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Diabetes and Kidney Disease

Acknowledgements

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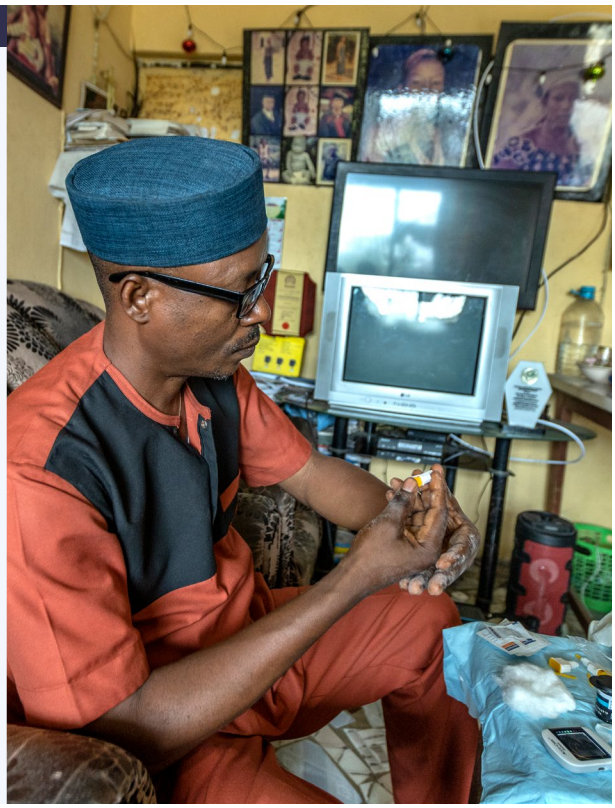
Diabetes and chronic kidney disease

Key messages

- Diabetes is one of the leading causes of chronic kidney disease (CKD) and end-stage kidney disease (ESKD)
- CKD due to type 2 diabetes increased worldwide by about 74% between 1990 and 2017. However, there has been a decline in CKD incidence among people with type 1 diabetes
- Most data on the epidemiology of CKD come from high-income countries, although countries with lower socioeconomic status experience the largest increase in diabetes prevalence
- People living with diabetes-related kidney disease are at higher risk of cardiovascular disease (CVD), progression to kidney failure, and death



Diabetes is one of the leading causes of chronic kidney disease (CKD), with approximately 30 to 40% of people living with diabetes developing CKD. Type 2 diabetes is by far the largest contributor to the burden of CKD associated with diabetes. Kidney damage can result directly from hyperglycaemia or other associated conditions such as hypertension, polyneuropathic bladder dysfunction, and infections.[1] People living with diabetes-related kidney disease are at higher risk of cardiovascular disease (CVD), progression to kidney failure, and death.

The number of new cases of CKD due to type 2 diabetes increased worldwide from about 1.4 million in 1990 to 2.4 million in 2017, representing a 74% increase.[2] The age-standardised incidence of diabetes-related CKD was 29.15% per 100,000 in 2017.[2] An increasing trend in age-standardised CKD in type 2 diabetes is found in all economic regions, with an inverse association between CKD incidence and a country's socio-demographic index.[2] A decline in CKD incidence has been reported among people with type 1 diabetes but not in those with type 2 diabetes,[3] indicating that the CKD burden is primarily related to the increasing prevalence of type 2 diabetes worldwide.

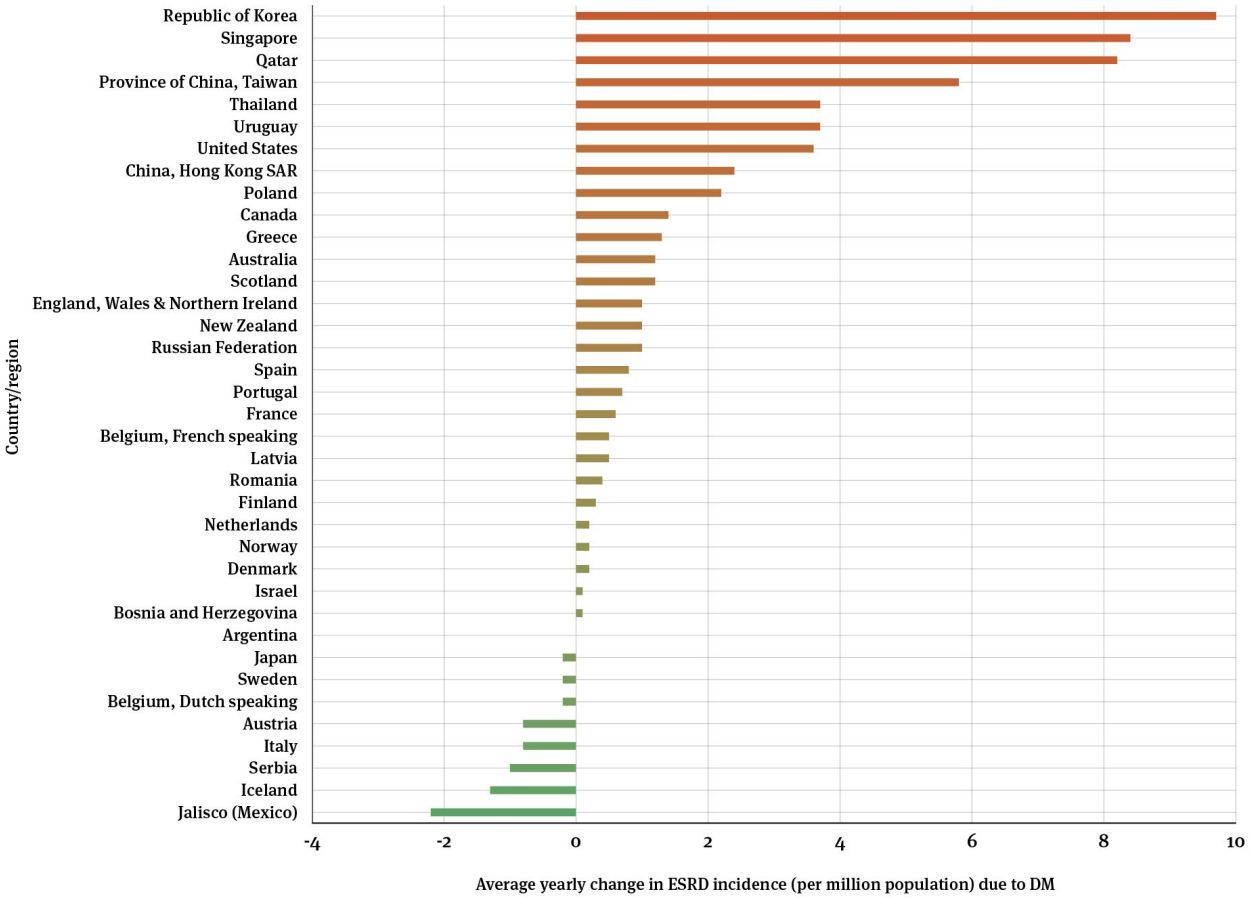
The prevalence of diabetes-related CKD increases with age and varies widely between countries, depending on the setting, the definition of CKD, and the local healthcare infrastructure.[3] The odds of CKD are between 1.3 and 4.6 higher in populations with diabetes than without, depending on the region of the world and associated comorbidities.[3] In the US, where diabetes-related CKD can be tracked at the national level, its prevalence changed from 41% in 2005-2008 to 39.4% in 2017-March 2020.[4] About 10% of adults with prediabetes had CKD stages three to four (estimated glomerular filtration rate [GFR] 15 to 59 ml/min/1.73m²) in the latter period.[5]

An increasing trend in age-standardised CKD in type 2 diabetes is found in all economic regions, with an inverse association between CKD incidence and a country's socio-demographic index.

In the adult population, diabetes remains a leading cause of kidney failure, or end-stage kidney disease (ESKD),[6] a condition in which the kidneys no longer function and treatment with dialysis or transplantation is required for survival. Globally, it is estimated that only 27% to 53% of the population with ESKD has access to renal replacement therapy, with its availability and access being particularly deficient in low- and lower middle-income countries.[7] The highest incidence of treated ESKD attributable to diabetes is found in some Asian countries and the US.[8] Regardless of region, ESKD incidence is highest among people with diabetes who are older than 65 years and male. Between 2010-2020, the largest average yearly increase in treatment for diabetes-related ESKD occurred in the Republic of Korea (9.7 per million persons [pmp]), Singapore (8.4 pmp), and Qatar (8.2 pmp), whereas it declined most markedly in Jalisco (Mexico) (-2.2 pmp), Iceland (-1.3 pmp), and Serbia (-1.0 pmp) [8] (Figure 1). National registry data from Australia indicate that annual incidence of ESKD increased for people with type 2 diabetes and remained stable in those with type 1 diabetes during 2002-2013.[9, 10]

Overall, prevalence of treated ESKD is 759 pmp, varying from 966 pmp in high-income countries to 550.2 pmp in upper-middle, 321 pmp in lower-middle, and 4.4 pmp in low-income countries. However, similar data on diabetes-related ESKD are not available.[11] A recent survey showed that the prevalence of diabetes in people with ESKD increased in most of the 142 countries studied. The global prevalence increased from 19% in 2000 to 29.7% in 2015.[12]

Figure 1 – Average yearly change in incidence of treated ESKD attributed to diabetes, by country and region, 2010-2020



Source: United States Renal Data System. 2022 USRDS annual data report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2022.

Reducing the burden of CKD in diabetes

The most effective strategy to reduce the burden of diabetes-related CKD is to delay or prevent type 2 diabetes and, among those already affected by diabetes, to diagnose and treat CKD in its early stages. Screening for albuminuria or reduced GFR is cost-effective in people with diabetes and hypertension.[13, 14] Screening for albuminuria is recommended yearly after diagnosis of type 2 diabetes, and the same after the first five years in people with type 1 diabetes.[15] Both diabetes and CKD are strongly associated with CVD and, therefore, controlling blood glucose and blood pressure can reduce the risk of both CVD and CKD. The availability of newer treatments to manage diabetes that also prevent albuminuria and slow the decline of renal function (glucagon-like peptide-1 receptor agonists and sodium-glucose co-transporter 2 inhibitors) hold promise for changing the landscape of CKD in diabetes.

Guidelines and policies for screening are possible to implement in high-income countries, whereas countries with lower socioeconomic status, that experience the largest increase in diabetes prevalence and have additional unique risk factors for CKD, remain at highest risk for CKD. This is due to limited capacity for screening, risk stratification and treatment, leading to disproportionately high death rates and disability.[16]

In an effort to tackle the burden of CKD and diabetes, the International Diabetes Federation (IDF) and International Society of Nephrology (ISN) developed a policy brief "Renewing the fight: a call to action on diabetes and chronic kidney disease".[17] The policy brief provides recommendations on the actions required to prevent, manage and treat this condition effectively.

Guidelines and policies for screening are possible to implement in high-income countries, whereas countries with lower socioeconomic status, that experience the largest increase in diabetes prevalence and have additional unique risk factors for CKD, remain at highest risk for CKD.

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