

WCN26-6809

DISORDERED GUT MICROBIOTA AND FECAL METABOLITES ARE ASSOCIATED WITH THE PROGRESSION OF CARDIOVASCULAR-KIDNEY-METABOLIC SYNDROME



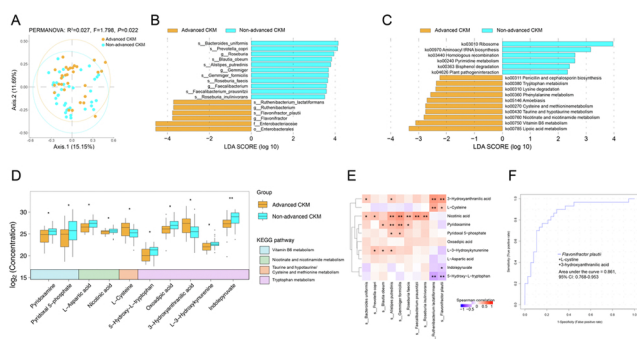
(Article No. 104870)

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Introduction: Cardiovascular-Kidney-Metabolic (CKM) syndrome, defined by converging metabolic, kidney, and cardiovascular disorders, represents a substantial global health burden. Accumulating evidence has established a link between the gut microbiota and CKM syndrome. However, its specific role in disease progression has not been fully elucidated.

Methods: To investigate the microbial drivers of CKM syndrome progression, we conducted metagenomic and untargeted metabolomic analyses on fecal samples from 38 non-advanced (stages 0-2) and 30 advanced (stages 3-4) patients.

Results: Beta diversity analysis revealed a significant difference in overall microbial composition between the advanced and non-advanced CKM groups (Figure 1A, $P = 0.022$). LefSe analysis showed enrichment of the *Enterobacteriaceae* family, *Flavonifractor plautii*, and *Ruthenibacterium lactatiformans* in the advanced CKM group, whereas eight species—including *Bacteroides uniformis*, *Gemmiger formicilis* and *Alistipes putredinis*, were enriched in the non-advanced CKM group (Figure 1B, $P < 0.05$). KEGG analysis of metagenomic and metabolomic data consistently identified alterations in two vitamin metabolic pathways (vitamin B6; nicotinate and nicotinamide) and three amino acid metabolic pathways (cysteine and methionine; taurine and hypotaurine; tryptophan) in CKM syndrome (Figure 1C, D, $P < 0.05$). Metabolites from amino acid pathways, L-cysteine and 3-hydroxyanthranilic acid, were increased and positively correlated with the abundance of *F. plautii* and *R. lactatiformans* in the advanced CKM group. In contrast, vitamin-related metabolites—such as nicotinic acid, pyridoxamine and pyridoxal 5-phosphate—were depleted and showed positive correlations with species including *G. formicilis* and *A. putredinis* (Figure 1E, $P < 0.05$). A random forest model combining *F. plautii*, L-cystine and 3-hydroxyanthranilic acid achieved an AUC of 0.861 (0.768–0.953) for distinguishing advanced from non-advanced CKM after 10-fold cross validation (Figure 1F).



Conclusion: Collectively our findings suggest that gut microbiota alterations disrupt key metabolic pathways with associated metabolites—including vitamins B6, nicotinate and nicotinamide, and amino acid metabolisms of cysteine and methionine, taurine and hypotaurine, and tryptophan—whose dysregulation may accelerate CKM syndrome progression. A combination of *F. plautii*, L-cystine and 3-hydroxyanthranilic acid may serve as a non-invasive detection on CKM syndrome.

I have no potential conflict of interest to disclose.

I did not use generative AI and AI-assisted technologies in the writing process.

WCN26-6814

ASSESSMENT OF PHYSICAL ACTIVITY IN HEMODIALYSIS AND FACTORS ASSOCIATED WITH A SEDENTARY LIFESTYLE



(Article No. 104871)

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Introduction: Sedentary lifestyle is an important risk factor for mortality, especially cardiovascular mortality. This risk is increased in hemodialysis patients owing to the presence of other comorbidities. The aims of this study were to assess physical activity in hemodialysis patients and to figure out factors associated with sedentary lifestyle.

Methods: This was a cross-sectional, descriptive, analytical study. It was conducted over a 2-month period. The study included patients who had been on regular hemodialysis for at least 6 months. Patients with physical disability were not included. Physical activity was assessed using an accelerometer.

Results: there were 30 included patients, of whom 22 were male and eight female. The mean age of the patients was 43.40 ± 15.14 years. The average number of steps per day was 7464.32 ± 4166.82 steps/day. The average number of steps per dialysis day was 6605.41 ± 4251.27 steps/day. According to the number of steps per day, 26.7% of patients were sedentary, 26.7% of patients were less active, and 46.6% were active. Factors associated with sedentary behavior were sex ($P=0.028$), age ($P=0.001$), and day of dialysis ($P=0.0001$).

Conclusion: Sedentary lifestyle was frequent in our study. This high frequency is explained by several factors related to chronic kidney disease and hemodialysis itself.

I have no potential conflict of interest to disclose.

I did not use generative AI and AI-assisted technologies in the writing process.

WCN26-6861

CHRONIC KIDNEY DISEASE IN VULNERABLE AFRO-DESCENDANT, INDIGENOUS, AND AGRICULTURAL COMMUNITIES IN LATIN AMERICA



(Article No. 104872)

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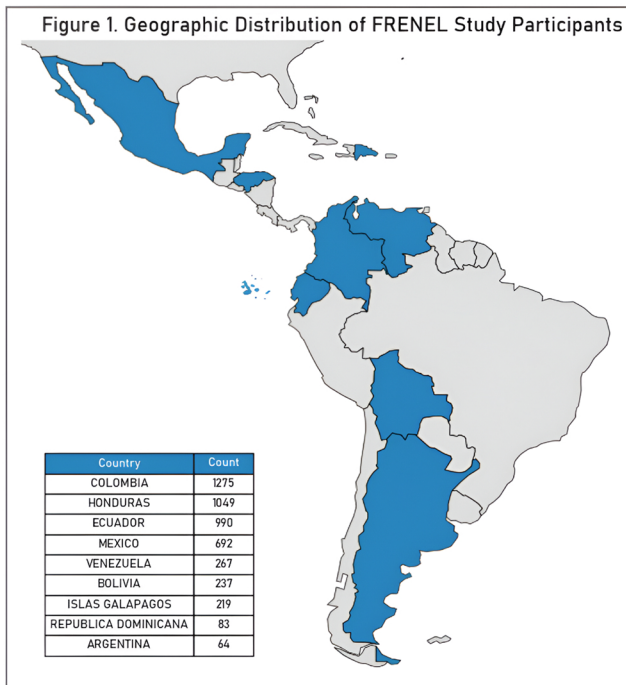
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Introduction: Chronic kidney disease (CKD) is a major global public health concern, affecting an estimated 13.4% of the world's population (Lv & Zhang, 2019). Among afro-descendant, indigenous, and agricultural communities in Latin America, studies have identified a high prevalence of CKD, frequently undiagnosed and untreated (Correa-

Rotter et al., 2014; Garza & Abascal Miguel, 2025; Ulasi et al., 2025). To effectively reduce the burden of CKD in these populations, it is essential to assess how the social determinants of health (SDOH) influence kidney health (Burgos-Calderón et al., 2021). The FRENEL study is an ongoing multicenter initiative, which to date has screened 4,876 participants from vulnerable agricultural, indigenous, and afro-descendant communities in Latin America.

Methods: The present study employed a cross-sectional, multicenter design involving adults from vulnerable Afro-descendant, Indigenous, and agricultural communities across nine Latin American countries. Objective To evaluate the risk factors associated with chronic kidney disease (CKD) in vulnerable afro-descendant, indigenous, and agricultural communities in Latin America. Sociodemographic, clinical, and lifestyle data were collected, including blood pressure, body mass index (BMI), proteinuria, and serum creatinine. The estimated glomerular filtration rate (eGFR) was measured using the Nova Max Pro point-of-care (POC) system. The binary outcome variable was defined according to the KDIGO classification, distinguishing participants with eGFR < 60 mL/min/1.73 m² (G3a–G5), indicative of at least moderate reduction in kidney function, from those with eGFR ≥ 60 mL/min/1.73 m². Multiple supervised machine learning algorithms, including logistic regression, categorical Naive Bayes, decision trees, random forest, and XGBoost, were compared. Model performance was assessed using standard classification metrics, including accuracy, precision, recall, F1-score, and the area under the receiver operating characteristic curve (AUC-ROC). Models were optimized through hyperparameter tuning using cross-validation to ensure robustness and prevent overfitting.

Results: Among 4,876 participants, 1,105 (22.7%) presented an eGFR < 60 mL/min/1.73 m² (CKD G3a or higher). Model comparison identified XGBoost as the best-performing classifier. The model achieved a Recall of 0.65, Precision of 0.38, F1-score of 0.48, Accuracy of 0.68, and a weighted average F1-score of 0.70 on the test set. Feature importance analysis indicated that the strongest predictors were hypertension history, proteinuria, and older age. Socioeconomic factors, including subsidized/no health insurance, indigenous ethnicity, and discontinued education were also highly predictive



Metric	Logistic Regression	Categorical Naive Bayes	Decision Trees	Random Forest	XGBoost
Train Recall	0.68	0.61	0.73	0.81	0.72
Test Recall	0.67	0.60	0.66	0.52	0.56
Train Precision	0.38	0.38	0.39	0.69	0.40
Test Precision	0.40	0.36	0.38	0.48	0.38
Train F1 Score	0.50	0.46	0.51	0.75	0.52
Test F1 Score	0.50	0.45	0.48	0.50	0.48
Train Accuracy	0.68	0.72	0.76	0.88	0.70
Test Accuracy	0.70	0.71	0.71	0.76	0.68

Table 1: Performance metrics of the classification models

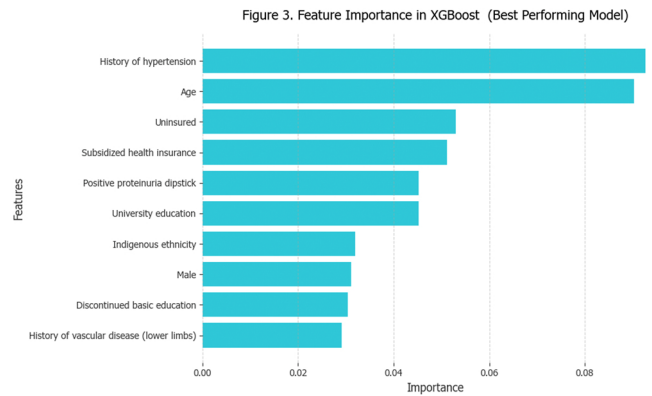
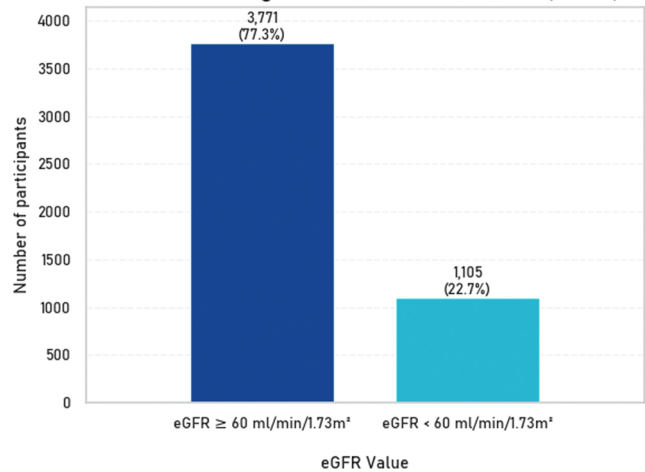


Figure 2. Distribution of participants according to estimated glomerular filtration rate (eGFR)



Conclusion: The study revealed a high burden of CKD among Afro-descendant, Indigenous, and agricultural populations, with a prevalence significantly higher than that observed in the general population, indicating an elevated risk in these groups. These findings highlight the need to implement preventive strategies that address both clinical factors and SDOH. The FRENEL registry is continuously expanding, with a target enrollment of 20,000 participants, and ongoing efforts are focused on developing improved predictive models that address class imbalance to better capture CKD risk patterns.

I have no potential conflict of interest to disclose.

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WCN26-6898

IN HOSPITAL OUTCOME OF PATIENTS WITH ACUTE KIDNEY INJURY AND CHRONIC KIDNEY DISEASE IN THE ICU: AN AUDIT OF THE REGIONAL HOSPITAL BAMENDA



(Article No. 104873)

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Introduction: Acute Kidney Injury (AKI) and Chronic Kidney Disease (CKD) are vital global health issues, whereby, in some cases, kidney replacement therapy (KRT) is needed with haemodialysis being the most common. Both AKI and CKD are complex syndromes with life threatening complications sometimes requiring intensive care services.