Current status of end-stage renal disease care in India and Pakistan

Vivekanand Jha[1]

[1]Professor of Nephrology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

India and Pakistan are the two largest and most populous countries in South Asia. The burden of noncommunicable disease (NCD) has increased in recent years and it is estimated that over 40% of all deaths are due to NCD. The exact magnitude of the burden of chronic kidney disease or end-stage kidney disease is not known. A population-based study calculated the end-stage renal disease (ESRD) incidence at 152 per million population. Diabetic kidney disease is the commonest cause of ESRD in India. CKD of undertermined etiology forms a large proportion as well. Environmental factors have been postulated in its causation. The majority of nephrology-related services are concentrated in expensive private sector hospitals. Economic issues limit the availability of renal replacement therapy to large sections of the population. Hemodialysis and peritoneal dialysis are equally expensive. Dialysis prescriptions are not optimized. Renal transplant is the most suitable option for a majority of patients, but is dependent on living donors. The Indian government has included kidney disease as a priority area, and is setting up facilities to provide subsidized dialysis for the whole population. A national transplant program envisions the setting up of a nationwide organ procurement network.

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Correspondence: *Vivekanand Jha, Professor of Nephrology, Postgraduate Institute of Medical Education and Research, Sector 12, Chandigarh 160 012, India. E-mail: vjha@pginephro.org*

India and Pakistan, the two most populous countries in South Asia, have a combined population of $\sim$1.4 billion, and a predominantly young population with median age of $<$30 years. Table 1 gives the economic and development indicators of the South Asian countries. Both countries have seen overall improvement in healthcare indices, such as life expectancy and maternal and infant mortality rates. A large proportion of people living in rural areas and urban slums is desperately poor with limited access to improved healthcare. About 0.7 billion people live on less than US$1/day.[1] Other sources of disparity include continuing class and gender bias, which puts females and people belonging to certain classes of the society at a disadvantage.

An important tool to assess the burden of disease is the collection of reliable mortality data. Death-recording systems in India and Pakistan suffer from poor coverage, a high incidence of unclassifiable deaths, delayed and irregular publication of data, and the lack of systematic screening.[2] Over 80% of deaths occur at home, and the cause is not captured accurately. According to a nationwide study conducted by the Indian Council of Medical Research, noncommunicable causes were found to be responsible for 42% of all deaths, and genitourinary diseases were listed as the cause in 4.8%.[3]

ESRD INCIDENCE AND PREVALENCE

Lack of registries makes an accurate estimation of the number of individuals needing renal replacement therapy (RRT) impossible. Published data are hospital-based or based on individual experience.[4–6] Reports prepared on the basis of those presenting to hospitals for RRT are likely to be significant underestimates. Many patients never come to medical attention.[7]

An Indian population-based study determined the crude and age-adjusted ESRD incidence rates at 151 and 232 per million population, respectively.[8,9] If validated in other parts of this region, it would mean that about 220,000–275,000 new patients need RRT every year in this part of the world. It is estimated that there are about 55,000 patients on dialysis in India, and the dialysis population is growing at the rate of 10–20% annually.

DEMOGRAPHICS OF ESRD

In 2005, the Indian Society of Nephrology set up a Registry to collect data to characterize and document the patterns

Table 1 | Economic and development indicators of major South Asian nations[1]

	India	Pakistan	Bangladesh	Sri Lanka
Population (billions)	1.13	0.16	0.15	0.021
Percent living in urban area	28.5	34.5	24.7	15.2
Birth rate (per 1000)	22.7	27.5	29.4	17
Annual growth rate (%)	1.6	1.8	2.1	1
Median age (years)	24.8	20.9	22.5	30
Infant mortality rate (per 1000 live births)	34.6	68.9	59	19.4
Life expectancy at birth (years)	68.6	63.7	62.8	74.8
Literacy rate (%)	61	50	43	91
Per capita GDP, US$	640	632	406	1,033
Per capita GDP (PPP), US$	3,139	2,225	1,870	4,390
Percentage living below national poverty line	29	33	50	25
Annual health expenditure per capita (private and public, PPP US$)	82	48	68	121
Health expenditure per capita (public, % of GDP)	1.2	0.7	1.1	1.6
Resources consumed by the top 10% population (%)	34	28	27	40

Abbreviations: GDP, gross domestic product; PPP, purchasing power parity.

of CKD. By the end of 2010, the Registry (http://ckdri.org) had data on about 55,000 adult subjects. Over 54% of the recorded subjects were in stage V at the time of inclusion, reflecting the hospital-based nature of the registry.

Figure 1 shows a breakdown of the etiological diagnoses from the Indian CKD registry and Pakistan dialysis registry. Diabetic nephropathy is the commonest cause, followed by CKD of undetermined etiology and chronic glomerulonephritis in the Indian Registry. In contrast, obstructive uropathy was the commonest cause of ESRD in children (22%), followed by reflux nephropathy (13%) and chronic glomerulonephritis (11%) in Pakistan. Obstructive nephropathy is common in certain regions of India and Pakistan known as 'stone belts'.

Compared with the developed world, the mean age of patients requiring RRT in India and Pakistan is lower, comprising individuals in the most productive years of their lives, often the sole wage earners of families with multiple dependents.[9,10] Several factors seem to be responsible, including poor availability of healthcare, which delays diagnosis and leads to a loss of opportunities to institute timely preventive measures. The role of genetic factors and unique environmental triggers has not been explored. Renal failure is usually far advanced at the time of presentation, patients often arrive in a morbid condition with complications involving multiple organ systems and in need of immediate dialysis.[11]

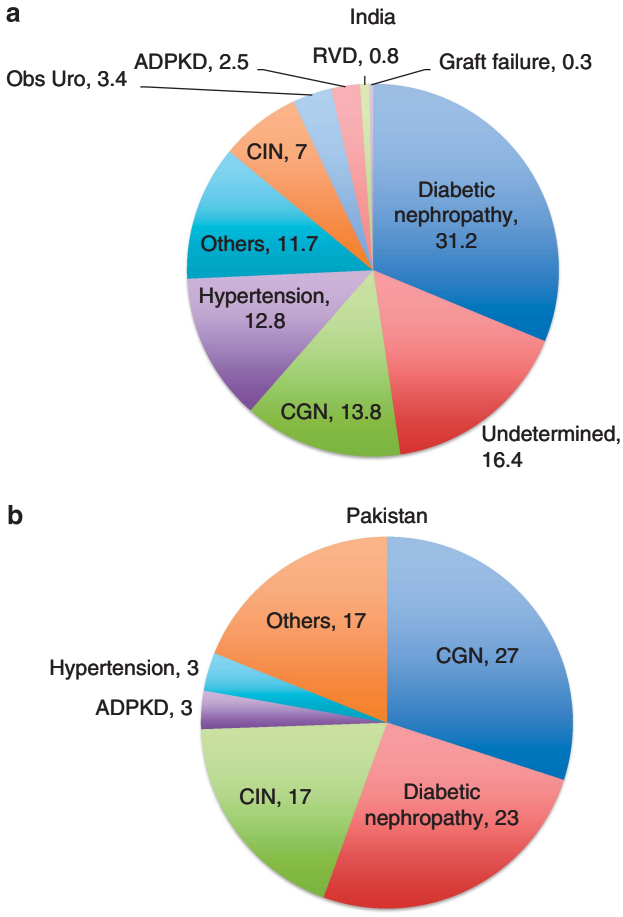

Figure 1 | Causes of chronic kidney disease. Causes of end-stage kidney disease indicated as percentage in (**a**) India[17] and (**b**) Pakistan.[12] ADPKD, Autosomal dominant polycystic kidney disease; CGN, chronic glomerulonephritis; CIN, chronic interstitial nephritis; RVD, renovascular disease.

DELIVERY AND COST OF ESRD CARE

The delivery of healthcare by the public sector healthcare takes place at multiple levels: the most basic units are the primary health centers, followed by block and district level hospitals. University hospitals form the apex, and provide specialist care for kidney disease.

The current expenditure on healthcare by union and state governments is less than 1.5 % of the total gross national product. Most expenses go towards maintaining the national programs, family planning and nutrition, staff salaries and maintenance of basic hospital infrastructure. Patients have to themselves pay for medications or disposables. The insufficient number of major hospitals results in overcrowding and long wait-times for dialysis or kidney transplantation. Over-burdened public sector facilities prefer to dialyze patients