for example, should be very close to that of developed countries. Approximately 28,000 patients (149 pmp) initiated chronic dialysis treatment in 2011. As with prevalence rates, we observed large regional variations in incidence rates. The actual incidence rate should be obtained by adding the preemptive transplant recipients, which would make it similar to that observed in many European countries and lower than that in the US (362 pmp) and Japan (288 pmp).[4]

The observation of 90.6% of patients on maintenance hemodialysis is similar to that observed in previous censuses. This highlights the higher percentage of patients on APD among those subsidized by private health insurance companies, and the contribution of daily hemodialysis as a therapeutic modality, which decreased compared to 2010. Hypertensive nephropathy and diabetes are the major underlying diseases. The prevalence of hepatitis C continues to decrease, and those of hepatitis B and HIV are stable. The percentage of patients whose examinations did not conform with the international guidelines[1,2] was generally similar for all measured indicators relative to the year 2010. The prevalence of anemia reached 39% despite the use of erythropoietin and intravenous iron in the vast majority of patients. The recent preconization of a lower range of values for hemoglobin should be further analyzed, which will certainly decrease the percentage of patients with low values.[5] A high percentage of patients with anemia and increased levels of phosphorus and PTH compared to targets recommended in guidelines have also been observed in other European countries, the US, and Japan.[6,7] Lack of adequacy observed in the BSN census data for the control of the indicators of disorders of mineral metabolism occurs despite the high percentage of patients in whom sevelamer (37%) and vitamin D (31%) were prescribed as well as the recent start of prescription of cinacalcet in dialysis units across the country. The crude mortality rate increased consistently compared with previous years, which requires further study and consideration.

Some hypotheses for these findings can be raised, which include difficulties related to the public health system, non-achievement of treatment quality goals, poor prognostic profile of patients (comorbidities, handling pre-dialysis, age), among others. In the last year, compared to 2010, the percentage of patients with diabetic nephropathy was stable and there was a slight increase in the proportion of elderly undergoing dialysis; however, more data are required to analyze mortality in greater detail. Despite this increase, the increased mortality of patients undergoing dialysis in Brazil remains lower than that in North America.[4]

Generalizations of these study findings should be made with caution due to the relatively small percentage (relativamente reduzido) of units that responded, differences among centers in the data collection methodology, and the lack of response validation.

Conclusions

The BSN census is an initiative of fundamental importance for the understanding of dialysis treatment in Brazil. This report continues to aid the process of improving the treatment provided to patients with end-stage chronic kidney failure as well as the national planning policy for chronic dialysis treatment.

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