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Chronic Kidney Disease in Type 2 Diabetes in Colombia: A Cost of Illness Analysis

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Introduction

Chronic Kidney Disease (CKD) in Type 2 Diabetes (T2D) is a main concern for economy and public health in Colombia. Around 40% of cases of microvascular complications in diabetes patients is due to CKD, with a prevalence of 1.42 million of cases and an incidence of 168 thousand people in Colombia; 2,2% from the latter are people within 40 to 44 years old and 65.74% from 50 to 74 years-old (about 110 thousand cases). Furthermore, 55% with Chronic Kidney Disease (CKD) are in stage 5 or end-stage renal disease -ESRD which is the most expensive because patients need Kidney replacement therapy (KRT), increasing cost per for healthcare system. Due to this, it is important to estimate the economic cost of this pathology.

Objective

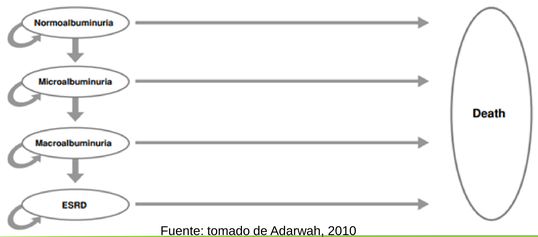
Estimate direct and indirect costs of Chronic Kidney Disease (CKD) in Type 2 Diabetes (T2D) in Colombia, focused on indirect costing based on public information around productivity loss.

Methods

Cost analysis was carried out from social perspective and particularly focused on Colombia´s Health System and include direct and indirect costs. To estimate direct medical costs associated to CKD-T2D, a macro costing method was used, which consisted of analyzing secondary information sources such as the SISPRO system [1] and DANE household surveys from 2019.

- From SISPRO were extracted the average costs of medicines and medical supplies from patients who received at least one medical care assistance and the average costs of medical procedures of ICD-10 codes associated to CKD in T2D such as N17-N19 E102, E112, E142, N06X, N083 and R80X, to obtain information on direct and indirect costs by disease stage (Normoalbuminuria, Microalbuminuria, Macroalbuminuria, ESRD [2] and death).
- Costs related to households or out-of-pocket expenses were estimated using the household surveys from DANE, which included medical costs such as medicines, physician's appointments, other related to the treatment of this disease and, non-medical costs like transportation and care cost paid for households (from family members and/or people hired to take care of the patient with CKD). In this way, were estimated both direct medical and non-medical costs related to the healthcare system and the household.
- For indirect costs, Disability Adjusted Life Years (DALY) and a reference of average labor income per worker over 40-years-old were used. Finally, the estimated costs were indexed to 2021 prices using the Consumer´s Price Index (CPI) in health for Colombia in 2021.

Figure 1. Transitions (Markov states) of the CKD-T2D



Fuente: tomado de Adarwah, 2010

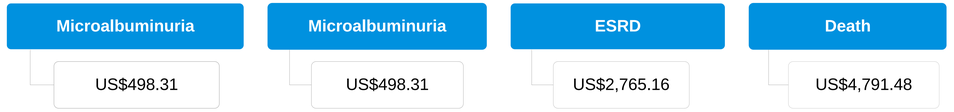
Results

Indirect Costs

To estimate indirect costs, which are associated with annual loss of productivity, were used the weights for the years lost due to disability (YLD) related to DALYs calculated by WHO for Chronic Kidney Disease (CKD) in T2D. Taking this information into account, the weights assigned were 0.104 for microalbuminuria & macroalbuminuria, 0.571 for ESRD and 1 for death. Then was estimated the average annual labor income per 40-year-old worker in Colombia from household surveys (approx.. $4,791 at 2021 prices).

Indirect cost were estimated multiplying weights (for each stage of CKD in T2D) and average annual labor income. Results are shown in the figure below

Figure 1. Annual loss of productivity due to disability

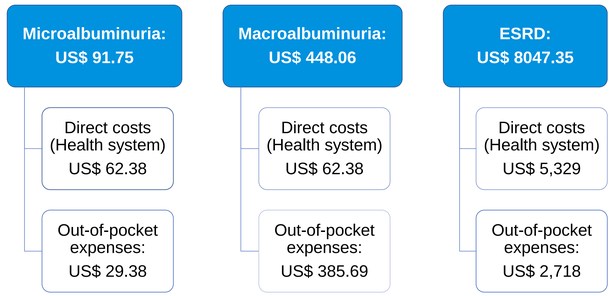


Note: exchange rate $3,756.67 Colombian pesos per dollar, representative of June 30, 2021.

Direct Costs

To estimate transportation costs (out-of-pocket expenses) were considered some assumptions: (i) CKD in T2D patients going through microalbuminuria and macroalbuminuria stages attend yearly to 12 physician's appointments and treatments and (ii) ESRD patients attend 156 to medical services, due to renal replacement therapies such as dialysis

Figure 2. Annual costs per patient and stage of CKD in T2D.



Note: exchange rate $3,756.67 Colombian pesos per dollar, representative of June 30, 2021.

Conclusions:

Direct costs for healthcare system increase from $62.38 to $5,329.21 a year, when macroalbuminuria stage is compared to ESRD stage. Out-of-pocket expenses increased from $385.69 to $2,718.14 a year when the same stages are compared. Finally, costs of one year of life lost due to disability are greater in ESRD ($2,765) than macroalbuminuria ($498.31), while one year of life lost due to premature mortality are equal to 4,791.48 per patient with CKD. In summary, CKD in T2D generates large costs for households, the health system and society. Regarding households' costs, they represents a high level of out-of-pocket expenses compared to average labor income, and it increases in more advanced stages of the disease.

References

- Cuenta de Alto Costo, «Situación de la enfermedad renal crónica, la hipertensión arterial y la diabetes mellitus en Colombia 2020,» Fondo Colombiano de Enfermedades de Alto Costo, 2021.
- Espinosa, Oscar, et al. "Estimating cost-effectiveness thresholds under a managed healthcare system: experiences from Colombia." Health Policy and Planning 37.3 (2022): 359-368.
- World Health Organization, WHO methods and data sources for global burden of disease estimates 2000-2019, Department of Data and Analytics - Division of Data, Analytics and Delivery for Impact WHO. 2020.
- Sarmiento-Bejarano, H., Ramírez-Ramírez, C., Carrasquilla-Sotomayor, M., Alvis-Zakzuk, N. J., & Alvis-Guzmán, N. Carga económica de la enfermedad renal crónica en Colombia, 2015-2016. Revista Salud Uninorte, 35(1), (2019). 84-100.
- Sanabria, M., Rodríguez, K., Sánchez, R., Astudillo, K., Camargo, D., & Bunch, A. Frecuencia y costos de hospitalización en una población de pacientes en diálisis en Colombia. Revista de la Facultad de Medicina. (2012). 60(4). 293-301.
- Sanabria et al, «Meses Evitados De Diálisis En Una Población Con Enfermedad Renal Crónica Estadio 5 Con Intervención Predialítica En Colombia,» Value in health journal, 2015.
- Rico Fontalvo, Jorge Eduardo. "Enfermedad renal diabética: de cara a la prevención, diagnóstico e intervención temprana." Revista Colombiana de Nefrología 7.2 (2020): 15-16.
- C. Adarkwah y A. Gandjour, «Cost-effectiveness ofangiotensin-converting enzyme inhibitors and angiotensin II receptor blockers in newly diagnosed type 2 diabetes in Germany,» International Journal of Technology Assessment in Health Care, vol. 1, nº 26, 2010.