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Prevalence and predictors of diabetic kidney disease: cross-sectional study in primary care

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RESUMO

Background: Diabetic kidney disease (DKD) is a leading cause of end-stage renal disease. Primary healthcare is essential for early diagnosis and management.

Aim: To assess the prevalence and diagnostic accuracy of DKD. Additionally, to identify potential risk factors for DKD and evaluate the prescription of nephroprotective medications.

Design and setting: Cross-sectional study on a random sample of 387 patients with type 2 diabetes in a primary care center in northern Portugal.

Method: Demographic and laboratory data of patients and evidence of RASi and/or SGLT2i prescription were collected. DKD diagnosis was based on KDIGO 2012 guidelines. ICPC-2 codes U-99 and U-88 were considered adequate to identify coded DKD. Multivariable logistic regression was used to investigate associations between DKD and potential risk factors such as age, sex, BMI, hypertension, dyslipidemia, smoking, and diabetes duration, control, and its macrovascular or microvascular complications.

Results: There were 338 patients included. 58% were men, with a mean (±std) age of 71.4 (±10.2) years. DKD prevalence was 42,6% [95%CI, 37.4-48.0%] with only 9.5% properly coded. Most patients were in stages G2 (33.3%), G3a (30.6%), and G3b (14.6%), and concerning albuminuria, stage A2 (68.8%). Among those with DKD, 77.1% [69.6-83.2%], 60.4% [52.3-68.0%], and 43.1% [35.3-51.2%] were medicated with RASi, SGLT2i, and both, respectively. Male sex (OR=1.89), advanced age (OR=1.08), higher BMI (OR=1.06), macrovascular DM complications (OR=1.90), and dyslipidemia (OR=4.95) were independent risk factors for DKD.

Conclusions: This study highlights the high prevalence and underdiagnosis of DKD, identifying areas for practice improvement.

Keywords: Diabetic nephropathies; Prevalence; Risk factors; Primary health care.

INTRODUCTION

Chronic kidney disease (CKD) is one of the leading causes of death, currently estimated to affect over 10% of the world's population.[1] Diabetic kidney disease (DKD), typically defined as the presence of CKD in a patient with diabetes mellitus (DM), is the leading cause of CKD in developed countries and one of the most common causes of end-stage renal disease. It has a broad spectrum that includes the classical diabetic nephropathy but also other etiologies that frequently coexist and share pathophysiological mechanisms, such as the ischemic and hypertensive nephropathies.[2-3]

Despite its relevance, there are still few studies on the prevalence and staging of CKD in early stages. Existing literature shows significant heterogeneity regarding CKD prevalence among different regions, possibly due to disparities in risk factors or methodologies used for creatinine determination, albuminuria, and estimated glome-

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rular filtration rate (eGFR) calculations. Internationally, reports for DKD prevalence range from 20 to 50%.[2,4-7] Although some data on overall CKD prevalence in Portugal exist, studies specifically addressing DKD prevalence remain limited.[5-6,8] Pointed associations with DKD include genetic and ethnic factors, male sex, advanced age, DM duration of 5-15 years, family history of DM or DKD, insulin resistance, obesity, metabolic syndrome, poor glycemic control, hypertension, smoking, dyslipidemia, sedentary lifestyle, high salt intake, and low birth weight.[4,7]

Primary healthcare plays a central role in prompt screening and diagnosis of DKD and early control of its progression. The latter includes the use of recommended nephroprotective drugs in DKD, such as renin-angiotensin system inhibitors (RASi) and sodium-glucose cotransporter 2 inhibitors (SGLT2i).[2-3]

This study was intended primarily to determine the prevalence of DKD in all its stages and its accurate identification in a primary care setting. Secondarily, it aimed to investigate possible associated factors in DKD and the adequacy of the most recently recommended nephroprotective prescription.

METHODS

This is an observational, analytical, and cross-sectional study conducted in 2023 at a primary care center in Portugal.

The study population comprised registered and monitored patients at this center with type 2 diabetes mellitus coded on the active problem list in January 2023. Patients without clinical monitoring at the clinic in the previous twelve months were excluded from the study. A total of 1,016 patients matching the inclusion criteria were enrolled. A simple random sample was selected using random number selection. The sample size was calculated for an expected prevalence of 40%, alpha of 0.05, and a margin of error of 4%. We adjusted for a 5% sampling loss, resulting in a total of 387 patients.

Data access for analysis was granted after approval by the local Ethical Committee. De-identified data were collected from electronic medical records regarding laboratory measurements, namely the two most recent values of serum creatinine (separated by at least three months) and the latest albuminuria, both within the previous year. We searched the electronic prescription platform for evidence of RASi and/or SGLT2i with proven renal benefits (dapagliflozin, empagliflozin, canagliflozin) prescriptions in the previous two years. Data were also collected on evidence for DKD's potential risk factors and comorbidities including age, sex, body mass index (BMI), duration of DM (in years), control of DM (given by the most recent glycosylated hemoglobin [HbA1c] value), presence of macrovascular DM complications (defined by evidence of cardiovascular, cerebrovascular or peripheral arterial disease), presence of other microvascular DM complications (defined by evidence of diabetic neuropathy or retinopathy), hypertension (coded on the problem list), dyslipidemia (coded on the problem list) and active smoking (coded on the active problem list).

The diagnosis of DKD was made according to KDIGO 2012 guidelines. The CKD-EPI 2021 formula was used to calculate eGFR, and the mean of the two collected creatinine values was used. Albuminuria was determined by the albumin/creatinine ratio (uACR) or, if not available, by approximation of urine dipstick test results. Patients who met DKD diagnostic criteria were stratified according to the stage of renal disease.

To study the prevalence of DKD appropriately coded, we considered the use of the International Classification of Primary Care, 2nd edition (ICPC-2)[9] codes U99 – Other Urinary Disease and U88 – Glomerulonephritis/Nephrosis as adequate, as there is no specific code for CKD or DKD. We assume all cases to be DKD, as previously defined.

Data analysis was performed using the SPSS® software, v. 28.0.1.0. Descriptive analysis of the presented variables included measures of central tendency and dispersion for numeric variables and absolute and relative frequencies for categorical variables. Comparison tests for proportions were conducted for categorical variables (chi-square), and comparison tests for means/medians were performed for continuous variables (Mann-Whitney and t-student tests), with calculation of crude odds ratios (OR). Additionally, to address potential sources of confoundment, a multivariable logistic regression analysis was conducted, and adjusted ORs were derived from the model.

RESULTS

Clinical and demographic characteristics

From the total sample, information was obtained for 338 individuals (87%). The sample losses were mostly

TABLE 1. Classification of DKD by stages, according to eGFR and albuminuria (adapted from KDIGO 2012 guidelines). In the relative number of patients. eGFR, in ml/min/1.73m², according to the CKD-EPI 2021 equation

DKD stages		A1	A2	A3	Total
		<30mg/g	30-300mg/g	>300mg/g	
G1	≥90		16.0%	1.4%	17.4%
G2	60-89		32.6%	0.7%	33.3%
G3a	45-59	13.9%	15.3%	1.4%	30.6%
G3b	30-44	9.0%	3.5%	2.1%	14.6%
G4	15-29	1.4%	1.4%	1.4%	4.2%
G5	<15	0.0%	0.0%	0.0%	0%
Total		24.3%	68.8%	7.0%	100%

due to the absence of clinical information, such as laboratory results, in the patients' records.

The sample consisted predominantly of males (58.0%) with a mean (±std) age of 71.4±10.2 years. The median (IQR) duration of DM was 9.0 (5.0-15.8) years, and the HbA1c value was 6.8% (6.2-7.1%). There were 38.2% of patients who had already had at least one macrovascular complication, and 13.6% with diabetic retinopathy or neuropathy.

Furthermore, 10.9% were active smokers, 92.3% had dyslipidemia, and 81.7% were hypertensive. The median (IQR) BMI was 26.9 (24.4-29.8) kg/m².

Prevalence of DKD and distribution by stages

The prevalence of DKD found was 42.6% [95%CI, 37.4-48.0%]. Most patients were in stages G2 (33.3%), G3a (30.6%), and G3b (14.6%). Concerning albuminuria, most were in stage A2 (68.8%). (Table 1)

The prevalence of DKD appropriately coded on the problem list was 9.5%.

Adequacy of nephroprotective pharmacological prescription

Among patients with established DKD, 77.1% [95%CI, 69.6-83.2%] were medicated with RASi, 60.4% [95%CI, 52.3-68.0%] had prescriptions for SGLT2i, and 43.1% [95%CI, 35.3-51.2%] used both medications (Figure 1).

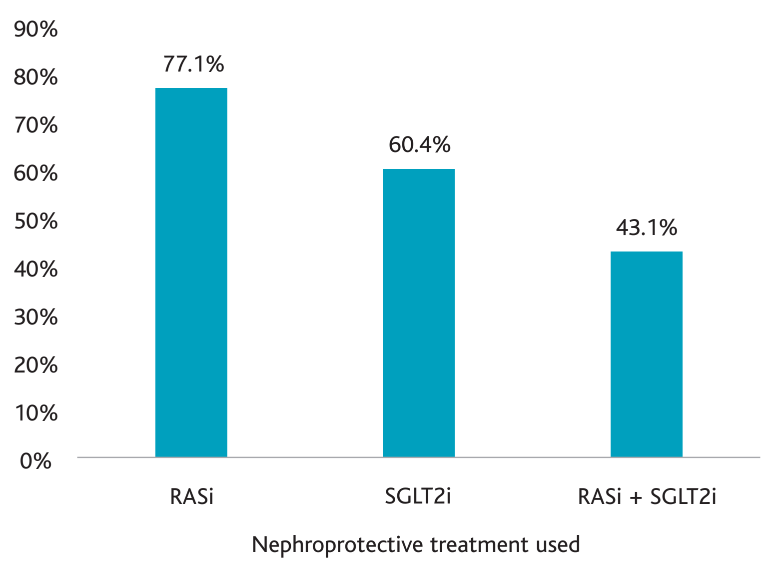

Figure 1. Prescription of nephroprotective pharmacological therapy in patients with established DKD, in a relative number of patients.

Analysis of potential factors associated with DKD

A multivariable model by logistic regression identified the male sex (OR=1.89), advanced age (OR=1.08), higher BMI (OR=1.06), presence of macrovascular DM complications (OR=1.90), and dyslipidemia (OR=4.95) as independent risk factors for DKD development (Table 3). The presence of other microvascular DM complications (OR 2.13) was associated with DKD in the bivariate analysis (Table 2).

TABLE 2. Bivariate analysis of potential factors associated with DKD (dichotomic variables above and continuous below)

Variables	*n*	DKD, *n* (%)	Crude OR	*p*
Sex				
Male	196	93 (47.4)	1.61	**0.034***
Female	142	51 (35.9)		
Macrovascular complication				
Present	129	74 (57.4)	2.67	**<0.001***
Not present	209	70 (33.5)		
Other microvascular complication				
Present	46	27 (58.7)	2.13	**0.018***
Not present	292	117 (40.1)		
Active smoking				
Yes	37	14 (37.8)	1.00	0.534*
No	301	130 (43.2)		
Hypertension				
Yes	276	122 (44.2)	0.98	0.210*
No	26	22 (35.5)		
Dyslipidemia				
Yes	312	139 (44.6)	1.90	0.012*
No	26	5 (19.2)		
Variable	**No DKD**	**DKD**	**Crude OR**	***p***
Age in years, mean (±std)	68.6±9.8	75.3±9.5	1.07	**<0.001****
BMI in kg/m², median (IQR)	26.9 (24.7-29-7)	26.9 (24.1-30.1)	1.00	0.827§
HbA1c value, median (IQR)	6.5 (6.2-7.2)	6.8 (6.2-7.1)	1.01	0.385§
Duration of DM in years, median (IQR)	9.0 (4.0-16.3)	9.0 (5.0-15.8)	1.00	0.726§

*Chi-square test; **Independent samples t test; §Mann-Whitney test.

No association was found between DKD and DM duration or control level, hypertension, or smoking (Tables 2 and 3).

DISCUSSION

A prevalence of 42.6% of DKD was found, which aligns with the numbers found in other regions: 38% in Italy (RIACE study, 2011), 46% in the USA (NHANES III study, 2013), 57% in Europe (DEMAND study, 2006), among others.[7]

Contrary to the found prevalence by adequate calculation, we identified a very low rate of DKD coding (9.5%), suggesting underdiagnosis. In fact, some studies demonstrate that awareness of CKD remains quite low, both among patients diagnosed with the condition and among the physicians caring for them. The low prevalence of DKD or CKD coding in our USF aligns with international studies showing, for example, disease recognition in 19.2% of patients[10] or documentation of the diagnosis in only 14.4% of cases by physicians.[11]

Regarding appropriate nephroprotective prescription, we identified a considerable number amount of DKD patients medicated with RASi and/or SGLT2i.

TABLE 3. Multivariate analysis of potential factors associated with DKD

Variables	Multivariate Analysis	
	Adjusted OR	*p**
Male sex, *n* (%)	1.89	**0.014**
Age in years, mean (±std)	1.08	**<0.001**
BMI in kg/m^2, median (IQR)	1.06	**0.048**
HbA1c value, median (IQR)	1.00	0.996
Duration of DM in years, median (IQR)	0.98	0.207
Macrovascular complications of DM, *n* (%)	1.90	**0.015**
Other microvascular complications of DM, *n* (%)	1.60	0.214
Active smoking, *n* (%)	0.77	0.532
Hypertension, *n* (%)	1.13	0.708
Dyslipidemia, *n* (%)	4.95	**0.004**

*Logistic regression.

However, it should be noted that these values may not reflect an equivalent awareness of the disease due to the presence of confounders. Among these, the existence of hypertension in the vast majority of the sample may justify part of the prescription of RASi, while the presence of other comorbidities (macrovascular DM complications, obesity, heart failure) or solely type 2 DM could explain part of SGLT2i prescription.

Comparing our team's performance with a study in UK primary care, we found higher percentages regarding performance of albuminuria screenings (65.7% versus 59.7%), but lower prescriptions of RASi (60.4% versus 68.4%).[12] Considering the prevalence of DKD found, most of our patients were in the early stages of the disease (G1-G3a and A1-A2), as also found in other studies.[12-13]

Regarding factors associated with DKD, we found statistically significant associations with male sex and advanced age, as most of the literature.[1-2,5,7,14-16] Although studies differ in gender prevalence, the majority show a higher proportion of CKD in males, possibly due to the deleterious effects of testosterone and the protective effects of estrogen on the renal level.[16] The association with advanced age is likely based on age-related loss of renal mass and increased risk of cardiovascular comorbidities.[15-16]

BMI was a factor associated with DKD only in the multivariate analysis, probably due to sex and age acting as confounders. Indeed, obesity is a proven risk factor for DKD.[2,7] Several arguments justify this association, highlighting the negative impact of obesity on other metabolic risk factors such as lipid, glucose, and blood pressure control, as well as insulin resistance. Furthermore, obesity exerts direct renal effects including changes in intraglomerular hemodynamics, hypertension, systemic inflammation, or endothelial dysfunction.[7]

Atherosclerotic disease, as a common pathophysiological basis for the development of both DKD and dyslipidemia or macrovascular DM complications, may justify the association found between them and DKD. Multiple studies support the relationship between dyslipidemia and DKD,[2,7,15] demonstrating that elevated levels of triglycerides, non-HDL cholesterol, apolipoprotein B, or low levels of HDL cholesterol are independently associated with the development of DKD.[7] Additionally, CKD is a major enhancer of major vascular complications of DM, making it difficult to understand if these complications are a cause or consequence of DKD.[15]

The presence of other microvascular DM complications was associated with DKD in bivariate analysis, as also evidenced in other studies.[15] However, multivariate analysis did not show a statistically significant association, possibly due to the small size of the group with microvascular DM complications (46 patients, 13.6%) and by age acting as a confounder, constituting a type II error. Moreover, evidence shows that only 50-60% of patients with DKD have diabetic retinopathy, a prevalence similar to our findings (58.7%).[15]

Contrary to the literature,[2,7,15-16] our study did not show significant associations between DKD and DM control/duration, hypertension, and active smoking. Regarding glycemic control, this may be attributed in part to our reliance solely on the most recent HbA1c measurement, which may not accurately reflect the overall glycemic control over the years. The metabolic memory theory[7] supports this explanation, arguing that, even in the absence of chronic hyperglycemia, transient episodes of hyper/hypoglycemia can have persistent consequences in the development and progression of diabetic complications. Regarding the lack of association with current smoking, our study only accounted for active smokers, contributing to a small number of patients included in this analysis. The authors acknowledge that in the future, studies with a similar methodology should account for smoking burden in pack-years for a better risk analysis. Finally, only the presence of a hypertension diagnosis was interpreted and not its degree of control, which might have biased the analysis.

Our study also has some limitations, like the use of secondary data (electronic records), which favors the existence of information bias. Also, the lack of inclusion of other comorbidities could have led to a potential confounding in the association of DKD with other risk factors. Moreover, being a cross-sectional study, the cause-effect relationship cannot be fully interpreted, unlike cohort studies.

Likewise, it is important to note that the found prevalence of DKD may be underestimated due to inadequate screening, either by serum creatinine or albuminuria. In fact, ten patients did not have two records of serum creatinine spaced by at least three months in the last year, and 117 patients (34.3%) did not undergo adequate albuminuria screening (either because their uACR was not requested or because it was not repeated in the presence of abnormal values). Furthermore, an important portion of patients underwent albuminuria screening using urine dipstick tests, a method not recommended as urinary concentration and albuminuria vary substantially throughout the day and with each urination,[7] which we interpret as a possible overestimation of the results.

Our study stands out for the importance of the topic, addressing a globally concerning health problem. It highlights the problem of low awareness by both patients and physicians, opening doors to team reflection and fostering quality improvement projects at our clinic. It is also a statistically robust study with a considerable sample size, rigorous methodology (considering the most recent guidelines regarding CKD diagnostic criteria), and the use of multivariate regression to adjust for potential biases and better predict the factors associated with DKD. In the future, it would be interesting to conduct a similar study at a national or multicentric perspective, so it would be more representative of the entire Portuguese population.

CONCLUSIONS

Despite the inherent limitations of cross-sectional studies and the use of secondary data, this study provides a comprehensive insight into the prevalence and underdiagnosis of DKD, identifying critical areas for improvement in clinical practice.

The underdiagnosis of DKD highlighted in this study emphasizes the need for a dedicated ICPC-2 code specifically addressing DKD/CKD. By establishing a distinct code for this disease, family doctors might also become more vigilant in diagnosing and, consequently, intervening in the early stages of CKD. On the other hand, this new code is essential in advancing research, policy-making, and resource allocation to combat this prevalent and progressive disease.

The association between DKD and male sex, advanced age, BMI, dyslipidemia, and presence of macrovascular DM complications emphasizes the complex interaction between metabolic, cardiovascular, and renal factors. On the other hand, the absence of association with variables such as control of DM, duration of DM, hypertension, and current smoking highlights the importance of considering more comprehensive methodological approaches and applying the concept of metabolic memory in interpreting these results.

REFERENCES

1. Kovesdy CP. Epidemiology of chronic kidney disease: an update 2022. Kidney Int Suppl. 2022;12(1):7-11.
2. Kidney Disease: Improving Global Outcomes (KDIGO) Diabetes Work Group. KDIGO 2022 clinical practice guideline for diabetes management in chronic kidney disease. Kidney Int. 2022;102(5S):S1-S127.
3. ElSayed NA, Aleppo G, Aroda VR, Bannuru RR, Brown FM, Bruemmer D, et al. 11. Chronic kidney disease and risk management: standards of care in diabetes-2023. Diabetes Care. 2023;46(Suppl 1):S191-S202.
4. Hoogeveen EK. The epidemiology of diabetic kidney disease. Kidney Dial. 2022;2(3):433-42.
5. Vinhas J, Gardete-Correia L, Boavida JM, Raposo JF, Mesquita A, Fona MC, et al. Prevalence of chronic kidney disease and associated risk factors, and risk of end-stage renal disease: data from the PREVADIAB study. Nephron Clin Pract. 2011;119(1):c35-40.
6. Vinhas J, Aires I, Batista C, Branco P, Brandão J, Nogueira R, et al. RENA study: cross-sectional study to evaluate CKD prevalence in Portugal. Nephron. 2020;144(10):479-87.
7. Thomas MC, Brownlee M, Susztak K, Sharma K, Jandeleit-Dahm KA, Zoungas S, et al. Diabetic kidney disease. Nat Rev Dis Primers. 2015;1:15018.
8. Santos-Araújo C, Mendonça L, Carvalho DS, Bernardo F, Pardal M, Coucei-

ro J, et al. Twenty years of real-world data to estimate chronic kidney disease prevalence and staging in an unselected population. Clin Kidney J. 2022;16(1):111-24.
9. World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA). ICPC-2: International Classification of Primary Care. 2nd ed. Oxford University Press; 2003.
10. Chu CD, Chen MH, McCulloch CE, Powe NR, Estrella MM, Shlipak MG, et al. Patient awareness of CKD: a systematic review and meta-analysis of patient-oriented questions and study setting. Kidney Med. 2021;3(4):576-85.e1.
11. Guessous I, McClellan W, Vupputuri S, Wasse H. Low documentation of chronic kidney disease among high-risk patients in a managed care population: a retrospective cohort study. BMC Nephrol. 2009;10:25.
12. Phillips K, Hazlehurst JM, Sheppard C, Bellary S, Hanif W, Karamat MA, et al. Inequalities in the management of diabetic kidney disease in UK primary care: a cross-sectional analysis of a large primary care database. Diabet Med. 2024;41(1):e15153.
13. Tomonaga Y, Risch L, Szucs TD, Ambühl PM. The prevalence of chronic kidney disease in a primary care setting: a Swiss cross-sectional study. PLoS One. 2013;8(7):e67848.
14. Wu B, Bell K, Stanford A, Kern DM, Tunceli O, Vupputuri S, et al. Understanding CKD among patients with T2DM: prevalence, temporal trends, and treatment patterns-NHANES 2007-2012. BMJ Open Diabetes Res Care. 2016;4(1):e000154.
15. Bouça B, Bogalho A, Agapito A. Nefropatia diabética [Diabetic nephropathy]. Rev Port Diabetes. 2021;16(2):80-9. Portuguese
16. Joshi R, Subedi P, Yadav GK, Khadka S, Rijal T, Amgain K, et al. Prevalence and risk factors of chronic kidney disease among patients with type 2 diabetes mellitus at a tertiary care hospital in Nepal: a cross-sectional study. BMJ Open. 2023;13(2):e067238.

AUTHORS CONTRIBUTION

Conceptualization, ARQ, and CBF; methodology, ARQ, and CBF; validation, ARQ, and CBF; formal analysis, ARQ, and CBF; investigation, ARQ; resources, ARQ; data curation, ARQ; writing – original draft preparation, ARQ, and RHF; writing – review and editing, AP, and CBF; supervision, AP, and CBF. All authors have read and agreed to the published version of the manuscript.

DECLARATIONS OF INTEREST

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ABSTRACT

PREVALÊNCIA E PREDITORES DE DOENÇA RENAL DIABÉTICA: UM ESTUDO TRANSVERSAL NOS CUIDADOS DE SAÚDE PRIMÁRIOS

Introdução: A doença renal diabética (DRD) é uma das principais causas de doença renal em estádio terminal. Os cuidados de saúde primários são fulcrais para o diagnóstico precoce e a gestão da doença.
Objetivos: Avaliar a prevalência e a precisão do diagnóstico de DRD. Adicionalmente, identificar potenciais fatores de risco para a DRD e avaliar a prescrição de medicamentos nefroprotetores.
Métodos: Estudo transversal numa amostra aleatória de 387 utentes com diabetes tipo 2 num centro de cuidados primários no norte de Portugal. Foram recolhidos dados demográficos e laboratoriais dos doentes, bem como evidências de prescrição de IECA ou ARAII e/ou iSGLT2. O diagnóstico de DRD foi baseado nas *guidelines* KDIGO 2012. Os códigos ICPC-2 U-99 e U-88 foram considerados adequados para identificar a DRD codificada. Uma regressão logística multivariável foi usada para investigar associações entre a DRD e potenciais fatores de risco como idade, sexo, IMC, hipertensão, dislipidemia, tabagismo e duração, controlo e complicações macrovasculares ou microvasculares da diabetes.
Resultados: Foram incluídos 338 utentes, dos quais 58% eram do sexo masculino, com uma idade média (±DP) de 71,4 (±10,2) anos. A prevalência de DRD foi de 42,6% [IC 95%, 37,4-48,0%], com apenas 9,5% devidamente codificada. A maioria dos doentes encontrava-se nos estadios G2 (33,3%), G3a (30,6%) e G3b (14,6%) e, em relação à albuminúria, no estádio A2 (68,8%). Entre os doentes com DRD, 77,1% [69,6-83,2%], 60,4% [52,3-68,0%] e 43,1% [35,3-51,2%] estavam medicados com IECA/ARA, iSGLT2 e ambos, respetivamente. O sexo masculino (OR=1,89), idade avançada (OR=1,08), maior IMC (OR=1,06), complicações macrovasculares da DM (OR=1,90) e dislipidemia (OR=4,95) foram identificados como fatores de risco independentes para a DRD.
Conclusões: Este estudo destaca a elevada prevalência e subdiagnóstico da DRD, identificando áreas para melhoria na prática clínica.

Palavras-chave: Nefropatia diabética; Prevalência; Fatores de risco; Cuidados de saúde primários.