Global dialysis perspective: Mexico

Enzo Vasquez Jimenez¹, Magdalena Madero¹
¹Department of Nephrology, Instituto Nacional de Cardiología Ignacio Chávez,
Mexico City, Mexico

Address correspondence to:
Magdalena Madero, MD
Department of Nephrology,
Instituto Nacional de Cardiología Ignacio Chávez
Juan Badiano No. 1, Col. Sección XVI,
Delegación Tlalpan,
Ciudad de México, México 14080
Email: madero.magalena@gmail.com
Mexico is the Latin American country with the highest prevalence and incidence of chronic noncommunicable diseases such as obesity, arterial hypertension and diabetes. This problem has worsened in recent years because of lengthening of life expectancy and competing financial demands 1. As a consequence of an epidemiological transition, diabetes mellitus (DM) remains the leading cause of End Stage Kidney Disease (ESKD) in Latin America and in Mexico represents 51% of cases 2, however, in approximately 30% of the patients the cause of Chronic Kidney Disease (CKD) is unknown 3.

High prevalence and poor control have led to an increased mortality associated to DM and its complications, including CKD.

Kidney failure in young people not related to traditional risk factors such as diabetes and hypertension has also emerged as a cause of kidney disease in the country, although hot spots have only been documented in Poncitlan, Jalisco and Tierra Blanca, Veracruz 4,5. In addition, in young people such as glomerular diseases are the cause of CKD and the lack of optimal care contributes to the late diagnosis of the disease.

The estimated prevalence of CKD in Mexico is 8.5% however it is important to mention that despite multiple national efforts, as of today, Mexico lacks a National CKD or Dialysis Registry. Access to RRT is limited or non-existent for the uninsured population which represents 49% of the country’s population, out of this only 3% can afford private health insurance leaving the rest without access to social security benefits or private health care services 6. Figure 1 shows a conceptual framework of the barriers to CKD care in Mexico.

Most of the health services in the country are provided by social security institutes like the Mexican Institute of Social Security (IMSS) and Institute for Social Security and Services for Civil Servants (ISSSTE). The uninsured population access health services through the Ministry of Health with a significant out-of-pocket cost to the people who use them 7. Significant differences are observed between the insured
and uninsured Mexican populations, universal health coverage for RRT is not available for the Mexican population.\textsuperscript{8}

In Mexico, the RRT offered are peritoneal dialysis (PD), hemodialysis (HD) and kidney transplantation. Home hemodialysis programs are non-existent in the country.

At the beginning of the century 15\% of the patients had HD and 85\% PD. HD has had a progressive growth due to the fact that some patients abandoned PD because of complications.\textsuperscript{9} In addition, in 2005 private HD clinics increased in the country and national social security (IMSS) provided HD through subrogation in external HD units. The IMSS Clinical Practice Guideline established PD as the initial therapy, mostly due to the lower cost estimated at $6000 USD patient per year, compared to HD which is about $9000 USD per year.\textsuperscript{10,11} Patients with social security can receive these treatments for free, and those without social security need to cover the costs of therapy.

Data from the IMSS reported a total of 59,754 patients on dialysis, 59\% are on PD and 41\% are in HD. Out of the total RRT population, 25\% are automated PD (APD), 33\% on ambulatory PD (CAPD), 19\% on hospital-based HD units and 23\% on external HD units. There is a subrogation system where social security institutes have agreements with dialysis provider companies or other private hospitals that offer the service. Some have evaluated the HD cost between private and public dialysis units with little differences in the costs. In most centers’ patients are evaluated by internists or nephrologist every 1 or 2 months.\textsuperscript{11} Because of the lack of nephrologists, many HD units in the country are ran by primary care physicians or internists. Some have reported the average number of dialysis treatments provided are 1.2 per week with a duration of 3 hours and a cost per session of at least $55-85 USD. Only 2\% of prevalent HD patients receive 3 sessions per week and only 8\% had an AVF\textsuperscript{6} (Table 1). Mendez-Duran et al reported complications in PD and HD patients with Health Insurance (IMSS). The most frequent complications in PD
were peritonitis, volume overload, mechanical dysfunction of the catheter; in HD, volume overload, hypertensive crisis and hyperkalemia. In Mexico, the Official Norm for the practice of HD updated in early 2017, recommends having HD equipment for the exclusive use of sero-positives patients (hepatitis B, hepatitis C and human immunodeficiency virus). Therefore, screening for these infections is done at start of therapy and controls are made every 4 months. Seronegative patients for Hepatitis B surface Antigen (HBs Ag) should be vaccinated for hepatitis B. Although the Official Norm allows dialysis filters reuse a maximum of 12 times, most HD clinics not reuse.

The above data represents insured patients, however the outcomes for those uninsured are not comparable. Mexico has the 6th highest CKD mortality rate in the world. The CKD mortality rate between 1990 and 2017 increased 102.3% in Mexico. Agudelo-Botero et al founded that men have a greater mortality rate for CKD than women [64.9 (95% UI 61.6–67.3) vs 52.2 (95% UI 50.5–53.7)]. García-García et al reported major incident and prevalent rates of dialysis of 327 pmp and 939 pmp in the insured population compared to 99 pmp and 166 pmp, in the non-insured population. Many uninsured Mexican patients with CKD refuse dialysis, have very advanced disease at the time of first nephrological evaluation, eventually abandon their treatment and have exceedingly high rates of mortality after dialysis initiation. Valdez et al reported the poor outcomes in the non-insured population in 850 patients with ESKD. Approximately 85.3% of patients started RRT as an emergency due to uremic syndrome, hyperkalemia, metabolic acidosis or acute pulmonary edema. The majority had not been seen by a nephrologist. Overall survival reached 46% at 3 years follow up and as expected, survival depended on the duration and the quality of the RRT offered. For instance, survival was 100% for kidney transplant, 73% for continuous ambulatory peritoneal dialysis (CAPD) program, 8.2% for patients that received HD only when it became an emergency (intermittent HD) and 11.4% for patients on emergency peritoneal dialysis or intermittent peritoneal dialysis (IPD). Also, mortality rate was higher in patients
without health insurance than patients with health insurance (56.6% vs 38.2%). This alarming data reflects the fact that uninsured patients with intermittent modalities and poor economic conditions experience the worst outcomes.\(^{16}\)

Although the kidney transplant rate has increased from 1.57 per million population in 1984 to 22.8 per million population in 2015, only 2939 kidney transplants were done in the country in 2019 and 17,189 patients are currently on the deceased donor list.\(^{17}\) Since the cost of kidney transplantation and immunosuppressive therapy is not provided for the uninsured patients, the kidney transplantation rate is lower in patients without social security.\(^{6}\) In fact, transplant rates are (72 pmp) in the insured population than non-insured population (7.5 pmp).\(^{3}\) Despite these barriers, survival is superior amongst those uninsured patients that undergo kidney transplantation, even if immunosuppressive therapy is not warranted.

In 2003 the Seguro Popular (Popular Insurance) program was funded by the federal government in order to have universal health coverage for all diseases, however CKD and RRT were never covered by this entity.\(^{11}\) In January 1\(^{st}\) 2020, the Health Institute for Welfare (Instituto de Salud para el Bienestar) was implemented to replace Popular Insurance. According to the government, this entity is designed to provide medical services in the first and second level of care to all people who lack social security. However, as of today there is still no coverage for RRT.\(^{18}\)

Few strategies are required in order to improve our health system. First, it is mandated to create a National Health Program that focuses on preventing chronic non-communicable diseases such obesity, diabetes mellitus and hypertension. Second, the first level of care should be strengthened and universal coverage for CKD guaranteed. Third the increase of public investment in health and decrease out-of-pocket is urgently needed. Fourth, a main governing body would allow elimination of the fragmentation of the health system, decentralization of dialysis and transplant programs and regulate bidding systems that allow economically accessible dialysis therapy. Finally, early referral to nephrologists is a key point for timely treatment and preventing the progression to ESKD. Since there are only 9 nephrologists per 1
million inhabitants, it is imperative that primary care physicians can identify and treat CKD at earlier stages.

In conclusion, CKD care in Mexico is suboptimal. Outcomes are far worse in the uninsured population. Urgent recognition of CKD by the authorities as public health problem is warranted in order to optimize health care services and improve access to care in the CKD population.

**Disclosures**

The authors declare that there is no conflict of interest regarding the publication of this article.

**Author Contributions**

Enzo Vasquez Jimenez: Writing - original draft  
Magdalena Madero: Writing - original draft

**References:**


A, Johnson R, Sanchez-Lozada L, Obrador GT, Madero M. Decreased kidney
function and agricultural work: a cross-sectional study in middle-aged adults
from Tierra Blanca, Mexico, Neph Dial Trasp, 2020, In Press.

6. García-García G, Chávez-iñiguez JS. The Tragedy of having ESRD in

7. Tirado-Gómez LL, Durán-Arenas JL, Rojas-Russell ME, Venado-Estrada A,
Pacheco-Domínguez RL, López-Cervantes M. Las unidades de hemodiálisis
en México: una evaluación de sus características, procesos y resultados.

health coverage: achieving social protection for all in Mexico. Lancet.

9. Peña JC. Transición y equilibrio de la diálisis peritoneal y la hemodiálisis en

10. Tratamiento sustitutivo de la función renal. Diálisis y Hemodiálisis en la
insuficiencia renal crónica. México: Instituto Mexicano del Seguro Social; 25
de septiembre de 2014.

Chronic Kidney Disease in Disadvantaged Populations. New York: Elsevier;
2017:77–82.

12. Méndez-Durán A, Ignorosa-Luna MH, Pérez-Aguilar G, Rivera-Rodríguez FJ,
González-Izquierdo JJ, Dávila-Torres J. Estado actual de las terapias
sustitutivas de la función renal en el Instituto Mexicano del Seguro Social.

13. Norma Oficial Mexicana NOM-003-SSA3-2016, Para la práctica de
hemodiálisis.


Figure 1. Conceptual Factors of Access of Chronic Kidney Disease Care in Mexico.

- Limited Access of CKD Care
- Lack of Universal Health Care
- Education
- Fragmentation of Health Care
- Socioeconomic status
- Perceived discrimination
Table 1. Renal Replacement Therapy in Mexico

<table>
<thead>
<tr>
<th>Country</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence (pmp)</td>
<td>1142</td>
</tr>
<tr>
<td>Dialysis coverage</td>
<td></td>
</tr>
<tr>
<td>Public Health Insurance</td>
<td>48%</td>
</tr>
<tr>
<td>(non-profit HD units)</td>
<td></td>
</tr>
<tr>
<td>No Health Insurance</td>
<td>49%</td>
</tr>
<tr>
<td>(for-profit HD units)</td>
<td></td>
</tr>
<tr>
<td>Private Health Care Services</td>
<td>3%</td>
</tr>
<tr>
<td>(for-profit HD units)</td>
<td></td>
</tr>
<tr>
<td>No. patients in RRT (IMSS data)</td>
<td>59,754 (100%)</td>
</tr>
<tr>
<td>PD</td>
<td>35,255 (59%)</td>
</tr>
<tr>
<td>CAPD</td>
<td>15,536 (26%)</td>
</tr>
<tr>
<td>APD</td>
<td>19,719 (33%)</td>
</tr>
<tr>
<td>HD</td>
<td>24,499 (41%)</td>
</tr>
<tr>
<td>HH</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hospital Based HD</td>
<td>10,756 (18%)</td>
</tr>
<tr>
<td>External HD Units</td>
<td>13,743 (23%)</td>
</tr>
<tr>
<td>Average Length of HD Treatment</td>
<td>3 h, 1.2 sessions/week</td>
</tr>
<tr>
<td>Vascular Access Type</td>
<td></td>
</tr>
<tr>
<td>VC</td>
<td>92%</td>
</tr>
<tr>
<td>AVF</td>
<td>8%</td>
</tr>
<tr>
<td>Dialysis nursing staff</td>
<td></td>
</tr>
<tr>
<td>Nurses</td>
<td>70%</td>
</tr>
<tr>
<td>Technicians</td>
<td>30%</td>
</tr>
<tr>
<td>Nurse/patient ratio</td>
<td>1:3</td>
</tr>
<tr>
<td>Patient follow-up frequency</td>
<td>Once every 1-3 months</td>
</tr>
<tr>
<td>Cost per year (USD)</td>
<td></td>
</tr>
<tr>
<td>PD</td>
<td>$6000</td>
</tr>
<tr>
<td>HD</td>
<td>$9000</td>
</tr>
</tbody>
</table>

pmp: per million population, RRT: renal replacement therapy, PD: peritoneal dialysis, CAPD: continuous ambulatory peritoneal dialysis, APD: automated peritoneal dialysis, HH: home hemodialysis, VC: vascular catheter, AVF: arteriovenous fistula

Source: References 1, 6, 7, 11, 12.