SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Cardiology

Cardiovascular Risk Factors in Chronic Hemodialysis Patients: A Cross-Sectional Study

Driss Britel[1], Youssef Fihri[1], Mehdi Moujahid[1*], Zouhair Lakhal[1]

[1]Department of Cardiology, Military Hospital Mohammed V, Rabat, Morocco

DOI: https://doi.org/10.36347/sasjm.2026.v12i02.009 | **Received:** 27.12.2025 | **Accepted:** 11.02.2026 | **Published:** 18.02.2026

***Corresponding author:** Mehdi Moujahid
Department of Cardiology, Military Hospital Mohammed V, Rabat, Morocco

Abstract **Original Research Article**

Background: Cardiovascular disease is the leading cause of mortality in patients with end-stage renal disease undergoing chronic hemodialysis. This elevated risk is related to both traditional cardiovascular risk factors and dialysis-specific mechanisms. ***Methods:*** We conducted a cross-sectional descriptive study including 40 patients on chronic hemodialysis. Demographic characteristics, traditional cardiovascular risk factors, and documented cardiovascular comorbidities were analyzed. ***Results:*** The mean age was 60 years (range: 26–82), with a female predominance (55%). Hypertension was present in 50% of patients and diabetes mellitus in 30%. Cardiovascular comorbidities were documented in 17.5% of cases, including ischemic heart disease (5%), atrial fibrillation (5%), ischemic stroke (5%), and peripheral arterial disease (2.5%). ***Conclusion:*** Hypertension and diabetes were the most prevalent cardiovascular risk factors in this cohort. Despite a relatively low prevalence of overt cardiovascular disease, chronic hemodialysis patients remain at high cardiovascular risk, underscoring the need for comprehensive preventive strategies.

Keywords: Cardiovascular disease, chronic hemodialysis, hypertension, diabetes mellitus, end-stage renal disease.

INTRODUCTION

Cardiovascular disease (CVD) represents the primary cause of morbidity and mortality among patients with end-stage renal disease (ESRD) undergoing chronic hemodialysis [1]. Cardiovascular mortality in this population remains markedly higher than in the general population, even in the contemporary era of improved dialysis techniques and medical care.

Traditional cardiovascular risk factors such as hypertension and diabetes mellitus are highly prevalent in hemodialysis patients; however, they do not fully explain the excessive cardiovascular burden observed in this population [2]. In addition, hemodialysis patients are exposed to multiple non-traditional and dialysis-related risk factors, including chronic inflammation, oxidative stress, anemia, endothelial dysfunction, volume overload, and mineral and bone metabolism disorders, all of which contribute to accelerated atherosclerosis and myocardial remodeling [3].

In low- and middle-income countries, including Morocco, data describing cardiovascular risk profiles in chronic hemodialysis patients remain limited. Characterizing these risk factors at the local level is essential to improve preventive strategies and optimize multidisciplinary management. The aim of this study was to describe the prevalence of traditional cardiovascular risk factors and documented cardiovascular comorbidities in a cohort of chronic hemodialysis patients treated at a tertiary care center.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted at the Nephrology Center of Mohammed V Military Teaching Hospital. The study included 40 adult patients undergoing chronic hemodialysis for ESRD.

Data were retrospectively collected from medical records. Variables analyzed included age, sex, traditional cardiovascular risk factors (hypertension and diabetes mellitus), and documented cardiovascular comorbidities.

Hypertension was defined by a documented medical diagnosis or current antihypertensive treatment. Diabetes mellitus was defined by a known history of diabetes or ongoing antidiabetic therapy. Cardiovascular comorbidities were identified based on prior documented diagnoses and included ischemic heart disease, atrial fibrillation, ischemic stroke, and peripheral arterial disease.

Given the descriptive nature of the study and the limited sample size, no inferential statistical analyses were performed.

RESULTS

The mean age of the study population was 60 years (range: 26–82 years). Female patients represented 55% of the cohort.

Hypertension was present in 50% of patients, while diabetes mellitus was observed in 30%. Overall, cardiovascular comorbidities were documented in 17.5% of patients. Ischemic heart disease and atrial fibrillation were each present in 5% of cases. Ischemic stroke was reported in 5%, and peripheral arterial disease was identified in 2.5% of patients.

DISCUSSION

This study demonstrates a high prevalence of traditional cardiovascular risk factors among patients undergoing chronic hemodialysis, with hypertension and diabetes mellitus being the most frequent. These findings are consistent with previous reports from hemodialysis populations worldwide [2,4]. Both conditions are well-established contributors to cardiovascular morbidity and mortality in ESRD patients [1].

Hypertension in hemodialysis patients is multifactorial and closely related to volume overload, arterial stiffness, and neurohormonal activation. Persistent hypertension promotes left ventricular hypertrophy and heart failure, which are major determinants of cardiovascular mortality in this population [3]. Diabetes mellitus, a leading cause of ESRD, is associated with accelerated atherosclerosis and an increased risk of ischemic heart disease and cerebrovascular events [1,2].

The relatively low prevalence of documented ischemic heart disease and peripheral arterial disease observed in this cohort may reflect underdiagnosis rather than a true lower burden of disease. Hemodialysis patients frequently present with atypical symptoms or silent ischemia, and systematic cardiovascular screening is not always performed, potentially leading to under-recognition of cardiovascular disease [1,3]. In addition, the small sample size and cross-sectional design may have limited the detection of cardiovascular comorbidities.

Importantly, cardiovascular risk in chronic hemodialysis patients extends beyond traditional risk factors. Uremia-related mechanisms such as chronic inflammation, oxidative stress, anemia, and disturbances in calcium–phosphate metabolism contribute to vascular calcification, arterial stiffness, and myocardial remodeling [3,5]. These non-traditional factors are not adequately captured by conventional cardiovascular risk assessment models but play a critical role in the excess cardiovascular mortality observed in ESRD patients [5].

Clinical Implications

The findings of this study highlight the need for a comprehensive cardiovascular prevention strategy in chronic hemodialysis patients. Optimal blood pressure control, strict glycemic management, adequate volume status optimization, and early detection of cardiovascular disease should be integral components of routine care. Regular electrocardiographic and echocardiographic assessment, along with close collaboration between nephrologists and cardiologists, may help reduce cardiovascular morbidity and mortality in this high-risk population [1,3].

Limitations

This study has several limitations. The small sample size and single-center design limit the generalizability of the findings. The cross-sectional nature of the study precludes assessment of causal relationships or long-term cardiovascular outcomes. Additionally, the absence of systematic cardiovascular screening may have led to underestimation of cardiovascular disease prevalence.

CONCLUSION

Hypertension and diabetes mellitus are highly prevalent among patients undergoing chronic hemodialysis and represent major contributors to cardiovascular risk. Even in the absence of a high prevalence of overt cardiovascular disease, chronic hemodialysis patients remain at substantial cardiovascular risk due to the combined effects of traditional and non-traditional factors. Comprehensive preventive and therapeutic strategies targeting these mechanisms are essential to improve cardiovascular outcomes in this population.

REFERENCES

1. Sarnak MJ, Amann K, Bangalore S, *et al.,* chronic kidney disease and coronary artery disease. *J Am Coll Cardiol.* 2019 ;74(14):1823–1838.
2. Foley RN, Parfrey PS, Sarnak MJ. Clinical epidemiology of cardiovascular disease in chronic renal disease. *Am J Kidney Dis.* 1998 ;32(5 Suppl 3):S112–S119.
3. London GM. Cardiovascular disease in chronic renal failure: pathophysiologic aspects. *Semin Dial.* 2003 ;16(2):85–94.
4. Burmeister JE, Mosmann CB, Costa VB, *et al.,* Prevalence of cardiovascular risk factors in hemodialysis patients. *Arq Bras Cardiol.* 2014 ;102(5):473–480.
5. Stenvinkel P, Carrero JJ, Axelsson J, *et al.,* Emerging biomarkers for evaluating cardiovascular risk in chronic kidney disease patients. *Clin J Am Soc Nephrol.* 2008 ;3(2):505–521.