

## ORIGINAL ARTICLE

# Clinical characteristics, complications and management of patients with type 2 diabetes with and without diabetic kidney disease (DKD): A comparison of data from a clinical database



Laura Brugnara<sup>a,b</sup>, Anna Novials<sup>a,b,\*</sup>, Rafael Ortega<sup>c</sup>, Beatriz De Rivas<sup>c,\*</sup>

<sup>a</sup> CIBERDEM – Spanish Biomedical Research Centre in Diabetes and Associated Metabolic Disorders, Madrid, Spain

<sup>b</sup> IDIBAPS – August Pi i Sunyer Biomedical Research Institute/Hospital Clínic de Barcelona, Barcelona, Spain

<sup>c</sup> GlaxoSmithKline, Madrid, Spain

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## KEYWORDS

Diabetic kidney disease (DKD);  
Type 2 diabetes;  
CKD-EPI equation

## Abstract

**Background and objectives:** The main objective of this study was to assess the percentage of co-morbid nephropathy in type 2 diabetes patients using the CKD-EPI equation and to compare the clinical characteristics and treatments of patients with type 2 diabetes with nephropathy with those of patients without nephropathy

**Patients and methods:** This was a cross-sectional analysis of the demographic and clinical data registered in the IDIBAPS Biobank database. Patients were considered to have nephropathy if the diagnosis was reported in their clinical history, albuminuria (>30 mg/g) was indicated as present in the last urine test available, or an estimated glomerular filtration rate (eGFR) below 60 mL/min/1.73 m<sup>2</sup> was calculated using the CKD-EPI equation.

**Results:** Clinical data were obtained from 1,397 patients with a diagnosis of type 2 diabetes. The percentage of patients with nephropathy was 29.3% (N= 369) (95% confidence interval, 26.8% to 31.9%); however, only 109 (7.8%) patients had a nephropathy diagnosis reported in their clinical history. Compared with patients without nephropathy, patients with nephropathy have a higher mean age, higher frequency of diabetes complications and received insulin more frequently.

**Conclusion:** Our results show that the percentage of type 2 diabetes patients with nephropathy was high and that this comorbidity was associated with a significantly higher frequency of diabetes macro- and microvascular complications (compared to diabetes patients without DKD).

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\* Corresponding authors.

E-mail addresses: [ANOVIALS@clinic.cat](mailto:ANOVIALS@clinic.cat) (A. Novials), [beatriz-de.o.rivas-otero@gsk.com](mailto:beatriz-de.o.rivas-otero@gsk.com) (B. De Rivas).

**PALABRAS CLAVE**

Enfermedad renal diabética;  
Diabetes tipo 2;  
Ecuación CKD-EPI

**Características clínicas, complicaciones y manejo en pacientes con diabetes tipo 2 con y sin enfermedad renal diabética: una comparación de datos de una base de datos clínica****Resumen**

**Antecedentes y objetivo:** El objetivo principal de este estudio fue evaluar el porcentaje de nefropatía en pacientes con diabetes tipo 2 utilizando la ecuación CKD-EPI y comparar las características clínicas y tratamientos de pacientes con diabetes tipo 2 con nefropatía con los de pacientes sin nefropatía.

**Pacientes y método:** Se trata de un análisis transversal de los datos demográficos y clínicos registrados en la base de datos IDIBAPS Biobank. Se consideró que los pacientes tenían nefropatía diabética si el diagnóstico figuraba en su historia clínica, presentaban albuminuria (>30 mg/g) en la última analítica de orina disponible o tenían un filtrado glomerular estimado (FGe) inferior a 60 ml/min/1,73 m<sup>2</sup> calculado usando la ecuación CKD-EPI.

**Resultados:** Se obtuvieron datos clínicos de 1.397 pacientes con diagnóstico de diabetes tipo 2. El porcentaje de pacientes con nefropatía fue de 29,3% (N = 369) (intervalo de confianza del 95%, 26,8% a 31,9%); sin embargo, sólo en 109 (7,8%) figuraba el diagnóstico de nefropatía en su historia clínica. En comparación con los pacientes sin nefropatía, los pacientes con nefropatía tienen una edad media más alta, mayor frecuencia de complicaciones relacionadas con la diabetes y recibieron insulina con mayor frecuencia.

**Conclusiones:** Nuestros resultados muestran que el porcentaje de pacientes diabéticos de tipo 2 con nefropatía fue alto y que esta comorbilidad se asoció con una frecuencia significativamente mayor de complicaciones macro y microvasculares relacionadas con la diabetes (en comparación con pacientes diabéticos sin nefropatía).

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**Introduction**

According to the International Diabetes Federation's estimates for 2015, 415 million adults are affected by diabetes; by 2040, this number is expected to rise to 642 million, or 1 in 10 adults.<sup>1</sup> In Spain, the Di@bet.es study has identified an overall age- and sex-adjusted prevalence of diabetes of 13.8% within the adult population, and half of these cases are undiagnosed.<sup>2</sup> With such a proportion of undiagnosed diabetes, a vast number of people with diabetes are progressing toward complications that include microvascular complications, such as diabetic retinopathy, neuropathy and nephropathy, and macrovascular complications, such as coronary heart disease and stroke.<sup>3</sup>

Chronic kidney disease (CKD) is a worldwide public health problem that affects millions of people and impacts both the individual and society in terms of disease burden (especially cardiovascular disease), mortality and associated costs.<sup>4-8</sup> Diabetes mellitus is the leading cause of CKD, and the rapidly increasing prevalence of diabetes worldwide virtually assures that the proportion of CKD attributable to diabetes, so called diabetic kidney disease, will continue to rise. Indeed, a report from the National Health and Nutrition Education Survey (NHANES) found that prevalence of diabetic kidney disease (DKD) increased from 1988 to 2008, and this increase was proportionate to the increase in the prevalence of diabetes.<sup>4</sup> It is known that preventive care for adults with diabetes has improved substantially in

recent decades; accordingly, a recent analysis showed large reductions in the incidence of a broad spectrum of diabetes-related complications between 1990 and 2010 in a U.S. population of adults with diabetes. Interestingly, the magnitude of reduction was greatest for cardiovascular disease and smallest for end-stage renal disease, which actually increased among older adults.<sup>9</sup>

It is estimated that the prevalence of DKD in patients with type 2 diabetes in Spain, as defined by the National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQI) criteria, could be between the 29.9% shown in a nationwide study of patients attending primary care offices<sup>10</sup> and the 34.6% found in a study conducted in 16 primary care centers of a specific Spanish region.<sup>11</sup> Notwithstanding these studies, information regarding the prevalence of DKD is limited at the national level, scarce in the specialized setting and heterogeneous in its definition of DKD and manner of measuring renal function.

The main objective of this study was to assess the percentage of patients with nephropathy in type 2 diabetes using the CKD-EPI equation that currently is considered the most accurate one, and to analyze the clinical characteristics and the different treatments used in a Spanish cohort of patients with type 2 diabetes and nephropathy and compare them to other cohort of type 2 diabetes patients without nephropathy from the clinical data base registered in the IDIBAPS Biobank.

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