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MONITORING OF CHRONIC KIDNEY DISEASE IN PROFESSIONAL FISHERMEN AND THE IMPORTANCE OF NURSES IN THE COMMUNITY

RASTREAMENTO DE DOENÇA RENAL CRÔNICA EM PESCADORES PROFISSIONAIS E A IMPORTÂNCIA DO ENFERMEIRO NA COMUNIDADE

SEGUIMIENTO DE ENFERMEDAD RENAL CRÓNICA EN PESCADORES PROFESIONALES Y LA IMPORTANCIA DEL ENFERMERO EN LA COMUNIDAD

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ABSTRACT

Screening is a strategy that involves testing asymptomatic populations for the early diagnosis of diseases and the reduction of morbidity and mortality, being essential for conditions such as chronic kidney disease (CKD). CKD, characterized by the progressive loss of kidney function, is associated with common risk factors found in vulnerable populations, such as professional fishermen. This study aimed to identify indicators of CKD among these workers through the analysis of urea, creatinine, fasting blood glucose, and urinalysis in a descriptive, quantitative, and cross-sectional study conducted during the 2023 fishing season with fishermen from the Z2 Fishing Colony in Cáceres, Mato Grosso, Brazil. Blood samples from 103 fishermen and urine samples from 83 fishermen were analyzed. The results indicated exposure to CKD risk factors, such as diabetes mellitus, evidenced by elevated mean glucose levels in both sexes, classified as prediabetes. Increased protein levels and urinary crystals were also detected, which may indicate renal dysfunction. It was concluded that it is possible to identify indicators of CKD among artisanal professional fishermen, reaffirming them as a population vulnerable to the disease.

KEYWORDS: Primary Health Care. Nursing. Fishing. Public Health. Social Vulnerability.

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RESUMO
O rastreamento é uma estratégia de exames em populações assintomáticas para diagnóstico precoce e redução da morbidade e mortalidade, sendo essencial para doenças como a doença renal crônica (DRC). A DRC, caracterizada pela perda progressiva da função renal, está associada a fatores de risco comuns em populações vulneráveis, como pescadores profissionais. Esta pesquisa teve como objetivo identificar indicativos de DRC nesses trabalhadores, por meio da análise de ureia, creatinina, glicemia em jejum e uroanálise, em um estudo descritivo, quantitativo e transversal realizado durante o período de pesca de 2023, com pescadores da colônia Z2 de Cáceres – MT. Foram analisadas amostras de sangue de 103 pescadores e urina de 83. Os resultados indicaram exposição a fatores de risco para DRC, como diabetes mellitus, evidenciada por médias elevadas de glicose em ambos os sexos, classificadas como pré-diabetes. Também foram detectados aumento de proteína e cristais na urina, possíveis sinais de disfunção renal. Conclui-se que é possível identificar indicativos de DRC entre pescadores profissionais artesanais, reafirmando-os como uma população vulnerável à doença.

PALAVRAS-CHAVE: *Atenção Primária à Saúde. Enfermagem. Pesca. Saúde Pública. Vulnerabilidade Social.*

RESUMEN
El cribado es una estrategia de realización de pruebas en poblaciones asintomáticas para el diagnóstico precoz y la reducción de la morbilidad y la mortalidad, siendo esencial para enfermedades como la enfermedad renal crónica (ERC). La ERC, caracterizada por la pérdida progresiva de la función renal, está asociada con factores de riesgo comunes en poblaciones vulnerables, como los pescadores profesionales. Este estudio tuvo como objetivo identificar indicios de ERC en estos trabajadores mediante el análisis de urea, creatinina, glucemia en ayunas y uroanálisis, en un estudio descriptivo, cuantitativo y transversal realizado durante el período de pesca de 2023 con pescadores de la colonia Z2 de Cáceres, Mato Grosso, Brasil. Se analizaron muestras de sangre de 103 pescadores y muestras de orina de 83 participantes. Los resultados indicaron exposición a factores de riesgo para ERC, como la diabetes mellitus, evidenciada por niveles medios elevados de glucosa en ambos sexos, clasificados como prediabetes. También se detectó un aumento de proteínas y cristales en la orina, posibles signos de disfunción renal. Se concluye que es posible identificar indicios de ERC entre los pescadores profesionales artesanales, reafirmándolos como una población vulnerable a esta enfermedad.

PALABRAS CLAVE: *Atención Primaria de Salud. Enfermería. Pesca. Salud Pública. Vulnerabilidad Social.*

INTRODUCTION

Screening is a strategy through which diagnostic tests or examinations are performed in asymptomatic individuals or populations, aiming at early diagnosis. This approach seeks to achieve identification, risk control, and reduction of morbidity and mortality associated with the screened condition[1]. Given its purpose, screening is a relevant strategy for the diagnosis of chronic kidney disease (CKD), a condition with an asymptomatic course[2].

CKD, also known as Chronic Renal Failure (CRF), consists of a slow and progressive loss of kidney function, resulting in biochemical, metabolic, and endocrine disturbances, including respiratory and cardiovascular alterations[3]. The Ministry of Health explains that CKD may have diverse origins and multiple risk factors, among which systemic arterial hypertension and diabetes mellitus stand out, representing opportunities for early detection of CKD[2].

Both conditions share the characteristic of higher prevalence among individuals in situations of socioeconomic vulnerability. In addition, educational level influences knowledge of lifestyle behaviors that may benefit an individual's health conditions[4].

In this sense, considering that chronic kidney disease is a major alteration of renal function with significant public health relevance[3], associated with risk factors more commonly found in vulnerable populations[4,5], such as professional fishermen, who are in socioeconomic vulnerability and politically unprotected[6], one must ask: Is chronic kidney disease a condition that affects and/or may affect professional fishermen of the Z2 colony in the municipality of Cáceres, in the state of Mato Grosso (MT)?

This study is justified by the fact that the city of Cáceres – MT is located on the banks of the Paraguay River, in the Mato Grosso Pantanal region, where fishing is an important economic activity for many families in the city[7]. Therefore, there was a perceived need to assess the health status of professional fishermen, giving visibility to this population in the municipality and in academic discussions.

The growing concern regarding chronic kidney disease is based on its epidemiologically alarming nature, affecting more than 10% of the global population, which corresponds to approximately 800 million individuals[8]. It is also worth noting that this condition not only affects a significant portion of society but is also among the leading causes of death in the 21st century[8]. In this context, it becomes imperative to understand and address CKD as a global health issue.

Thus, the present study aims to identify indicators of chronic kidney disease in professional fishermen through screening enabled by the measurement of laboratory tests including urea, creatinine, fasting blood glucose, and urinalysis.

MATERIALS AND METHODS

For the development of this study, a cross-sectional field study was conducted, characterized as descriptive with a quantitative approach, derived from a doctoral project entitled "Health Profile of Artisanal Professional Fishermen in the Post-COVID-19 Pandemic Period." The

research was carried out throughout the fishing season of 2023, covering the months from February to September. Subsequently, data tabulation and analysis were performed, followed by scientific writing.

The target population of this study consisted of a group of professional fishermen residing in the municipality of Cáceres, in the state of Mato Grosso, registered and affiliated with Colony Z2, which comprises a total of 257 registered fishermen, 175 male and 79 female. The sample was obtained using a non-probability sampling method, specifically convenience or accessibility sampling[9]. In this approach, the researcher selects elements that are accessible, allowing the participation of various individuals and assuming that they may represent the study population.

The inclusion criteria for participation in this study were: artisanal professional fishermen affiliated with Colony Z2 and in good standing with the colony; age 18 years or older; agreement to participate in the study by signing the Informed Consent Form. The exclusion criteria were: professional fishermen not affiliated with Colony Z2; colony workers or other individuals who do not work as fishermen; age under 18 years; failure to sign the Informed Consent Form; and hemolyzed samples.

After applying the inclusion and exclusion criteria, the final sample consisted of 102 fishermen who voluntarily agreed to participate in the study. Considering the convenience sampling approach, the final sample was influenced by the fishermen's willingness to participate.

For data collection, two days were selected for fishermen to attend the colony. The first biological sample collection took place at the facilities of Colony Z2 on April 22, 2023, involving 74 fishermen affiliated with the colony. In a second stage, on May 20, 2023, a second collection was carried out with 28 fishermen, totaling 102 participants. All were properly informed in advance about the need to fast, ensuring the reliability of the test results.

Blood samples were collected using the vacuum method, while for urine collection, fishermen were previously provided with a urine collection container and instructed to collect the first morning urine. Additionally, visits were made to some fishermen's camps in the Pantanal, where a questionnaire was applied and blood pressure was measured at an appropriate time, accompanying them during their professional activities.

Sample analyses were performed at the Environmental Ecophysiology Laboratory (LEFA), located at UNEMAT facilities. Biochemical analyses followed the manufacturer's instructions for the reagents used (Biotécnica), using a biochemical analyzer.

After biological analysis, results were compared with pre-established reference ranges provided by the reagent manufacturer: creatinine 0.9–1.3 mg/dL for men and 0.6–1.1 mg/dL for women; urea 13–45 mg/dL; fasting blood glucose 74–99 mg/dL. Urinalysis was performed using

the reagent strip manufacturer's reference standards, as well as descriptions provided by the Brazilian Society of Nephrology (SBN)[10]. Sediment microscopy followed general SBN standards for leukocytes, epithelial cells, hyaline casts, amorphous urate, uric acid, and triple phosphate.

All variables were obtained through anamnesis (nursing history), biological sample collection, and laboratory analysis. Data were organized in a Microsoft Excel 2009 spreadsheet for analysis, comparison, and classification.

Data on glucose, urea, and creatinine were subjected to statistical analysis using Student's t-test assuming unequal variances in Microsoft Excel, in order to assess differences between sexes for each test, as well as to verify whether the mean values were above or below the established reference parameters. Results for these tests were also presented in boxplot graphs using R software, stratified by sex. In addition, Pearson correlation analysis was performed among the three mentioned tests.

Regarding urinalysis and sediment microscopy, the chi-square test was applied to verify possible differences in frequencies between sexes. A Sankey diagram was also used to present the percentage of abnormalities in urine tests for men and women.

This study was submitted to and approved by the Research Ethics Committee in accordance with Resolution 466/12 – CEP, under opinion No. 5.928.210. For participation in this study, professional fishermen were informed about the Informed Consent Form, which they subsequently signed. Only after signing the form were participants included in the study. Regarding financial resources, the project to which this study is linked was funded by the Coordination for the Improvement of Higher Education Personnel (CAPES), under CAPES Call No. 12/2021 PDPG.

RESULTS

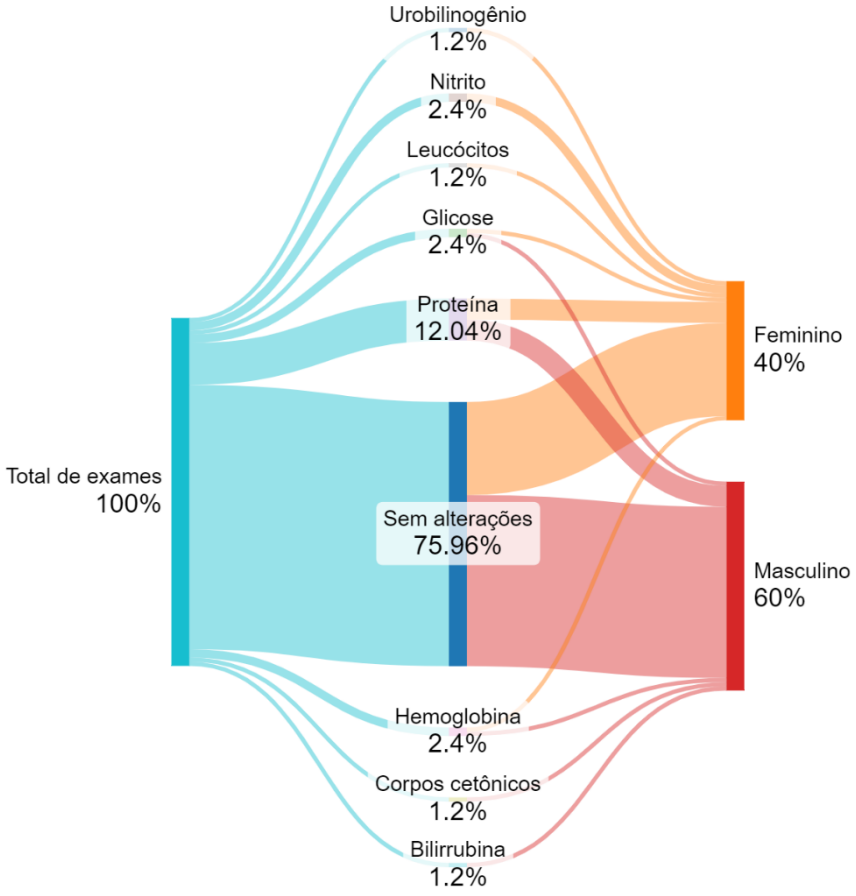
Of the 257 fishermen registered in the colony, 39.68% participated in this study. This group underwent biological sample collection and analysis. In this context, it was observed that 56.9% of the participants were male, while 43.1% were female.

Among the 102 fishermen who participated in biological sample collection, 83 provided urine samples, of whom 60% were male and 40% were female. These samples were submitted to physical, chemical, and sediment microscopy analyses.

In the physical analysis, changes in urine color were observed in all analyzed samples. Regarding the chemical analysis of urine, the presence of leukocytes, hemoglobin, nitrite, protein, bilirubin, ketone bodies, glucose, and urobilinogen was identified. In this analysis, females

presented 13.22% of the alterations, while males presented 10.82%. Of the total 83 samples, 75.96% showed no alterations, as demonstrated in (Figure 1). The chi-square test ($\chi^2(48)=40.00$; $p<0.05$) indicated a statistically significant difference among urinary chemical components, with protein being the most frequently observed alteration.

Figure 1 – Chemical urine analysis by sex among artisanal professional fishermen in the municipality of Cáceres, Mato Grosso, in 2023.

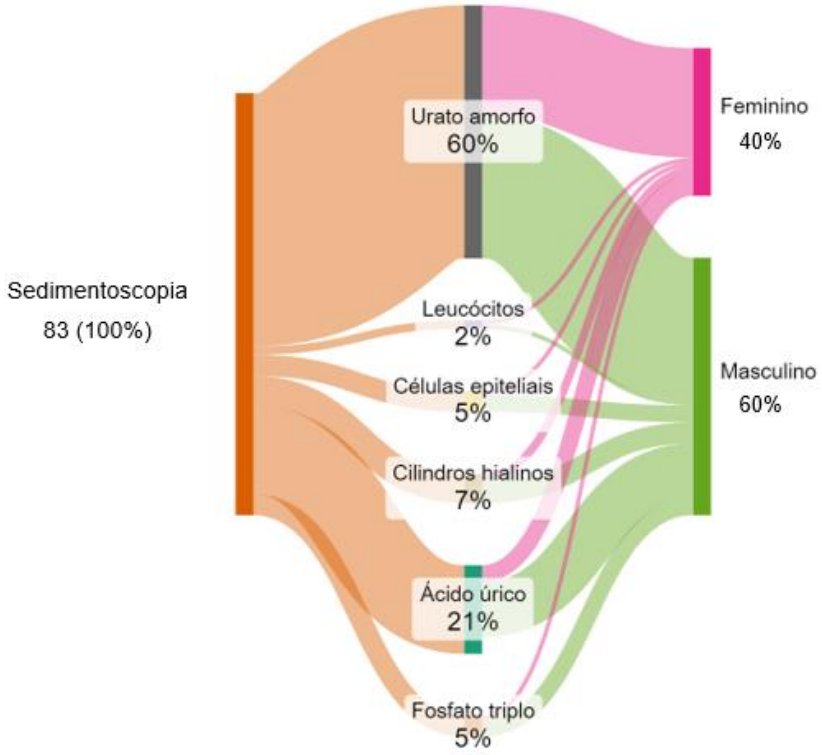


Source: Author's own elaboration (Made at Sankeymatic, 2024)

For the sediment microscopy examination, all 83 samples presented at least one alteration, corresponding to 100% of altered samples. In this analysis, amorphous urate was the most prominent component, accounting for 60% of the observed alterations (Figure 2).

The chi-square test ($\chi^2(48)=416.00$; $p<0.05$) indicated a statistically significant difference among the components of urine sediment analysis, with amorphous urate being the most frequently observed finding in both sexes.

Figure 2 – Urine sediment microscopy analysis by sex among artisanal professional fishermen in the municipality of Cáceres, Mato Grosso, in 2023.

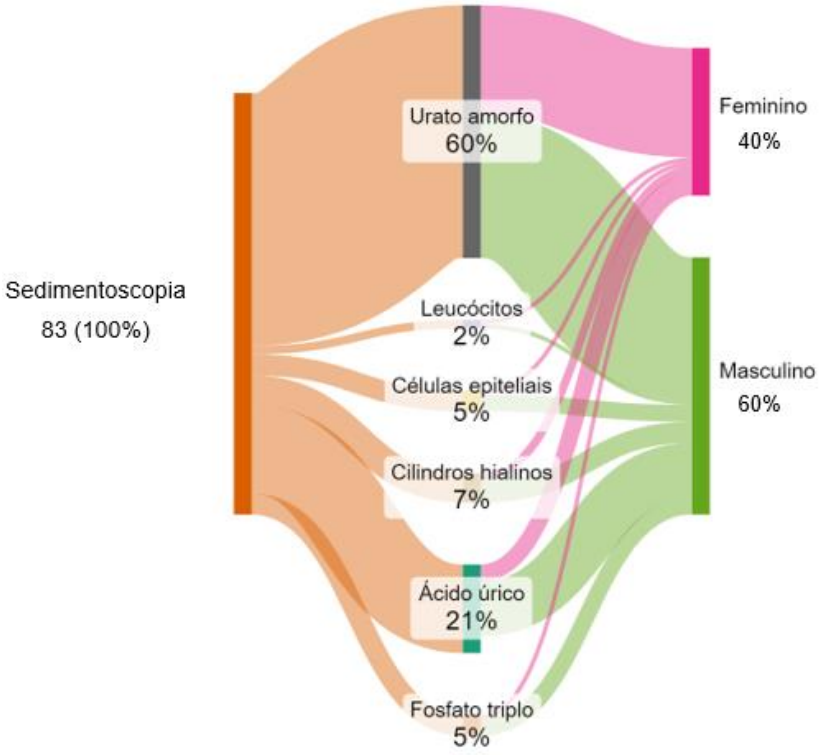


The evaluation criteria include chromatic characteristics (coloration), metric dimensions, macroscopic surface aspects, anatomical location, duration of evolution, and relevant associated factors. Each variable constitutes a decision node within the flowchart, allowing the progressive refinement of the differential diagnosis.

The sequence of questioning follows well-established principles of oral semiology, prioritizing parameters with greater discriminatory value. With each response provided, the algorithm excludes incompatible nosological entities, progressively converging toward a set of plausible differential diagnoses.

This step-by-step approach reproduces specialized clinical reasoning, simulating the mental process of diagnostic exclusion and confirmation based on objective clinical evidence (Figure 2).

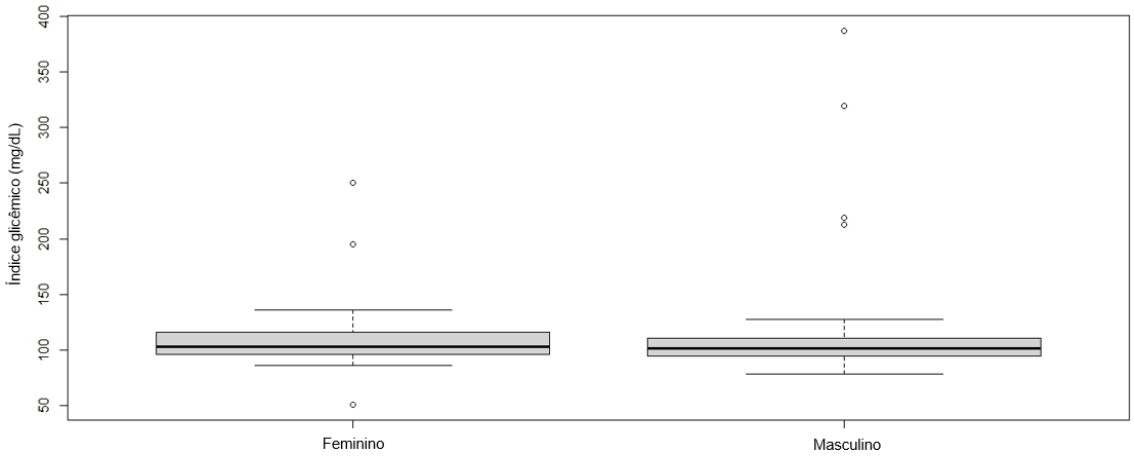
Figure 2. *Step-by-step* approach leading to the diagnosis of oral lesions in the digital application



Fonte: Elaboração própria (Made at *Sankeymatic,* 2024)

Para a glicose, não houve diferenças significativas entre os sexos. Entretanto, foi possível perceber que a média é superior ao valor limítrofe de glicose de 99mg/dL adotado para esta análise, como representa a Figura 3. O sexo feminino apresentou uma média de 109,74±31,25 enquanto o sexo masculino apresentou média 114,55±51,03. Na aplicação do teste T Student $T_{(99)}=0,33<T_{0,05}=1,66$) não apresentou diferença significativa entre os sexos.

Figura 3 - Comparação de glicose por sexo dos pescadores profissionais artesanais de Cáceres – MT, 2023.



Source: Author's own elaboration (2024)

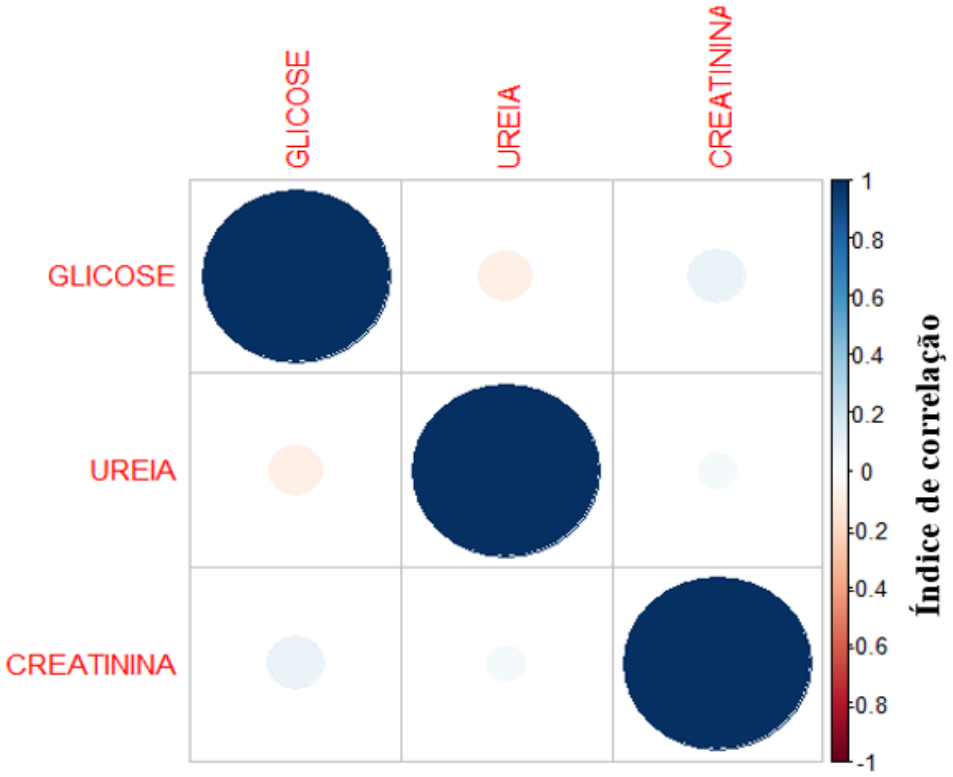
In the analysis of urea, no significant differences were identified between female and male artisanal professional fishermen. The mean values for both sexes remained within the reference range used in this study (13–45 mg/dL), as shown in Figure 3, with a mean of 22.46 ± 11.31 for females and 24.21 ± 9.41 for males.

The Student's t-test ($t(61)=0.29 < t_{0.05}=1.67$) showed no statistically significant difference between sexes.

Creatinine levels in the female group showed a mean of 0.89 ± 0.27, remaining within the reference range of 0.6 to 1.1 mg/dL. In the male group, the mean was 1.00 ± 0.27, also within the reference range for this sex (0.9 to 1.3 mg/dL). The Student's t-test ($t(98)=0.02 < t_{0.05}=1.66$) did not show a statistically significant difference between sexes.

Pearson's correlation test ($r=0.25$, $p<0.05$) between urea, glucose, and creatinine showed a statistically significant correlation, indicating the existence of a real positive relationship between the variables. Figure 4 presents the correlation index among the laboratory tests performed.

Figure 4 – Pearson correlation graph between glucose, urea, and creatinine tests among artisanal professional fishermen in Cáceres – MT, 2023.



Source: Author's own elaboration, 2024

DISCUSSION

Artisanal fishing is an important economic activity, employing approximately 36 million people worldwide, most of whom rely on it as their primary source of income[11]. In Cáceres, Mato Grosso, artisanal fishermen represent an important social group, since artisanal fishing is a significant practice for the municipality, contributing to ecological balance, market sectors, and certain public agents[7].

Given fishing as their main source of income, the earnings of professional fishermen are considered low, highlighting socioeconomic vulnerability[12]. However, there are no specific public policies focused on healthcare for this group; thus, there is a lack of incentives for health promotion, disease prevention, and care actions directed at fishermen, highlighting the need to study health conditions in this population[6].

In order to assess the health of artisanal fishermen, laboratory tests were performed, providing important results regarding the population's health conditions, namely urinalysis, urea, creatinine, and blood glucose. Urine chemical analysis showed protein as the main abnormal component, with indications of proteinuria in 12.04% of the analyzed samples. This pattern of increased protein may be related to various health conditions, including severe diseases such as chronic kidney disease (CKD)[10]. Proteinuria, which may have a variety of clinical causes[13], can be a marker of kidney disease[14], and alterations in other components of the chemical examination may also provide important indications of yet unidentified disorders[15].

Urine sediment analysis showed amorphous urate as the main altered component, which is a urinary crystal related to solute concentration in urine[10]. Thus, the results indicating a high percentage of amorphous urate in the samples (60%) demonstrate that this population experiences crystalluria, commonly observed in rural workers and associated with a variety of renal injuries[16].

The elevated mean blood glucose levels in both sexes show alarming results, since diabetes mellitus is one of the main risk factors associated with chronic kidney disease[2]. According to the results obtained, participants in this study may present prediabetes or increased risk for diabetes mellitus, according to diagnostic criteria established by the Brazilian Diabetes Society, which defines prediabetes as fasting glucose levels between ≥100 and <126 mg/dL[17]. Considering that artisanal professional fishermen are a socially vulnerable group[6], there is concern regarding diabetes mellitus, as this condition is common among individuals in vulnerable situations[5] and is associated with CKD, being an important risk factor for this disease[2].

Poor control of diabetes mellitus is one of the main causes of CKD, as it leads to significant microvascular changes that may affect the kidneys, being the second leading cause of CKD in patients with end-stage renal disease[18]. Furthermore, about 30% to 50% of patients with diabetes mellitus, especially type 2, develop CKD, highlighting the need for CKD screening in individuals diagnosed with diabetes, enabling early diagnosis and consequently better prognosis[18].

Urea results remained within normal parameters in both sexes. Although it is an important marker of renal function, urea is a substance highly influenced by factors not directly related to kidney function, such as high-protein diet, tissue breakdown, gastrointestinal bleeding, and corticosteroid use, all of which may increase its blood levels, while low-protein diets and liver disorders may reduce its levels[19]. Thus, although it provides relevant information regarding renal alterations, this biomarker has not proven effective for early-stage CKD diagnosis[20].

Creatinine testing provides important results for the diagnosis of chronic kidney disease, as its clearance is closely related to the glomerular filtration rate (GFR), which directly assesses renal function[10]. However, creatinine levels are directly influenced by factors such as age, sex, ethnicity, and muscle mass, since its production is entirely dependent on the latter, which may interfere with diagnosis in cases of muscle loss such as malnutrition or amputation. In addition, low-protein diets may reduce serum creatinine levels, while the use of certain medications may increase this biomarker[10].

Although influenced by several factors, urea and creatinine are important indicators of normal kidney function as well as renal dysfunction, and should be considered given the strong relationship between changes in their levels and kidney disorders, providing essential information about renal function in individuals[21].

Screening is an important strategy for the early detection of diseases in asymptomatic populations through the use of diagnostic tests, aiming to reduce morbidity and mortality caused by the targeted disease[1]. In this context, nurses play an essential role as professionals working across various levels of healthcare, including disease prevention, which involves different levels, including early disease detection[22].

In performing this role, nurses directly contribute to comprehensive community health care by providing assistance to individuals, families, and groups within the community, while understanding their reality and building relationships with them, addressing social and health care issues, and considering health inequalities across different social groups, with a focus on meeting their specific needs[23].

CONSIDERATIONS

Given the results obtained and the analyses conducted, it becomes evident that there is a need for specific screening and prevention strategies for the population of artisanal professional fishermen from the Z2 colony in the municipality of Cáceres, Mato Grosso, Brazil. The presence of certain alterations, such as proteinuria and increased amorphous urate in urine, as well as elevated glucose levels, reinforces the importance of continuous and targeted monitoring of this population.

The socioeconomic vulnerability of artisanal professional fishermen highlights the urgency of developing studies focused on the health of this population. The early identification of metabolic and renal alterations is essential for the implementation of interventions that may prevent the progression of chronic diseases and minimize their impact on fishermen's lives.

Therefore, this study reaffirms the relevance of screening as an essential tool for identifying and controlling health conditions that often go unnoticed in vulnerable populations.

It is concluded that it is possible to identify indicators of chronic kidney disease among artisanal professional fishermen, highlighting the population's vulnerability to this health condition. The data obtained through the performed laboratory tests reinforce concerns regarding the health of these workers, who are exposed to risk factors that contribute to the development of chronic kidney disease, thus requiring targeted health promotion and prevention strategies.

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