The Challenge of Providing Renal Replacement Therapy in Developing Countries: The Latin American Perspective

Gregorio T. Obrador, MD, MPH,1 Ximena Rubilar, RN, MSc,1,2 Evandro Agazzi, PhD,3 and Janette Estefan, MD4

Developing countries face growing challenges for the provision of expensive medical interventions, such as dialysis and kidney transplantation.1 This problem has become even more difficult in recent years because of non-communicable disease epidemics, lengthening of life expectancy, and competing financial demands in many developing countries.2

Latin America is a region that extends from Mexico and the Caribbean Islands in the north to Argentina and Chile in the south. As of 2013, its population was estimated at more than 616 million inhabitants, who are distributed in 19 countries and 14 dependencies.3 The region is characterized by wide ethnic diversity and use of different languages (mainly Spanish and Portuguese, but also French). As shown in Table 1, there are wide variations in per capita gross national income throughout Latin America. In this article, we describe the current situation of chronic kidney failure and renal replacement therapy (RRT) in Latin America and analyze the ethical principles involved. We attempt to reconcile ethical principles with reality by exploring efforts to improve access to RRT in 2 Latin American countries, Mexico and Colombia.

Competing financial demands in developing countries under enormous economic pressure. Latin America is a region characterized by wide ethnic and per capita gross domestic product variations among different countries. Chronic kidney failure prevalence and incidence, as well as provision of renal replacement therapy (RRT), have increased in all Latin American countries over the last 20 years. From an ethical point of view, life-sustaining therapies such as RRT should be available to all patients with chronic kidney disease who might benefit. However, even among Latin American countries with similar per capita incomes and health care expenditures, only some have been able to achieve universal access to RRT. This indicates that it is not just a problem of wealth or distribution of scarce health care resources, but one of social justice. Strategies to increase the availability of RRT and renal palliative-supportive care, as well as implementation of interventions to prevent chronic kidney disease development and progression, are needed in Latin America and other developing countries.


INDEX WORDS: Renal replacement therapy (RRT); end-stage renal disease (ESRD); chronic kidney disease; developing countries; Latin America; health disparities; health care expenditures; medical ethics; challenges.

From the 1Universidad Panamericana School of Medicine; 2Universidad Panamericana School of Nursing; 3Universidad Panamericana Interdisciplinary Center for Bioethics; and 4Hospital Central Sur de Alta Especialidad de Petróleos Mexicanos, Mexico City, Mexico.

Received December 1, 2014. Accepted in revised form August 18, 2015. Originally published online December 18, 2015.

Address correspondence to Gregorio T. Obrador, MD, MPH, Universidad Panamericana, Faculty of Health Sciences and Medical School, Donatello 59; Col. Insurgentes Mixcoac, México, DF 03920. E-mail: gobrador@up.edu.mx

© 2016 by the National Kidney Foundation, Inc.

0272-6386

http://dx.doi.org/10.1053/j.ajkd.2015.08.033

The costs of health care place developing countries under enormous economic pressure. Latin America is a region characterized by wide ethnic and per capita gross domestic product variations among different countries. Chronic kidney failure prevalence and incidence, as well as provision of renal replacement therapy (RRT), have increased in all Latin American countries over the last 20 years. From an ethical point of view, life-sustaining therapies such as RRT should be available to all patients with chronic kidney disease who might benefit. However, even among Latin American countries with similar per capita incomes and health care expenditures, only some have been able to achieve universal access to RRT. This indicates that it is not just a problem of wealth or distribution of scarce health care resources, but one of social justice. Strategies to increase the availability of RRT and renal palliative-supportive care, as well as implementation of interventions to prevent chronic kidney disease development and progression, are needed in Latin America and other developing countries.


INDEX WORDS: Renal replacement therapy (RRT); end-stage renal disease (ESRD); chronic kidney disease; developing countries; Latin America; health disparities; health care expenditures; medical ethics; challenges.
Table 1. Economic and Health Indicators and Chronic Kidney Failure and RRT Rates in Latin America

<table>
<thead>
<tr>
<th>Country or Territory</th>
<th>Per Capita Gross National Income(^a)</th>
<th>Total Health Expenditure as Proportion of GDP(^a,b,20)</th>
<th>As Proportion of Total Health Expenditure(^b)</th>
<th>Per Capita (^c)</th>
<th>Life Expectancy at Birth, y(^d)</th>
<th>National DM Prevalence(^e)</th>
<th>Universal RRT Coverage(^d,17)</th>
<th>Chronic Kidney Failure, pmp(^i,4)</th>
<th>RRT, pmp(^i,6)</th>
<th>Kidney Tx, pmp(^h,6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>$15,500(^e)</td>
<td>8.2%</td>
<td>64%</td>
<td>$927</td>
<td>76</td>
<td>5.98%</td>
<td>Yes</td>
<td>836</td>
<td>159</td>
<td>777.8</td>
</tr>
<tr>
<td>Bolivia</td>
<td>$4,950</td>
<td>5.5%</td>
<td>66.2%</td>
<td>$175</td>
<td>68</td>
<td>6.29%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>153.1</td>
</tr>
<tr>
<td>Brazil</td>
<td>$13,520</td>
<td>9.0%</td>
<td>47.0%</td>
<td>$474</td>
<td>74</td>
<td>9.04%</td>
<td>Yes</td>
<td>720</td>
<td>171.5</td>
<td>708.7</td>
</tr>
<tr>
<td>Chile</td>
<td>$17,010</td>
<td>7.1%</td>
<td>48.1%</td>
<td>$716</td>
<td>80</td>
<td>10.36%</td>
<td>Yes</td>
<td>1,263</td>
<td>170.1</td>
<td>1,136.7</td>
</tr>
<tr>
<td>Colombia</td>
<td>$10,130</td>
<td>6.8%</td>
<td>73.6%</td>
<td>$494</td>
<td>79</td>
<td>7.2%</td>
<td>Yes</td>
<td>578</td>
<td>92.8(^i)</td>
<td>533.1</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>$11,840</td>
<td>9.7%</td>
<td>73.5%</td>
<td>$928</td>
<td>79</td>
<td>6.78%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>338.8</td>
</tr>
<tr>
<td>Cuba</td>
<td>$17,680</td>
<td>10.6%</td>
<td>95.2%</td>
<td>$406</td>
<td>79</td>
<td>9.74%</td>
<td>Yes</td>
<td>NR</td>
<td>NR</td>
<td>303.9</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>$17,680</td>
<td>10.6%</td>
<td>95.2%</td>
<td>$406</td>
<td>79</td>
<td>9.74%</td>
<td>Yes</td>
<td>NR</td>
<td>NR</td>
<td>303.9</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>$9,880</td>
<td>5.5%</td>
<td>50.4%</td>
<td>$257</td>
<td>77</td>
<td>10.66%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>165.0</td>
</tr>
<tr>
<td>Ecuador</td>
<td>$8,710</td>
<td>7.2%</td>
<td>36.8%</td>
<td>$240</td>
<td>75</td>
<td>5.68%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>405.9</td>
</tr>
<tr>
<td>El Salvador</td>
<td>$6,920</td>
<td>6.9%</td>
<td>62.1%</td>
<td>$297</td>
<td>72</td>
<td>9.42%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>562.4</td>
</tr>
<tr>
<td>Guatemala</td>
<td>$6,520</td>
<td>6.9%</td>
<td>34.9%</td>
<td>$117</td>
<td>72</td>
<td>8.97%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>123.3</td>
</tr>
<tr>
<td>Honduras</td>
<td>$4,000</td>
<td>8.7%</td>
<td>49.9%</td>
<td>$165</td>
<td>74</td>
<td>6.28%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>187.2</td>
</tr>
<tr>
<td>Mexico</td>
<td>$14,590</td>
<td>6.3%</td>
<td>49.0%</td>
<td>$505</td>
<td>76</td>
<td>11.77%</td>
<td>No</td>
<td>1,409(^j)</td>
<td>466.5(^j)</td>
<td>974.9</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>$3,800</td>
<td>7.6%</td>
<td>57.3%</td>
<td>$159</td>
<td>73</td>
<td>10.25%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>37.0</td>
</tr>
<tr>
<td>Panama</td>
<td>$15,350</td>
<td>8.5%</td>
<td>70.6%</td>
<td>$806</td>
<td>77</td>
<td>7.87%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>517.3</td>
</tr>
<tr>
<td>Paraguay</td>
<td>$6,390</td>
<td>8.7%</td>
<td>34.4%</td>
<td>$212</td>
<td>75</td>
<td>6.17%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>148.7</td>
</tr>
<tr>
<td>Peru</td>
<td>$9,330</td>
<td>4.9%</td>
<td>56.2%</td>
<td>$275</td>
<td>77</td>
<td>4.28%</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>335.3</td>
</tr>
<tr>
<td>Puerto Rico(^g)</td>
<td>$48,880</td>
<td>17.1%</td>
<td>47.4%</td>
<td>$3,936</td>
<td>79</td>
<td>12.3%</td>
<td>Yes</td>
<td>1,924</td>
<td>362</td>
<td>1,355.2</td>
</tr>
<tr>
<td>Uruguay</td>
<td>$15,550</td>
<td>8.8%</td>
<td>63.7%</td>
<td>$899</td>
<td>77</td>
<td>6.34%</td>
<td>Yes</td>
<td>1,073</td>
<td>150</td>
<td>1,031.1</td>
</tr>
<tr>
<td>Venezuela</td>
<td>$15,960</td>
<td>4.7%</td>
<td>38.2%</td>
<td>$210</td>
<td>76</td>
<td>6.61%</td>
<td>Yes</td>
<td>NR</td>
<td>NR</td>
<td>457.4</td>
</tr>
</tbody>
</table>

Abbreviations: DM, diabetes mellitus; GDP, gross domestic product; NR, not reported; pmp, per million people; RRT, renal replacement therapy; Tx, transplantation.

\(^a\)International dollars using purchasing power parity rates.

\(^b\)2010 data.

\(^c\)2011 data.

\(^d\)2012 data unless otherwise indicated.

\(^e\)From reference 51.

\(^f\)Data from Jalisco State.

\(^g\)Territory of the United States.
failure incidence rates increase by 16% to 38%, and in Argentina, Brazil, Chile, and Mexico, the prevalence has increased by 30% to 45%. Based on the Jalisco data, Mexico is the Latin American country with both the highest chronic kidney failure incidence and prevalence rates (Table 1).

As in developed countries, diabetes mellitus and hypertension are the most frequent causes of chronic kidney disease (CKD) in the majority of Latin American countries. The nations with higher chronic kidney failure rates tend to be those with a higher population prevalence of diabetes as well (Mexico, Chile, and Brazil) (Table 1). Furthermore, in the last decade an epidemic of CKD of unknown origin has emerged in some areas of Central America, the so-called Mesoamerican nephropathy. Although the precise cause of this entity is unknown, recurrent dehydration possibly exacerbated by long-term use of high doses of analgesics may play a role.

Renal Replacement Therapy

RRT rates vary considerably among Latin American countries. These may be explained by chronic kidney failure underdiagnosis, restricted availability of RRT, absence of or incomplete national or regional registries, and/or national wealth differences. Per capita gross national income has been shown to correlate directly with RRT access, that is, economic prosperity increases both dialysis and kidney transplantation prevalence (Fig 1).

Similarly, life expectancy at birth and total health expenditure are also directly associated with RRT prevalence.

Since 1991, the Latin American Dialysis and Renal Transplant Registry has collected data for RRT prevalence and incidence from 19 countries and Puerto Rico, covering 99% of the Latin American population. The overall prevalence of RRT has consistently increased from 119 patients per million population (pmp) in 1991 to 660 pmp in 2010. Similarly, the overall incidence rate increased from 27.8 pmp in 1992 to 190.8 pmp in 2010.

It is important to note that despite having middle-range per capita gross national incomes and lower health expenditures compared with high-income countries, 7 Latin American nations provide universal access to RRT: Argentina, Brazil, Chile, Cuba, Uruguay, Venezuela, and Colombia. As expected, countries with universal coverage reported high RRT prevalence rates, which are remarkably similar to those seen in the developed world.

Uruguay and Chile reported the highest RRT prevalence, whereas Nicaragua, Guatemala, and Paraguay, which do not provide universal access, reported the lowest. However, Mexico and Honduras had the highest incidence rates, whereas Guatemala, Paraguay, and Peru reported the lowest.

Similarly, the overall transplantation rate has increased from 6.9 pmp in 1991 to 19.1 pmp in 2010, with 58% of transplants from deceased donors. The highest transplantation rates were reported by Argentina and Brazil, and the lowest, by Honduras and Nicaragua (Table 1). Although these numbers are well below those of developed countries, such as Norway (60 pmp) or the United States (55 pmp), it is worth noting that Costa Rica has one of the highest proportions of transplant recipients (>60% of its RRT population had received kidney transplants).

Resources for Nephrology Care

In Latin America, there is a shortage of nephrology expertise. There are 14 nephrologists pmp in the region, although this number ranges from 2 pmp in Honduras to 53 pmp in Uruguay. Likewise, there is an insufficient number of renal nurses, dialysis technicians,
and dialysis centers to provide adequate treatment for all patients.

**ETHICAL ISSUES REGARDING PROVISION OF RRT TO CHRONIC KIDNEY FAILURE PATIENTS**

The main ethical issue related to provision of RRT to patients with chronic kidney failure arises because although RRT prolongs life, it does so at a very high cost. Consequently, the question of whether it is worth extending lives of a relatively small group of patients for a short period and at a disproportionate cost is often raised. This question is ambiguous because the adjective “worth” has no precise ethical meaning, although it might have some sense in a reasoning weighing costs and benefits. However, even then, the comparison would almost be impossible because in principle, costs can be reduced to a given amount of money, whereas no such translation is possible for the value of life or survival. People are often ready to pay any price they can for securing their own survival or that of a close relative unless they estimate that the quality of the prolonged life would be poor. This spontaneous human attitude does not presuppose rejecting the principle of the “sanctity of life,” but simply reflects the moral concept that life is a good that can be diminished when it falls below certain minimal conditions.

Therefore, even if a life-sustaining therapy is in itself ethically defensible, the decision not to start or to withdraw from the therapy can be ethically appropriate when the quality of the prolonged life would be poor. In such cases, adoption of palliative care interventions would be appropriate from an ethical standpoint. Nevertheless, in general, the attitude that no monetary value can be put on life, let alone its duration, is in keeping with several everyday situations in which no moral objection is raised when very expensive means are used in order to save the life of very few or even of a single person (eg, search and rescue).

Ethical discussions concerning the worth of a life must also be examined in the context of “distributive justice.” This principle refers to the fair, equitable, and adequate distribution of goods within a society as established by justified norms that define the terms of social cooperation, and it is often invoked to assess ethical obligations to provide universal RRT coverage in developing countries. For example, is it ethically right to spend money to extend survival of a single patient with chronic kidney failure by means of dialysis for 30 days when the same amount of money would be sufficient to prolong the survival of 10 patients with terminal cancer for 300 days? To resolve this dilemma, one has to consider first the quality of life in the 2 different scenarios. It is likely that the patient with chronic kidney failure would achieve a reasonably good quality of life during the 30 days of dialysis, whereas the 10 patients with terminal cancer would probably not. The second point is whether use of the money for one purpose necessarily prevents the achievement of the second. Because this is not automatically the case, to determine what should and should not be funded becomes a health policy decision.

Problems with distributive justice typically arise when there is scarcity or competition to obtain goods or avoid burdens, as is the case with RRT. Allocation of health care resources under conditions of scarcity, a process also known as “microallocation,” is a complex issue for health care professionals and policy makers. According to Beauchamps and Childress, rationing scarce treatments require criteria to choose a qualifying pool of potential recipients and criteria for final selection of recipients. Screening potential recipients can be based on social factors (eg, certain constituencies, such as the military) and/or medical factors, such as progress of science (if research oriented), and more often, chances of success. The latter is not determined only on medical grounds, but also on the availability of family/social support (eg, for initiation of long-term ambulatory peritoneal dialysis). Final selection of recipients is typically based on medical utility criteria; however, social utility criteria may also play a role in the decision, although the extent of this is a controversial issue.

Although distributive justice and microallocation seem perfectly tailored to address the issue of universal access to RRT in developing countries, they do not fully encompass all the considerations. Although statistical data show a clear correlation between the wealth of a country and access to RRT, there are notable exceptions. Argentina and Colombia, though having similar or even smaller gross domestic products than other Latin American countries (Table 2), have been able to achieve universal access to RRT, whereas Mexico has not. Thus, rather than being solely an economic issue, universal access to RRT may also be a cultural issue reflecting the fundamental values of a society. The preservation of life may be valued so highly that nobody can be excluded from such a protection. The health policy of Argentina and Colombia is constructed accordingly. This is also true for European societies, in which this fundamental value is embedded in their cultural background and informs their health policies.

However, in general, the ethical concerns of medical practice may conflict with public health policy. Serious reflection of ethical
criteria and procedural conditions are now being developed.16

RECONCILING RRT CHALLENGES WITH ETHICAL PRINCIPLES IN LATIN AMERICA

There is no single answer to the question of how to ethically address RRT challenges in Latin America, but 3 key components are universal RRT coverage, renal palliative-supportive care, and CKD preventive measures.

Increasing Availability and Access to RRT

From an ethical point of view, life-sustaining therapies such as dialysis or kidney transplantation should be available to all patients with chronic kidney failure who might benefit from it. However, because this is often not the case in many developing countries, the microallocation principle for distribution of scarce resources has to be invoked. Health care authorities often indicate that universal RRT coverage is not affordable. The case of Colombia deserves detailed examination because it has a legal framework that guarantees the right to social security and empowers all citizens to demand their constitutional rights. In 2007, the High Cost Account was launched in Colombia; this nongovernmental organization engages health care providers, corporations, and members of society at large to form a common front for the prevention and control of high-cost noncommunicable diseases, specifically diabetes, hypertension, and CKD.17 According to the program’s reported results, treated chronic kidney failure incidence rates decreased 31.8% between 2006 and 2011, from 125.9 to 92.8 pmp.18 By 2014, the crude prevalence of treated chronic kidney failure decreased to 61.62 per 100,000 beneficiaries, which is significantly lower than that of other countries, including Chile, Brazil, Mexico (Jalisco State), and the United States.18 The cost of dialysis therapy per patient has been reduced, which has translated into an estimated savings of about US $450 million in the last 5 years.19 In view of the program’s success, an International Network for CKD Prevention has recently been established.20,21

However, there is significant annual variability in incidence rates of treated chronic kidney failure and thus further data on trends are needed to confirm the validity of these seemingly striking results.

In contrast to Colombia, it has been estimated that only half of all patients with chronic kidney failure have access to RRT in Mexico.22 Several factors may contribute to the lack of universal access to RRT, including a fragmented health care system, lack of a single renal health care authority and national dialysis registry, problems with methods for purchasing dialysis services, the high cost of dialysis, and inefficiencies in health care delivery.

A national RRT policy is needed in Mexico and other Latin American countries if universal access to RRT is to be achieved. This policy may include: (1) an appropriate legal framework; (2) appointment of a health care authority that directs and oversees the CKD program; (3) development of a national dialysis registry and a performance-measured health information system; (4) promotion of kidney transplantation as the treatment of choice; (5) use of generic immunosuppressive drugs; (6) use of peritoneal dialysis as an effective and relatively inexpensive therapy, particularly for patients living in regions with a lack of access to hemodialysis; and (7) incentives to reduce the cost of hemodialysis treatments while maintaining quality.23-25 Additionally, involvement of nongovernmental organizations and societies appears to be a key factor for success. The impact of public-private partnerships in increasing funding for RRT in several countries of Southeast Asia could be a model.26

Increasing Availability and Access to Renal Palliative-Supportive Care

Conservative care (palliative nondialysis care) is an alternative

---

Table 2. Comparison of GDP and Health Care Expenditure Among Argentina, Colombia, and Mexico

<table>
<thead>
<tr>
<th></th>
<th>Argentina</th>
<th>Colombia</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP per capita</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In US dollars at average exchange rate53</td>
<td>$10,959</td>
<td>$7,304</td>
<td>$9,717</td>
</tr>
<tr>
<td>In PPP international dollars53</td>
<td>$17,477</td>
<td>$10,208</td>
<td>$14,684</td>
</tr>
<tr>
<td><strong>Total expenditure on health</strong></td>
<td>7.9</td>
<td>6.5</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>Total expenditure on health, as % of GDP</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion that is government expenditure</td>
<td>66.5%</td>
<td>75.2%</td>
<td>50.3%</td>
</tr>
<tr>
<td>Proportion that is private expenditure</td>
<td>33.5%</td>
<td>24.8%</td>
<td>49.7%</td>
</tr>
<tr>
<td><strong>Private expenditure on health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion that is out of pocket</td>
<td>62.8%</td>
<td>64%</td>
<td>91.6%</td>
</tr>
<tr>
<td>Proportion from private prepaid plans</td>
<td>37%</td>
<td>36%</td>
<td>8.4%</td>
</tr>
<tr>
<td><strong>Per capita total expenditure on health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In US dollars at average exchange rate</td>
<td>$866</td>
<td>$466</td>
<td>$609</td>
</tr>
<tr>
<td>In PPP international dollars</td>
<td>$1,393</td>
<td>$657</td>
<td>$1,004</td>
</tr>
<tr>
<td><strong>Per capita total government expenditure on health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In US dollars at average exchange rate</td>
<td>$576</td>
<td>$350</td>
<td>$306</td>
</tr>
<tr>
<td>In PPP international dollars</td>
<td>$927</td>
<td>$494</td>
<td>$505</td>
</tr>
</tbody>
</table>

Abbreviations: GDP, gross domestic product; PPP, purchasing power parity.
for patients with CKD who are unlikely to benefit from dialysis and are not candidates for kidney transplantation.\textsuperscript{27} This could also be beneficial for patients with no access to RRT. Unfortunately, renal palliative-supportive care is almost nonexistent in Mexico, but recent changes in the law and new funding opportunities may promote its development. It is fitting that a KDIGO (Kidney Disease: Improving Global Outcomes) controversies conference on supportive care in CKD took place in Mexico.\textsuperscript{28} Renal palliative-supportive care programs have already been developed in other Latin American countries, particularly in Chile.

**CKD Prevention**

Public health programs aimed at reducing risk factors for diseases that can lead to CKD, such as diabetes, hypertension, and obesity, as well as early detection and adequate control of these diseases in patients who already have them is of paramount importance to reduce the demand for RRT.\textsuperscript{29} These interventions can certainly be included within the “decent minimum” package of health care services for all individuals living in developing countries. Unfortunately, reduction of risk factors for noncommunicable diseases, such as unhealthy diets, physical inactivity, and tobacco use, imply lifestyle changes that are difficult to achieve. Additionally, poverty can contribute to the difficulty reducing these risk factors because it has been shown to be strongly associated with the development of obesity, which in turn is a risk factor for diabetes and hypertension.\textsuperscript{30} Despite these obstacles, a structured program should have a positive impact on the prevention and control of noncommunicable diseases that lead to CKD. For example, at a yearly cost of US $0.43 per capita of population, a program in rural India that involved use of nonphysician health care workers and the least expensive diagnostic tests and treatments available resulted in achievement of blood pressure and glycemia targets, as well as a possible impact on CKD.\textsuperscript{31}

In addition to health promotion efforts and primary prevention and control of noncommunicable diseases leading to CKD, strategies must include other public policy interventions to reduce risk factors. Given the high burden of diabetes, hypertension, and overweight and obesity in Mexico, a national strategy for prevention and control of diabetes and obesity was recently launched and presented at the United Nations 68th General Assembly High-Level Meeting on noncommunicable diseases.\textsuperscript{32} The Mexican Government has now undertaken several measures, such as levying a tobacco tax and banning smoking in restaurants and other public spaces. Other actions include regulating the amount of salt in bread, banning particular ingredients from meals served in schools, prohibiting commercials for chocolates and candies, levying additional taxes on sugar and high-calorie beverages, and requiring total calories to be listed on food labels.

These public policies are important steps for the prevention and control of noncommunicable diseases, as well as for reducing the need for RRT. However, significant challenges still remain. For example, according to Mexico’s National Health Survey, about a quarter of diabetic participants and close to half of hypertensive participants were unaware of these conditions prior to participating in the survey.\textsuperscript{33} Additionally, only a small fraction of diabetic patients achieve satisfactory glucose control, although some improvement has been noted in recent years.\textsuperscript{34}

Regarding secondary prevention, early detection of CKD in individuals with risk factors should be included within the “decent minimum” package of health care services for all individuals living in developing countries. Despite some discordant opinions,\textsuperscript{35} several reasons appear to justify CKD screening,\textsuperscript{36} including that it (1) is cost-effective in high-risk patients,\textsuperscript{37,38} (2) can be done with simple and inexpensive tests,\textsuperscript{36} and (3) allows early implementation of interventions that delay and in some cases prevent progression of CKD, reduce complications, and probably decrease costs.\textsuperscript{37}

Unfortunately, CKD screening in at-risk patients is still uncommon even among those at highest risk. In Mexico, KEEP (Kidney Early Evaluation Program), a CKD screening and educational initiative, has reported a high prevalence of CKD among individuals with diabetes, hypertension, and/or family history of these conditions or CKD. Approximately 40% of diabetic participants, 30% of hypertensive participants, and close to 50% of participants with diabetes and hypertension are found to have CKD upon screening, with most having CKD stages 1 or 2.\textsuperscript{40} In a second KEEP screening performed 1 year later in the same participants, CKD was confirmed in 100%, 65%, 52%, and 40% of participants who had previously been categorized in CKD stages 4 or 5, 3, 2, and 1, respectively. Additionally, among participants who were not categorized as having CKD at the time of the first KEEP screening, CKD incidence was 15% at 1 year later, indicating a high incidence of CKD with repeat testing in this high-risk population.\textsuperscript{41} Notwithstanding these results, <1% of participants were aware of having CKD despite 70% having seen a physician in the year prior to participating in KEEP.\textsuperscript{40}

Several interventions have been shown to be effective for delaying and in some cases preventing CKD
progression, particularly if they are implemented early in the course of the disease. Additionally, many global and national clinical practice guidelines are available to assist physicians and patients with decision making. Some studies have shown that educational programs regarding the management of early CKD stages directed to family physicians as well as multidisciplinary care are associated with better intermediate outcomes. Additional efforts are needed to further disseminate and, more importantly, implement clinical practice guidelines, measure their impact on long-term outcomes, and assess its cost-effectiveness. In this regard, Colombia’s High Cost Account has reported that implementation of interventions to delay CKD progression has resulted in avoidance of RRT for an estimated 5,169 patients within 4 years, which translates into substantial savings for the health care system. Creation of dialysis registries in Latin America would also be of utmost importance in measuring trends.

CONCLUSIONS

Developing countries are under enormous economic pressure to provide RRT to a growing CKD population. From an ethical point of view, life-sustaining therapies such as RRT should be made available to everyone who might benefit from it. However, this often is not the case due to high cost, and thus microallocation principles for the distribution of scarce resources have to be invoked. In some Latin American countries, limited financial resources are an insufficient explanation for the differences in universal access to RRT. Strategies to increase access to RRT and renal palliative-supportive care, as well as implementation of interventions to prevent CKD, are essential and require the support of all sectors of society.

ACKNOWLEDGEMENTS

The authors acknowledge Jenifer Palencia Sierra, RN, for assistance in the preparation of Colombia’s High Cost Account description. Support: None. Financial Disclosure: The authors declare that they have no relevant financial interests. Peer Review: Evaluated by 3 external peer reviewers, the Feature Editor, and the Editor-in-Chief.

REFERENCES


Estudio de Insuficiencia Renal Crónica y Atención Mediante Tratamiento de Sustitución. Mexico City, Mexico: UNAM; 2010.