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Decomposing the Cardiovascular Event Disparity Between U.S. and Korean Chronic Kidney Disease Patients : A Blinder-Oaxaca Analysis of CRIC and KNOW-CKD Cohorts

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Objectives : U.S. CKD patients show markedly higher cardiovascular event rates than Korean patients, but the underlying mechanisms remain unclear. This study investigated which clinical, socioeconomic, and structural factors contribute to this disparity, and examined the role of ethnicity as a potential determinant.

Methods : We analyzed 4,679 patients from two prospective CKD cohorts: 2,666 from the CRIC and 2,013 from the KNOW-CKD. The primary outcome was major adverse cardiovascular events (MACE). Sequential Cox proportional hazards models were used to assess the contribution of each covariate group to the between-cohort hazard ratio. To decompose the sources of outcome disparity, we applied Blinder–Oaxaca decomposition analysis, which partitions outcome differences into: endowment effects, reflecting differences in the distribution of baseline characteristics, and coefficient effects, capturing structural differences in how those characteristics relate to outcomes. Within CRIC, MACE incidence rates were compared across ethnic groups.

Results : The mean age was 56.8 ± 11.3 years, 57.4% were male, with a median follow-up of 5.8 years (IQR 2.8–10.1). In unadjusted Cox analysis, CRIC patients had a 3.0-fold higher MACE risk than KNOW-CKD patients (HR 2.996, 95% CI 2.469–3.637). Sequential adjustment for CKD severity (eGFR, UACR) and traditional cardiovascular risk factors (diabetes, BMI, smoking) attenuated the cohort hazard ratio to 1.96. Blinder–Oaxaca decomposition revealed that only 20–33% of the MACE difference was attributable to endowment effects, while the majority (166–171%) was explained by coefficient effects. Notably, crude MACE incidence rates (per 100 person-years) were 1.42 in Korean (KNOW-CKD), 3.18 (White), and 5.02 (Asian), with Black (5.19) and Hispanic (5.02) patients showing the highest burden. The 3.5-fold higher incidence in U.S. Asians compared to Koreans.

Conclusions : The substantially higher MACE incidence in U.S. compared to Korean CKD patients is only partially explained by clinical risk factor distributions. The disparity is primarily driven by structural differences in how these factors translate into events.