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Prevalence of Cardio-Kidney-Metabolic Syndrome and Missed Opportunities for Guideline-Directed Medical Therapy Among Chronic Kidney Disease Patients at a Malaysian Tertiary Centre

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Background:
Cardio-Kidney-Metabolic (CKM) syndrome describes the intertwined burden of cardiovascular, renal, and metabolic disorders. While the American Heart Association's 2023 framework highlights its global importance, data from Southeast Asia remain scarce. Guideline-directed medical therapies (GDMT)—statins, SGLT2 inhibitors, non-steroidal mineralocorticoid receptor antagonists (ns-MRAs), and GLP-1 receptor agonists—are proven to reduce cardio-renal events, yet real-world use among CKD patients is uncertain.

Methods:
This cross-sectional study analyzed 600 adult CKD patients attending nephrology clinics at University Malaya Medical Centre (UMMC) in 2022. CKM syndrome was defined per AHA 2023. Demographics, comorbidities, eGFR, albumin-creatinine ratio (ACR), and PREVENT 10-year cardiovascular risk were recorded. GDMT eligibility was approximated using pragmatic proxies (statin ≥ 40 years, SGLT2i all diabetes or ACR ≥ 30mg/g *and eGFR ≥*20ml/min/1.73m2, ns-MRA for diabetes with ACR ≥30mg/g & eGFR ≥ 25ml/min/1.73m2, GLP-1 RA = DM with CKD with ACR>100mg/g & eGFR ≥ 15ml/min/1.73m2

Results:
Mean age was 68.7 ± 7.9 yrs; 51% male; ethnicity: Chinese 43%, Malay 38%, Indian 17%. Mean BMI 27.0 ± 4.4 kg/m². Mean eGFR 47.3 ± 11.7 mL/min/1.73 m². CKD stages: G3a 51%, G3b 30%, G4 8%, G1-2 11%. Albuminuria (ACR ≥ 30mg/mmol) affected 69%. Diabetes 71%, hypertension 86%. Mean PREVENT risk 23.4 ± 10.7%. CKM prevalence was 33% (198/600). CKM patients had higher PREVENT risk (25.1% vs 22.6%, $p < 0.01$). Medication use: statins 89%, SGLT2i 21%, ns-MRA 3%, GLP-1 RA 3%. Usage was slightly higher in CKM patients (e.g., SGLT2i 28% vs 18%), but absolute uptake remained low. Using eligibility proxies, missed GDMT opportunities were substantial: statins 11%, SGLT2i 76%, ns-MRA 97%, GLP-1 RA 94%.

Conclusion:
One-third of CKD patients at UMMC met CKM criteria, with high cardiometabolic risk but under-utilization of reno-protective therapy, especially SGLT2i, ns-MRAs, and GLP-1 RAs. Findings highlight the urgent need for structured CKM pathways, pharmacist-supported initiation, and broader formulary access to close the evidence-to-practice gap in Malaysia.

Keywords: CKM syndrome, chronic kidney disease, SGLT2 inhibitor, finerenone, GLP-1 receptor agonist, albuminuria, Malaysia