Editorial

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KIDNEY RESEARCH AND CLINICAL PRACTICE

The new race-free equations for estimating glomerular filtration rate: should they be adopted for Asians?

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In 2021, researchers of the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) published new CKD-EPI equations without race coefficients [1]. These equations showed acceptable estimation of the measured glomerular filtration rate (GFR), and the equation incorporating both creatinine and cystatin C showed better performance than the equations incorporating either creatinine or cystatin C alone. Therefore, the National Kidney Foundation and the American Society of Nephrology Task Force recommend the immediate adoption of the new equations and the use of cystatin C in all laboratories in the United States [2]. However, the publication of these new estimated GFR (eGFR) equations was largely driven by efforts to address healthcare disparities associated with racial diversity in the United States [3]. Because this change was based on social rather than biological issues in the United States, further scientific background should be collated to decide whether these new equations should be adopted in other countries.

Two aspects must be evaluated for the adoption of the new equations: predictability and accuracy. Kim et al. [4] evaluated the predictive performance of the 2021 CKD-EPI equations for cardiovascular disease and mortality using data from the KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD). This study showed that the 2021 CKD-EPI equations based on creatinine alone and both creatinine and cystatin C did not show superior predictability compared to the original 2009 creatinine-based CKD-EPI equation. The results of this study should be interpreted with caution because of the relatively lower incidence of cardiovascular disease and mortality in the KNOW-CKD cohort than in other CKD cohorts. However, I and other KNOW-CKD investigators have also previously evaluated the predictive performance of the new equations for the risk of kidney failure [5] and found a similar performance of the new equations compared to the original 2009 equation. In both studies, the difference in eGFR between the 2009 and 2021 creatinine-based equations was approximately 3 mL/min/1.73 m^2. Therefore, the small eGFR difference between the 2009 and 2021 equations is not expected to have a significant impact on the predictive performance. However, in terms of accuracy, a recent Korean study showed that the 2021 creatinine-based equation overestimated the measured GFR such that the median bias was 4.8 mL/min/1.73 m^2, which was significantly larger than that of the 2009 equation (1.8 mL/min/1.73 m^2) [6].

The difference in bias between the equations was almost

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Table 1. Application of new race-free creatinine-based CKD-EPI equation for Asians

Effects	2021 equation vs. 2009 equation
Predictability	
Cardiovascular disease and mortality [4]	Not significant
Kidney failure [5]	Not significant
Accuracy, median bias (mL/min/1.73 m^2)	
Korea [6]	4.8 vs. 1.8
China [7]	6.4 vs. 3.3
CKD prevalence (%)	
Korea [6]	11.0 vs. 10.3
Korea [8]	3.1 vs. 2.2
Singapore [8]	23.3 vs. 18.2
China [8]	2.0 vs. 1.6
India [8]	14.8 vs. 10.8
Russia (Central Asia) [8]	29.1 vs. 22.2

CKD-EPI, Chronic Kidney Disease Epidemiology Collaboration.

identical to the difference in eGFR between the equations in the KNOW-CKD studies. Additionally, the 2021 CKD-EPI equation showed less accuracy and overestimated the measured GFR compared with the 2009 equation in the Chinese population [7]. Accordingly, a lower prevalence of CKD using the new equation has been shown across various Asian cohorts, including Korea, China, India, Singapore, and Russia (Central Asia) [8].

The accuracy of the 2021 CKD-EPI equations should be further validated in various Asian cohorts, especially those with cystatin C. However, based on current evidence, there is no benefit in using the new CKD-EPI equations in Asians (Table 1). The new equations reclassify a significant proportion of CKD grade 3 patients close to the threshold of 60 mL/min/1.73 m^2 to grade 2, which may delay diagnosis and intervention of CKD for many Asian patients. Moreover, the application of the new equations is unlikely to improve the prediction of outcomes in Asian patients. Furthermore, changes in the prevalence of CKD can influence CKD-related research and healthcare policies in Asian countries. Therefore, the adoption of the new CKD-EPI equations requires further discussion among healthcare professionals and other stakeholders in Asian countries. In particular, it requires careful discussion which eGFR equation should be recommended in the next CKD guidelines of the Kidney Disease: Improving Global Outcomes.

Conflicts of interest

The author has no conflicts of interest to declare.

Data sharing statement

The data presented in this study are available on request from the corresponding author.

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