

DIALYSIS STATUS IN CHINA: A REPORT FROM THE SHANGHAI DIALYSIS REGISTRY (2000–2005)

Qiang Yao, MD, PhD; Weiming Zhang, MD; Jiaqi Qian, MD

Introduction: As economic development continues in China, it is important to evaluate recent changes in dialysis status. However, China lacks a national dialysis registry. This elevates the need to use local registry systems like the Shanghai Dialysis Registry to gain an overview of dialysis status in developed cities in China.

Methods: Data were collected from the Shanghai Dialysis Registry from the beginning of 2000 to the end of 2005. All dialysis centers ($n = 58$) in Shanghai are included in the registry system.

Results: Point prevalence of dialysis on December 31, 2005, was 5496, compared with 4842 in 2000. In 2005, 3746 patients began dialysis, yielding a treatment rate of 275.4 patients per million population. The percentage of peritoneal dialysis patients was 18% in 2005, compared with 14% in 2000. The main cause for end-stage renal disease was chronic glomerulonephritis. However, the incidence of diabetic nephropathy increased from 9.9% in 2000 to 17.2% in 2005 and counts as the second major cause of end-stage renal disease. The death rate of patients on dialysis decreased from 9.2% in 2000 to 7.5% in 2005. Cerebrovascular disease was still the leading cause of death and decreased significantly from 2.4% in 2000 to 1.5% in 2005. Dialysis adequacy, hepatitis infection control, and anemia treatment improved.

Conclusions: The Shanghai dialysis population grew continuously during the period covered by this study (2000 to 2005). Clinical outcomes improved because of prompt treatment for co-morbidities. (*Ethn Dis.* 2009;19[Suppl 1]:S1-23–S1-26)

Key Words: Dialysis, Registry, Shanghai

From the Shanghai Center for Hemodialysis Quality Control, Shanghai Municipal Bureau of Health; Renal Division, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, People's Republic of China (QY, WZ, JQ).

Address correspondence and reprint requests to: Jiaqi Qian, MD; Renal Division, Renji Hospital, School of Medicine; Shanghai Jiaotong University; 145 Shandong Rd C; Shanghai, China 200001; 86-21-63260745; qianjq@public7.sta.net.cn

INTRODUCTION

The rising incidence and prevalence of chronic kidney disease is a worldwide public health problem. In a certain percentage of chronic kidney disease patients, renal function inevitably deteriorates. In China, the incidence of end-stage renal disease (ESRD) is estimated to be 102 patients per million population (pmp).¹ The registered number of patients in China with ESRD treated by dialysis was 41,755 in 1999 and is expected to surpass 140,000 by 2009.² Of note, it is estimated that the registered number of dialysis patients accounts for <10% of the total ESRD population in China. With China's recent economic growth, overviews of dialysis status in China, especially comparisons between present data (2005) with those from 5 years ago (2000), may be particularly relevant.

Unfortunately, China lacks a national registry system for tracking dialysis data throughout the country. This fact elevates the need to use local registry systems like the Shanghai Dialysis Registry to gain an overview of dialysis status in developed cities in China. Shanghai is known as one of the biggest and most developed cities in China. The Shanghai Dialysis Registry was begun in 1996 by the Shanghai Center for Hemodialysis Quality Control. The data were collected manually from 1999 through 2006. This study compares dialysis registry data for Shanghai from the beginning of 2000 to the end of 2005.

METHODS

Data collected in the Shanghai Dialysis Registry cover all 58 dialysis centers in the city. Half of these dialysis

centers ($n = 29$) provide both peritoneal dialysis and hemodialysis. The other half provide hemodialysis only. Nineteen of Shanghai's dialysis centers are located in the highest-level, municipal hospitals (including 16 academic hospitals), 37 are in mid-level, district hospitals, and the rest (two) are in primary-level, community hospitals. Report forms are sent out by the Shanghai Center for Hemodialysis Quality Control in December and collected in the first quarter each year by mail. The report form asks data such as the following: the number of patients, their age and sex, dialysis modality, duration on dialysis, primary kidney disease, infections (peritonitis, hepatitis C virus, or hepatitis B virus), adequacy, anemia, working staff, dialysis facilities, and payments. The response rate was 100% in 2005.

According to the government's annual report, the population of Shanghai as of December 31, 2005, exceeded 19 million, although the number of local residents was 13.6 million. In this report, we calculate the point prevalence and incidence of dialysis by using the number of local residents.

RESULTS

The Prevalence and Incidence Rate of Dialysis

The number of dialysis patients has been increasing in recent years in Shanghai. As of December 31, 2005, the point prevalence of dialysis was 404 pmp (5496 patients), compared with 175 pmp (4842 patients) in 2000 (Figure 1). A total of 3746 new patients began dialysis in 2005, giving a treatment rate of 275 pmp in 2005, as compared with only 119 pmp in 2000 (Figure 2). At the end of 2005, the

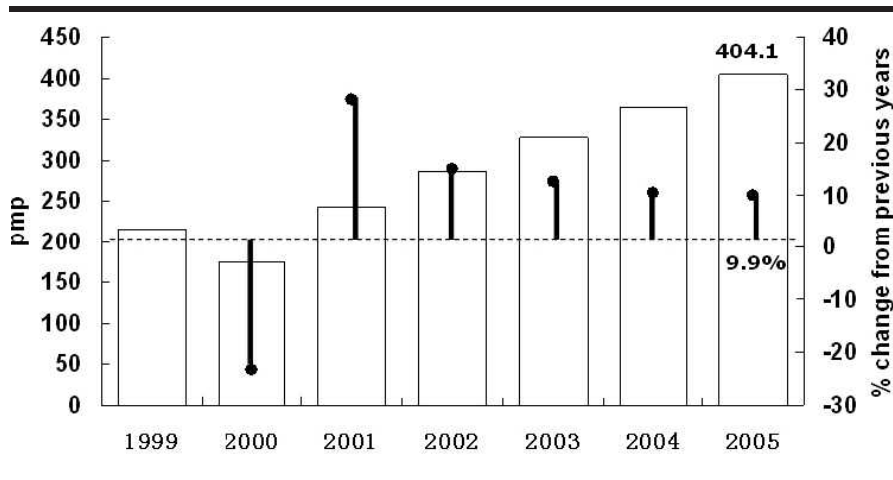


Fig 1. Prevalence of dialysis and percentage change from previous year (black line within each bar), Shanghai, 1999–2005. pmp = per million population

number of patients undergoing hemodialysis was 4503, a number that has been stable in recent years. By comparison, the number of patients undergoing peritoneal dialysis increased from 677 in 2000 to 993 in 2005. The percentage of peritoneal dialysis among total dialysis patients also increased from 14% in 2000 to 18% in 2005. The main cause of ESRD was chronic glomerulonephritis, which accounted for 43.6% of cases. However, the incidence of diabetic nephropathy increased from 9.9% to 17.2% in the same 5-year period (Figure 3) and counts as the second major cause of ESRD in Shanghai.

Dialysis Quality

Dialysis adequacy (calculated as Kt/V) has been stable in recent years. In hemodialysis patients in 2005, the mean Kt/V was 1.43, and the urea reduction ratio was 0.66; 88.2% of patients reached the target of Kt/V 1.2. In peritoneal dialysis patients in 2005, the mean value of Kt/V was 1.82/week and creatinine clearance was 58.4 L/1.73m²/week; 71.8% and 80.7% of peritoneal dialysis patients reached the minimum target of Kt/V 1.6 and creatinine clearance 50 L/1.73m²/week. Compared with statistics from 2000, the mean frequency of hemodialysis treatment increased from

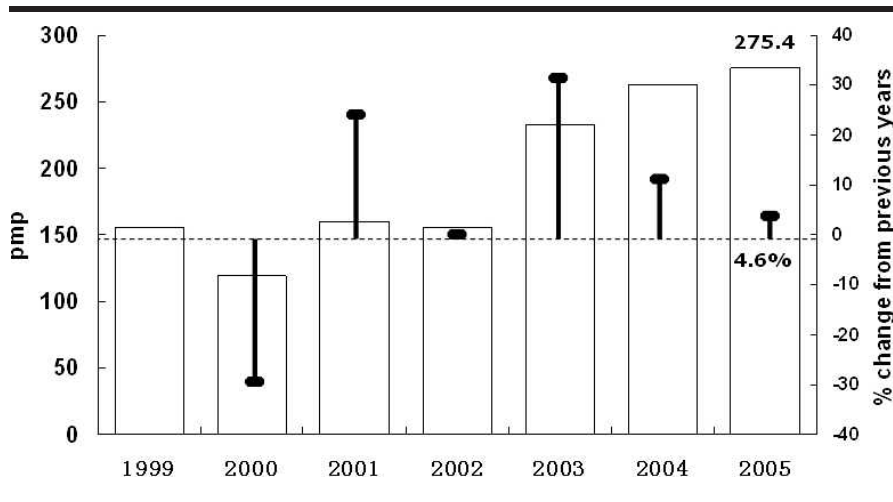


Fig 2. Incidence of dialysis and percentage change from previous year (black line within each bar), Shanghai, 1999–2005. pmp = per million population

2.3 to 2.6 times per week, and the mean duration of each session decreased from 4.6 to 4.4 hours in 2005. The mean dosage for peritoneal dialysis patients was stable at 7.9 L/day in 2000 and 7.8 L/day in 2005.

The seroconversion rate for hepatitis C virus in hemodialysis decreased from 2.5% to 1.9% in the same 5-year period. A similar decrease was found in peritoneal dialysis patients, from 2.4% to 1.2%. The prevalence of hepatitis B surface antigen–positive patients decreased from 18.1% (2000) to 12.7% (2005) in peritoneal dialysis patients, while it was relatively stable in hemodialysis patients, increasing slightly from 13.0% (2000) to 14.6% (2005).

With the use of erythropoietin and iron, the mean hematocrit level in both hemodialysis and peritoneal dialysis improved. From 2000 through 2005, the mean hematocrit level increased from 25.4% to 29.2% in hemodialysis patients and from 26.8% to 29.9% in peritoneal dialysis patients.

Patient Outcome

In total, 516 hemodialysis patients and 110 peritoneal dialysis patients died in 2005. The death rate decreased from 9.2% in 2000 to 7.5% in 2005. (The death rate equals the number of deaths divided by the sum of the number of patients alive at the end of the previous year and the number of new patients diagnosed in the current year). Cerebrovascular disease remained the leading cause of death, although the ratio decreased significantly from 2000 to 2005 (from 2.4% to 1.5%). Cardiovascular disease and infection were the second and third leading causes of death among dialysis patients and accounted for 1.3% and 1.1% of deaths in dialysis patients, respectively, in 2005. There were 164 hemodialysis patients who transferred to peritoneal dialysis, and 55 peritoneal dialysis patients transferred to hemodialysis in 2005 (Figures 4a and 4b). In total, 451 hemodialysis patients

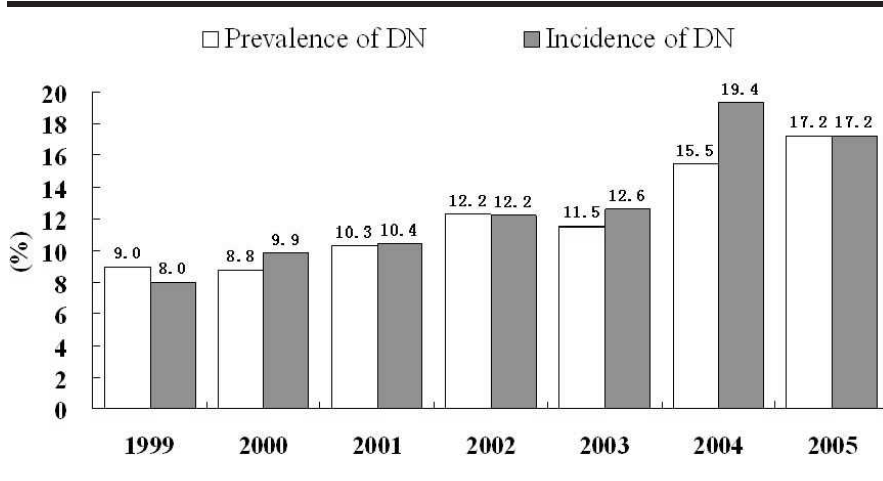


Fig 3. Prevalence and incidence of diabetic nephropathy among dialysis patients, Shanghai, 1999–2005

and 24 peritoneal dialysis patients were transplanted in 2005.

DISCUSSION

In the last 5 years the United States Renal Data System has noted a continued growth in the number of treated patients. Since 1999, however, incidence rates have been relatively stable, ranging from 331 pmp in 1999, to a peak of 343 pmp in 2002, to 339 pmp in 2004, evidence that the incidence rate may be stabilizing.³ A similar phenomenon was found in New Zealand, where the number of new patients entering renal failure programs decreased 5% from 2004.⁴ However, according to the Beijing dialysis registry report,⁵ in 2004, Beijing reached a record high of 173.3 pmp, which represents an increase of 31% from 2003. Although the rapid increase in the number of patients may be due in part to the gradual maturity of the registry system, it must also reflect an increase in the actual number of patients in China. In Shanghai, incidence of dialysis has steadily increased and reached a peak of 275 pmp in 2005, an increase of 4.6% from 2004, for a total of 5496 dialysis patients at the end of the year.

There are several possible explanations for the growth in the number of patients. Beginning in 2005, government resources now cover more patients in Shanghai, which means these patients only need to pay 10%–50% of the total cost of treatment. Previously, only government employees who worked for government-owned enterprises and those enrolled in the government health insurance program were able to receive reimbursement for the costs of their treatment. Now, more farmers, elderly patients, and laid-off workers may enroll in the social insurance system and receive financial assistance. Before 2005, two-thirds of dialysis patients received financial support, while in 2005, >80% of patients pay for dialysis with social insurance and a variety of other sources. So far, ≈10% of dialysis patients are self-payers in Shanghai. This group of patients typically receives a lower dose of dialysis, demonstrates poor compliance, and has a higher dropout rate.

Improved patient outcome is another reason for the growth in the number of patients. Although cerebrovascular disease is still the leading cause of death, it decreased from 2.4% in 2000 to 1.5% in 2005. Rates of cardiovascular disease and infection, which were the second and third leading causes of death, are

stable. Although the registry did not show the data on fluid removal or antihypertensive treatment, a higher percentage of patients reached minimum targets, and fewer patients changed their dialysis modality. This indicates that dialysis quality control has improved in Shanghai. In addition, in comparison with data from 2000 (62.8% for hemodialysis and 65.2% for peritoneal dialysis), more patients (85.7% for hemodialysis and 78.1% for peritoneal dialysis) were treated with erythropoietin and iron in 2005, resulting in improved hematocrit levels—a factor which may also have contributed to the lower risk of death. Compared with peritoneal dialysis patients, hemodialysis patients have more chances for exposure to hepatitis. According to the guideline of hemodialysis treatment requested by Shanghai Center for Hemodialysis Quality Control, each hemodialysis center should obey infection-control practices, including 1) hepatitis B virus vaccination for susceptible patients and staff, 2) isolated dialysis machines/areas/rooms and separate staff for hepatitis patients, 3) staff barrier protection (protective glasses/one-off gloves), and 4) avoidance of blood transfusions. At least 2 visits to each hemodialysis center per year by staff from the Shanghai Center for Hemodialysis Quality Control ensure adherence to infection-control practices, resulting in reduced hepatitis C virus seroconversion rates.

There are a total of 58 dialysis centers and more than 1000 hemodialysis machines in Shanghai. Peritoneal dialysis programs are available in 29 of them. Basically, ESRD patients can choose their dialysis modality in these centers. However, with the increasing number of patients and the limited availability of hemodialysis facilities, patients may be increasingly advised to select peritoneal dialysis in the future. In fact, more clinical staff are dedicated to peritoneal dialysis, thus providing better patient education, peritoneal dialysis training, and followup.

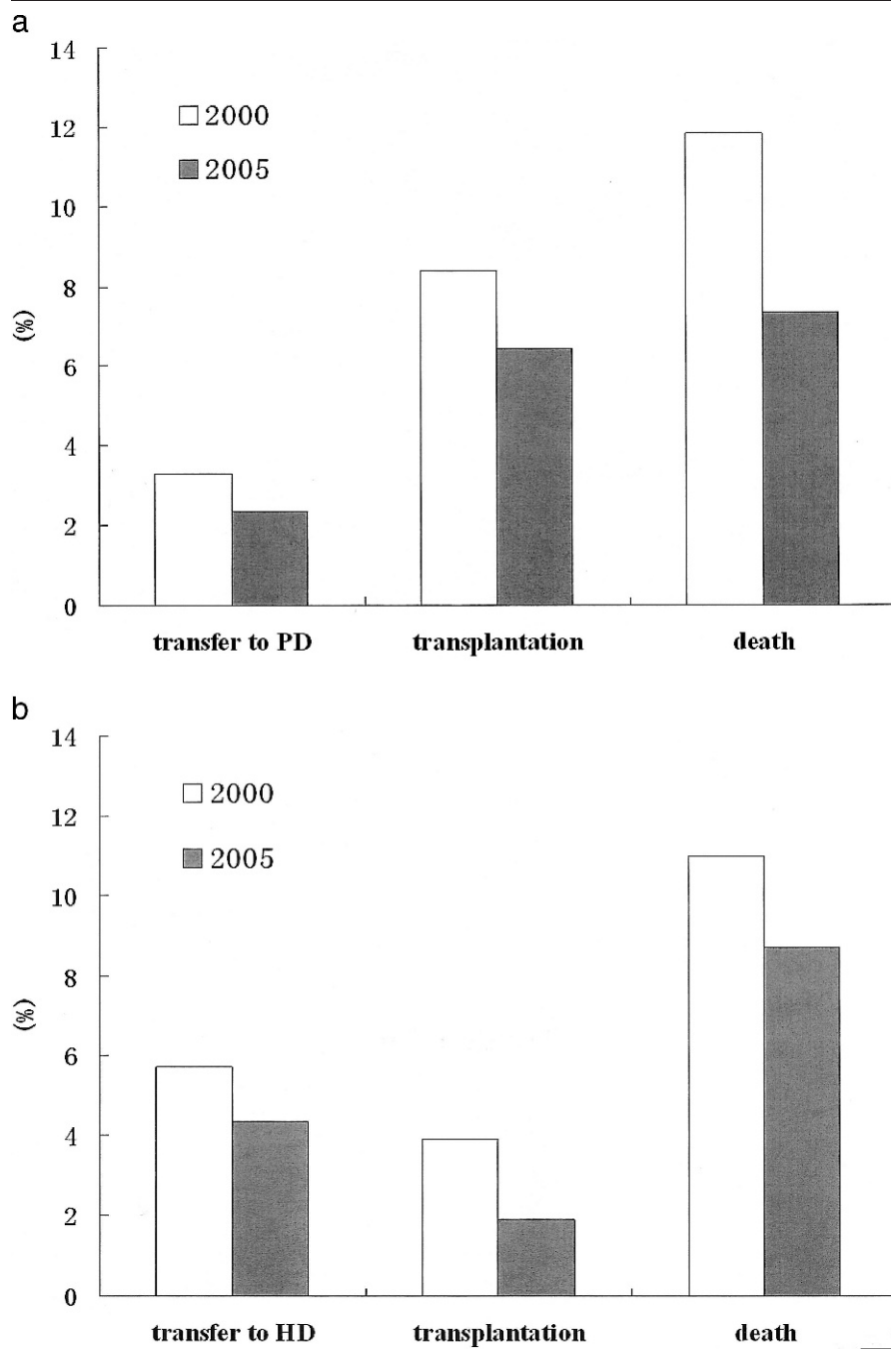


Fig 4. A) Number of patients transferred to peritoneal dialysis, 2000 vs 2005 B) Number of patients transferred to hemodialysis, 2000 vs 2005

Of 3746 new ESRD patients in 2005, 554 (15%) chose peritoneal dialysis as their dialysis modality.

The Shanghai Dialysis Registry has been running for >10 years now. To handle the increasing amount of data in the dialysis registry, an online electronic registry began in 2007; this registry will enable us to report data in a more accurate and informative manner. In the future, we anticipate that the registry system will be deployed on a nationwide basis.

In conclusion, the Shanghai dialysis population has grown in the first 5 years of this decade (2000–2005). Hemodialysis is still the main modality for ESRD patients, although peritoneal dialysis is steadily expanding. Clinical outcomes of both hemodialysis and peritoneal dialysis patients improved because of prompt treatment of co-morbidities.

ACKNOWLEDGMENTS

We thank all of the 58 dialysis centers in Shanghai for their great effort and support.

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