Clinical-Epidemiological Profile of End-Stage Chronic Kidney Disease in Dialytic Therapy in the State of Pará, Brazil

Ana Lydia Ledo de Castro Cabeça[1], Renata Maria Coutinho Alves[2], Ana Carolina de Castro Ribeiro Cabeça[3],Marcelo Coelho Simões[4], Daniele Melo Sardinha[5], Juan Andrade Guedes[6], Cláudia do Socorro Carvalho Miranda[7], Clea Nazaré Carneiro Bichara[8],Nelson Veiga Gonçalves[9].

Abstract

Purpose of the study: to examine the epidemiological profile of patients with end-stage chronic kidney disease in dialytic therapy in the State of Pará. **Methods:** We conducted a prospective, descriptive, cross-sectional of quantitative approach. The survey was developed in patients in the health system from the State of Pará, and met in November 2017, in three Renal Therapy Services located in the municipality of Substitutionary Belém-PA, through the application of a questionnaire Semistructured and analysis of patient records. Demographic variables, cartographic and public policy in health were obtained, respectively, of the 2010 CENSUS, the Millionth Digital system of IBGE and national register of Health establishments. **Results:** 50 to 59 guys prevailed years (29.2%), ethnicity (63.5%), with basic-level education (56.2%) and family income of up to 1 minimum wage (59.6%). The main causes of kidney disease were hypertension (78.6%) and diabetes melittus (43.2%). **Conclusion:** Further studies are necessary to the understanding of social determinants and epidemiologic, clinical, and about the existence of dialysis treatment networks in the State, in order to contribute to the formulation and implementation of public policies in the area of Nephrology.

Keywords: Renal Insufficiency, Chronic; Epidemiology; Renal Dialysis.

1 Introduction

Chronic kidney disease (CKD) is a non-transmissible condition, defined by a glomerular filtration rate of < 60ml/min/1, 73m ² for at least three months. It is characterized by heterogeneous alterations affecting both the structure and renal function, with multiple causes and prognostic factors. It presents a prolonged, insidious course and, most of the time, with asymptomatic evolution (Brazil, 2014). The aging of the population and the growth of the incidence and prevalence of chronic degenerative diseases, such as diabetes and arterial hypertension, can lead to progressive renal failure, causing increased CKD today as a public health problem World (Kdoqi, 2002).

---

[1]Medical Nephrologist, Master. In environment and society in the Amazon. Federal University of Pará. Center for tropical medicine. Belém, PA, Brazil.

[2] Doctor, Master. In environment and society in the Amazon. Federal University of Pará. Center for tropical medicine. Belém, PA, Brazil.

[3] Academic of Medicine, University of State of Pará. Belém, PA, Brazil. Professional skills IV monitor.

[4] Biologist, MSc in Environmental Sciences, University of The State of Pará UEPA. Belém-PA. Brazil

[5]Nurse, Master Student in Epidemiology and health Surveillance by PPGEVS – IEC.
Preceptoria in Nursing in Medical Clinic at the University of Amazonia - UNAMA. Ananindeua-PA. Brazil.

[6] Cartographic Engineer. Member of the laboratory of Epidemiology and geoprocessing/UEPA.

[7] Biomedical, Master inEducational Sciences. PhD student em Parasite Biology of Amazon, University of State of Pará- IEC.

[8] Doctor, PhD in Biology of Infectious and Parasitic Agents. Federal University of Pará UFPA, Teacher University of the State of Pará UEPA.

[9]PhD inComputer Sciences. Professor of the Federal University of Pará. Chief of the laboratory of Epidemiology and geoprocessing/UEPA.

Data from the Brazilian Chronic Dialysis Survey (BCDS), in 2014, reveal that, in relation to the etiology of CKD, the most frequent diagnoses were arterial hypertension (35%) and diabetes (29%), followed by chronic glomerulonephritis (11%) and polycystic kidneys (4%). Other diagnoses were made in 11% and this was undefined in 9% of the cases, and this percentage distribution remained stable in recent years.

In the United States of America (USA), about 13% of the adult population exhibits some degree of kidney function loss (Kdigo, 2012). Approximately 90% of diagnosed cases are from developing countries. In Brazil, the prevalence of end-stage chronic kidney disease is below nations with similar profile, depending on the need for early identification and appropriate treatment of patients with risk factors for CKD, aiming at the reduction of outcomes unfavorable, such as cardiovascular mortality and your progression (Nice, 2004; Bastos; Kirsztajn, 2011). Study in Bambuí, Minas Gerais-Brazil, evaluated more than 2000 individuals, and detected change in serum creatinine, ranging from 0.48 percent to 8.19%, being more frequent in elderly individuals (Bastos et al., 2009).

Several factors are related to the etiology of CKD, among which include diabetes mellitus, hypertension, advanced age, obesity (body mass index-BMI >30 Kg/m²), history of circulatory disease (cardiovascular disease), stroke, peripheral vascular disease, congestive heart failure), history of CKD in the family, smoking and use of nephrotoxic drugs agents (MacIsaac et al., 2009; Brazil, 2014). Important to note that the etiological factors for CKD are also conditioning risk factors for the progression of CKD to the end-stage chronic kidney disease, since the inadequate control of these chronic morbidity conditions triggers, or aggravate the deterioration of renal function over time, especially in elderly individuals, more exposed to chronic non-communicable diseases (Brazil, 2014).

The delayed diagnosis of CKD and the non-stratification of risk of progression to advanced stages, coupled with the lack of integral care of patients and referral in appropriate time to the nephrologist, for the appropriate treatment, are the determinant factors for the lowest prevalence observed in the Brazilian population. From 2014, the Ministry of Health established the "Clinical guidelines for the care of patients with chronic kidney disease-CKD in the Unified Health System", in order to collaborate with the management of these patients in an attempt to reduce unfavorable outcomes, such as Cardiovascular mortality and progression to end-stage CKD (Brazil, 2014). There are still scarce epidemiological studies that allow how to identify socioeconomic conditions, as well as data on the prevalence of dialytic end-stage CKD in the various Brazilian territories, especially in the northern region of Brazil.

On this basis, this study analyzed the epidemiological profile of the patients diagnosed with end-stage chronic kidney disease in dialytic therapy met in three centers of Renal Replacement Therapy (RRT) in Belém, Pará State, Brazil in the year 2017. Contextualizing it according to epidemiological (gender, age, ethnicity, city of origin), clinical (risk factors for CKD and etiology of end-stage CKD), socioeconomic (education and household income) and public policy (hospitals and RRT services, regional centers of health), in order to offer a scenario of possibilities to intervene in one of the serious problems of the contemporary public health.

2 Materials and Methods

2.1 Ethical aspects

This research was conducted in accordance with provisions of the Declaration of Helsinki and the Nuremberg Code, respecting the norms of Research Involving Humans of the National Health Council (National Health Council resolution 466/12), with the submission and approval of the research project to the Research Ethics Committee of the Public Gaspar Vianna Clinical Hospital Foundation (GVCHF), via Brazil Platform (Brazil, 2012), with number of opinion: 79084117.8.0000.0016.

2.2 Type of study

It is a study of prospective, descriptive, cross-sectional type and quantitative approach.

2.3 Location and population of the study

The study was conducted in patients with end-stage CKD from all over the State of Pará and served in three RRT services located in the city of Belem, capital of Pará State, thus identified: Renal Replacement Therapy Service (RRTS) of the Gaspar Vianna Clinical Hospital Foundation (GVCHF), Monteiro Leite Hemodialysis Center and Kidney Disease Treatment Center. All serve the patients of the Brazilian Public Health System (SUS).

The GVCHF is a State public hospital featured as a reference center in Nephrology, Cardiology and Psychiatry. Serves patients from all over the State of Pará in their outpatient and inpatient units and receives patients referred by the central State and local regulation, as well as spontaneous demand to its Cardiology and Psych emergency services. The two dialysis units, which together have a capacity of 264 patients on chronic hemodialysis program are inserted at GVCHF: Renal Replacement Therapy Service (RRTS/GVCHF), intra-unit that supports the patients requiring dialysis under hospitalization and also patients in outpatient hemodialysis program; and the Monteiro Leite Hemodialysis Center, extramural unit that caters exclusively to patients in outpatient hemodialysis program.

The Kidney Disease Treatment Center is a private concession to SUS, which caters exclusively to patients in outpatient hemodialysis program, offering vacancies for 132 patients. The three RRTS has capacity of 396 patients, representing the population of the study.

2.3 Inclusion and exclusion criteria

Were included in the study patients with end-stage CKD in hemodialysis therapy in one of the three services of RRT study participants in November 2017, with age greater than or equal to 18 years, through the signature of informed consent, which were capable of understanding the questions made and answered in a clear and consistent. Were excluded from the study patients who were on hemodialysis under hospitalization; who refused, for any reasons, to participate in the research; and patients from other States. Were also excluded the cases whose data collection instruments showed inconsistencies in the filling.

2.4 Acquisition of data sources

The data related to epidemiological variables (gender, age, ethnicity, cities of origin), socioeconomic (education, family income) and clinical (risk factors for CKD and etiology of end-stage CKD) were obtained by applying a semi-structured questionnaire composed predominantly of closed questions. For greater breadth of analysis, we also used as a source of secondary data, documentary information collected on the charts of patients. The data related to the variables of public policies in health (Hospitals and Regional Health Centers, RRT) were obtained from the Brazilian Public Health System establishments-CNES. Patients who lived in Belém were broken down into two categories: those who have already lived in Belém before the diagnosis and start of dialytic therapy and those who have transferred their residence to the county seat of RRT service, featuring so migratory flow of these patients within the State.

2.5 Debug/data processing

After obtaining the database, it was filtered the set of variables to debug it, using the Tab Win program to remove incompleteness, redundancy and data inconsistencies, possible causing factors biases.

2.6 Analysis of the data

An inferential and descriptive analysis of the data, with the elaboration of indicators concerning the individual variables, using Epi Info 7 programmers and 5.0 Bioestat (Ayres et al., 2007). It were analyzed the variables linked to individuals by applying the Chi-square statistical test of partition, to check the different degrees of significance among them. The interpretation of the test was in accordance with the scientific Convention, that is, so called statistically significant the result whose p-value (p-value or descriptive level) was less than 0.05, once the significance level α (alpha), and was established of 5%.

3. Results

The present study evaluated data of 336 patients on hemodialysis in Belém/PA, in November of 2017. After the application of the inclusion criteria, the population comprised 329 individuals. In the epidemiological and socioeconomic profile analysis it was observed that all the variables presented epidemiological significance, with value p 0.0001, except the genus < (p = 0.1517). The highest percentage of cases occurred in the adult age (62.3%-205/329), ethnicity (63.5%-209/329), with low education, whichever is the fundamental level (56.2%-185/329) and family income of up to 1 minimum wage (59.6%-196/329). The RRT 3 service presented the highest number of cases (45.9% – 151/329). See in table 1.

Table 1: Epidemiological and socioeconomic profile of patients with end-stage CKD in RRT, Belém/PA, 2017.

Variables	N	%	P-value
Genus			
Female	151	45,9	**0.1517**
Male	**178**	**54,1**	
Age Group			
Adult	**205**	**62,3**	**<0.0001**
Elderly	124	37,7	
Ethnicity			
Yellow	12	3,6	
White	36	10,9	
Indigenous	5	1,6	**<0.0001**
Black	67	20,4	
Brown	**209**	**63,5**	
Schooling			
Illiterate	14	4,3	
Elementary School	**185**	**56,2**	
High School	107	32,5	**<0.0001**
Higher Education	17	5,2	
Post-Graduation	4	1,2	
Ignored	2	0,6	
Family Income			
Up to 1 minimum wage	**196**	**59,6**	
Between 1 and 2 minimum wages	80	24,3	
Between 2 and 3 minimum wages	25	7,6	**<0.0001**
Between 3 and 4 minimum wages	10	3,0	
More than 4 minimum wages	15	4,6	
Ignored	3	0,9	
Search location			
RRTS 1	119	36,2	
RRTS 2	59	17,9	**<0.0001**
RRTS 3	**151**	**45,9**	

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2019.
RRT: Renal Replacement Therapy; RRTS: Renal Replacement Therapy Service

The analysis also shows that the age group ranged from 18 to 102 years, averaging 54.1 years, standard deviation of 14.7 years. The results show significant statistical trend for the age group of 50 to 59 years (29.2%), with p value < 0.0001. Note in table 2.

Table 2: Age profile of patients with end-stage CKD in RRT, Belém/PA, 2017.

Age Group	N	(%)	P-value
18-29 Years old	22	6.7	
30-39 Years old	38	11.6	
40-49 Years old	47	14.3	
50-59 Years old	98	29.8	<0.0001
60-69 Years old	77	23.4	
70-79 Years old	41	12.5	
80-102 Years old	6	1.7	

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2017.

Analysis of risk factors related to cases of end-stage CKD in the three reference centers showed that hypertension (83.3%), smoking (45.3%) and diabetes mellitus (45%) were the ones who presented the greatest percentage of occurrence and statistical significance. See in table 3.

Table 3: Risk factors of patients with end-stage CKD in RRT, Belém/PA, 2017.

Risk factors	N	(%)
Arterial hypertension*	**274**	**83.3**
Smoking*	149	45.3
Diabetes mellitus*	148	45.0
Peripheral vascular disease	77	23.4
Chronic kidney disease family	74	22.5
Obesity	70	21.3
Nephrotoxic drugs	53	16.1
Lithiasis	52	15.8
Cerebrovascular accident	51	15.5
Heart failure	47	14.3
Coronary heart disease	25	7.6
Another risk factor	27	8.2

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2017.
*p-valor <0.0001 (binomial test comparison with other Comorbidities).

As for the conditions or determinants of etiological end-stage CKD in patients analyzed, hypertension (78.6%) and diabetes melittus (43.2%) presented more expressiveness with statistic p-value < 0.0001.

Table 4: Conditioning Factors of patients with end-stage CKD in RRT, Belém/PA, 2017.

Conditioning Factors	N	(%)
Hypertension*	259	78,7
Diabetes*	144	43,8
Nephrolithiasis	12	3,6
Polycystic kidneys	8	2,4
Chronic Glomerulonephritis	1	0,3
Other	73	22,2
Undefined	26	7,9

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2017.
*p-valor <0.0001 (binomial test comparison with other Conditions).

As for the travel time used by patients with end-stage CKD to reach their final destination, RRT, it was observed that most accomplishes the route in the time interval up to 1 hour (79.3%), with p value < 0.0001.

Table 5: Travel time of end-stage CKD patients in RRT, Belém/PA, 2017.

Travel time (Hours)	N	(%)	P Value
Up to 1 hour	261	**79.3**	<0.0001
Of 1 to 2 hours	22	**6.7**	
Of 2 to 3 hours	22	**6.7**	
Up to 3 hours	24	**7.3**	
Total	329	**100.0**	

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2017.

With regard to the diagnosis of patients with end-stage CKD was verified that most occurred in the municipality of origin (64.7%) and, yet, it was observed that for the majority of patients (70.2%) the CKD with need for RRT not defined the location of residences. However, a large contingent (29.8%) reported having to change the city for the purpose of performing the treatment.

Table 6: Location of diagnosis, change of domicile for patients in RRT, Belém/PA, 2017.

Variables	N	(%)	P-Value
End-stage CKD Diagnosis in the municipality of origin			
Yes*	213	64.7	**<0.0001***
Not	116	35.3	
Local housing defined disease		-	**<0.0001***
Yes	98	29,8	
Not*	231	70,2	

Source: research and Protocol EPIGEO/DSCM/CCBS/UEPA, 2017.

4. Discussion

The CKD is recognized as a complex disease, with great social and economic burden, which requires multiple approaches to your understanding. Throughout the development of the analysis, it was observed that the assistance to patients with end-stage CKD is today an important public health problem in our country and in the world (Couchoud et al., 2012). In the State of Pará in the northern region, the number of cases kept in chronic dialysis program has increased in recent years (Pará, 2015). In this context, the analysis of the variables related to the individual, not the particular trend was observed in patients with end-stage CKD in RRT, this fact corroborates with works made in Brazil (Dutra et al., 2013; Sesso et al., 2017). However, studies conducted by Goldberg (2016) noted that women tend to be more affected, but by the hormone is most severe CKD and with higher rates of progression in men.

The majority of the population registered presented ethnic brown. This fact may be related to ethnic formation characteristic in Brazil (Moran, 1990). The large presence of Browns in the Amazon region is due to the fact that the process of miscegenation of indigenous peoples with Europeans and Africans, and in the State of Pará 73% of the population declares himself brown (Pará, 2012). This fact constitutes a particularity in Brazil, because the study ELSA-Brazil higher prevalence of CKD identified in blacks, Browns and Indians (Barreto et al., 2015). On the other hand, it was observed a predominance of white people in patients on RRT in the Triângulo Mineiro (Cravo et al., 2011) and in a population of southern Brazil with CKD.

Studies claim that individuals of African descent have a four times greater risk of developing CKD over Caucasians.. It may be related to the presence of the gene variants responsible for codifying the apolipoprotein L1 (APOL1 gene), which is responsible for various etiologies of CKD, among them the nephrosclerosis, global focal glomerulosclerosis, hypertensive nephropathy associated with human immunodeficiency virus (HIV) and lupus nephritis (Kasembeli et al., 2015; Moura et al., 2015).

The age group most affected was observed between 50 to 59 years old and in accordance with the data of the Brazilian Investigation of Chronic Dialysis (Sesso et al., 2016). The literature demonstrates the increase of patients on dialysis in older population (Sampaio et al., 2013; Menezes et al., 2015). This fact may be related to pathological findings of glomerular sclerosis, tubular atrophy and vascular sclerosis associated with aging and epidemiological studies that identify higher prevalence of reduction in glomerular filtration rate and increasing albuminuria in elderly (Kdigo, 2012). Studies point to the direction of the increasing prevalence of CKD and end-stage CKD in individuals 60 years > in recent decades in Brazil and in the world (Moura et al., 2015; Delanaye; Glassock, 2015).

The majority of reported cases showed low schooling represented by elementary school. This factor may possibly be related to ignorance regarding CKD and their risk factors and progression, the lack of preventive health care and difficulties relating to access to treatment. Similarly, people who earn up to one minimum salary were those who presented a higher involvement of end-stage CKD in the study.

The low education and income individuals, therefore, have low social economic status and are considered socially vulnerable. They are more susceptible to all manner of iniquities, including inadequate food, rich in salt and fat; as the difficulty of access to health services in both primary health care services of high complexity, due to distance, offset or even low service coverage, particularly in rural locations (Patzer; Macclellan, 2012; Lalloué et al., 2013; Kihal-Talantikite et al., 2014). From another perspective, a study compared the prevalence of CKD in the United States and the Netherlands, from the perspective of access to health care related to income and education. It concluded that in the US, where access to health care depends on income, CKD is more strongly associated with income than population education, while in the Netherlands, where health care is universal, CKD is more closely associated with less educated individuals. Therefore, low socioeconomic status seems to be associated with CKD (Vart et al., 2013).

It was noted also in this social group that cardiovascular diseases, hypertension and diabetes mellitus assume more relevant dimension on impact of development of CKD as they do not find favorable conditions for its large scale monitoring and control (Crestani Filho; Rodrigues, 2013). Studies show the association between low socioeconomic status and proteinuria, progressive loss of kidney function and end-stage CKD, for both developed and developing countries (Sampaio et al., 2013; Moura et al., 2015). The analysis of the number of cases of CKD showed differences between the percentages of patients in RRT reference centers in the State. The highest percentage of number of cases was observed in the RRTS 3, which can be justified due to the amount of dialysis places and because it is the largest service of RRT among the analyzed in this study. The three centers are located in different districts of the urban area of Belém, capital of Pará State, and serve patients from SUS. It is necessary to emphasize, that the RRTS 2, is a smaller unit, but inserted into reference hospital of high complexity.

With respect to risk factors, the variables that presented the highest statistical significance were high blood pressure, smoking and diabetes mellitus. In this sense, uncontrolled hypertension and diabetes are the main risk factors associated with CKD progression, as well as persistent proteinuria, obesity, smoking, use of nephrotoxic drugs, infections and urinary tract obstructions, dyslipidemia and diseases of the cardiovascular system (Moura et. al., 2015). In relation to hypertension the correlation with CKD can be explained by the transmission of systemic arterial hypertension the glomerular capillaries, resulting in high blood pressure and glomerular progression of glomerulosclerosis (Nahas; Khwaja, 2016).

The commitment of the vascular endothelium is associated with the risk of progression of kidney disease and increased cardiovascular morbidity. Mortality from cardiovascular diseases in patients with end-stage CKD is about ten to thirty times greater than in the general population (Jha et al., 2013). In this way the actions to identify individuals at risk of developing CKD and progress to loss of kidney function through monitoring of patients with comorbidities such as heart failure, peripheral arterial disease, stroke cerebral, coronary insufficiency, in addition to high blood pressure by itself (Alves et al., 2017).

The presence of hypertension as the primary risk factor in this work is in accordance with other studies (Cravo et al., 2011; Alves et al., 2017). In Brazil, hypertension and diabetes remain the main causes of primary nephropathy leading to CKD in RRT (Sesso et al., 2017). However, the diabetes is still the leading cause of CKD and end-stage CKD in the world (Stanton, 2014; Abou-Saleh et al., 2016; Narres et al., 2016; Usrds, 2017).

Diabetes kidney injury can be considered multifactorial and is associated with activation of metabolic, inflammatory and hemodynamic pathways, which determine protein glycosylation, reactive oxygen species generation, renin-angiotensin-aldosterone system activation, endothelial dysfunction, glomerular capillary hypertension and proteinuria, the latter considered a marker of CKD progression. Once initiated the diabetic kidney disease, regardless of route of activation, the progression is given by the accumulation of connective tissue, renal fibrosis and healing process (MacIsaac et al., 2014). The possible genetic factors involved in the pathogenesis of diabetic kidney disease await better scientific elucidation (Ma; Cooper, 2017).

Diabetes mellitus was identified as the primary etiology for the CKD in patients accompanied in the municipality of Santarém, Pará, in whom hypertension and proteinuria were the main factors for CKD progression. Study in a medium-sized municipality of Minas Gerais observed prevalence of 17.3% of CKD in hypertensive subjects and diabetic patients enrolled in hypertension and diabetes program, without prior knowledge of that diagnosis (Alves et al., 2017). Another risk factor for cardiovascular disease is cigarette smoking, which, admittedly, is an independent factor for the progression of CKD, due to their direct effects, and thromboembolic vasoconstrictors on the vascular endothelium (Bastos; Kirsztajn, 2011). Accordingly, the suspension of smoking is one of the measures recommended for the reduction of CKD progression. (Kdigo, 2012).

The analyses showed the report of more than one primary cause of CKD etching factor, possibly due to the superposition of diagnoses of hypertension and diabetes in large number of patients. In Brazil, hypertension and diabetes remain the main causes of primary nephropathy leading to CKD in RRT (Sesso et al., 2017). The study also noted the large number of cases whose etiological factor or condition was reported as indefinite (7%) or assigned to other causes (22.3%). It was in accordance with the study of the epidemiological profile of patients on dialysis by SUS in Brazil during the period from 2000 to 2012, which identified 42.3% of patients with undetermined cause of CKD (Moura et al., 2014).

The reliability of this data type has been reported as a challenge, since many patients arrive at the RRT without previous medical follow-up, even less by doctor nephrologist and no data enabling accurate etiological diagnosis, as for example renal biopsy or clinical trials (Liu et al., 2015; Usrds, 2017). In the population examined it was observed that 64.7% of patients had diagnosis of end-stage CKD in their municipalities of origin showing that, somehow, there was access to health care and diagnosis for most individuals around their residences. This suggests that the health assistance can reach these patients in any stage of CKD, however unable to serve them fully in their need for high-complexity treatment by SUS, in the case in question, the RRT. It reflects a situation of low resolution in the basic attention and with low ability to effect liaison with higher-density technology services (Ouverney; Noronha, 2013; Sampaio et al., 2013).

However, we observed in the study a percentage of 70.2% of patients for which the end-stage CKD not defined the location of housing, i.e., did not change their home due to the disease, either because they live in the city where the RRT is offered, either because undergoing dislocations toward the treatment site. At the same time that 41.03% do not reside in the municipality where the RRT and require offsets greater than 50 km, reaching over 200 km to commit their treatment and are therefore beneficiaries of treatment outside of address in SUS.

The social, economic and merely physical impact, when taken into account the situation of organic weakness inherent in end-stage CKD for the patient and his family is of utmost importance in the decision to change or not of city to be close to the treatment imposed for the maintenance of life, because many patients do so simply for lack of choice, both to face extensive and repeated displacements, and to leave their homes for the sake of life. The effect of distance on access to treatment shows that people move more in search of more complex care (Oliveira, 2004). There is a gap between the secondary care level of attention and referral to the specialist in CKD care, even for patients with advanced disease, setting up a major barrier to access to treatment and undermining the principle of care integrality.

5 Conclusion

In this study, was analyzed the epidemiological and socioeconomic profile of individuals affected by end-stage CKD, marked to be adults, browns, low education and income, without predominance by genre, whose main risk factor and condition of CKD was hypertension.

The present study raises the need to expand the research to the regions where an epidemiological silence about CKD was observed in order to meet its social, clinical and epidemiologic determinants, seeking to identify the existence of possible social vulnerability in the State and to contribute in a rational way in the formulation and implementation of public policies in the field of Nephrology.

References

Abou-Saleh, A.; Bain, S.; Goldsmith, D. J. A. (2016). *Abordagem do Paciente Diabético com Doença Renal Crónica.*In: Jonhson, Richard J.; Feehally, Jonh; Floege, Jürgen. NefrologiaClínica: AbordagemAbrangente. 5. ed. Rio de Janeiro: Elsevier, Cap. 32. p. 381-389.

Alves, L. F. et al. (2017). *Prevalence of chronic kidney disease in a city of southeast Brazil.*Jornal Brasileiro de Nefrologia, v. 39, n. 2, p.126-134.

Ayres, M. et al. (2007). *BioEstat: aplicações estatísticas nas áreas das ciências biológicas e médicas*. Belém: Sociedade Mamirauá. MCT-CNPq.

Barreto, S. M. et al. (2015). Chronic kidney disease among adult participants of the ELSA-Brasil cohort: association with race and socioeconomic position. *Journal Of Epidemiology And Community Health*, v. 70, n. 4, p.380-389.

Bastos, M. G.; Kirsztajn, G. M. (2011). Doença renal crônica: importância do diagnóstico precoce, encaminhamento imediato e abordagem interdisciplinar estruturada para melhora do desfecho em pacientes ainda não submetidos à diálise. *Artigo de Revisão. Bras. Nefrol.*, v. 33, n. 1, p. 99-108.

Bastos, M. G.; Kirsztajn, G. M. (2011). Doença renal crônica: importância do diagnóstico precoce, encaminhamento imediato e abordagem interdisciplinar estruturada para melhora do desfecho em pacientes ainda não submetidos à diálise. *Artigo de Revisão. Bras. Nefrol.,* v. 33, n. 1, p. 99-108.

Bastos, R. M. R.; et al. (2009). Prevalência da Doença Renal Crônica nos Estágios 3, 4 e 5 em adultos. *Rev. Assoc. Med. Bras.*, v. 55, n. 1, p. 40-4.

Brasil. (2012). Resolução 466/2012. *Diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos*. Ministério da Saúde/Conselho Nacional de Saúde, Brasília- DF, 2012.

Brasil. (2014). *Diretrizes Clínicas para o Cuidado ao Paciente com Doença Renal Crônica*. DRC no Sistema Único de Saúde. Ministério da Saúde. Brasília-DF.

Couchoud, C. et al. (2012). Medical practice patterns and socio-economic factors may explain geographical variation of end-stage renal disease incidence. *Nephrology Dialysis Transplantation,* v. 27, n. 6, p.2312-2322.

Cravo, C. D. L. et al. (2011). Perfil epidemiológico dos pacientes em hemodiálise de um hospital universitário. *Ciência, Cuidado e Saúde,* v. 10, n. 1, p.110-115.

Crestani Filho, V. J.; Rodrigues, R. A. C. (2013). Progression of chronic kidney disease: ambulatory experience in Santarém - Pará. *Jornal Brasileiro de Nefrologia*, v. 35, n. 2, p.99-106.

Delanaye, P.; Glassock, R. J. (2015). Glomerular Filtration Rate and Aging: Another Longitudinal Study - A Long Time Coming. *Nephron*, v. 131, n. 1, p.1-4.

Dutra, M. C. et al. (2014). Assessment of kidney function in the elderly: a population-based study.*JornalBrasileiro de Nefrologia,* v. 36, n. 3, p.297-303.

Jha, V. et al. (2013). Chronic kidney disease: global dimension and perspectives. *The Lancet*, v. 382, n. 9888, p.260-272.

Kasembeli, A. N. et al. (2015). African origins and chronic kidney disease susceptibility in the human immunodeficiency virus era. *World Journal Of Nephrology,* v. 4, n. 2, p.295-306.

Kdigo. (2012). Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney International Supplements*, v. 3, n. 1.

Kdigo. (2013). Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney International Supplements*, v. 3, n. 1.

Kdoqi. (2002). Clinical practice guidelinesfor chronic kidney disease: evaluation, classification and stratification. *Am J Kidney Dis,* v. 39, n. 2, p. S1-S246.

KihaL-Talantikite, W. et al. (2014). Spatial distribution of end-stage renal disease (ESRD) and social inequalities in mixed urban and rural areas: a study in the Bretagne administrative region of France. *Clinical Kidney Journal*, v. 8, n. 1, p.7-13.

Lalloue, B. et al. (2013). A statistical procedure to create a neighborhood socioeconomic index for health inequalities analysis. *International Journal For Equity In Health,* v. 12, n. 1, p. 12-21.

Liu, F. X. et al. (2015). A global overview of renal registries: a systematic review. *Bmc Nephrology*, v. 16, n.1, p.16-31.

Ma, R. C. W.; Cooper, M. E. (2016). Genetics of Diabetic Kidney Disease—From the Worst of Nightmares to the Light of Dawn?.*Journal Of The American Society Of Nephrology,* v. 28, n. 2, p.389-393.

Macisaac, R. J.; Ekinci, E. I.; Jerums, G. (2014). Markers of and Risk Factors for the Development and Progression of Diabetic Kidney Disease. *American Journal Of Kidney Diseases*, v. 63, n. 2, p.39-62.

Menezes, F.G. et al. (2015). Panorama do tratamento hemodialítico financiado pelo Sistema Único de Saúde - Uma perspectiva econômica. *J. Bras. Nefrol.,* v. 37, n.3, p. 367-378.

Moran, E. F. (1990). *Ecologia humana das populações da Amazônia*. Petrópolis: Vozes.

Moura, L. de et al. (2014). Dialysis for end stage renal disease financed through the Brazilian National Health System, 2000 to 2012. *BmcNephrology*, v. 15, n. 1, p.1-6.

Moura, L. de et al. (2015). Prevalência de autorrelato de diagnóstico médico de doença renal crônica no Brasil: Pesquisa Nacional de Saúde, 2013. *Revista Brasileira de Epidemiologia*, v. 18, p.181-191.

Nahas, M. E. l.; Khwaja, A. (2016). *Epidemiologia, História Natural e Fisiopatologia da Doença Renal Crônica*.In: Johnson, Richard J.; Feehally, John; Floege Jürgen. NefrologiaClínica: AbordagemAbrangente. 5. ed. Rio de Janeiro: Elsevier, Cap. 79. p. 916-930.

Narres, M. et al. (2016). The Incidence of End-Stage Renal Disease in the Diabetic (Compared to the Non-Diabetic) Population. *A Systematic Review. Plos,* v. 11, n. 1, p.1-28, 26.

Nice. (2014). *Early Identification and Management of Chronic Kidney Disease in Adults in Primary and Secondary Care*.

Oliveira, E. X. G. de; Carvalho, M. S.; Travassos, C. (2004). Territórios do Sistema Único de Saúde – mapeamento das redes de atenção hospitalar. *Cad. Saúde Pública,* Rio de Janeiro, v. 3, n. 4, p.386-402.

Ouverney, A. M.; Noronha, J. C. (2013). Modelos de organização e gestão da atenção à saúde: redes locais, regionais e nacionais. In FUNDAÇÃO OSWALDO CRUZ. *A saúde no Brasil em 2030* - prospecção estratégica do sistema de saúde brasileiro: organização e gestão do sistema de saúde [online]. Rio de Janeiro: Fiocruz/Ipea/Ministério da Saúde/Secretaria de Assuntos Estratégicos da Presidência da República, v. 3. p. 143-182.

Pará. (2012). *Equipe Técnica do Nisplan*. Secretaria de Estado de Saúde Pública (Comp.). PLANO ESTADUAL DE SAÚDE DO PARÁ: PES-PA 2012-2015. Belém: 248 p.

Pará. (2015). Resolução CIB/PA nº 113 de 21 de setembro de 2015. Aprova o Plano Estadual de Atenção ao Portador de Doença Renal Crônica 2015 - 2019. *Diário Oficial do Estado,* Belém, PA, Nº 32978, 2015.

Patzer, R. E.; Mcclellan, W. M. (2012). Influence of race, ethnicity and socio economic status on kidney disease. *Nature Reviews Nephrology*, v. 8, n. 9, p.533-541.

Rodriguez, R. A.; Hotchkiss, J. R.; O'hare, A. M. (2013). Geographic information systems and chronic kidney disease: racial disparities, rural residence and forecasting. *Journal Of Nephrology,* v. 26, n. 1, p.3-15.

Sampaio, R. M. M. et al. (2013). Perfil epidemiológico de pacientes nefropatas e as dificuldades no acesso ao tratamento. *Revista Brasileira de Promoção à Saúde,*Forteleza, v. 1, n. 26, p.95-101.

Sesso, R. C. et al. (2017). Brazilian Chronic Dialysis Survey 2016. *Jornal Brasileiro de Nefrologia,* v. 39, n. 3, p.261-266.

Stanton, R. C. (2014). Clinical Challenges in Diagnosis and Management of Diabetic Kidney Disease. *American Journal Of Kidney Diseases*, v. 63, n. 2, p.3-21.

Usrds. (2017). *United States Renal Data System annual data report:* Epidemiology of kidney disease in the United States. National institutes of Health, National institute of Diabetes and Digestive and Kidney Diseases. Bethesda, MD.

Vart, P. et al. (2013). Socioeconomic Measures and CKD in the United States and The Netherlands.*Clinical Journal Of The American Society Of Ne*