Nephrologists sans frontières: Preventing chronic kidney disease on a shoestring

Indian nephrologists have the expertise and the facilities to provide all forms of renal replacement therapy for end-stage renal disease. The problem is that a renal transplant costs US$8000, but our per capita annual income is US$430, only 3% of the population earns more than $1140, and 26% earn less than $110. Only a fraction of Indians can afford it. Our government is just as poor and spends only $9 per capita per year on health.

We set up the Kidney Help Trust in 1985 with the aim of raising funds to help patients to pay for transplantation. It did not take us long to discover how foolish we were. We could support a mere handful of patients. Is it right to collect so much money from so many to benefit so few? How does one select the lucky 15 from hundreds of thousands who die each year from renal failure? We could not just tell the rest to go home and die, and so we decided we would shift our aim and use our limited resources to prevent chronic kidney disease (CKD) to the maximum extent possible. With diabetes and hypertension widely prevalent, and the incidence increasing steadily, our plan was simple. We had to identify all diabetics and hypertensives as soon as they got the disease and control blood pressure and blood glucose well before the kidneys were damaged. And we had to do this at the least possible expense.

The people of rural India are served by a number of Primary Health Centers (PHCs), manned by two doctors and a number of paramedical workers. Each PHC covers a population of around 25,000, spread over an area of around 50 square kilometers. An individual village could be 10 kilometers from the PHC. The PHC is supposed to look after the health of the people, but they need to go to the center for attention. Traveling across fields or on cart tracks, waiting in a queue for attention, and then in another for a week's medicines, would take half a day and would cost a day's wages. For a family living from hand to mouth, a day without wages is a day without food. Wage earners, and that means all adults in every family, go to the PHC if they are unable to work because of severe pain or high fever, hoping to get well enough to return to their job early. Chronic diseases are ignored. We would never be able to achieve our objective through the PHCs working as they do now.

A widely accepted means of undertaking such a project is to organize a camp. The hope is that, if it is well publicized in advance, everyone will turn up at the camp for the planned study. Prestigious surveys, including some planned and funded from overseas, have been undertaken using camps. My experience has been that only those who know or suspect they have a disease will go to these camps. They are useful for acquiring statistics and for publishing a few papers, but only 30% of patients know they have diabetes or hypertension, and the other 70% would just stay away, confident that there is nothing wrong with them. And what about treatment? Patients who would have to come once a week or once a month to take their medicines would stay away for the same reason that they would avoid the PHC.

The only feasible method of detecting disease, and then of administering treatment over a long period of time, is to go to the person's home. We have domiciliary programs in India, for tuberculosis and leprosy, but ours was the first for a non-communicable disease. And by keeping our methods simple, we avoided the need for highly trained personnel for the job. We found our workers easily. Although economic compulsions force urban Indians, women and men, to study enough to take a job and contribute to the family income, rural India is more conservative. Few girls are sent to universities for higher education. They complete high school at the age of 15 and stay at home until they can get married at the legal age of 18. We asked some of them to work for us. We taught them to fill out our forms and registers, to record the blood pressure, and to examine the urine for protein and sugar. They made a positive contribution to our methods, too; we devised compliance registers for patients and made each person wash the container in which his or her urine was collected and the test tube in which it was...
examined. They had instant recognition and acceptance in the community.

Our single medical officer lives in the city and has his or her own general practice. We provide transportation to the village. The medical officer supervises the work of the field workers and treats all the patients with the cheapest drugs, reserpine and hydrochlorothiazide, metformin and glibenclamide. Details of our methods have been published.1–3 The results have been gratifying. Ninety percent of the population cooperates with us. We have controlled hypertension to 140/90 or less in 96% of the hypertensives. Glycated hemoglobin is down to 7% or less in 52% of the diabetics, and in a further 25% we have brought the level down by 10% of the original reading.

When the project had been running for 8 years, we spread our activities to the adjacent area. Both areas have the same climate; the same occupation, mainly agricultural; and the same economic level. We simultaneously surveyed the new group of 21 500 people, and the 20 000 we had served. Among other tests, we calculated glomerular filtration rate by the Modification of Diet in Renal Disease formula in both groups. In short, there were 28 per 1000 with glomerular filtration rate below normal in the new area, and 11 per 1000 in the old. Glomerular filtration rate was below 15 ml/min in 0.87 per 1000 in the new area, and none in the old. Our costs were 43 US cents per capita of the population per year.

I want you to sit back and think for a moment. We have no national figures for the number of people dying of CKD in India. It is patently absurd to project the findings from a population of 21 500 to the entire country. Without dialysis or transplantation, which they and we and the whole country cannot afford, they will certainly die within a year. If these figures are true for the entire country, 940 000 people will die of CKD every year, and just 5000 will go on dialysis or receive transplants. Tsunamis and earthquakes pale into insignificance in comparison, and this number die every year, not just once in a few decades. If we could prevent CKD in 60% of them, or even give them just a few more years of healthy, productive life, the impact would be huge. We have not yet looked at the benefits of preventing strokes and myocardial infarcts and amputation of limbs, but I am sure these would be considerable.

The key word has been economy. Our workers stay in their own homes and are happy to earn the small sum we pay them. Our screening is by a few key symptoms, a recording of blood pressure, and urine examination for protein and sugar, not blood tests. Urine is examined by Benedict’s reagent and sulfosalicylic acid, not by dipsticks, which would add 4 cents per capita and increase our costs by 10%. We use the cheapest medicines.

We have been advised that our yields would be far higher if we concentrated on those older than 40 years. I accept the obvious truth of that but must point out that no less than 12% of the patients we picked up were aged between 20 and 40. This is the group whose protection is most important, for they will have the disease longest. And once you go to a house and screen the adults, it does not take much time or effort to include children, who were 0.6% of our patients.

We are convinced that we have established a model that works, that is easy to apply, and that will fit within almost any budget. Our goal now is to widen the coverage to the entire country. We are trying to convince the government to add this program to the work done by the PHCs. The cost is a small fraction of the PHC budget, and the savings should be great. It would be easier to get other nongovernmental organizations, each working in a small area, to emulate us. We were not sure it would be justifiable to divert public funds, collected specifically for this task, to training others, with uncertain results. Only a few would follow through with enthusiasm. Fortunately, the International Society of Nephrology gave me the John H Dirks Award in 2005. I have earmarked this sum for training programs. We have already conducted one such program for representatives of a dozen nongovernmental organizations and hope they will set up similar projects in their places of activity. We intend to conduct more workshops of this sort every few months as long as the International Society of Nephrology funds last.

The economics that guide me may not hold for those of you in the developed world, where manpower costs more and drugs relatively less. However, some lessons from our experience may apply to you too. Only 30% of diabetics and hypertensives are aware of their disease. Considerable damage may be done to their organs before the diagnosis is made. A certain inertia prevents people from making the effort
to go somewhere for investigation, but they are often ready to cooperate if the test is brought to them. Visits to homes or offices would greatly add to the number of people diagnosed. As for my compatriots from economies like India’s, I exhort you to adopt this model. Our success is due, I feel, to the simplicity of our methods, and to our firm resolve not to let ambition run away with reality. I have received much well-meant advice to study lipids or genetics, to investigate more, to use blood glucose instead of a urine test in screening. I am sure I could have published many more scientific papers, and perhaps added to the sum total of human knowledge. But if your goal is to provide the greatest good for the greatest number with the least expense, I believe you should stick with the methods of Chennai’s Kidney Help Trust.