

Chronic kidney disease in sub-Saharan Africa



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Infectious diseases—led by HIV/AIDS, tuberculosis, and malaria—are still the leading cause of death in sub-Saharan Africa; however, the contribution of non-communicable diseases to morbidity and mortality in the region has grown over the past 30 years. These emerging non-communicable diseases in Africa have been attributed at least in part to the improving longevity, urbanisation, and modernisation of cultures in the region. Cardiometabolic diseases have been suggested to be the leading contributor to deaths due to non-communicable diseases in sub-Saharan Africa,¹ with high and rapidly increasing incidences of these cardiometabolic diseases reported across diverse settings in the region. For instance, the International Diabetes Federation projects that Africa is set to witness the highest relative increase in diabetes, by 156% between 2017 and 2045, with the total population of adults with diabetes increasing from 16 million to 41 million people.² Populations in sub-Saharan Africa have also been shown to have a high prevalence of hypertension (48%) and obesity (20%).³ To this list we can now add chronic kidney disease, as shown by Jaya George and colleagues in *The Lancet Global Health*.⁴

In a cross-sectional population study, that involved over 8000 participants aged 40–60 years at six centres from four African countries, the overall prevalence of chronic kidney disease was reported as 10·7% (95% CI 9·9–11·7).⁴ The study by George and colleagues supports the results of a 2018 meta-analysis that examined 98 432 individuals from 98 studies in Africa and reported an overall prevalence of chronic kidney disease stages 1–5 of 15·8% (95% CI 12·1–19·9) and a prevalence of chronic kidney disease stages 3–5 of 4·6% (3·3–6·1) for in the general population.⁵ Given the increasing incidence of hypertension, HIV, and diabetes in Africa, all of which were independently associated with chronic kidney disease in the study by George and colleagues, the stage is set for a major disruption in health provision that would demand major infrastructural changes and a hefty increase in health budgets if efforts are not immediately made to prevent the onset of chronic kidney disease.

The significantly different prevalences in chronic kidney disease between the four subregions analysed is a clear indication of the different transition stages across

participating countries. Prevention measures that have been put in place for HIV/AIDS, although not optimal, might be of use to halt the advancing prevalence of non-communicable diseases in Africa. In this regard, similar to campaigns in east and southern Africa aiming for individuals to find out their HIV status, individuals could be encouraged to find out their diabetes and hypertension status, which are strong determinants of chronic kidney disease. Renal registries might also be useful for establishing the causes of chronic kidney disease and end-stage renal disease. The establishment of an Africa Renal Registry in 2015 by the African Association of Nephrology and the African Paediatric Nephrology Association could provide further data that might assist various health organisations in Africa to plan effective strategies.⁶

Estimated glomerular filtration rate (eGFR) is considered the best overall index of kidney function and standardisation of creatinine measurements, a key component of calculating the eGFR, is crucial in identifying and stratifying patients accurately. In George and colleagues' study,⁴ creatinine measurements were done in one central laboratory using an isotope dilution mass spectrometry (IDMS)-traceable method; however, many laboratories in Africa are not using methods for creatinine that are IDMS-traceable. Africa in general faces huge challenges, with shortages of qualified personnel and quality of laboratory tests. According to the latest figures published by the African Society for Laboratory Medicine, few laboratories outside South Africa have been accredited to internationally recognised standards. Point-of-care measurement of creatinine is an attractive alternative to measuring creatinine in traditional laboratories. Point-of-care testing has been shown to be effective in diagnosing and monitoring of patients with HIV and tuberculosis in South Africa.⁷ With improvements in point-of-care testing technology and improved connectivity, such testing for creatinine can easily be introduced as part of a concerted effort to meet the quadruple burden of HIV, tuberculosis, diabetes, and chronic kidney disease.

Of greater importance is that the four-variable Modification of Diet in Renal Disease (4-v MDRD) and Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations used by George and colleagues

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have previously been shown to perform better without adjustments for African American ethnicity and are inaccurate for populations in South Africa, Kenya, and Ghana.^{8–10} Therefore, until these equations are validated in Africa, the accuracy of the findings of this Article and any other studies in Africa is unknown. These limitations have obvious public health implications for the implementation of large-scale screening and programmes for the prevention and management of chronic kidney disease.

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We declare no competing interests.

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- 1 Gouda HN, Charlson F, Sorsdahl K, et al. Burden of non-communicable diseases in sub-Saharan Africa, 1990–2017: results from the Global Burden of Disease Study 2017. *Lancet Glob Health* 2019; **7**: e1375–87.
- 2 International Diabetes Federation. IDF Diabetes Atlas 8th. Brussels, Belgium: International Diabetes Federation, 2017.
- 3 Nyirenda MJ. Non-communicable diseases in sub-Saharan Africa: understanding the drivers of the epidemic to inform intervention strategies. *Int Health* 2016; **8**: 157–58.
- 4 George JA, Brandenburg J, Fabian J, et al. Kidney damage and associated risk factors in rural and urban sub-Saharan Africa (AWI-Gen): a cross-sectional population study. *Lancet Glob Health* 2019; **7**: e1632–43.
- 5 Kaze AD, Ilori T, Jaar BG, Echouffo-Tcheugui JB. Burden of chronic kidney disease on the African continent: a systematic review and meta-analysis. *BMC Nephrol* 2018; **19**: 125.
- 6 Davids MR, Eastwood JB, Selwood NH, et al. A renal registry for Africa: first steps. *Clin Kidney J* 2016; **9**: 162–67.
- 7 Cox HS, Mbhele S, Mohess N, et al. Impact of Xpert MTB/RIF for TB diagnosis in a primary care clinic with high TB and HIV prevalence in South Africa: a pragmatic randomised trial. *PLoS Med* 2014; **11**: e1001760.
- 8 Madala ND, Nkwanyana N, Dubula T, Naiker IP. Predictive performance of eGFR equations in South Africans of African and Indian ancestry compared with ^{99m}Tc-DTPA imaging. *Int Urol Nephrol* 2012; **44**: 847–55.
- 9 Wyatt CM, Schwartz GJ, Owino Ong'or W, et al. Estimating kidney function in HIV-infected adults in Kenya: comparison to a direct measure of glomerular filtration rate by iohexol clearance. *PLoS One* 2013; **8**: e69601.
- 10 Eastwood JB, Kerry SM, Plange-Rhule J, et al. Assessment of GFR by four methods in adults in Ashanti, Ghana: the need for an eGFR equation for lean African populations. *Nephrol Dial Transpl* 2010; **25**: 2178–87.