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CLINICAL-EPIDEMIOLOGICAL PROFILE OF PATIENTS OF A MEDICAL TEACHING UNIVERSITY CENTER IN THE AMAZON

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ABSTRACT

Introduction: Renal system diseases, including Chronic Kidney Disease (CKD), Nephrolithiasis, Glomerulopathies, Diabetic Nephropathy, and recurrent Urinary Tract Infections (UTIs), significantly impact patient health, necessitating hospitalizations and hemodialysis, thereby affecting quality of life and healthcare costs. ***Objective:*** This study aimed to profile these diseases at the Nephrology outpatient clinic of CEMEC (CESUPA Medical Specialties Center) to enhance patient care strategies. ***Methodology:*** Data from 302 patients, predominantly women (66.6%) over 50 years (83.1%), were collected from January 2022 to June 2023. Statistical analysis utilized BioEstat and SPSS 21, including the Chi-square goodness-of-fit test and G-test. ***Results:*** Prevalent conditions included CKD (stages G3-G5 with high albuminuria), Polycystic Kidney Disease, renal lithiasis, UTIs (mainly E. Coli-related), and Glomerulopathies. Treatment involved statins, Angiotensin II Receptor Blockers (ARBs), Erythropoietin, and Ferrous Sulfate. Laboratory tests focused on Creatinine, Hemoglobin, and Vitamin D levels, showing normal parameters in patients with Nephrolithiasis and Autosomal Dominant Polycystic Kidney Disease. ***Conclusion:*** This study highlights the importance of tailored management strategies, early interventions, and integrated approaches to address the challenges posed by CKD and related conditions, aiming to improve patient outcomes and healthcare delivery.

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INTRODUCTION

According to the Brazilian Society of Nephrology (SBN), Nephrology is a medical specialty dedicated to the diagnosis and clinical treatment of diseases of the urinary system, mainly related to the kidney. The most frequent pathologies in the outpatient routine of Nephrology are represented by Chronic Kidney Disease (CKD), Nephrolithiasis, Glomerulopathies, Diabetic Nephropathy, and recurrent Urinary Tract Infections (UTIs). Chronic Kidney Disease (CKD) is considered a public health problem that affects people of all racial and ethnic groups in society. It is characterized by a progressive and irreversible loss of kidney function, resulting in an abnormal excretion of albumin and disturbances in homeostasis. In 2017, the prevalence of CKD was estimated at 9.1% of the global population, representing more than 700 million cases, showing an increase of 29.3% in prevalence since 1990. It is estimated that 3 out of every 100 individuals in Brazil have the disease, and that 5 out of every 10,000 require renal replacement therapy.

CKD can be characterized as a decrease in kidney function, indicated by a glomerular filtration rate (GFR) of less than 60 ml/min/1.73m² and/or markers of kidney damage, or both, lasting greater than or equal to three months. GFR is an available indicator of kidney function, estimated from exogenous markers such as inulin (gold standard) or endogenous markers such as serum creatinine. The staging of CKD proposed by KDIGO (reference) is divided into the following groups: G1 = ≥90 mL/min/1.73 m², G2 = 60 to 89 mL/min/1.73 m², G3a = 45 to 59 mL/min/1.73 m², G3b = 30 to 44 mL/min/1.73 m², G4 = 15 to 29 mL/min/1.73 m², G5 = <15 mL/min/1.73 m². CKD can also be defined by evidence of kidney damage, usually albuminuria (A1 <30 mg/g; A2 >30 mg/g and less than 300 mg/g; A3 >300 mg/g). At the time of kidney failure (stage 5), renal replacement therapy, mainly hemodialysis, is indicated. Nephrolithiasis, also called renal lithiasis, is a common pathology in the routine of the nephrology outpatient clinic and is characterized by the concentration and formation of crystals in the urinary tract, popularly known as "kidney stones." These stones tend to form mainly in the renal calyces and pelvis. Their formation in the urine

occurs from the aggregation of organic compounds and some minerals, with the most related to calculi being the saturation of calcium, phosphate, oxalate, ammonium, uric acid, and the concentration of hydrogen (pH). However, other substances inhibit crystallization, including urinary citrate and magnesium. Therefore, urinary supersaturation of crystals represents the main risk factor for the disease, and other factors are influenced by decreased urinary pH and volume, as well as the presence of bacteria. Calcium oxalate stones represent the majority of renal lithiasis cases, accounting for about 70% of all cases. Another 15% are magnesium ammonium phosphate crystals (struvite stones), 5 to 10% are uric acid stones, and 1 to 5% are cystine stones.

Regarding the clinical presentation of renal lithiasis, the most characteristic symptom of the disease is renal colic, also known as nephritic colic, where the patient experiences intense pain that can become unbearable in a short period, often associated with nausea, vomiting, and episodes of hematuria. Upon clinical suspicion of nephrolithiasis, the diagnosis should be confirmed by imaging, with non-contrast abdominal computed tomography being the gold standard. In special cases, such as in pregnant patients or when there is diagnostic uncertainty with other differential diagnoses like cholecystitis and gynecological conditions, ultrasonography can be an option. Although it has low sensitivity for small stones and distal ureterolithiasis, it has good sensitivity for detecting hydronephrosis, a common complication in this pathology, and renal pelvis stones. Laboratory investigation can be performed with two or more 24-hour urine samples to assess possible causes of stone formation, including inadequate hydration, hypercalciuria (>4 mg/kg/day), hyperuricosuria (>750 mg/day in women and 800 mg/day in men), hyperoxaluria (>44 mg/day), cystinuria (>100 mg/day), and hypocitraturia (≤ 320 mg/day). An isolated urine sample should be requested for urinary sediment, pH, and culture. Other laboratory tests may be requested to complement the diagnosis, including a complete blood count, serum levels of calcium, phosphorus, albumin, creatinine, bicarbonate, uric acid, and PTH to investigate hyperparathyroidism, which is a significant risk factor for stone formation.

Pain associated with nephrolithiasis is a common symptom that usually requires treatment. Nonsteroidal anti-inflammatory drugs (NSAIDs), which act by blocking the afferent arteriole, reducing GFR, and relieving patient pain, are the first-choice drugs. Diclofenac and naproxen are examples of this class, with diclofenac being the most studied, demonstrating greater efficacy and safety. However, in cases of symptomatic refractory pain, opioids may be necessary. These are more potent medications that act on the nervous system, reducing pain stimuli, but they may present more serious adverse effects such as dizziness, vomiting, decreased consciousness, and respiratory depression. The most commonly used are tramadol (50-100 mg/dose), meperidine (1 mg/kg), and morphine (0.1 mg/kg). Smaller stones located more distally may benefit from expulsive therapy with alpha-blockers like tamsulosin to promote ureteral relaxation and facilitate stone elimination. Glomerular diseases can have a secondary cause (lupus nephritis, diabetic nephrosclerosis, etc.) as well as a primary one. Glomerular lesions present as nephritic syndrome and nephrotic syndrome. Nephritic syndrome is characterized by hematuria, edema, and systemic arterial hypertension. Nephrotic syndrome, on the other hand, is characterized by edema, hypoalbuminemia, and proteinuria (greater than 3.0 g/24h), and can also present with hyperlipidemia. Glomerular pathologies can present with only one component of the described syndromes, with an association of the two syndromes (nephrotic and nephritic components), and with other signs and symptoms such as oliguria and loss of renal function.

For the diagnostic investigation of glomerular diseases, the following should be requested: urinalysis, glomerular filtration rate assessment, 24-hour proteinuria, creatinine, cholesterol, triglycerides, total and fractionated proteins, blood glucose, complete blood count, coagulation profile, complement measurement, ANA, ANCA, serologies for hepatitis B, C, HIV, and syphilis, as well as protein electrophoresis to investigate secondary causes that justify glomerulopathies. The gold standard examination for the diagnosis and classification of glomerular diseases is renal biopsy, which is an invasive and rarely available procedure, making diagnosis through this test challenging. Once a primary glomerulopathy is diagnosed, specific treatment is instituted, ranging from clinical measures to immunosuppression. In secondary glomerulopathies, the priority should be the treatment of the underlying disease causing the glomerular alteration. Diabetic kidney disease is characterized by excess glucose, which induces systemic and intra-renal inflammation, playing a role in the pathogenesis of diabetic kidney disease. This condition is one of the leading causes of dialysis-dependent kidney disease worldwide. Its pathogenesis is complex, multifactorial, and not yet fully elucidated. Its diagnosis is characterized by urinary albumin excretion (UAE) > 30 mg/24h or albumin-creatinine ratio (ACR) greater than or equal to 30 mg/g of creatinine, or glomerular filtration rate (GFR) < 60 ml/min/1.73 m² for a period equal to or greater than three months. The treatment is based on preventing the progression of diabetes mellitus with the use of oral antidiabetics, as well as nutritional treatment, physical exercises, monitoring, and education. Additionally, the use of antihypertensive medications such as angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) is useful for reducing the progression from microalbuminuria to clinical proteinuria, delaying the loss of glomerular function. A new option for the treatment of diabetic kidney disease is the use of SGLT2 inhibitors (SGLT2i). Moreover, the drug can be used for patients with diabetes mellitus as well as for patients without the comorbidity. This medication has shown a reduction in the effects of hyperglycemia, cardiovascular diseases, and the progression of chronic kidney disease, in addition to reducing hospitalization rates for any cause, being considered a good therapeutic option for patients with diabetes mellitus who have diabetic kidney disease.

Objectives

- To determine the clinical-epidemiological profile of patients with nephrological diseases at the Nephrology Outpatient Clinic at CEMEC (Center of Medical Specialties of Cesupa).
- Determine the clinical-epidemiological profile of patients with nephrological diseases at the Nephrology Outpatient Clinic at CEMEC (Center of Medical Specialties of Cesupa).
- Establish which nephrological diseases are most prevalent at the outpatient level.
- Establish the Creatinine Clearance (CrCl) of patients with nephrological diseases at the outpatient level.
- Evaluate the main associated comorbidities in patients with nephrological diseases.
- Elucidate the most commonly used therapeutic management for each nephrological disease addressed in the outpatient setting, considering pharmacological and non-pharmacological approaches.
- Determine the main complementary exams used in the diagnostic investigation of nephrological diseases.
- Define the most common type of kidney stone in patients with nephrolithiasis.
- Determine if patients with Chronic Kidney Disease (CKD) are already using erythropoietin.
- Define the most prevalent type of bacteria in patients with Urinary Tract Infection (UTI).

METHODOLOGY

The research project is ethically in accordance with the Nuremberg Code and the Helsinki Declaration. Additionally, the research project has been submitted to Plataforma Brasil and the Research Ethics Committee (CEP) of the Centro Universitário do Estado do Pará (CESUPA). The research project also complies with Resolution No. 466 of December 12, 2012, ensuring confidentiality, minimizing and avoiding any risks to participants, and conducting research with the permission of the institution providing the data, as evidenced in the Data Use Commitment Agreement, along with the approval of the

supervisor and the proposing institution. Simultaneously, the results of this research will be made public, whether they are favorable or not. Publication will be achieved through conference proceedings and scientific journal articles. This work is an observational, retrospective, and quantitative study conducted through the analysis of data from medical records of patients with nephrological diseases registered at CEMEC and the Nephrology Outpatient Clinic from January 2022 to June 2023. Researchers recorded data using a questionnaire designed to gather necessary information for identifying the clinical-epidemiological profile of the patients. The analysis of medical records was authorized by CEMEC to obtain data on the clinical-epidemiological profile of patients with nephrological diseases. It concerns patients registered and treated at CEMEC in the Nephrology Outpatient Clinic from January 2022 to June 2023, who were diagnosed with some nephrological disease. Their medical records were analyzed, examining the most recent clinical presentation up to the data collection date. CEMEC will grant prior approval for the participation of all patients included in the research, contingent upon signing the Data Use Commitment Agreement (TCDU), allowing researchers access to use the data. The research was conducted at the Centro de Especialidades Médicas do Cesupa (CEMEC) by students in the 11th semester of the same institution. CEMEC is located at Av. Gov. José Malcher, 1242 - São Brás, Belém - PA, 66060-230.

All patients diagnosed with nephrological diseases and under follow-up at the Nephrology Outpatient Clinic at CEMEC were included, during a specified period, regardless of religion, race, or gender. Participants of any age who had their last outpatient visit between January 2022 and June 2023 were included. Excluded were patients whom CEMEC did not authorize access via the TCUD (Data Utilization Commitment Agreement), or those whom CEMEC wished to withdraw from the study at any point during its course, without any cost or harm to them. Also excluded were patients who did not have any follow-up visits during the period from January 2022 to June 2023. We evaluated 302 medical records of patients actively followed in the Nephrology outpatient clinic, following the inclusion and exclusion criteria mentioned earlier. The information used in this study was systematically obtained through the analysis of physical and electronic medical records of the patients included in the research by the researchers, using a questionnaire filled with data from the most recent consultation up to the day of data collection. The data were collected only after approval by the Research Ethics Committee (CEP), from the medical records of patients who met the inclusion criteria established in section E. Data collection was carried out under the responsibility of the researchers, who systematically analyzed the patient records provided by CEMEC. Researchers used a questionnaire to record information from the records in an objective and systematic manner. After the collection period, the information from the questionnaire was compiled, organized, and statistically analyzed by the researchers. The results were then presented in graphs and tables. For statistical analysis, BioEstat and SPSS 21 software were used. The Chi-square test was used for goodness-of-fit tests, and the Student's t-test was used to compare independent samples. The significance level was set at $\alpha < 5\%$, with $p < 0.05$ considered statistically significant for rejecting the null hypothesis.

RESULTS

302 patients were analyzed, with a higher prevalence of females (66.6%). Regarding age, most patients were over 50 years old (83.1%), with the age group between 50 and 69 years being the largest proportion (42.4%), and 40.7% of patients were over 70 years old at the time of the study. Regarding the patients included in the study, 57.3% had Chronic Kidney Disease (CKD), 5.6% had Polycystic Kidney Disease, 4% had Kidney Stones (Nephrolithiasis), 2% had recurrent Urinary Tract Infections (UTIs), and 1.65% had Glomerular Diseases. In terms of CKD staging, we observed that 41.4% of CKD patients were in stage G3, 10.3% in stage G4, and 5.6% in stage G5. Albuminuria was observed in 65.5% of the patients, with stage A2 being seen in 34.8% of them. Among stage 3 CKD patients, 40.4% had A2 stage Albuminuria.

In stage G4, 36.3% of patients were in stage A3, and in stage G5, 57.1% were in stage A3. Additionally, 3% (n=9) of the patients were referred for ambulatory hemodialysis. In terms of medications, statins (75.8%) and Angiotensin II Receptor Blockers (ARBs) (64.6%) were the most commonly used medications by the studied patients. Among patients in the final stages of CKD (stages G4 and G5), 75.5% were using statins, 42% were using ARBs, and 8.1% were using Angiotensin-Converting Enzyme Inhibitors (ACEIs). Regarding the treatment of anemia in CKD patients, the use of Erythropoietin was identified in 2.0% of participants, with 3 patients in stage G4 and 1 patient each in stages G3 and G5. As for the use of Ferrous Sulfate, it was observed in 9.6% (n=29) of the sample, with 41% (n=12) in stage G3 and 27.5% (n=8) in stage G4.

In relation to UTI, it was observed that 3.6% (n=11) had a positive urine culture, with the G4 group being the most prevalent at 45.4% (n=5). E. coli was the most frequently found bacteria, affecting 72.7% (n=8) of the sample. Regarding the use of antibiotics for recurrent UTI, only 3 patients were undergoing this treatment (1.0%), with Ciprofloxacin, Nitrofurantoin, and Urovaxom being used for treating this condition. In relation to nephrolithiasis, 8.9% (n=27) of the patients had this condition. Among them, 9 patients were in stage G1, with 2 patients showing Albuminuria A1 and 4 patients A2. There were 10 patients in stage G2, with 1 patient having Albuminuria A1 and 3 patients A2. In stage G3, there were 7 patients, with 4 having Albuminuria A2. One patient was in stage G4 with Albuminuria A3, and there were no patients in stage G5. Calcium oxalate was the most frequent type, observed in 63.0% (n=17) of these patients, followed by uric acid with 26% (n=7) and calcium phosphate with 11%. Regarding the use of potassium citrate, only 8 patients (2.6%) used it, with a dosage of 10 mEq/day being the most common among those who used this medication (75%). No participants in the sample collection were using any other medication for the treatment of kidney stones. When analyzing the laboratory test records from the last consultation, as documented in the medical records, the survey showed that Creatinine (100%), Hemoglobin (91.1%), Potassium (85.8%), Sodium (82.5%), Urea (82.5%), Vitamin D (78.2%), Urinalysis (64.2%), and Calcium (62.9%) were the most frequently requested tests for patients, with statistically significant proportions ($p < 0.05$) in the sample.

Regarding the means obtained by pathology group, this study identified that the 85 patients in stage G2 had an average hemoglobin (Hb) of 12.7 g/dL, the 129 individuals in stage G3 had an average Hb of 12.1 g/dL, 35 patients in stage G4 had an average Hb of 11.7 g/dL, and 13 patients in stage G5 had an average Hb of 10.7 g/dL. In addition, mean creatinine levels were observed for stages G2, G3, G4, and G5, respectively: 1.10 mg/dL, 1.70 mg/dL, 2.0 mg/dL, and 4.30 mg/dL. Mean creatinine clearance values were also noted as: 72.7 mL/min, 44.7 mL/min, 23.4 mL/min, and 10.6 mL/min for stages G2, G3, G4, and G5, respectively. Calcium averages were also evident in the population for stages G2, G3, G4, and G5, with results of 9.5 mg/dL, 9.5 mg/dL, 9.4 mg/dL, and 8.9 mg/dL, respectively. Additionally, ferritin averages for these stages were as follows: G2, 203.8 ng/mL; G3, 168.6 ng/mL; G4, 169.6 ng/mL; and G5, 396.4 ng/mL. The study also verified parathyroid hormone (PTH) averages for stages G2, G3, and G5 of CKD, yielding results of 108.8 pg/mL, 213.6 pg/mL, and 176.4 pg/mL, respectively. No PTH samples were collected from patients in stage G4 of chronic kidney disease. Another important finding in the study was the average vitamin D levels among groups G2, G3, G4, and G5, which were: 32.4 ng/mL, 35.5 ng/mL, 33.8 ng/mL, and 36.7 ng/mL, respectively.

As for patients with nephrolithiasis, they present with an average creatinine level of 1.27 mg/dL, associated with an average hemoglobin level of 13.44 g/dL, mean calcium levels at 9.38 mg/dL, potassium levels at 4.4 mmol/L, and vitamin D at 36 ng/mL. These values fall within the normal range for the general population. Following this trend, patients with Autosomal Dominant Polycystic Kidney Disease presented with a slightly elevated average serum creatinine level compared to the nephrolithiasis group, at 1.7 mg/dL. However, when evaluating the average hemoglobin (12.3 g/dL),

calcium (9.36 mg/dL), potassium (4.33 mmol/L), and Vitamin D (31.4 ng/mL) levels, they show similar averages within the normal range compared to patients without this condition.

DISCUSSION

This study evaluated the medical records of patients from the Nephrology department at the Centro de Especialidades Médicas do Cesupa (CEMEC), who were undergoing outpatient follow-up from January 2022 to June 2023, in order to determine the clinical and epidemiological profile of patients treated in this service. The majority of patients seen were female, which is consistent with literature where women have been the majority in these specialized care services. This data can also be explained by the fact that women seek preventive healthcare more often than men. However, among patients undergoing renal replacement therapy (RRT), primarily hemodialysis, we observe an inversion of these numbers, with male patients outnumbering females. The prevalent age group in this study was patients aged 50 to 69 years. Literature shows that glomerular filtration decreases by approximately 0.08 ml per year from the age of 40, increasing renal system vulnerability and reducing the capacity to maintain renal homeostasis under stress, corroborating the findings of this study and reflecting the exponential increase in chronic degenerative comorbidities from this age group onwards. Chronic Kidney Disease (CKD) is the most frequently observed condition in this outpatient clinic, likely related to uncontrolled renal diseases and associated comorbidities leading to this condition. Autosomal Dominant Polycystic Kidney Disease (ADPKD) was the second most frequent condition, which can be attributed to being the most common hereditary renal disease in humans, followed by nephrolithiasis, urinary tract infections (UTIs), and glomerulonephritis. However, literature data indicate a different prevalence pattern, with a study in a referral hospital outpatient clinic showing that glomerulonephritis, acute kidney injuries, and urinary tract infections were the leading causes requiring renal replacement therapy, in addition to CKD.

In our sample, 57.2% of patients were classified as having Stage G3 or lower CKD, and of those who had urinary albumin measured, 65.5% showed some degree of albuminuria. According to the Kidney Disease Improving Global Outcomes (KDIGO) staging, 30.5% were classified as Stage 2 CKD, 20.9% as Stage 3a, and 20.5% as Stage 3b. Patients in end-stage CKD represented the smallest percentage among the samples at 5.6%. The predominance of Stage 3 CKD patients aligns similarly with findings from a study in a teaching hospital in Minas Gerais, where 171 renal follow-up patients were also predominantly in this stage, reflecting guidelines for specialist referral and follow-up for patients with an estimated glomerular filtration rate (eGFR) < 60 ml/min. As for the main associated comorbidities, systemic arterial hypertension (80.5%), dyslipidemia (62.2%), and diabetes mellitus (51.7%) were highlighted, underscoring the relationship between these conditions and their impacts on the development of renal-related diseases, particularly CKD. Peralta *et al*. (2005), in a study in the United States, found that 54% of the study population knew they had hypertension, but only 27% maintained blood pressure values within target ranges.

Therefore, this reinforces the importance of controlling comorbidities as a primary measure in preventing the progression of these conditions, given their significant impact on CKD progression, the most frequent pathology in this outpatient clinic. Accordingly, the most commonly used medications to control this progression include statins, antihypertensives, hypoglycemics, and diuretics. Among other nephrological treatments, potassium citrate stands out for its ability to increase urinary pH, thereby reducing the aggregation of oxalate crystals and consequently decreasing kidney stone formation. Hence, among the 27 patients with urolithiasis, 7 use potassium citrate, with a dosage of 10 mEq/day being the most commonly prescribed in this service. Regarding urolithiasis, most patients in our study had calcium oxalate stones, followed by uric acid stones, consistent with the literature on stone composition. Trinchieri (2013), analyzing PubMed data in Asian countries, found that calcium oxalate and uric acid stones were predominant. This trend was also noted by Cunha (2020), who analyzed 1,158 stones from patients across Brazil and found calcium oxalate and uric acid stones to be the most prevalent. As observed in this study, E. coli was the most common etiological agent involved in urinary tract infection pathogenesis. This aligns with literature indicating that the most common etiological agents in UTIs are, in order of prevalence, Escherichia coli, followed by Klebsiella and Enterococcus spp. This dominance can be explained by E. coli's virulence factors, such as type 1 and P fimbriae, which facilitate adherence and progression of this pathology. The mean Creatinine Clearance (ClCr) obtained in stages G2, G3, G4, and G5 were, respectively, 72.7 ml/min, 44.7 ml/min, 23.4 ml/min, and 10.6 ml/min. These values align with literature averages for G2, G3, and G4 stages, which reported values of approximately 70.1 ± 7.7 ml/min, 42.1 ± 8.8 ml/min, and 22.8 ± 4.0 ml/min, respectively.

Serum creatinine was the most requested test in the outpatient clinic, ordered for all patients under follow-up. Urinalysis (EAS) is also crucial in nephrology for diagnosing glomerular, infectious, inflammatory, and other conditions. However, this study observed a low rate of EAS requests, ordered for only 64% of patients, contrary to current literature which emphasizes the importance of EAS in nephrological diagnostics. Among the patients analyzed, 2% were using erythropoietin (EPO). According to the World Health Organization (WHO), anemia is defined as hemoglobin (Hb) levels below 13 g/dL in men and postmenopausal women, and below 12 g/dL in premenopausal women, with up to 90% of CKD patients experiencing anemia depending on the stage analyzed. EPO initiation criteria in adults with CKD include stages 3-5 (glomerular filtration rate < 60 ml/min/1.73m²), hemoglobin levels ≤ 10 g/dL, and adequate iron reserves (defined as serum ferritin > 100 ng/mL and transferrin saturation > 20%) for conservative or peritoneal dialysis treatments, and serum ferritin > 200 ng/mL and transferrin saturation > 20% for hemodialysis patients. In this study, among patients with an eGFR between 90 and 60 ml/min/1.73m², 85 patients had an average hemoglobin (Hb) level of 12.7 g/dL, with 27 men having an Hb of 13 g/dL and 58 women an Hb of 12.6 g/dL. These findings align with literature indicating average hemoglobin levels of approximately 14.0 ± 1.8 g/dL in Stage G2 CKD patients. For Stage G3, with a total of 129 patients, the average hemoglobin was 12.1 g/dL, with 44 men having an Hb of 12.5 g/dL and 85 women an average Hb of 12.0 g/dL, consistent with literature indicating hemoglobin levels of approximately 13.1 ± 1.9 g/dL in Stage G3 CKD patients.

For Stage G4 CKD, our study found no patients using EPO, with an average Hb of 11.8 g/dL in men and 11.6 g/dL in women, aligning with literature averages of 12.2 ± 1.7 g/dL. This stage sees an increased prevalence of anemia due to advancing renal disease. In Stage G5, 13 patients had an average hemoglobin of 10.4 g/dL, with 5 men averaging 10.6 g/dL and 8 women averaging 10.3 g/dL, aligning with literature averages of 11.5 ± 1.8 g/dL for Stage G5 patients, indicating the common use of medications such as iron supplementation or exogenous EPO. Patients in this outpatient clinic showed a low rate of EPO replacement, with only 2% receiving erythropoietin treatment, possibly due to the low number of patients in advanced stages of disease at this service. In contrast, 11% of patients were undergoing iron replacement therapy, likely due to the observed good ferritin levels among patients. Ferritin levels indicating iron deficiency are considered less than 100 ng/mL in G3 and G4 CKD patients on peritoneal dialysis, and less than 200 ng/mL for hemodialysis patients. Regarding ferritin mean values, this study found values of 226.3 ng/mL, 166.5 ng/mL, 169.6 ng/mL, and 367.1 ng/mL for stages G2, G3, G4, and G5, respectively, compared to literature averages of approximately 133.4 ± 113.9 ng/mL, 153.7 ± 185.7 ng/mL, 131.4 ± 126.2 ng/mL, and 196.3 ± 185.2 ng/mL for G2, G3, G4, and G5 stages of CKD, indicating discrepancies possibly due to the inflammatory nature of CKD and iron supplementation among many patients. The "RENAAL" study demonstrated an association between anemia and CKD progression, indicating that patients with both conditions experience accelerated renal function loss and are likely to require earlier dialysis therapy compared to those without both pathologies.

Regarding parathyroid hormone (PTH), we observed that G4 stage patients did not have PTH values documented in their medical records, possibly due to this test only being implemented at CESUPA CEMEC beginning in early 2023, hindering analysis. For G2 and G3 stages, our study found average PTH levels of 108.8 pg/mL and 213.6 pg/mL, respectively, differing from literature averages of approximately 69.2 ± 48.3 pg/mL and 109.4 ± 65.6 pg/mL. Increased PTH levels in our study, despite adequate vitamin D levels and correct supplementation, warrant further evaluation, including for early vascular calcification and the use of other medications such as calcitriol (active vitamin D). In Stage G5, we observed an average PTH of 176.4 pg/mL, much lower than literature averages of 355.5 ± 241.9 pg/mL. Close monitoring of these patients may have contributed to adjusting vitamin D, calcium, and phosphorus levels, thereby better controlling PTH levels.

CONCLUSION

The detailed analysis of medical records from patients in the Nephrology department at the Centro de Especialidades Médicas do Cesupa (CEMEC) provides valuable insights into the clinical-epidemiological profile of these individuals during the period from January 2022 to June 2023. Key findings revealed a predominance of female patients, particularly in the age group over 50 years, highlighting aging as a vulnerability factor for renal health. Chronic Kidney Disease (CKD) emerged as the most prevalent condition, especially in stages G3, G4, and G5. The significant association with comorbidities such as systemic arterial hypertension, dyslipidemia, and diabetes mellitus underscores the critical need for controlling these factors to prevent CKD progression. Common treatments included the use of statins and angiotensin II receptor blockers, indicating the multidisciplinary approach adopted to manage these patients. However, the low rate of erythropoietin replacement suggests a need for greater attention to anemia associated with CKD, a known factor accelerating renal progression. Detailed analysis of laboratory tests showed variations in averages of hemoglobin, creatinine, calcium, ferritin, parathyroid hormone, and vitamin D, reflecting the progressive impact of CKD across different stages. The low request rate for urine microscopy contrasts with recommended practices, indicating potential challenges in sample collection or result interpretation. Findings related to urolithiasis align with the literature, highlighting the predominance of calcium oxalate and uric acid stones. Identification of E. coli as the most common agent in urinary tract infections underscores the importance of surveillance and effective treatment. In conclusion, this study provides a comprehensive view of the clinical-epidemiological landscape of nephrology patients treated at CEMEC. The insights gained have practical implications for managing and enhancing care for these patients, emphasizing the ongoing need for monitoring, early intervention, and an integrated approach to address the challenges associated with CKD and related conditions.

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