Lower income levels are associated with higher risk for developing chronic kidney disease: A nationwide cohort study

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Objectives: Low income has been highly associated with poor medical conditions. However, the relationship between income level and the risk for developing chronic kidney disease (CKD) is less clear given the relatively small sample size of the studies to date.

Methods: We studied the association of income levels with incident CKD using Cox proportional hazard regression models from the National Health Insurance Service National Health Checkup Cohort which was comprised of 10.8 million adults in Korea between 2009 and 2015. Income levels were divided into 10 categories based on the deciles of monthly insurance charge at the time of cohort entry. CKD was defined as de novo development in estimated glomerular filtration rate (eGFR) of <60 mL/min per 1.73m² for at least two consecutive measurements or a ≥30 % decline in eGFR from the baseline.

Results: During 50,777,367 person-years of follow-up, CKD newly developed in 297,977 (2.77%) individuals and a crude event rate was 5.87 (95% confidence intervals [CIs], 5.85 to 5.89) per 1,000 person-years. In fully-adjusted models, a graded inverse association between income levels and CKD development was found; Adjusted hazard ratios (95% CIs) from the lowest (poorest) to highest (richest) categories were 1.24 (1.22-1.26), 1.16 (1.14-1.18), 1.09 (1.07-1.11), 1.04 (1.02-1.0), 1.02 (1.00-1.03), 1.00 (reference), 0.97 (0.95-0.99), 0.97 (0.95-0.99), 0.97 (0.96-0.99), and 0.93 (0.92-0.95), respectively. In fully-adjusted cubic spine models where income (monthly insurance charge) was treated as a continuous variable, similar inverses relationships were observed.

Conclusions: In this large-scale nationwide cohort study, lower income levels were significantly associated with higher risk of incident CKD. Our findings suggest that much attention should be paid to income inequality to reduce risk of chronic diseases such as CKD.

Figure 1. Multivariate adjusted hazard ratios of CKD development associated with baseline income levels in Cox model using restricted cubic spines