

Chronic Kidney Disease and Associated Risk Factors in Isolated African-Brazilians Communities: Data from Prevrenal Study

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Abstract: ***Background:** The prevalence of chronic kidney disease (CKD) in the early stages is unknown. Clinical conditions associated with this loss of renal function, including systemic hypertension, diabetes, anemia, dyslipidemia, metabolic syndrome, and cardiovascular risk are also poorly studied. Data from the PREVRENAL study are intended to provide new information on the development and progression of CKD in a specific population group. **Main body:** In 32 isolated communities of African slave descendants, 1,539 people were evaluated. The study was conducted in three phases: in the first stage, a clinical, nutritional and anthropometric evaluation was performed; measurements of serum and urinary markers were provided; and exams related to other comorbidities were performed. The second stage consisted of repeated examinations in individuals diagnosed with CKD, systemic arterial hypertension and / or diabetes mellitus; patient selection for imaging exams was performed; and the cardiac risk is calculated. Long-term monitoring of all individuals will be the last phase of the study. The dataset deposited here describes the results of the first and second stages. **Conclusion:** Thus, we hope that the data set can improve the knowledge about the onset and progression of CKD, as well as the associated risk factors, mainly applied to the population of African descent.*

1. Background

Due to the large increase in cases, chronic kidney disease (CKD) has become a serious public health problem worldwide [1, 2]. In Brazil, studies on the prevalence of CKD are still scarce, especially in the early stages of the disease, where approximately 40% of the population is of African origin. Studies in other countries, especially the United States, suggest that kidney disease is more commonly found in the population of African descent, especially when compared with other ethnicities [3,6]. Many other studies have also shown high rates of adverse cardiovascular events [7,8], diabetes mellitus (DM) and obesity, among other risk factors [9,10] in this group. The

literature also does not provide detailed discussion of the processes involved in arteriosclerotic disease and its relationship with the different glomerular filtration rates (GFR) among Brazilian descendants. Based on the assessment of the African descent population living in isolated Brazilian communities (quilombos), new information on the development and progression of CKD within a specific population group may emerge. Concomitant to this, and in these same individuals, demographic, clinical and laboratory aspects were measured to identify factors associated with the development of cardiovascular diseases.

1.1 Methods and data

The study was conducted in the city of Alcântara, northeastern Brazil. In overall, the city has 139 quilombolas communities. In the first stage, randomized selection of quilombolas communities was performed. Thirty two of them was selected. In the next step, households were randomly chosen. Finally, all individuals aged 18 years or older from each previously chosen households were included in the study sample and a face-to-face interview was conducted. The final sample size was calculated using a combined factors: expected CKD prevalence (15%), Radom sampling error (2%), and confidence interval (95% CI). After applying all these parameters, the selected sample was composed of 1,539 volunteers. Individuals with preexisting medical conditions were excluded: pregnancy, consumptive, neoplastic, hematologic, thyroid and autoimmune diseases, infections, end-stage renal disease, and those using immunosuppressant drugs. The training of a multidisciplinary team in all study procedures was performed in advance. Three phases were established to achieve the study objectives. In the first stage, clinical, nutritional and anthropometric evaluations were performed, measurements of serum and urinary markers for CKD and examinations to detect other comorbidities (systemic arterial hypertension (SAH), DM, cardiovascular diseases, obesity and dyslipidemia) were determined. On the day after blood pressure measurement, anthropometric measurements and the completion of epidemiological data, blood and urine were collected. In the first stage, clinical, nutritional and anthropometric evaluations were performed, as well as the measurement of serum and urinary markers for CKD and tests to detect other comorbidities (systemic arterial hypertension (SAH), DM, cardiovascular disease, obesity and dyslipidemia). On the day after blood pressure measurement and anthropometric measurements, blood and urine were collected. In a future attempt to establish the best formula for early stage CKD detection, GFR was calculated using four equations, three of them from the from the Chronic Kidney Disease - Epidemiologic Collaboration Equation (CKD-EPI) study. After the first stage, 437 patients with reduced GFR, hypertension, DM and / or high albuminuria were selected for the second stage, which consisted of albuminuria examination and cardiac risk

assessment. After the first stage, 437 patients with any pathological conditions (reduced GFR, DM, hypertension, albuminuria) were selected for the second stage, which consisted of albuminuria examination and cardiac risk assessment. The latter was estimated using de Framingham score [11], tomographic measurement of visceral fat, two-dimensional ultrasonography of the carotid arteries, and computerized tomography of the coronary arteries. A part of the data collected during the first and second stage from this cohort is already available in the Figshare repository and is summarized in the data file Table 1 (data file 1, 2 and 3) [12-14]. The third (presently ongoing) stage included long-term monitoring of all CKD patients and / or their risk factors at the Kidney Disease Prevention Center, University Hospital of the Federal University of Maranhão. The frequency of further evaluations will be determined according to the needs of each patient, taking into account parameters such as blood pressure and glycemic levels, stage of kidney disease and albuminuria. For each patient return, all laboratory tests will be repeated, as well as appropriate therapy should be initiated, if necessary. These 437 patients will be followed up indefinitely and new recruitments in the quilombola communities will be performed every 5 years. From each patient, the plasma, serum, and urine samples were stored at -80°C freezer. Genetic ancestry testing will be used to identify bio-geographic ancestry. A previous paper with detailed description study methods was published [15].

Data collection analysis

The data were analyzed using the STATA 14.0 software. Categorical variables were presented through frequencies and percentages, the numerical by means and standard deviation (mean \pm SD). The normality of the numerical variables was assessed by the Shapiro-Wilk test. Association between the categorical variables was analyzed using the chi-square or Fisher's exact test. For continuous variables, group comparison will be based upon the results of the t-test or the Wilcoxon rank-sum test. To estimate the independent effect of variables, a multivariate linear regression model will be performed. The comparison of survival will also be performed based upon the log-rank test. Variables whose p values were < 0.05 were considered significant. Odds ratios (OR) and their confidence intervals were obtained (CI 95%).

Table 1: Overview of data files/data sets

Name of data file/data set	Description	File types (file extension)	Digital Object Identifier (DOI)
Carotid Atherosclerosis	Databank of the carotid atherosclerosis in 206 hypertensive Afro-descendants of remaining communities of quilombo de Alcântara, Maranhão, Brazil (2013)	.xlsx format	10.6084/m9.figshare.6141485
Coronary Atherosclerosis	Databank of the coronary atherosclerosis in 155 Afro-descendants of remaining quilombo communities of Alcântara, Maranhão, Brazil (2013).	.xlsx format	10.6084/m9.figshare.6141470
PrevRenal Project	Databank of the Prevrenal study that included 1447 Afrodescendants living in quilombo communities remaining in Alcântara, Maranhão, Brazil (2013).	.xlsx format	10.6084/m9.figshare.6139967
25(OH) Vitamin D vs CIMT	Association between 25(OH) Vitamin D and carotid intimal medial thickness in Afro-descendants of remaining quilombo communities of Alcântara, Maranhão, Brazil (2013)	.xlsx format	10.6084/m9.figshare.6914495

2. Discussion

It is certain that the whole dataset can be useful for subsequent studies interested in African descent groups, if missing information to this area of research is provided. We have used datasets from the first stage of the PREVRENAL study in two manuscripts that were previously published, one of them correlating serum levels of 25-hydroxyvitamin D with carotid intima-media thickness and another one that evaluates the urinary excretion of sodium [16,17]. Still from the first stage, other publications will be carried out, following the lines of study of each researcher. Over time, as new articles are published, their respective data will be deposited automatically.

The most significant results will be obtained in the last phase of the study, where patients will be monitored and evaluated periodically and we will be able to respond to several gaps in the literature, such as those related to the development of arteriosclerosis in individuals with pre-uremic stages of CKD. This will allow the adoption of therapeutic and preventive measures that enable the reduction of cerebrovascular and coronary events, reducing the high morbidity and mortality in this group of patients. To date, there are still no studies that adequately assess the factors associated with coronary calcification in African descent patients. In fact, the relationship between arteriosclerosis and CKD in different ethnic groups is not well established [18]. In addition, the study has the advantage of comparing four different GFR equations and establish the optimal approach to estimate GFR over a long period of time.

Some limitations are inherent in this type of study. The study population lives in a hard-to-reach region, making it difficult to monitor the entire sample. The Afro-descendant Brazilian population, as well as the world, has several origins have diverse origins; therefore, the results of our research cannot be automatically applied to this entire ethnic group, making data sharing even more important for concrete results. It is also important to highlight that therapeutic interventions along the follow-up will interfere with the natural course of the disease.

3. Conclusion

The PREVRENAL dataset may improve our understanding CKD progressing in a specific ethnic group. This knowledge can inform future treatment and care, as well may be used as risk assessment tools in clinical practice. In addition, these data may be used by other researchers interested in this population and issue.

Abbreviations

CKD: Chronic kidney disease

CKD-EPI: Chronic Kidney Disease - Epidemiologic Collaboration Equation

DM: diabetes mellitus

GFR: Glomerular Filtration Rate

SAH: Systemic Arterial Hypertension

4. Declarations

Authors' contributions

All authors have contributed sufficiently to the project to be included as authors. NSF conceived the study concept and obtained funding. RCCS designed and reviewed the manuscript. DJAB, GASS and RSCDS took responsibility for the integrity of the data and the accuracy of the data analysis. JSL, GEBS and FCMJ wrote the manuscript, elaborated tables and figures, participated in the analysis and interpretation of data. JVLS participated in drafting the article or revising it critically for important intellectual content. DVA participated in the research design and development and refinement of the methodological approach. NSF, DJAB and JVLS are responsible for data collection. All authors read and approved the final version to be published.

5. Acknowledgements

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6. Competing interests

The authors declare that they have no competing interests.

7. Availability of data materials

The datasets generated during and/or analyzed during the current study are available in the Figshare repository (Brito DJA, Silva GEB, Santos EM et al. Dataset Carotid Atherosclerosis. Available from: <https://figshare.com/s/d7a806e27e9378dac34c>; Brito DJA, Silva GEB, Santos EM et al. Dataset Coronary Atherosclerosis. Available from: <https://figshare.com/s/3f39c1609334ae373da4>; Salgado-Filho N, Lages JS, Santos EM et al. Dataset PrevRenal Project. Available from: <https://figshare.com/s/e8d8303d6e62e7c8d81e>. Dataset 25(OH) Vitamin D and carotid intimal medial thickness. Available from: <https://figshare.com/s/46a52d5363c5fa3fb4ca>. Please see Table 1 and reference list for details and links to the data.

8. Consent for publication

Not applicable.

9. Ethics approval and consent to participate

The study was approved by the Research Ethics Committee of the University Hospital of the Federal University of Maranhão (n° 41492/2012) and Paulista School of Medicine (n° 51405/2012). provided informed consent. Informed and written consent are obtained from all participants.

10. Funding

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