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Renal Risk among Diabetic Patients in Togo

Kodjo Kossi[1], Tsevi Yawovi Mawufemo[1], Dolaama Badomta[1*], Tona Komlan Georges[1], Balaka Abago[1], Yao K. Hubert[2], Gnionsahe Daze Apollinaire[3]

[1]Centre Hospitalier Universitaire Sylvanus Olympio, Lome, Togo
[2]Centre Hospitalier Universitaire de Treichville, Abidjan, Cote d'Ivoire
[3]Centre Nationale de Prévention et de Traitement de l'Insuffisance Renal, Abidjan, Cote d'Ivoire
Email: *badomta@gmail.com

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Abstract

Background: Diabetic patients have risk of kidney disease. The aim of this study was to assess the level of renal risk in our study population and to identify the associated predictive factors. **Methods:** It was a descriptive and analytical cross-sectional study carried out over 5 years (January 1, 2016 to December 31, 2020). All patients were included regardless of the duration of diabetes and having achieved at least one serum creatinine and at least two (2) proteinuria in the 24 hours over a period of at least three months. The level of renal risk was assessed using the KDIGO 2012 classification. **Results:** A total of 320 patient medical files were retained. The sex ratio M/F was 1.2. The average age was 57.2 ± 11.8 years. Hypertension was the most common comorbidity (84.4%). Diabetic nephropathy was found in 177 patients, a frequency of 42.8%. The very significant renal risk was found in 174 patients (54.4%). In multivariate logistic regression, the risk factors significantly associated with renal risk were: Male sex (OR = 2.50; 95% CI = 1.29 - 4.84, p-value = 0.006); microangiopathy (OR = 5.54; 95% CI = 1.82 - 16.85 p = 0.002) and betablockers (OR = 5.64; 95% CI = 1.04 - 30.53 p = 0.004). The Oral Antidiabetes (OR = 0.23; 95% CI = 0.10 - 0.55, p = 0.001), the blockers of Renin-Angiotensin system (OR = 0.58; 95% CI = 0.41 - 0.90, p = 0.040) and the average socioeconomic level (OR = 0.50; 95% CI = 0.25 - 0.98, p = 0.044) were rather the protective factors.

Keywords

Diabetic Kidney Disease, Kidney Risk, Togo

1. Introduction

Diabetes is a major public health issue with increasing prevalence globally and in sub-Saharan Africa, where its ever-increasing prevalence is a major concern [1].

Indeed, in 2019 the International Diabetes Federation (IDF) estimated that 463 million adults (20 - 79 years) worldwide have diabetes, a prevalence of 9.3%. In 2045, there will be 10.9% of adults with diabetes in the world. This growth is expected to be the result of an ageing population and lifestyle changes. Africa will experience the largest increase in diabetes in the world, rising from 19.4 million in 2019 to 47.1 million in 2045 [2]. In Togo, according to the STEPPS survey, this all-age prevalence in the general population was estimated at 2.4% in 2019 [1].

Renal risk is defined as the renal impact of variations in eGFR and 24-hour microalbuminuria/proteinuria [3]. With the increase in the incidence of diabetes and the ageing of the population, the physician is more often confronted with the diabetic subject with renal disease [4]. As early as 2002, the nephrology societies proposed a classification of renal risk, which was adapted in 2012 (KDIGO 2012) to include the estimated or measured glomerular filtration rate and the urinary Albumin/Creatinine ratio (ACR) [5]. Therefore, every diabetic patient should have a renal characterisation at least once a year with an estimated glomerular filtration rate (eGFR) and an albumin/creatinine ratio (ACR) on a urine spot [4]. The eGFR is usually calculated with the CKD-EPI formulas based on creatinine measurement. At least 2 pathological values are required for the KDIGO (Kidney Disease Improving Renal Global Outcome) classification. In some situations, a 24 h creatinine clearance measurement is proposed when eGFR calculation is less reliable (obesity, children, elderly) or when 24 h proteinuria is to be quantified from macroalbuminuria (ACR > 30 mg/mmol) [6].

Diabetic kidney disease, the most serious microangiopathic complication, affects 30% - 40% of people with diabetes. It is responsible for more than 22.6% of cases of chronic end-stage renal disease in France in 2017, its prevalence was 21.6% among dialysis patients in Morocco and 7.8% in Ivory Coast [7]. In Togo, the hospital incidence of rapid renal function decline in diabetic patients is 35% [8].

Preservation of renal function in diabetes mellitus is an important public health issue. It requires the control of progression factors such as chronic hyperglycaemia, hypertension and proteinuria [9]. It is important to assess the renal risk of any diabetic patient at the first consultation. There is no data on risk renal in diabetics patients in West Africa. Hence this study whose objective was to determine the factors associated with each level of renal risk identified in diabetic patients.

2. Patients and Method

2.1. Setting, Period and Study Population

This study took place at the Teaching Hospital Sylvanus Olympio in Lomé (Togo). It was a descriptive and analytical cross-sectional study conducted from 1st January 2016 to 31st December 2020 covering a period of 5 years.

All diabetic patients were included in our study, regardless of the duration of their diabetes, and had at least one serum creatinine level and at least two (2) 24-hour proteinuria measurements over a period of at least three months. Those

not included in our study were: patients with haematuria, leukocyturia, urinary tract infection and patients with incomplete or unusable medical records (records without at least one creatinine level and at least two (2) 24-hour proteinuria measurements).

2.2. Parameters Studied

The parameters studied were

- Socio-demographic data: age, sex, profession, socio-professional level, geographical location, level of education.
- Clinical and paraclinical data:
  - On diabetes: duration of evolution, type of diabetes, current treatment, complications: micro-angiopathy (retinopathy, nephropathy, neuropathy, maculopathy), macroangiopathy (stroke, obliterative arteriopathy of the lower limbs, ischaemic heart disease); glycated haemoglobin (HbA1c).
  - Associated cardiovascular risk factors: hypertension, dyslipidaemia, obesity, alcohol, smoking, hyperuricaemia.
  - On renal impairment: creatininemia and estimated Glomerular Filtration Rate (eGFR) eGFR; 24-hour proteinuria and/or 24-hour microalbuminuria.
- The treatment: use of Blockers of renin-angiotensin system (BRAS).

2.3. Data Collection and Analysis

Data were collected using a pre-designed survey form from the patient's medical records. After collection, the data were entered into an electronic xlsform deployed through the KoboToolbox platform. The database was analyzed with SPSS (Statistical Package for Social Science) and Microsoft Office Excel 2016 with descriptive and statistical tests including Chi-square completed with logistic regression. The fit of our model was verified by the Hosmer-Lemeshow test and our model has a very good predictive capacity with an ROC curve of 82.4%.

2.4. Definitions

- **Diabetic patient**: any patient diagnosed with diabetes according to the World Health Organization (WHO) [10] criteria and on oral antidiabetic drugs (OAD) and/or insulin therapy.
- **Renal function**: was estimated according to the simplified version of the CKD-EPI [11] equation.
- **Renal risk**: It is defined by the renal impact of variations in eGFR and microalbuminuria/proteinuria over 24 hours. We assessed and classified it according to the KDIGO (Kidney Disease: Improving Global Outcomes) 2012 classification [12].
- **Hypertensive patient**: any patient diagnosed according to the World Health Organization (WHO) criteria and under antihypertensive medication. A patient with a systolic blood pressure (SBP) greater than or equal to 140 mmHg and/or a diastolic blood pressure (DBP) greater than or equal to 90 mmHg

measured in the doctor's office and persisting over time is considered hypertensive [13].

- **Neuropathy**: this is determined by the existence of sensory and motor signs (paraesthesia, tingling, cramps, paresis).
- **Diabetic retinopathy**: this is diagnosed at the eye fundus in the presence of retinal detachment, vitreous haemorrhage, neo-vessels, micro-aneurysms, cottony nodules or deep exudates.
- **Diabetic kidney disease (DKD):** this is defined as diabetes that has been evolving for at least 5 years and is poorly controlled, associated with proteinuria > 30 mg/24h, without extrarenal signs.
- **Obesity**: the diagnosis is made when the Body Mass Index (BMI) is greater than or equal to 30 kg/m^2.
- **Glycaemic balance**: Blood glucose is considered balanced when hemoglobin A1c (HbA1c) is less than 7%.
- **Socio-economic level**: we defined it in three levels according to the monthly salary:
  - High (monthly salary above 150,000 FCFA): executives, ambassadors, university professors, accountants, bankers, engineers, liberals.
  - Medium (monthly salary between 35,000 and 150,000 FCFA): shopkeepers, workers, farmers
  - Low (monthly salary less than 35,000 FCFA) among unemployed patients, housewives.

3. Result

Table 1 shows demographic, clinical, biological and therapeutic characteristics for the 320 patients enrolled. During the study period, 320 patient's medical records were collected. The sex ratio was 1.2 men to women. The mean age was 57.4 ± 11.8 years with extremes of 5 and 88 years. Hypertension was the most common comorbidity in 84.4% of cases. Our population consisted mainly of type 2 diabetics; three hundred and five patients (96.5%). The average duration of diabetes was 10.8 years ± 8.6. The mean glycated haemoglobin was 8.2% ± 1.8; Two hundred and fifty-nine patients (80.9%) had a glycaemic imbalance. One hundred and ninety-nine patients in our study (62.2%) were on oral antidiabetic drugs (OADs) alone, one hundred and fifteen patients (35.9%) were on insulin alone and one hundred and sixty-five patients (51.6%) on insulin and OADs and 203 patients (63.4%) were on blockers of renin angiotensin system (BRAS). Two hundred patients (62.5%) had an eGFR below 60 ml/min of which 16.6% had an eGFR below 15 ml/min. Among the 320 patients, 137 patients (42.8%) had diabetic nephropathy (Table S1). The renal risk was very high in 174 (54.4%) patients and 37 patients (11.6%) were at low renal risk with an eGFR greater than 60 ml/min (Table 1 and Table S2). The renal risk was very high in patients with low eGFR (Figure 1). The renal risk was low in patients with low proteinuria (Figure 2).

Table 1. Comparison of characteristics according renal risk in Togo.

	Low risk			Modarate risk			Important risk			Most important risk			Total			p-value
	N = 37	n	%	N = 51	n	%	N = 58	n	%	N = 174	n	%	N = 320	n	%	
Age (years)																0.075
<50		14	37.8		22	43.1		10	17.2		28	16.1		74	23.1	
≥50		23	62.2		29	56.9		48	82.8		146	83.9		246	76.9	
Sex																0.03
Male		22	59.5		20	39.2		29	50		71	40.8		142	44.4	
Female		15	40.5		31	60.8		29	50		103	59.2		178	55.6	
Social-economical level																0.02
High		5	13.5		4	7.8		7	12.1		10	5.7		26	8.1	
Middle		15	40.5		23	45.1		31	53.4		76	43.7		145	45.3	
Low		17	46		24	47.1		20	34.5		88	50.6		149	46.6	
Hypertension																<0.001
No		19	51.4		9	17.6		15	25.9		7	4		50	15.6	
Yes		18	48.6		42	82.4		43	74.1		167	96		270	84.4	
Dyslipidemia																0.245
No		32	86.5		39	76.5		48	82.8		128	73.6		247	77.2	
Yes		5	13.5		12	23.5		10			46	26.4		73	22.8	
Complications																
None		8	21.6		2	3.9		0	0		0	0		10	3.1	<0.001
Microangiopathy		17	46		43	84.3		41	70.7		164	94.3		265	82.8	<0.001
Macroangiopathy		5	13.5		11	21.6		8	13.8		39	22.4		63	19.7	0.082
OAD																<0.001
Yes		28	75.7		36	70.6		46	79.3		89	51.1		199	62.2	
No		9	24.3		15	29.4		12	20.7		85	48.9		121	37.8	
Insulin																0.308
Yes		13	35.1		14	27.5		18	31		70	40.2		115	35.9	
No		24	64.9		37	72.5		40	69		104	59.8		205	64.1	
BRAS																<0.001
Yes		11	29.7		37	72.5		29	50		126	72.4		203	63.4	
No		26	70.3		14	27.5		29	50		48	27.6		117	36.6	
Calcium channel blockers																<0.001
Yes		7	18.9		16	31.4		24	41.4		94	54		141	44.1	
No		30	81.1		35	68.6		34	58.6		80	46		179	55.9	
Diuretics																0.356
Oui		5	13.5		14	27.5		10	17.2		32	18.4		61	19.1	
Non		32	86.5		37	72.5		48	82.8		142	81.6		259	80.9	

BRAS: blockers of Renin-Angiotensin System; OAD: Oral Antidiabetics.

In univariate analysis, male gender was found to be a risk factor significantly associated with high renal risk (OR = 1.73; CI 95% = 1.05 - 2.77; p-value = 0.03). Hypertension (OR = 7.28; CI 95% = 3.77 - 14.07; p-value < 0.001), the presence of microangiopathy (OR = 7.33; CI 95% = 3.89 - 13.89; p-value < 0.001) and the absence of antihypertensive treatment (OR = 1.23; CI 95% = 1.13 - 2.92. p-value < 0.001) were also risk factors significantly associated with high renal risk. In contrast, high socio-economic status (OR = 0.38; CI 95% = 0.16 - 0.91; p-value 0.029), the absence of a cardiovascular risk factor was a protective factor significantly associated with renal risk (OR = 0.14; CI 95% = 0.07 - 0.32; p-value <

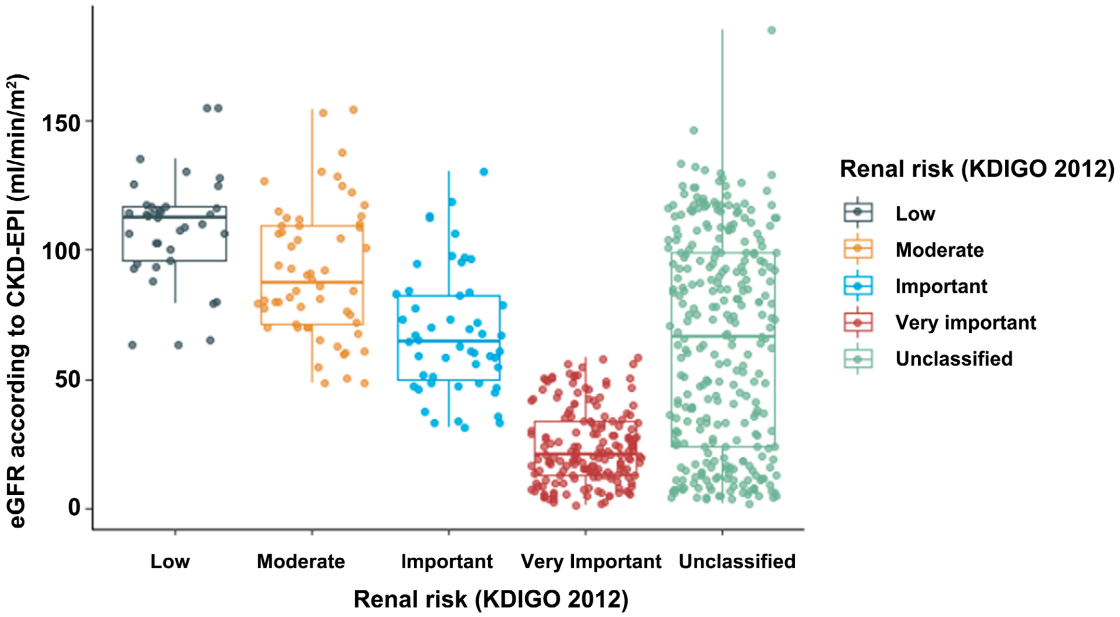

Figure 1. Relationship between eGFR and renal risk in Togo.

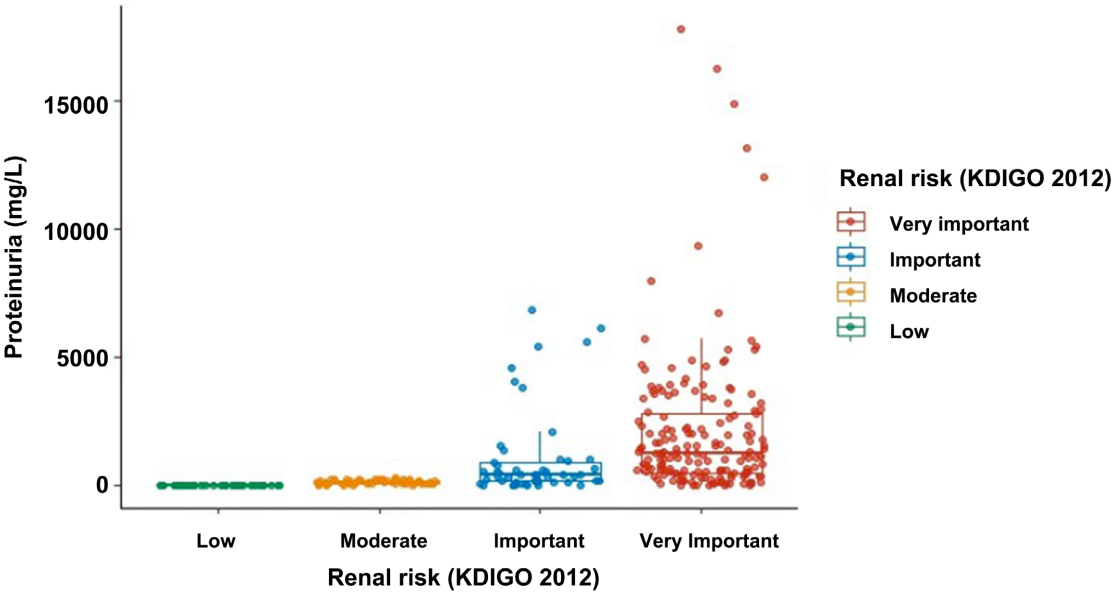

Figure 2. Relationship between proteinuria and renal risk.

0.001), the absence of diabetes complication (OR = 0.15; CI 95% = 1.48 - 4.53; p-value < 0.001), the use of treatment such as OADs (OR = 0.35; CI 95% = 0.20 - 0.61. p-value < 0.001), blockers of renin-angiotensin system BRAS (OR = 0.82; CI 95% = 0.71 - 0.90; p-value < 0.001), and calcium channel blockers (OR = 0.97; CI 95% = 0.19 - 0.98; p-value = 0.008) are protective factors significantly associated with the occurrence of high renal risk (Table S3).

Table 2 shows the initial and final multivariate model of factors associated with renal risk. Male sex (OR = 2.50; p-value = 0.006), microangiopathy (OR = 5.54; p-value = 0.002), and beta-blockers (OR = 5.64; p-value = 0.004) were identified as the risk factors significantly associated with increased renal risk. However, the protective factors (slowing down) of renal risk were: average socioeconomic level (OR = 0.50; p-value = 0.044), use of OAD (OR = 0.23; p-value = 0.001) and BRAS (OR = 0.58; p-value = 0.04).

4. Discussion

This is one of the first studies on renal risk among diabetes patients in Togo and West Africa. This is the first study carried out in Togo that has not only determined the level of renal risk in the diabetic population in a hospital setting, but also investigated the associated predictive factors. We found that 54.4% has most important renal risk. It was based on the evaluation of the level of renal risk by measuring micro-albuminuria or proteinuria over 24 hours and estimating the

Table 2. Initial and final model of multivariate analysis of factors associated with renal risk: typical diabetic patient.

	Initial model			Final model		
	OR	95% CI	p-value	OR ajusted	95% CI ajusted	p-value
Age ≥ 50 years	3.85	[0.63 - 23.56]	0.4			
Male sex	1.70	[1.05 - 2. 77]	0.03	2.50	[1.29 - 4.84]	0.006
Socio-economical level						
High	0.38	[0.16 - 0.91]	0.03			
Middle	0.71	[0.43 - 1.18]	0.19	0.50	[0.25 - 0.98]	0.04
No complication	0.14	[0.07 - 0.32]	0.00			
Microangiopathy	7.33	[3.89 -19.89]	0.00	5.54	[1.82 - 16.85]	0.002
Hypertension	7.28	[3.77 - 14.07]	0.00			
Dyslipidemia	1.85	[0.99 - 3.47]	0.054			
Duration of diabetes ≥ 5years	1.00	[1.04 - 1.10]	0.00			
Oral Antidiabetic Drugs	0.35	[0.20 - 0.61]	0.00	0.23	[0.10 - 0.55]	<0.001
None antihypertensive drugs	1.23	[1.13 - 2.92]	0.00			
BRAS	0.82	[0.71 - 0.90]	0.00	0.57	[0.41 - 0.90]	0.04
Calcium channel blockers	0.97	[0.19 - 0.9]	0.01			
Betablockers				5.64	[1.04 - 30.53]	0.04

BRAS: blockers of Renin-Angiotensin System; CI: confidence interval, OR: odd ratio.

glomerular filtration rate by calculating creatinine clearance using the CKD-EPI formula.

Among the 320 patients in our study, 54.4% had a very high renal risk. This is almost double that found in the Tsevi *et al.* series (25%) [8]. These results could be justified by the fact that the management of our patients is probably not optimal (uncontrolled progression factors such as diabetic imbalance, hypertension, proteinuria). Moreover, most Togolese patients consult a doctor at an already advanced stage of the disease [14]. Risk factor such as smoking and hypercholesterolaemia, proteinuria are common [9] [15] [16]. It should be noted that prolonged hyperglycaemia leads to an increase in intra-glomerular pressure, resulting in albuminuria, the production of advanced glycation products and inflammatory cytokines with local inflammation [17]. The albuminuria increases the renal risk and the cardiovascular risk in these patients [16]. This subsequently determines a vicious circle involving factors of progression of DKD and DKD itself.

The reduction of renal risk in our context will be achieved by lowering intraglomerular pressure with a blocker of the renin-angiotensin-aldosterone system (BRAS). Thus, the nephroprotective role of blockers of renin-angiotensin system (BRAS) in the treatment of DKD has been demonstrated in the literature [18] [19]. Administration of BRAS delayed the worsening of nephropathy and reduced microalbuminuria in a dose-dependent manner, independently of the antihypertensive effect. This nephroprotective effect has been demonstrated both on the reduction of proteinuria and on the long-term renal prognosis [20]. These data are similar to our results. In our study, BRAS were the most prescribed (63.4%). This rate of prescription is significantly associated with a decrease in the level of renal risk. The absence of antihypertensive treatment was more predictive of increased renal risk. However, the very high level of renal risk found in our study population raises the need for regular follow-up by nephrologists of any diabetic patient with urinary albumin excretion.

In our study, male gender, microangiopathy, and beta-blockers were risk factors associated with significant or very significant renal risk Errahali al in Morocco had instead found that predictive factors of renal risk are age, hypertension, and duration of diabetes, dyslipidaemia, diabetic retinopathy, microalbuminuria and renal failure [21]. The beta-blockers found here as predictors of significant or very significant renal risk raises the need for multidisciplinary management of a diabetic patient with heart failure.

The average socioeconomic level was identified as a protective predictive factor. In Mali, Sanogo estimated the direct cost of managing a diabetic patient at 527,500 FCFA per year [22]. In Togo, medical costs are paid by the patient. Thus, patients with higher incomes have better access to health care. Until a study is carried out in this respect, by extrapolation, a diabetic patient in our country will not be able to benefit from good medical care (annual income estimated at 420,000 CFA francs, taking into account the minimum wage). This is much lower than the estimated direct cost in Mali and could explain in other senses this high proportion of very important renal risk.

Blockers of the renin-angiotensin system associated with oral antidiabetes delay the progression of renal risk in diabetics the evolution of renal risk in diabetic subjects [23]. The UKPDS (United Kingdom prospective diabetes study) found a 25% - 30% reduction in renal risk progression in type 2 diabetics [24]. The Diabetes Control and Complications Trial (DCCT) in type 1 diabetics found a 50% reduction in renal risk progression [25]. We found a significant association of BRAS as a protective factor for renal risk. The PRETERAX study showed a 27% reduction in renal risk in patients receiving an angiotensin-converting enzyme inhibitor alone and a 42% reduction in renal risk in patients receiving an ACE inhibitor in combination with a thiazide diuretic [24] [25] [26] [27].

5. Conclusion

We found a level of "significant and very significant renal risk" of 54.4%. Male sex, the existence of microangiopathy and the use of beta-blockers were the predictive factors of a significant or very significant renal risk level. On the other hand, the average socioeconomic level, the use of OAD, and the renin angiotensin aldosterone system blockers were rather the protective predictive factors (slowing down the level of renal risk). The particularity of our study lies in the evidence of a high proportion of "very high renal risk" in diabetic patients with protective factors among which the "average socioeconomic level". It would therefore be desirable to conduct a prospective study to better identify the predictive factors.

Limitation

The absence of some anthropometric data, the failure to carry out certain complementary examinations such as 24-hour proteinuria or 24-hour microalbuminuria, the albuminuria/creatinuria ratio, renal ultrasound and renal biopsy constitute some biases. It is a monocentric study, so the data are not superposable to those of the population. The diagnosis of diabetic kidney disease was based only on clinical and laboratory evidence, which can lead to selection bias. The retrospective nature of our study and the mode of recruitment of the patients could be at the origin of selection biases which may make it difficult to generalize our results.

Ethics Approval and Consent to Participate

We obtain authorization from the Hospital Director; written informed consent to participate in the study has been obtained from participants, anonymity has been respected.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

KK and TYM conceived the study and developed the data; DB and TKG wrote

the paper and carried out the study; BA, YKH and GDA translated the study, developed the data analysis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviations

ACE: Angiotensin Conversing Enzyme
BMI: Body Mass Index
BRAS: blockers of Renin-Angiotensin System
CKD: Chronic Kidney Disease
DBP: Diastolic Blood Pressure
DCCT: Diabetes Control and Complications Trial
DKD: Diabetic Kidney Disease
eGFR: Estimated Glomerular Filtration Rate
HbA1c: Glycated Hemoglobin
KDIGO: Kidney Disease: Improving Global Outcomes
OAD: Oral Antidiabetic Drugs
SBP: Systolic Blood Pressure
UKPDS: United Kingdom Prospective Diabetes Study
WHO: World Health Organization

Additional Tables

Table S1. Staging of diabetic nephropathy according to Mogensen.

Classification of diabetic nephropathy	Effective (n = 320)	Percentage (%)
No diabetic nephropathy: <30 mg/24h (stage 1 and 2)	183	57.2
Diabetic nephropathy incipient: 30 - 300 mg/24h (stage 3)	37	11.6
Patent diabetic nephropathy: >300 mg/24h (stage 4 et 5)	100	31.2

Table S2. Distribution according to glomerular filtration rate and proteinuria (Renal risk).

			Proteinuria			
			A1	A2	A3	Total
Stage	Description	eGFR ml/min/1.73m²	Optimal High <30 mg/g <3 mg/mmol	High 30 - 300 mg/g 3 - 30 mg/mmol	Most high or nephrotic > 300 mg/g >30 mg/mmol	
1	Kidney damage with normal or ↑ GFR	≥90	31 (9.7%)	28 (8.8%)	10 (3.1%)	69 (21.6%)
2	Kidney damage with mild ↓ GFR	60 - 89	6 (1.9%)	25 (7.8%)	20 (6.2%)	51 (15.9%)
3a	Light to moderate	45 - 59	5 (1.6%)	15 (4.7%)	23 (7.2%)	43 (13.4%)
3b	Moderate to severe	30 - 44	6 (1.9%)	8 (2.5%)	22 (6.9%)	36 (11.2%)
4	Severe ↓ GFR	15 - 29	4 (1.2%)	10 (3.1%)	54 (16.9%)	68 (21.2%)
5	Kidney failure	<15	2 (0.6%)	3 (0.9%)	48 (15.0%)	53 (16.6%)
Total			54 (16.9%)	89 (27.8%)	177 (55.3%)	320 (100.0%)

CKD: Chronic Kidney Disease; eGFR: estimated Glomerular Filtration Rate. Low risk: ; Moderate risk: ; Important risk: ; Most important risk: .

Table S3. Factor associated with renal risk, univariate analysis.

	n	OR	Std. Err.	P-value	IC à 95%
Age (years)					
<50	64	2.71428	2.58536	0.294	[0.42 - 17.55]
[50 - 75[	239	3.85073	3.55870	0.145	[0.63 - 23.56]
≥75	17	4.87499	5.25110	0.141	[0.59 - 40.26]
Male sex	178	1.70679	0.43080	0.03	[1.05 - 2.77]
Socio-economical level					
High	26	0.38541	0.16831	0.029	[0.16 - 0.91]
Middle	145	0.71098	0.18512	0.19	[0.43 - 1.18]
Comorbidities					
Hypertension	270	7.28073	2.44842	<0.001	[3.77 - 14.07]
Dyslipidemia	73	1.85229	0.59272	0.054	[0.99 - 3.47]
Duration > 5 yrs	185	1.00788	0.00166	<0.001	[1.04 - 1.10]
HbA1c > 7%	259	0.89600	0.28337	0.730	[1.48 - 4.53]
Complications					
Microangiopathy	265	7.33	2.37329	<0.001	[3.89 - 13.89]
Macroangiopathy	63	1.80	0.6107	0.082	[0.92 - 3.50]
None	46	0.156	0.06612	<0.001	[1.48 - 4.53]
Treatment					
OAD	199	0.35	0.09978	<0.001	[0.20 - 0.61]
Insulin	115	1.22992	0.31807	0.424	[0.74 - 2.04]
BSRA	203	0.82512	0.72634	<0.001	[0.71 - 0.90]
Ica	141	0.97475	0.50605	0.008	[0.19 - 0.98]
Diuretics	61	0.37057	0.44726	0.34	[0.72 - 2.60]

BRAS: blockers of Renin-Angiotensin System; Std Err.: standard error; OAD: Oral Anti-diabetics; OR: odd ratio.