END-STAGE RENAL DISEASE AND CHRONIC KIDNEY DISEASE IN BRAZIL

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The world is facing an epidemic of chronic kidney disease (CKD). This report discusses the present state of chronic kidney disease care in Brazil. We report frequency of dialysis treatment and prevalence of kidney transplantation throughout Brazil. We estimated the number of CKD patients in the country through a mathematical extrapolation based on data generated by the NHANES. On January 2007, 73,605 patients were on dialysis, which corresponds to 390 patients per million of population (pmp); the majority of these patients (~90%) were funded by the Brazilian Public Health System. If we aggregate patients with a functioning kidney graft, unofficially estimated by ABTO as 27,500 (~150 pmp), the whole adjusted prevalence of end-stage renal disease patients in Brazil by January 2007 is ~540 pmp. We estimate that the number of patients with glomerular filtration rate <60 mL/min/1.73 m^2 of body surface approximates 15 million people in Brazil, many of whom are not in treatment. (*Ethn Dis* 2009;19[Suppl 1]:S1-7–S1-9)

Key Words: End-stage Renal Disease, Chronic Kidney Disease, Brazil

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INTRODUCTION

The world is facing an epidemic of chronic kidney disease. Databases containing information as to the care of end-stage renal disease (ESRD) patients, especially in the United States, supplied one of the first bits of solid evidence in this regard.[1] The public health authorities of a number of countries are now alert to the social and economic burden that chronic kidney disease may impose on societies.[2] Japan and Taiwan are the countries with the highest prevalence of ESRD patients. In 2003, the prevalence was ≈1800 patients per million population (pmp) in Japan and 1600 pmp in Taiwan. Prevalence is a little lower in the United States (1500 pmp) and Spain (1000 pmp).[3] Prevalences in developing countries are lower than those from developed countries, perhaps reflecting the lower quality of the public health systems. However, the number of ESRD patients is increasing worldwide.[2] Diabetic nephropathy is the leading cause of ESRD in developed countries and is catching up with hypertension and chronic glomerulonephritis as the leading cause of ESRD in developing countries.[4] In this report, I discuss the present state of chronic kidney disease care in Brazil.

Brazil is a large South American country (total area of 8,511,965 km^2) that is primarily located in the Southern Hemisphere. According to the IBGE, the Brazilian statistics bureau, there were 183,888,841 inhabitants as of April 2007.[5] At start of 2008, gross domestic product per capita, based on purchasing-power-parity, was $10,223. Growth in the last 3 years has been ≈5.5% per year.[6]

Access to health care is a right of every Brazilian citizen as stated in the Brazilian Constitution of 1988. The implementation of a unified and decentralized public health system in 1993 was a cornerstone in the assertion of the viability of this constitutional right. Therefore, access to every health resource in Brazil including, dialysis and kidney transplantation, should theoretically be universal and free (funded by the government). In practice, however, the health system in Brazil is a hybrid of public and private medical assistance, which means that, in addition to public funding, much health care is financed privately. Most private health care is provided by for-profit companies and doctor's cooperatives and a small fraction by individual providers. Approximately 40 million people (≈20% of the population) are covered by some kind of private health insurance in Brazil.[7]

Both modalities of chronic dialysis, hemodialysis and peritoneal dialysis, are offered by the healthcare system. Public reimbursement for dialysis treatment in ESRD is depicted in Table 1. Most patients that undergo chronic dialysis come from emergency departments of public hospitals or predialysis care clinics of the public healthcare system. From there, they are referred to a dialysis center close to their homes after undergoing an initial dialysis treatment as inpatients whenever needed. A small fraction is referred from individual physicians' offices. In recent years, a massive investment has been made in transplantation. According to the Brazilian Society of Organ Transplantation, in 2004 and 2005, for instance, >3300 kidney transplants were performed in each of these years.[8]

The structure and functioning of the dialysis centers dealing with ESRD patients must follow the rules of the national regulatory agency of Brazil, ANVISA (RDC 154, published on July 2004 and reviewed in August 2006). The document emphasizes the need to employ modern technology to handle ESRD patients as previously proposed in an ordinance of

Table 1. Reimbursement for dialysis treatment for end-stage renal disease in Brazil

Procedure	Reimbursement, $*
Hemodialysis, per month (as a package)†	1,032.35
Peritoneal dialysis, per month†‡	
Continuous ambulatory peritoneal dialysis	1,085.59
Automated peritoneal dialysis	1,394.42

* $1 = 1.7 Brazilian real.
† Medications and laboratory tests are reimbursed separately.
‡ The healthcare team fee is $81.92 per month for both modalities of peritoneal dialysis; the remainder is specifically designated for supplies.

the Health Ministry in July 2000. In brief, dialysis machines must work with bicarbonate-buffered dialysate prepared at the time of use by a proportioning system and should be equipped with an ultrafiltration control device. The quality of water should be strictly controlled. Dialyzer reprocessing is allowed up to a maximum of 12 uses, except for with HIV patients, whose dialyzers need to be discarded after a single use. Dialyzers from hepatitis C-positive patients must be reprocessed in a separate room. Hepatitis B-positive patients are required to be treated in a separate room, and their dialyzer reprocessing is also done in a separate room. To assure compliance with the regulation, dialysis centers are visited by ANVISA or its affiliates at least once a year.

The Brazilian Society of Nephrology started to collect data regarding dialysis treatment in Brazil in 1999. Since then, in January of each year, every dialysis center is requested to provide information regarding dialysis care. Typically, >80% of the centers return the forms. After data processing, a panoramic view of the dialysis care in Brazil is obtained and depicted at the society's website (www.sbn.org.br). In the census of January 2007, 621 centers were contacted, and 546 of them returned the forms (88%). Approximately 70% of them were privately run, 20% were philanthropic institutions, and 10% were public. There were 73,605 patients on dialysis, most (≈90%) funded by the SUS, the Brazilian Public Health System (the number is in some ways surprising, considering that nearly 20% of the Brazilian population has private health insurance). When the prevalence is adjusted for the population, the number of 390 dialysis patients per million of population is derived. Brazil is a heterogeneous country, and the adjusted prevalence was higher in more developed regions (159–493 pmp). If we aggregate the number of patients with a functioning kidney graft, unofficially estimated by ABTO at that time as 27,500 (≈150 pmp), the whole adjusted prevalence of ESRD patients in Brazil on January 2007 comes close to 540 pmp. The number still indicates insufficient access to treatment for a large section of the population.

If we compare the annual growth rate of patients in dialysis since 2000 (Figure 1), the mean annual increase in prevalence until January 2006 was ≈9%. In January 2008, the annual growth rate was 3.9%. The probability that the incidence of ESRD in Brazil is declining is low, so the decrease in the annual growth rate most likely reflects the inability of the system to comply with the demand of the population for dialysis. In support of this interpretation, the increase in the number of dialysis centers in Brazil in the last 2 years has been negligible (619 vs 621). An alternative explanation for the decline in the annual growth could be accelerated egress from dialysis, but the 2 major pathways by which patients can exit dialysis, death and kidney transplantation, have remained at a relatively stable rate in the last 2 years (13% per year vs 14% per year and 3362 per year vs 3281 per year, respectively).

Statistics regarding dialysis modalities show that 91% of patients are treated by hemodialysis and 9% by peritoneal dialysis. Twenty-six percent of dialysis patients were diabetic. People aged ≥65 years are overrepresented among dialysis patients (26%, compared with the 10% of the Brazilian general population who are >60

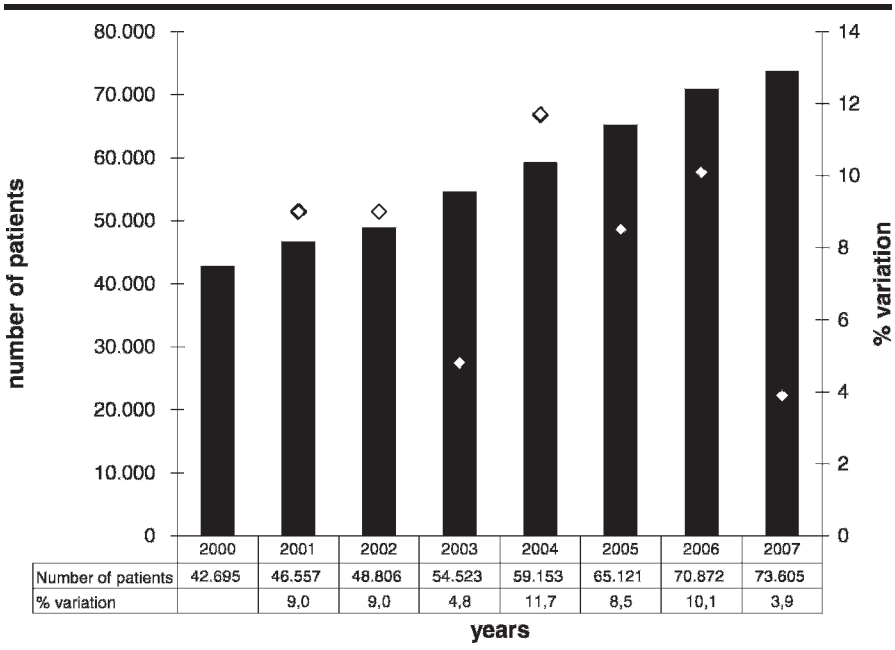

Fig 1. Prevalence of dialysis patients in Brazil

years),[9] which reinforces the view that advanced age is a risk factor for chronic kidney disease. A total of 32,650 dialysis patients (44%) were registered as candidates for kidney transplantation. In January 2007, the percentage of patients who tested positive for the presence of hepatitis B surface antigen was 1.6%, and for antibodies against hepatitis C virus, 9.1%. These values are substantially lower than those obtained in 2000, when 3.9% of patients were hepatitis B-positive, and 19.9% were hepatitis C-positive. The percentage of HIV-positive patients on January 2007 was .7%.

Considering that kidney disease is usually a progressive disease, it is appropriate to pay attention to the problem presented by patients entering the pool of ESRD patients. Studies that could yield precise numbers as to the diagnosis of predialysis chronic kidney disease are not available in Brazil. However, if we apply the proportion recently reported for the United States (8.4%),[10] the number of patients who fit the criterion for chronic kidney disease (glomerular filtration rate <60 mL/min/1.73 m^2)[11] would be ≈15 million people in Brazil. Unfortunately, most of these patients are not diagnosed and therefore not treated. The Brazilian Public Health System has begun to pay attention to prevention and the early diagnosis of chronic kidney disease, but again, public initiatives in this regard are at an early stage.

In summary, treatment for ESRD in Brazil is predominantly funded by the government, and the access to treatment options is universal. Despite an acceptable annual death rate on dialysis (14%) and the recent efforts to increase the rate of kidney transplantation, there is still considerable room for improvement. The prevalence of ESRD in Brazil on January 2007 (≈540 pmp) was low, even by Latin American standards. In Chile and Uruguay, for instance, ESRD prevalence in 2004 was 750 pmp and 800 pmp, respectively.[3] The treatment of ESRD in Brazil does not seem to match the size of the economy of the country. This is not surprising considering that, according to a source from the Health Ministry, the public expenditure on health care in 2004 was only 3.7% of gross domestic product, or ≈$304.00 per capita per year.[12]

REFERENCES

1. Port FK. The end-stage renal disease program: trends over the past 18 years. *Am J Kidney Dis*. 1992;20(Suppl 1):3–7.
2. Hamer RA, El Nahas AM. The burden of chronic kidney disease is rising rapidly worldwide. *BMJ*. 2006;332:563–564.
3. US Renal Data System. Excerpts from the USRDS 2005 Annual Data Report: international comparisons. *Am J Kidney Dis*. 2006; 47(Suppl 1):S215–S226.
4. US Renal Data System. Excerpts from the USRDS 2005 Annual Data Report: patient characteristics. *Am J Kidney Dis*. 2006;47 (Suppl 1):S81–S94.
5. http://www.ibge.gov.br/home/estatistica/populacao/contagem2007/default.shtm. Accessed on July 29, 2008.
6. http://www.indexmundi.com/brazil/gdp_per_capita_(ppp).html, visited on July 28th, 2008.
7. http://www.ans.gov.br/portal/upload/informacoesss/folder_ANS-Info_2008.pdf. Accessed on July 28, 2008.
8. http://www.abto.org.br/profissionais/profissionais.asp. Accessed on July 26, 2008.
9. http://www.ibge.com.br/home/presidencia/noticias/noticia_visualiza.php?id_noticia= 987 &id_pagina=1. Accessed on July 22, 2008.
10. US Renal Data System. Excerpts from the USRDS 2007 Annual Data Report: chronic kidney disease. *Am J Kidney Dis*. 2008;52 (Suppl 1):S63–S80.
11. Coresh J, Astor BC, Greene T, Eknoyan G, Levey AS. Prevalence of chronic kidney disease and decreased kidney function in the adult US population: third National Health And Nutrition Examination Survey. *Am J Kidney Dis*. 2003;41:1–12.
12. http://tabnet.datasus.gov.br/cgi/tabcgi.exe?idb2006/e0601.def. Accessed on July 22, 2008.