Brazilian Chronic Dialysis Census 2014

Inquérito Brasileiro de Diálise Crônica 2014

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ABSTRACT

Introduction: National chronic dialysis data have had impact in the treatment planning. **Objective:** To report data of the annual survey of the Brazilian Society of Nephrology about chronic kidney disease patients on dialysis in July 2014. **Methods:** A survey based on data of dialysis units from the whole country. The data collection was performed by using a questionnaire filled out on-line by the dialysis units. **Results:** Three hundred twelve (44%) of the dialysis units in the country answered the questionnaire. In July 2014, the total estimated number of patients on dialysis was 112,004. The estimated prevalence and incidence rates of chronic maintenance dialysis were 552 (range: 364 in the North region and 672 in the Southeast) and 180 patients per million population (pmp), respectively. The annual incidence rate of patients with diabetic nephropathy was 77 pmp. The annual gross mortality rate was 19%. For prevalent patients, 91% were on hemodialysis and 9% on peritoneal dialysis, 32,499 (29%) were on a waiting list of renal transplant, 37% were overweight/obese, 29% were diabetics, 16% had PTH levels > 600 pg/ml and 26% hemoglobin < 10 g/dl. A venous catheter was the vascular access for 17% of the hemodialysis patients. **Conclusion:** During 2011-2014 the prevalence and incidence rates of patients on dialysis tended to increase, while the gross mortality rate remained stable. In 2014, diabetes was the primary renal disease in 42% of the new dialysis patients.

Keywords: Brazil; census data; dialysis; epidemiology; kidney failure, chronic.

RESUMO

Introdução: Dados nacionais sobre diálise crônica têm tido impacto no planejamento do tratamento. **Objetivo:** Apresentar dados do inquérito da Sociedade Brasileira de Nefrologia sobre os pacientes com doença renal crônica em tratamento dialítico em julho de 2014. **Métodos:** Levantamento de dados de unidades de diálise do país. A coleta de dados foi feita utilizando questionário preenchido on-line pelas unidades de diálise. **Resultados:** Trezentas e doze (44%) unidades responderam ao censo. Em julho de 2014, o número total estimado de pacientes em diálise foi de 112.004. As estimativas nacionais das taxas de prevalência e de incidência de tratamento dialítico foram de 552 (variação: 364 na região Norte e 672 na Sudeste) e 180 pacientes por milhão da população (pmp), respectivamente. A taxa de incidência de nefropatia diabética foi de 77 pmp. A taxa anual de mortalidade bruta foi de 19%. Dos pacientes prevalentes, 91% estavam em hemodiálise e 9% em diálise peritoneal, 32.499 (29%) estavam em fila de espera para transplante, 37% tinham sobrepeso/obesidade, 29% tinham diabetes, 16% tinham PTH > 600 pg/ml e 26% hemoglobina < 10 g/dl. Cateter venoso era usado como acesso em 17% dos pacientes em hemodiálise. **Conclusão:** Entre 2011-1014, as taxas de incidência e prevalência em diálise tenderam a aumentar e a de mortalidade ficou estável. Em 2014, diabetes era a doença de base em 42% dos pacientes novos.

Palavras-chave: Brasil; censos; diálise; epidemiologia; falência renal crônica.

INTRODUCTION

The Brazilian Society of Nephrology (SBN) organizes a national survey every year to collect basic information from patients with chronic kidney disease on dialysis at the renal care centers

registered with the SBN. In a country of continental proportions such as Brazil, with over 700 dialysis centers in 2014, the online surveys now used for six years have significantly facilitated the collection and treatment of the data. The main purpose of the survey is to gather basic epidemiological information and technical data from renal care centers to allow further insight into our patient population and provide input to policymakers and other institutions offering care to patients with advanced chronic kidney disease, in order to ultimately improve renal care in Brazil.

This initiative has counted on the voluntary participation of a significant share of the dialysis centers in Brazil. In addition to characterizing the patient population on outpatient chronic dialysis on July 1, 2014, the survey report offers comparisons and observations based on data from 2011 onwards, and specifically looks into the incidence of patients on chronic dialysis with baseline diseases related to *diabetes mellitus*. And, for the first time, the report included a review on patient nutritional statuses based on anthropometric indices.

METHODS

A survey with patients diagnosed with CKD on outpatient dialysis at the renal centers registered with the SBN was carried out in the second semester of 2014. From August to December of 2014, the survey questionnaire was made available in the SBN website. Every renal center in the country, either by letter or e-mail, was invited by the SBN to fill out the questionnaire and submit their data online to the SBN Secretariat. Renal centers failing to send surveys were reminded and invited again to send their data every month until December 31, 2014.

When required, data was collected or confirmed through phone calls made by the SBN to the persons in charge of the renal care centers. The questions about most of the sociodemographic, clinical, workup, and treatment variables reflected the reality of the patients on dialysis on July 1, 2014. The data concerning death rates and patients starting dialysis covered the entire month of July and were estimated to reflect annual values.

Active chronic dialysis programs were available in 715 of the 795 dialysis centers registered with the SBN in July of 2014, and 312 (43.6%) of them answered the questionnaire and had their data included in the report. The collected information comprised the

data from 48,834 patients on dialysis at 312 renal centers. The data sent by these centers was collected and grouped together. Therefore, they must be understood as a representation of the average patient and the most prevalent treatment practices in effect at the responding renal centers. National data was estimated taking into account the numbers expected from the centers that did not respond the survey based on their geographic location. The renal centers that did not respond the survey were arbitrarily assigned the mean number of patients expected for the region where they were located, and were thus included in the estimates.

The population estimates for Brazil and each of the country's regions published by the Brazilian Institute of Geography and Statistics (IBGE) for the month of July of 2014 were used in the calculation of prevalence and incidence rates. Grouped data was used to estimate the percent rate of patients outside the recommended targets[1,2] for dose of dialysis (Kt/V or urea reduction rate) and serum albumin, phosphorus, PTH, and hemoglobin. Most of the data is shown in a descriptive manner and refers to the year of 2014. Comparisons with previous years - 2013 in particular[3] - are also included. The patients were categorized based on their body mass indices (BMI = body weight in kg/height in m to the square) as malnourished (< 18.5 kg/m^2), normal (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2), obese (30-39.9 kg/m^2), or morbidly obese (≥ 40 kg/m^2).

Estimate calculations. Total estimated n of patients on July 1: n of reported patients/ratio of active centers responding the survey. Estimated global prevalence: estimated total n of patients on July 1/Brazilian population on July 1, 2014, in per million population. The data for each of the country's regions were used in the estimation of regional n and rates. Estimated total n of patients starting treatment in 2014: (informed n of patients starting treatment in July x 12)/ratio of active centers responding the survey. Estimated global incidence rate: estimated total n of patients starting treatment in 2014/Brazilian population on July 1, 2014, in per million population. The prevalence rates concerning demographic, clinical, workup, and medication data were expressed in relation to the totals reported for the 48,834 patients treated at the 312 responding renal centers. Estimated total n of deaths in 2014: (n of deaths reported for the month of July x 12)/ratio of active centers responding the

survey. Gross death rate: estimated n of deaths in 2014/estimated n of patients on dialysis on July 1, 2014.

Results

The total number of active renal centers increased in 2014 in relation to 2013 (from 658 to 715). The regional distribution of active renal centers responding the survey in relation to the total number of renal centers was as follows: 21% in the South; 47% in the Southeast; 9% in the Midwest; 18% in the Northeast; and 5% in the North region. An overall 44% of the renal centers responded the survey (n=312/715). The number of renal centers responding the survey in relation to the total number of active centers in each region ranged from 30% to 46%, with the Southeast and South regions (46% and 44%) leading the pack and the Northeast and North regions (40% and 30%) trailing behind. A total of 48,834 patients from 312 renal centers responded the survey. The Brazilian Public Health Service covered the care of 85% of these patients, while 15% had private health insurance. The surveyed renal centers had an occupancy rate of 85%. Fifty-two percent of the renal centers were inside hospitals and 48% outside. Eighty-three percent of the renal centers had patients with chronic kidney disease on conservative therapies and 74% saw patients with acute kidney injury. The survey indicated that each nephrologist saw a mean of 28 dialysis patients in the responding renal centers.

An estimated 112,004 patients were on dialysis in Brazil on July 1, 2014, an increase of 20,000 within the last four years (92,091 patients in 2010). The number of patients grew by a mean annual rate of 5% in the last four years. Half of the patients were in the Southeast region. The prevalence rate of dialysis in 2014 was 552 patients per million population (pmp), ranging from 364 patients pmp in the North to 672 patients pmp in the Southeast region (Figure 1). The global prevalence rate increased in relation to 2013 (499/pmp), after having increased by nearly 6% in relation to 2011 (475/pmp). An estimated 36,548 patients started dialysis in Brazil in 2014, yielding an incidence rate of 180 patients pmp (Figure 2).

The estimated incidence rates in 2013 and 2012 were 170 and 177 patients pmp, respectively. Fifty-one percent of the patients starting dialysis initiated treatment in the Southeast, 18% in the Northeast, 15% in the South, 11% in the Midwest, and 5% in the North region. The annual incidence rate of dialysis varied from 112 pmp in the North to 269 pmp in the Midwest (Figure 2). The estimated total number of patients starting dialysis was greater than in 2013 (n = 34,366), and the incidence rate has not changed since 2012. The total number of patients with diabetic nephropathy starting dialysis was 15,465, yielding a rate of 77 patients pmp (42% of the total number of incident cases).

Fifty-eight percent of the patients were males. Patients on dialysis aged 12 years and younger, between 13 and 18 years, between 19 and 64 years, between 65 and 80 years, and subjects older than 80 years accounted for 0.3%, 0.7%, 66.4%, 27.9%, and 4.6% of the surveyed sample, respectively. The body mass index indicated that 10% of the patients were malnourished, 53% had normal body weight, and 37% were overweight, obese, or morbidly obese (Figure 3). In July of 2014, 91.4% of the patients on chronic dialysis were undergoing hemodialysis and 8.6% were on peritoneal dialysis; most of the individuals in the latter group were on automated peritoneal dialysis (APD). Table 1 shows the distribution of patients by types of dialysis and health insurance. Patients covered by private health insurance were offered daily dialysis and peritoneal dialysis - APD in particular - more often than individuals supported by the Brazilian Public Health Service (SUS). Peritoneal dialysis was prescribed to 8.4% of the SUS patients *versus* 9.9% of the individuals covered by private health insurance.

The most commonly diagnosed primary kidney diseases were hypertension (35%) and diabetes (29%), followed by chronic glomerulonephritis (11%) and polycystic kidney disease (4%); other conditions were found in 11% of the patients and in 9% of the cases the diagnosis was undefined. These percentages have not changed significantly in the last few years.

The prevalence of dialysis patients positive for hepatitis C and B in Brazil has remained unchanged, at 4.2% and 1.4%, respectively; 0.8% of the patients were HIV-positive.

An estimated 16.6% of the patients on hemodialysis had central venous catheters (short-term catheters: 9.2%; long-term catheters: 7.4%) and 4.1% used grafts. The monthly hospitalization rate of the patient sample analyzed in July of 2014 was 6.0%. Considering the workup recommended for patients on dialysis,[1,2] the following was observed for individuals on hemodialysis:

Figure 1. Estimated prevalence of patients on dialysis in Brazil per region, 2011-2014.
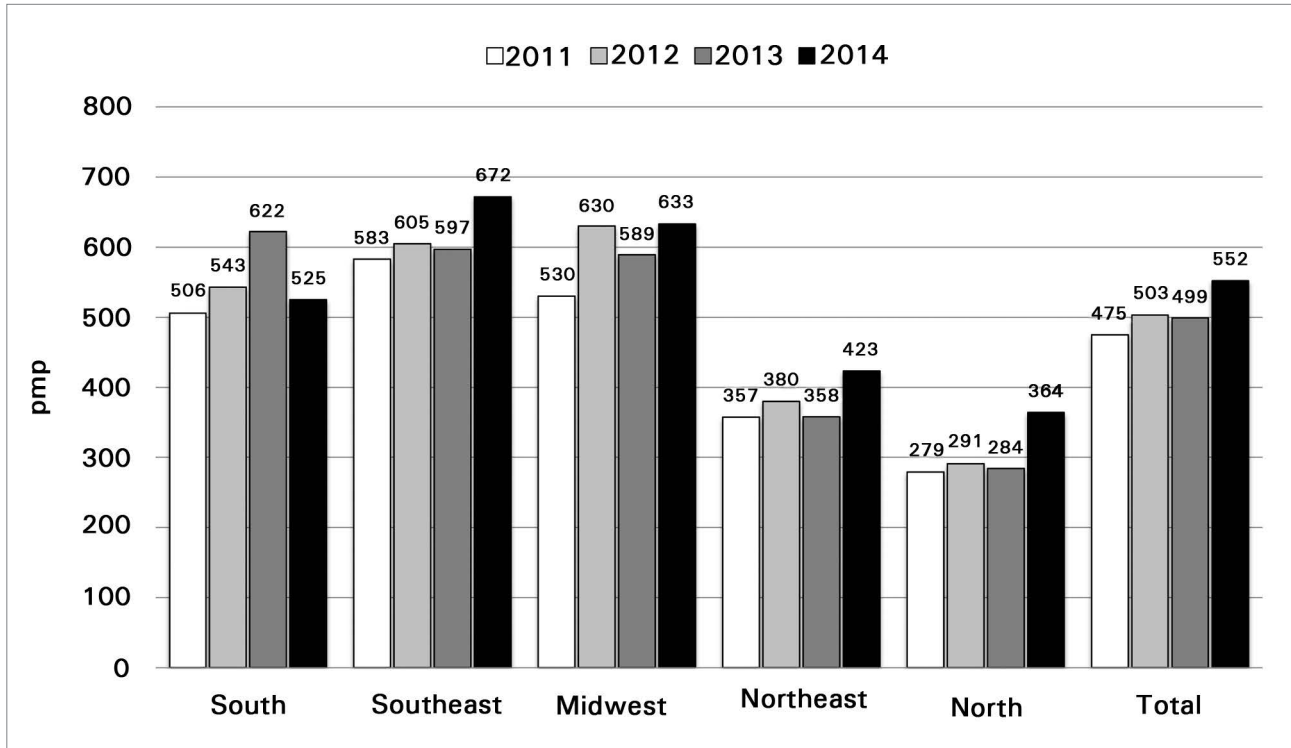
Figure 2. Estimated incidence of patients on dialysis in Brazil per region, 2011-2014.
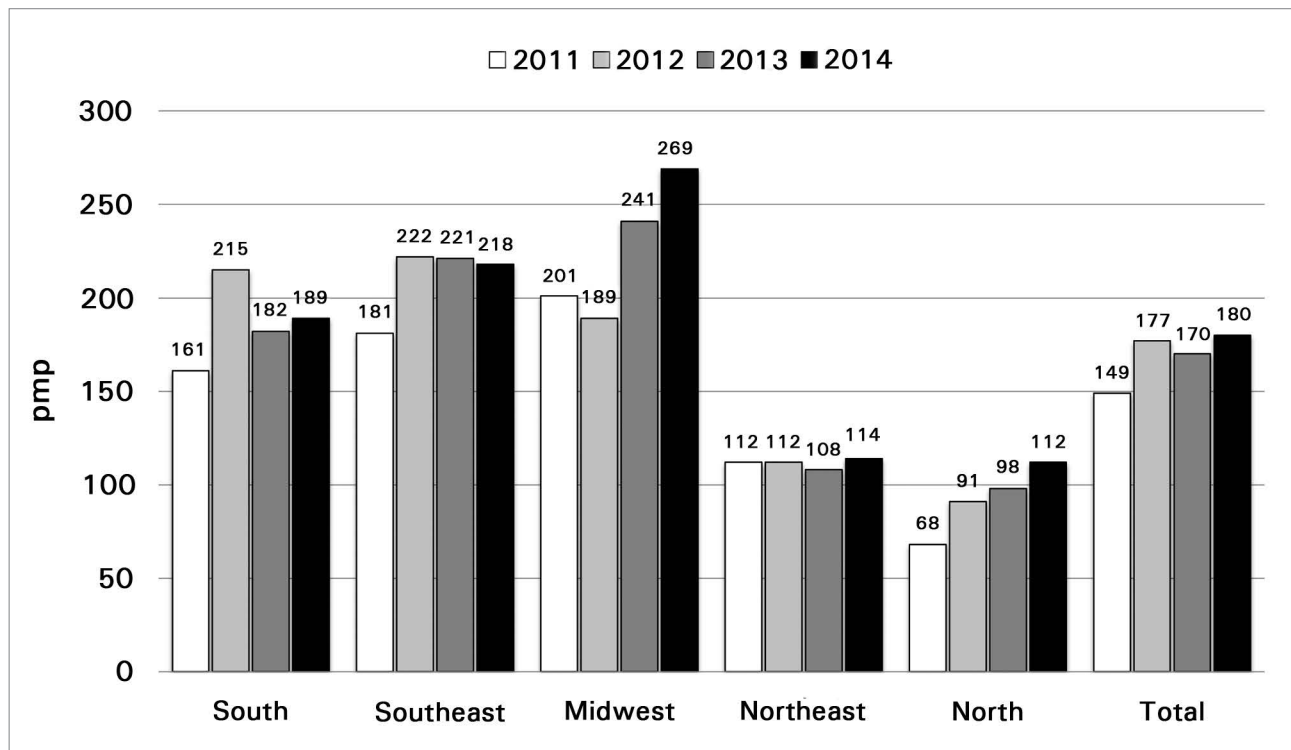
19% had a Kt/V < 1.2 or a urea reduction rate < 65%; 14% had serum albumin levels < 3.5 g/dl; 32% had serum phosphorus levels > 5.5 mg/dl; 16% had PTH levels above 600 pg/ml; and 17% had PTH levels below 100 pg/ml. Twenty-six percent of the patients had hemoglobin levels < 10 g/dl.

Figure 4 shows the distribution of prescribed medications: 77% of the patients were on

Figure 3. Categorization of patients on dialysis in Brazil based on the body mass index, 2014.
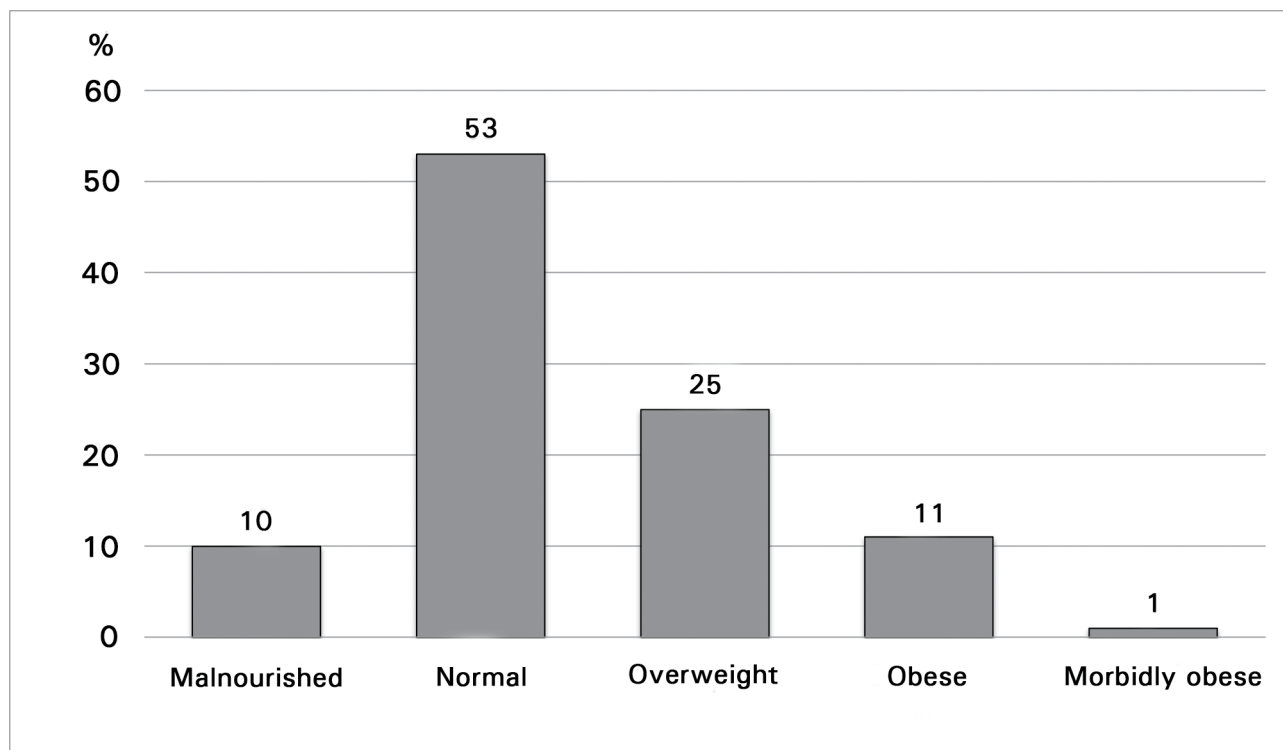
TABLE 1 PATIENT DISTRIBUTION BASED ON TYPE OF DIALYSIS AND HEALTH INSURANCE, 2014 CENSUS

Dialysis mode	SUS N (%)	Non-SUS N (%)	Total N (%)
Conventional HD	33,676 (91.3)	6,417 (85.0)	44,093 (90.3)
Daily HD (> 4x/sem.)	143 (0.3)	388 (5.0)	523 (1.1)
CAPD	1,284 (3.1)	197 (2.1)	1,443 (3.0)
APD	2,137 (5.2)	728 (7.8)	2,729 (5.6)
IPD	46 (0.1)	0 (0.0)	46 (0.1)
Total	41,286 (100)	7,548 (100)	48,834 (100)

erythropoietin; 53% took intravenous iron; 27% were on calcitriol; 3% took paricalcitol; 4% cinacalcet; and 40% sevelamer.

An estimated 32,499 individuals - or 29% of the patients - were waiting for a transplant in July of 2014.

An estimated 21,181 patients died in 2014, yielding an annual gross death rate of 19.0% (Figure 5).

DISCUSSION

Forty-three percent of the active dialysis centers in Brazil joined the 2014 survey, against 51% in 2013.[3] Despite the decrease, a still significant share of the renal centers agreed to volunteer information to the survey. The distribution of participating centers followed closely the geographic distribution of renal centers in Brazil, as most regions had between 40% and 46% of their centers responding the survey, the exception being the North region, with less than 30% of their centers joining the study. Estimates indicate that both annual incidence and prevalence rates have increased, as did the absolute number of patients on dialysis. The number of patients on treatment has increased by a mean annual rate of 5% from 2011 to 2014.

The annual estimates published in the survey report must be interpreted with caution, give the varying percentage of survey questions answered by participating centers and the need to further validate the answers to the questions. Therefore, observing the trends manifesting within the last few years is even more important than looking at the annual variation

Figure 4. Selected medications taken by patients on dialysis, 2011-14.
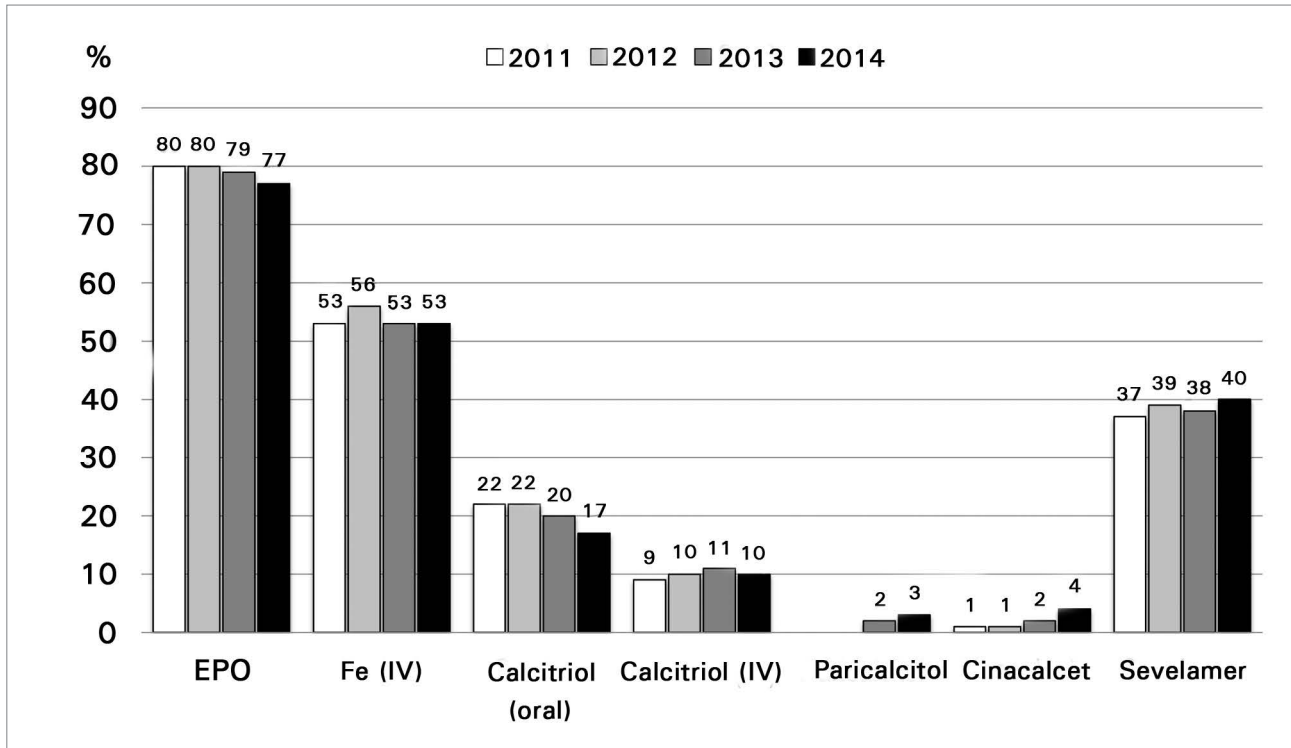
Figure 5. Gross annual death rates of patients on dialysis, 2011-2014.
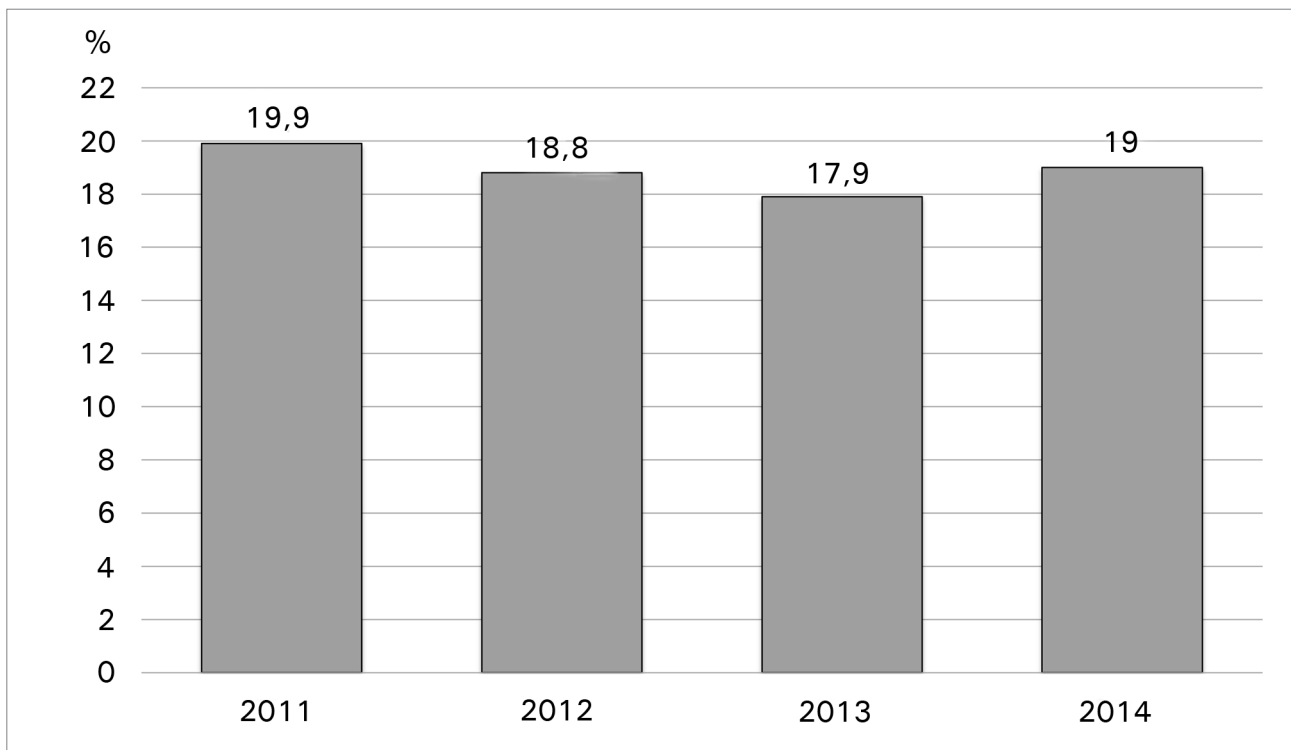
of percent rates and estimates. The survey has consistently shown a broad variation in the incidence and prevalence rates seen in different regions of the country. The Southeast, South, and Midwest had higher rates than the Northeast and North regions. In the United States and other developed nations in Europe and Asia, an increase in prevalence has been reported in recent years, although the incidence rate

of patients in renal replacement therapy has grown very little or tended to becoming stable.[4] In the United States, for example, the prevalence rate has increased by approximately 3% between 2007 and 2012.[4]

The actual prevalence rate of renal replacement therapy is the summation of the global prevalence rate of dialysis (552/pmp) and the prevalence rate of patients with functioning renal grafts (approximately 210/pmp), which added to approximately 760/pmp in 2014. This rate is lower than that of Chile (1263/pmp), Argentina (836/pmp), and some developed nations in Europe, whose rates range between 900 and 1200/pmp, and of the United States, with 1976/pmp in 2012.[4] However, there are significant regional variations in Brazil. The rates observed in the Southeast and South regions, for example, are probably higher than 850/pmp and closer to the rates seen in developed nations.

Some 36,000 patients (180/pmp) were started on chronic dialysis in 2014, showing a slight increase in relation to 2013. As seen in the case of prevalence rates, significant regional variation was observed in incidence rates, which ranged from 112 to 269 pmp. The actual rate of incident patients including preemptive transplant recipients yielded incidence figures similar to what has been reported in many European countries and lower than the rates described for the United States (359/pmp) and Japan (285/pmp).[4] Diabetes was assumed to be the condition causing the kidney disease of 42% of the new patients, a rate greater than the one seen in European countries and close to the rate reported in the United States (44%).[4] Although this diagnosis requires validation, it may indicate an increase in the contribution of diabetes as a cause of advanced kidney disease, a finding yet to be confirmed in future surveys.

Fewer children/teens were on dialysis (1%) in 2014 than in previous years (2012-13). However, the accuracy of these estimates is questionable. The share of patients on maintenance hemodialysis remained stable in relation to previous years at 91.4%. A persistent and mild increase was observed in the number of patients with private health insurance on APD and daily hemodialysis, although the latter accounts for only 1% of the total number of patients on dialysis. The share of patients using venous catheters increased slightly (16.6% vs. 15.4% in 2014 and 2013), with short-term catheters topping the list with 9.2%; vascular grafts were implanted in 4.1% of the patients.

Hypertensive nephropathy (35%) and diabetes (29%) were the main baseline diseases of prevalent patients. Malnutrition was not entirely uncommon (10%), and 37% of the patients were overweight/obese. The share of overweight/obese individuals was lower among dialysis patients than the Brazilian population in 2014 (53%)[5] and than the population on dialysis in the United States, where the mean BMI of patients has increased in recent years.[4] Positive serology for hepatitis B, C, and HIV remained unaltered. In relation to international recommendations, the analysis of patient workup revealed a mild increase in the number of subjects with hemoglobin levels < 10 g/dl, a decrease in the number of individuals with hyperphosphatemia levels > 5,5 mg/dl, and a trend toward a decrease on the number of patients with PTH levels > 600 pg/ml (16%).

The number of patients on erythropoietin and IV iron was kept high and unaltered. The use of sevelamer and calcitriol was unchanged. A non-significant increase was observed in the prescriptions of paricalcitol and cinacalcet, probably because these drugs have been made available in Brazil only recently and were not included in the list of high-cost medications offered free of charge by State Health Offices in 2014. Significant numbers of patients with anemia and high phosphorus and PTH levels *versus* guideline-recommended levels have also been described in the United States, Japan, and developed European nations.[6,7] Hyperparathyroidism will potentially be better managed once more patients are prescribed paricalcitol and cinacalcet.

Gross death rates have not changed for the past four years and remained at 19% a year. The number of patients with diabetic nephropathy and elderly individuals on dialysis last year remained unchanged in relation to 2013-11, revealing the risk of death for these factors has not increased. The gross death rate seen in Brazil is lower than the rate reported for patients on dialysis in the United States.[4]

Inferences from the data published in this study should be made with caution, given the voluntary nature of the study, the method each center used to collect patient group data, and the lack of validation of the submitted survey responses.

CONCLUSION

The annual report revealed a trend toward a global increase on the number of individuals on dialysis along

with treatment incidence and prevalence rates, particularly when the last four years are considered. Death rates remain unchanged. Secondary hyperparathyroidism appears to have been better managed, as fewer patients had hyperphosphatemia and increased parathyroid hormone levels. Additionally, the report offers valuable input to projects designed to improve the care provided to patients with advanced kidney disease dados and the policymakers responsible for regulating the supply of chronic dialysis treatment in Brazil.

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