Risk factors associated with CKD progression in Pamplona Hospital, Norte de Santander, Colombia

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Abstract

Introduction: chronic kidney disease (CKD) causes irreversible changes in kidney function or structure after about 3 months. It is considered in public health as a serious problem, given its behaviour and potential lethality.

Objective: To determine the risk factors associated with the progression of chronic kidney disease in patients treated at the San Juan de Dios Hospital in the municipality of Pamplona, Norte de Santander during the period 2019 - 2021.

Methodology: cross-sectional, analytical, retrospective study. Sociodemographic and clinical characteristics were studied and analysed using descriptive and inferential statistical methods, and a multivariate logistic regression model was constructed with a significance level of 0.05.

Results: the prevalence of stage 3A CKD was 74.9%. Of the total number of patients included in the study, 186 (53.7%) reported progression. The multivariate model indicated that being female was associated with progression of kidney disease when adjusted for GFR (OR 1.07 (CI 1.03-1.12; p = <0.001))), age (OR 1.07 (CI 1.03-1.11; p = <0.001)), creatinine (OR 25.2 (CI 5.10-125.1); p = <0.001)) and albuminuria (OR 1.00 (CI 0.99 - 1.01); p= <0.001)).

Conclusions: it is necessary in a future study to involve variables of adherence to treatment, as well as the time of evolution of the pathology and some elements such as habits, lifestyles and quality of control.

Key words: Risk factors, chronic kidney disease, disease progression.

Resumen

Introducción: la enfermedad renal crónica (ERC) provoca cambios irreversibles en la función del riñón o en su estructura alrededor de 3 meses. Se considera en salud pública como un grave problema, dado a su comportamiento y potencial letalidad.

Objetivo: determinar los factores de riesgo asociados a la progresión de la enfermedad renal crónica en pacientes atendidos en el Hospital San Juan de Dios del municipio de Pamplona, Norte de Santander durante el período 2019 – 2021.

Metodología: estudio de corte transversal, analítico, retrospectivo. Se estudiaron y analizaron características sociodemográficas y clínicas mediante métodos de estadística descriptiva e inferencial, se construyó un modelo multivariado de regresión logística con nivel de significancia de 0,05.

Resultados: la prevalencia de la ERC estadio 3A fue del 74,9%. Del total de pacientes incluidos en la investigación, 186 (53,7%) tuvieron reporte de progresión. El modelo multivariado indicó que ser mujer está asociado a la progresión de la enfermedad renal cuando se ajusta por TFG (OR 1,07 (IC 1,03-1,12; p = <0,001)), la edad (OR 1,07 (IC 1,03-1,11; p = <0,001)), creatinina (OR 25,2 (IC 5,10-125,1); p = <0,001)) y albuminuria (OR 1,00 (IC 0,99 – 1,01); p= <0,001)).

Conclusión: se hace necesario en un futuro estudio involucrar variables de adherencia al tratamiento, así como el tiempo de evolución de la patología y algunos elementos como hábitos, estilos de vida y calidad del control.

Palabras clave: factores de riesgo, enfermedad renal crónica, progresión de la enfermedad.

Introduction

Kidneys, from a macroscopic point of view, are two oval organs measuring approximately 11 x 7 x 3 cm and weighing about 150 grams, the left kidney being slightly larger than the right one. The kidneys are located in the posterior wall of the abdomen on both sides of the spine. Microscopically, the functional renal unit is the nephron formed by a grouping of capillary vessels called glomerulus, each kidney contains between 800,000 to 1,000,000. During normal renal aging, injury or disease, the number of

nephrons is reduced because they do not have regenerative capacity, but the loss of nephrons does not usually compromise renal function because adaptive changes occur that manage to replace the functionality of the system (3).

Among the functions of the kidney are acting as a filter eliminating metabolic products and toxins from the blood; participating in the integrated control of extracellular fluid, electrolyte and acid-base balance; producing hormones such as calcitriol or erythropoietin, that is, it maintains the liquid homeostasis of the organism through the capacity to purify circulating substances in the blood plasma, resulting in the excretion of products such as urea, uric acid, creatinine, elimination of drugs and chemical substances and regulation of plasma insulin levels (3). Chronic kidney disease occurs when the kidneys are unable to perform their normal functions (4).

The natural history of CKD indicates that the glomerular filtration rate decreases over time and progresses to more advanced stages of kidney damage that are not cured. General treatment includes medications for symptom control, reduction of complications and disease progression (5). The decrease in GFR is mediated by loss of the number of nephrons with damage to renal tissue, decrease in filtration function without decrease in the number of nephrons, and combination of these conditions (3).

The glomerular filtration rate (GFR) is the amount of glomerular filtrate formed in all the renal corpuscles of both kidneys per minute, in men it is approximately 125 ml/min, and in women 105 ml/min, which depends essentially on the hydrostatic blood pressure, the liquids or solutes are pushed against the filtration membrane, the length or extension of this membrane and its permeability regulate the filtration (4).

Based on glomerular filtration rate, CKD is classified into 5 stages: 1) presence of renal injury with increased or normal glomerular filtration, 2) evidence of renal injury with mild decrease in glomerular filtration; 3a and 3b) presence or not of renal injury with moderate decrease in glomerular filtration; 4) presence or not of renal injury with decrease in glomerular filtration; 5) renal failure. In addition, it requires categorizing albuminuria according to reference values (A1 - A2 - A3) (1). In that sense the progression of CKD is assessed "by a sustained decline in GFR > 5 ml/min/1.73 m2 per year or by category change (from G1 to G2, from G2 to G3a, from G3a to G3b, from G3b to G4 or from G4 to G5), provided that it is accompanied by a loss of GFR ≥ 5 ml/min/1.73 m2" (1).

CKD is considered a serious public health problem worldwide, being a high-cost non-communicable event, demanding services of high technical, administrative and financial complexity for its management, it is progressive and of increasing prevalence and incidence in recent years and is characterized by irreversible changes in kidney function or its structure that last at least 3 months and have implications for health. The extent of this association is determined by measuring glomerular filtration rate (GFR) and kidney damage, as indicated directly or indirectly by markers such as albuminuria. As a result, the kidneys lose their primary function of filtering, eliminating wastes, and maintaining chemical balance (6).

A "risk factor" is any detectable characteristic or circumstance of a person or group of people related to the probability of being especially exposed to developing or suffering from a disease. The risk factor is related to a particular type of damage to health and can be found in individuals, families, communities and environments. However, several authors have used this term with different meanings, the first is defined as characteristics or exposures that are related to an increased probability of a particular outcome such as the occurrence of a disease, but not necessarily the causative factor; a second concept refers to determinants defined as a trait or exposure that increases the probability of a disease or other outcome. Finally, there are risk factors that can be modified by intervention (7).

Factors for the development of CKD include factors inherent to the disease (anemia, calcium (Ca), phosphorus (P), parathyroid hormone (PTH) and metabolic acidosis), modifiable risk factors (arterial hypertension (AHT), diabetes, dyslipidemia, smoking, hyperuricemia, hypoalbuminemia, obesity), non-modifiable risk factors (sex, advanced age, black race, low birth weight) (8,12). It is essential to analyze risk factors in all areas, because based on the damage to health and the frequency of the presence of these factors, prevention actions can be planned and implemented.

The increase in chronic diseases such as hypertension and diabetes has had an impact on the epidemiological situation of CKD, with a worldwide incidence of 10%. Diabetes is currently considered one of the main causes of kidney damage and it is estimated that between 10% and 20% of people with diabetes die from this disease, taking into account that the signs and symptoms of CKD appear in the later stages. When this disease is diagnosed at a late stage, the chances of benefiting from renal replacement therapy increase (9).

People with CKD present symptoms that have a negative impact on their standard of living, such as insomnia, fatigue, loss of mobility, muscle pain, dry skin and vomiting. The psychological effects reported are depression, anxiety, loss of independence and low self-esteem. In socioeconomic terms, the patient faces the possibility of losing his or her job and thus economic stability. In addition, there is an inability to perform daily tasks and a negative impact on family and couple relationships (10).

Patients with CKD must achieve a balance between the medical treatment of the disease and other chronic pathologies and their daily activities, including the management of psychosocial and emotional risks generated by chronic diseases, which is why it is necessary to develop strategies for patients to continue with a good management of the disease, to delay or prevent the progression of the disease, where the importance of actions such as self-care is evident in order to promote the ability to make changes in the ways and lifestyles to control the symptoms.

The psychosocial and physical consequences associated with CKD also include adjusting to the needs of the disease itself, such as developing skills and abilities to manage care and timely treatment and the creation of support networks to cope with the disease (11). In this sense, CKD affects not only diagnosed patients, but also their families.

Materials and Methods.

Cross-sectional, analytical and retrospective study. Non-probabilistic sampling by convenience with information from male and female patients older than 18 years diagnosed with CKD attended at the Hospital San Juan de Dios de Pamplona (low and medium complexity institution) during the years 2019 to 2021.

Inclusion criteria: patients with CKD over 18 years of age, who were seen at least once in each study year and with complete records in the clinical history of the study variables.

Exclusion criteria: Stage V patients on peritoneal dialysis and hemodialysis.

From a total of 1,195 available records with 4,713 attendances, 233 records of patients diagnosed with stage V CKD requiring peritoneal dialysis and hemodialysis, 595 records that did not receive care at least once in each year of the study and 21 records that did not have complete records in the clinical history were excluded. Finally, a total of 346 records were obtained,

with 3,490 attendances. Since all patients who met the eligibility criteria were included, the sample size was not calculated.

To determine the risk factors associated with the progression of CKD, the dependent variable was CKD progression, which is defined by the change from one stage to another, and for its calculation, albuminuria and glomerular filtration rate were analyzed together. The following independent variables were considered: sex, age, health regimen, GFR, albuminuria, diagnosis of arterial hypertension, type 2 diabetes mellitus (DM), dyslipidemia, BMI, abdominal perimeter. Finally, potential confounding variables were considered, such as area of residence, ethnicity, level of schooling, tobacco and alcohol consumption.

The health institution provided the database in Excel® with records of people diagnosed with CKD treated between 2019 and 2021, information that was collected and anonymized in the instrument designed for this purpose, considering compliance with the eligibility criteria.

The database was crossed to verify the care of patients in the three years of study, it was evidenced that the information provided was incomplete, therefore, the hospital directors authorized access to consult, review and extract data from the medical records within the hospital facility, the search process was performed for sociodemographic variables such as: occupation, educational level, socioeconomic stratum and clinical: diagnosis of HT, diagnosis of DM, alcohol consumption and smoking, as well as, the completeness of the other variables. As for the patient's final condition, the information is verified in the ADRES application, as well as the insurance company and health regime. After completing the data collection stage, the statistical analysis was carried out with the IBM SPSS v29 program licensed by the Fundación Universitaria del Área Andina.

An initial univariate descriptive statistical analysis was carried out. The results for qualitative variables were presented in tables of absolute and relative frequencies. Quantitative variables were summarized in frequency distributions and measures of central tendency, percentiles and measures of dispersion were obtained, and the Kolmogorov-Smirnov normality test was performed.

In the statistical inference stage, bivariate and multivariate analysis was performed to determine the association between qualitative variables. For this purpose, contingency tables were formed and the X2 statistical test was performed for categorical variables. The Kruskal-Wallis test was also applied.

To estimate the association, the Odds Ratio (OR) was applied with its corresponding 95% confidence interval (95%CI). For the relationship between CKD stages and risk factors, a multivariate logistic regression model was developed.

Ethical considerations

The study was conducted in accordance with the principles of the Belmont Report (13), which is widely recognized in medical ethics and is the reference underlying the ethical considerations of this research. The authors comply with the provisions of the Declaration of Helsinki of the World Medical Association, which adopts the basic principles of the Nuremberg Code and national guidelines by adhering to a rigorous research methodology.

Results

In the analysis of the sociodemographic characteristics it was found that 72.5% of the people diagnosed with CKD were women, 96.5% of the total patients were older than 60 years, the age varied between 40 and 98 years with a mean of 76 ± 8.6 years, most of the participants belonged to the Nueva EPS entity with 71.4%, the subsidized regime predominated, 341 patients (98.6%) indicated not belonging to a specific ethnic group (Table 1).

Regarding the population group, the largest number corresponds to the elderly with a proportion of 92.5%, and the area of residence is mostly urban with 83.5%. The patients attended come first from the municipality of Pamplona, followed by Chitagá, and only one person registered Venezuelan nationality. In turn, 323 people (93.4%) were unemployed at the time of care, 215 (62.1%) had primary school education and 221 were of low socioeconomic status (63.9%).

Table 1. Sociodemographic characteristics of patients with CKD

Sociodemographic characteristics	Categories	n= 346	(%)
Gender	Female	251	((72,5)
	Male	95	((27,5)
Age	< 60 years	12	((3,5)
	≥ 60 years old	334	((96,5)
Health Regime	Subsidize	345	((99,7)
	Contributory	1	((0,3)
	Nueva EPS	247	((71,4)
	Comfaoriente EPS-S	50	((14,5)
	Coosalud	24	((6,9)
Health Administrator	Sanitas	12	((3,5)
	Medimás	1	((1,4)
	Comparta	5	((1,4)
	Caja de compensación Compensar	2	((0,6)
	Compensar Entidad Promotora	1	((0,3)
	None	341	((98,6)
Ethnicity	Black or Afro-descendant	3	((0,9)
	Rom (Gypsy)	1	((0,3)
	Indigenous	1	((0,3)
	Elderly	320	((92,5)
	Other population group	19	((5,5)
Population group	Displaced	4	((1,2)
	Disabled	2	((0,6)
	Head of household	1	((0,3)
Housing area	Urban	289	((83,5)
	Rural	57	((16,5)
	Pamplona	332	((96,0)
	Chitaga	6	((1,7)
Origin	Cacota	4	((1,2)
	Pamplonita	2	((0,6)
	Cucutilla	1	((0,3)
	Mutiscua	1	((0,3)
	No occupation	323	((93,4)
	Street vendors	7	((2,0)
	Farmers	5	((1,4)
	Domestic helpers	4	((1,1)
Occupation	Tailor	2	((0,6)
	Cooks	2	((0,6)
	Craftsmen	1	((0,3)
	Construction workers	1	((0,3)
	Shoemakers	1	((0,3)

Source: Own elaboration

In the patients attended in the institution under study, the prevalence of stage 3a CKD was 74.9%, patients with albuminuria < 30 mg/g normal to slightly elevated category A1 predominated with 86.1%, the prevalence of AHT was 99.7%, mostly stage 1. Likewise, the prevalence of DM was 29.8%, an important number of patients did not register results of glycosylated hemoglobin because according to Clinical Practice Guidelines they do not require this laboratory because they do not have this pathology. (Table 2).

Table 2. Clinical characteristics of patients with CKD.

Clinical characteristics	Categories	n= 346	(%)
	Stage 2	12	((3,5)
ERC Stage	Stage 3a	259	((74,9)
	Stage 3b	65	((18,8)
	Stage 4	10	((2,9)
	A1	298	((86,1)
Albuminuria Category	A2	45	((13,0)
	A3	3	((0,9)
AHT diagnosis	Yes	345	((99,7)
	No	1	((0,3)
AHT Stage	Stage 1	262	((75,7)
	Stage 2	84	((24,3)
	HbA1c>7%	47	((13,6)
Glycosylated Hemoglobin	HbA1c ≤7%	97	((28,0)
	No Data*	202	((58,4)
DM Diagnosis	Yes	103	((29,8)
	No	243	((70,2)
LDL cholesterol	Higher ≥100mg/dl	193	((55,8)
	Optimal < 100mg/dl	153	((44,2)
Dyslipidemia Diagnosis	Yes	4	((1,2)
	No	342	((98,8)
	Underweight	11	((3,2)
BMI classification	Normal	186	((53,8)
	Overweight	130	((37,6)
	Obese	19	((5,5)
Risk of abdominal perimeter	Yes	199	((57,5)
	No	147	((42,5)
Tobacco smoking	Yes	33	((9,5)
	No	313	((90,5)
Alcohol Consumption	Yes	2	((0,6)
	No	344	((99,4)
No HbA1c data = patients without a diagnosis of Diabetes Mellitus who did not require the laboratory, AHT = Arterial Hypertension, BMI = Body Mass Index			
Source: Own elaboration			

The prevalence of dyslipidemia was 1.2%, 186 patients registered a BMI between 18.5 and 24.9 kg/m2 normal classification with a median of 24.2 (22.4-26.6) with a minimum value of 17.2 and a maximum of 35.7. The 57.5% of the patients presented an abdominal perimeter measurement > 102 cm in men and > 88 cm in women, classifying them as at risk. Creatinine presented a median of 0.9 (0.8 - 1.1) with a minimum of 0.5 and a maximum of 3.4. Finally, the prevalence of tobacco and alcohol consumption was low at 9.5% and 0.6% respectively. There is a record of a patient who died in 2021, specifically on the last day of care; however, all the care provided during the 3 years of the study is available.

Of the total number of patients with CKD included in the study, 186 reported progressions according to clinical history, corresponding to 143 women and 43 men. According to the bivariate analysis, there were no statistically significant differences between men and women in terms of progression (OR 1.60 (CI 0.99-2.57) p = 0.05).

On the other hand, no statistically significant association was found when the other sociodemographic and clinical characteristics were evaluated with the progression of CKD; however, the variables sex and GFR had a p value of less than 0.2, which according to Hosmer and Lemeshow can be incorporated in a multivariate analysis (Table 3).

Table 3. Sociodemographic variables results.

Ssociodemographic characteristics	CKD Progression								
	Yes		No		X^2	p value	OR	CI 95%	
	n	(%)	n	(%)				LL	UL
Gender									
Female	143	((41,,3)	108	((31,2)	3,801	0,051	1,601	0,996	2,575
Male	43	((12,4)	52	((15,0)			1	-	-
Age									
< 60 years	5	((1,4)	((7)	2	0,731	0,393	1	-	-
≥ 60 years old	181	((52,3)	((153)	44,2			0,604	0,188	1,941
Living area									
Urban	151	((43,6)	138	((39,8)	1,605	0,205	0,688	0,385	1,23
Rural	35	((10,1)	22	((6,3)			1	-	-
Reported p -value, OR: Odds Ratio, IL: lower limit, UL: upper limit, CI: confidence interval.									
Source: Own elaboration									

Table 4. Clinical variable results

Clinical characteristics	Yes		No		X²	p value	OR	IC 95%	
	n	(%)	n	(%)				LL	UL
AHT diagnosis									
Yes	186	((53,7)	159	((45,9)	1,166	0,28	0,461	0,411	0,517
No	0	((0)	1	((0,28)			1	-	-
AHT Stage									
Stage 1	137	((39,5)	125	((36,1)	0,934	0,334	1	-	-
Stage 2	49	((14,1)	35	((10,1)			0,783	0,476	1,287
DM Diagnosis									
Yes	54	((15,6)	49	((14,1)	0,104	0,747	0,927	0,584	1,471
No	132	((38,1)	111	((32,0)			1	-	-
LDL cholesterol									
Optimal < 100mg/dl	106	((30,6)	87	((25,1)	0,238	0,625	1	-	-
Higher >=100mg/dl	80	((23,1)	73	((21,0)			1,112	0,726	1,701
Dyslipidemia Diagnosis									
Yes	4	((1,15)	0	((0)	3,481	0,062	1,879	1,701	2,075
No	182	((52,6)	160	((46,2)			1	-	-
Risk of AP									
Yes	109	((31,5)	90	((26,0)	0,195	0,659	1,101	0,718	1,688
No	77	((22,2)	70	((20,2)			1	-	-
Tobacco smoking									
Yes	18	((5,2)	15	((4,3)	0,009	0,924	1,036	0,504	2,129
No	168	((48,5)	145	((41,9)			1	-	-
Alcohol Consumption									
Yes	1	((0,28)	1	((0,28)	0,011	0,915	1,164	0,072	18,753
No	185	((53,4)	159	((45,9)			1	-	-

Reported p -value, OR: Odds Ratio, IL: lower limit, UL: upper limit, CI: confidence interval.
Source: Own elaboration

Table 5. Quantitative clinical variables results.

Clinical characteristics		p value	Median	CI 95% LL	CI 95% UL
Filtration rate G					
Progression	Yes	0,09	50,31	48,87	51,49
	No		52,76	51,05	54,00
Creatinine					
Progression	Yes	0,50	0,90	0,87	0,93
	No		0,92	0,90	0,96
BMI					
Progression	Yes	0,39	24,19	23,74	24,87
	No		24,28	23,74	25,32
Albuminuria					
Progression	Yes	0,86	13,8	12,02	15,81
	No		13,65	11,64	15,17
Reported p -value, CI: confidence interval, IL: lower limit, UL: upper limit.					
Source: Own elaboration					

For the multivariate analysis, the Hosmer and Lemeshow goodness-of-fit test was performed on the proposed model, with the null hypothesis of no differences between the observed values and the predicted values; the test reported a value of p: 0.156 therefore, the null hypothesis is not rejected and it is concluded that the observed data are equal to the expected data, both in the progression and non-progression of CKD, this means that, the logistic regression model is valid and a sensitivity of 69% and a specificity of 52.5% is reported.

Table 6. Logistic regression model results.

| Variable | B | SE | *Sig.* | Exp (B) | CI 95% for Exp (B) | |
					Lower	Upper
Gender						
Female	1,576	1,751	<0,001	4,83	2,37	9,83
Male				1	-	-
GFR ml/min/1,73 m^2	0,076	0,023	<0,001	1,07	1,03	1,12
Age Years old	0,074	0,20	<0,001	1,07	1,03	1,11
Creatinine mg/dl	3,23	20,63	<0,001	25,2	5,1	125,1
BMI kg/ m^2	0,261	0,038	0,126	0,84	0,77	0,92
Albuminuria mg/gr	0,004	0,003	<0,001	1,00	0,99,	1,01
GFR: Glomerular Filtration Rate , BMI: Body mass index.						
Source: Own elaboration						

The multivariate model indicated that being female is associated with CKD progression when adjusted for GFR (OR 1.07 (CI 1.03-1.12; p = <0.001))), age (OR 1.07 (CI 1.03-1.11; p = <0.001)), creatinine (OR 25.2 (CI 5.10-125.1); p = <0.001)) and albuminuria (OR 1.00 (CI (0.99-1.01); p= <0.001)) (Table 6). Female gender behaved as a factor that increased the probability of CKD progression (OR 4.83 (CI 2.37-9.83); p = <0.001) when adjusted for the variables listed above. No statistical association was found for the variable BMI as a function of CKD progression.

Discussion

In relation to sociodemographic factors, the analysis shows that of the total number of patients with CKD there is a predominance of female sex (72.5%), this result contrasts with studies conducted in Colombia, by Acuña et al. (14) in 2016 with a population of 1. 039,119 patients with a diagnosis of CKD, where 64.8% were women , likewise, Bastidas et al (15) in a study conducted in Nariño - Colombia between 2016 and 2018, in 5,872 people with CKD in different stages ,reported that 72.2% were women. This is possibly due to the fact that women frequently attend health services, having a greater awareness of health care.

Regarding the age variable, the study records that 96.5% are over 60 years of age, showing that in the provider institution CKD care is centered on this population, with a predominance in the subsidized regime (98.6%),

without occupation (93.4%), with primary education (62.1%), low socioeconomic stratum (63.9%). In a study of characterization of renal disease in Cuba (16), it was found that when relating the classification with age, the highest percentage belongs to ages between 70 and 79 years (56.9%), of these 71 participants belong to the male gender (65.1%), 63.3% had attended primary school or did not conclude it, with a higher proportion of low socioeconomic level (68.8%), this study differs in the predominance of male gender, referring to the other sociodemographic variables, there is concordance with the results obtained; This is attributable to the fact that the present study was carried out with a vulnerable population in an ESE with low and medium complexity health services to EAPB of the subsidized regime. It is relevant that the Clinical Practice Guidelines for some chronic pathologies consider people over 60 years of age as a risk population; therefore, the ages of the patients in this study were segmented into those over and under 60 years of age.

A study of regional perspectives states that CKD shows an exponential increase over time, in Latin America it is one of the first causes of mortality with a prevalence between 9% and 35%, it is generally diagnosed in people with arterial hypertension, dyslipidemia and diabetes mellitus, in low socioeconomic strata and in adults over 60 years of age. The care of patients with kidney damage presents a number of obstacles in low-income countries, ranging from lack of knowledge of adequate practices for the pathology, untimely consultation of health services, scarce resources, as well as the limited supply of health service providers specialized in nephrology (17).

According to the figures reported in the high cost account, the most prevalent stage of CKD in Colombia is stage 3, representing 34.2%, in agreement with the data reported in the present study (6).

In a Cúcuta Hospital in Norte de Santander they conducted an investigation of prevalence of CKD in 2017 and 2018 (18), where it is indicated that the main underlying diseases recorded in patients in the hospitalization service with kidney disease, 80% had AHT and 43.1% DM, in contrast to the present study the prevalence of AHT was 99.7% mostly stage 1 and the prevalence of DM was 29.8%.

Lipid alterations can cause renal dysfunction, so that a GFR lower than 60 ml is considered a very high cardiovascular risk, with LDL cholesterol being one of the main risk predictors (19), in this study 55.8% of patients had elevated LDL cholesterol and 1.2% dyslipidemia, Furthermore, the

BMI in the study population was between normal (53.8%) and overweight (37.6%) and according to the abdominal perimeter 57.5% were at risk, given that it is in this area where the fat that leads to overweight and obesity accumulates, increasing the risk of cardiovascular disease.

Studies have examined various elements that influence the progression of chronic kidney disease such as high blood pressure, the presence of proteins in the urine, excess weight, arterial hypertension, tobacco consumption and diabetes mellitus, these factors are categorized as elements that can be modified, due to which it is aimed to interrupt its progress by performing a therapeutic, multidisciplinary approach that acts on cardiovascular and renal risk based on evidence-based knowledge (20).

In attention of the data provided it can be established that the prevalence of smoking was (9.5%) in people diagnosed with CKD in the institution of Pamplona, it is similar to the study conducted in the city of Bogota for the year 2013 (10.7%) with a sample size of 290 patients (21), in front of alcohol consumption was more frequent in < 50 years (25.9%) in the city of Bogota than in the population of this study (0.6%).

In this study female sex behaves as a factor that increases the probability of progression of CKD (OR 4.83 (CI 2.37-9.83) p = <0.001) when adjusted for the variables of GFR, creatinine, BMI, age and albuminuria, in other studies male sex (OR 1.07 (CI 1.060-1.074)) is related as a determinant in the progression of kidney disease (15,25). The literature recognizes that being male is a risk factor for the progression of CKD; however, this finding requires that the health institution formulate strategies for the care and therapeutic intervention required to reduce the progression of the disease. Worldwide, women are the most affected by CKD, but men are more susceptible to renal failure in advanced stages, these variations are mainly attributed to a series of physiological, social and structural risk factors that differ between men and women. It has been suggested that the high mortality in men diagnosed with kidney damage is due to rapid progression between stages, poor adherence to treatment, and nonuse of health services (22).

It is important to highlight that gender is a non-modifiable variable, but it is considered transcendental to take into account in future research as an associated factor the climate and the intake of water by good habit and not by thirst, when finding that the adverse renal effects of insufficient hydration could be mediated by the increase of vasopressin, since a generous water intake contributes to eliminate the osmotic load and studies suggest

that the amount of liquid ingested may be a risk factor for CKD that has not been studied (23), additionally, in the population pyramid of the country there are more women than men, which may contribute to this association.

The dyslipidemia variable in this study does not behave as a factor that contributes to renal deterioration. Having dyslipidemia increases the probability of suffering atherosclerosis; adequate control allows the reduction of cardiovascular disease (26). According to the study conducted by Ziad et al. (27) who obtained results that show a correlation between dyslipidemia and progression of CKD from the initial stages.

The treatment of arterial hypertension is essential to reduce the progression of CKD and cardiovascular events. Observational studies have shown a higher risk of progression if blood pressure is higher than 130/80mmHg. The patients in the health institution studied have controlled blood pressure figures (28).

With regard to type II diabetes, the levels of glycosylated hemoglobin (HbA1c) it is crucial to keep a constant and periodic record, this follow-up is essential to confirm that the values are maintained in the range of 6.5 to 7% in cases of mild chronic kidney disease (glomerular filtration > 60 ml/min/1.73 m2), especially if there is microalbuminuria because in these circumstances, strict control of glucose can contribute to delay the progression of renal injury. Patients at the Hospital San Juan de Dios with a diagnosis of diabetes and CKD have a predominance of HbA1c ≤ 7%, which leads us to think that it is not prone to progression (29).

Range and limitations

A limitation of the present study was not having records of adherence to the nutritional management plan. The evidence supports that diets formulated by professionals for patients with renal impairment contribute to the control of CKD progression; specifically, low-protein diets reduce the risk of reaching terminal stages. A special consideration is the existence of comorbidities in these patients which implies a greater challenge to structure a scheme based on the daily requirements and restrictions according to the existing pathologies and stages of the disease. Therefore, skills are required to generate alternatives between available foods and tastes, as well as motivation for adherence to the recommendations given by health personnel (24).

In this sense, an individualized nutritional plan and exercise become complementary interventions to pharmacological treatments for patients

with kidney damage, studies point out the benefits in terms of lower blood pressure, cardiovascular health and quality of life (25).

It should also be noted that the study period includes part of the duration of the pandemic. At the end of 2019, the pandemic generated by the Coronavirus was classified as a public health emergency of international importance by the WHO. In 2020 the first case was confirmed in Colombia, therefore, at national level different actions were taken for the containment, mitigation and prevention of the disease, actions such as quarantine and care in the different health services focused on treating this problem limited the monitoring of patients with chronic diseases and the performance of tests in the terms established by current guidelines.

Finally, it is advisable to study the association of CKD with comorbidities such as diabetes, hypertension and endothelial lesions, including a control group with the characteristic of absence of renal lesions.

Conclusions

The sociodemographic characterization of the persons diagnosed with CKD of the social enterprise of the state of Pamplona Norte de Santander was carried out, finding a predominance of women, older than 60 years, between 40 and 98 years of age, belonging to the subsidized regime, most of them indicated not belonging to a specific ethnic group, residing in the urban area, without occupation, with basic primary education and low socioeconomic stratum.

Regarding risk factors, it was found that the prevalence of CKD is in stage 3a, with a predominance of patients with Albuminuria < 30 mg/g normal to slightly elevated category A1, 99.7% of patients with CKD are diagnosed with stage 1 AHT, 29.8% with DM, 1.2% with Dyslipidemia. Finally, the prevalence of tobacco and alcohol consumption was low, 9.5% and 0.6%, respectively.

Of all the patients with CKD included in the study, 186 (53.7%) reported progression according to clinical history, corresponding to 143 women and 43 men. According to the bivariate analysis, there were no statistically significant differences between men and women in terms of progression (OR: 1.60 (CI: 0.99-2.57) p= 0.05). When other sociodemographic and clinical data were studied, there was no statistically significant association with the outcome progression of CKD.

The multivariate model indicated that being female is associated with progression of kidney disease when adjusted for GFR, creatinine, BMI, age,

and albuminuria. Female sex behaves as a factor that increases the probability of CKD progression when adjusted for the variables listed above.

The regression model, although valid, has limited sensitivity and specificity, so it is necessary in a future study to include variables of adherence to treatment and treatment, as well as the time of progression of the pathology and some elements such as habits, lifestyles and quality of control. In addition, primary sources of information should be considered when planning the study, since these data are not consolidated in the clinical history.

The present study revealed a lack of data quality, both in the medical records and in the database of chronic patients, which makes it difficult for the researchers to collect the information.

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