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Effects of polygenic risk score and sodium, potassium intake on hypertension in Asians: A nationwide prospective cohort study

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Objectives: Hypertension is not only a major risk factor for cardiovascular disease, but also leads to death. The association of PRS with hypertension has been studied, but mostly European subjects and very few Asian subjects. Therefore, we investigated the effect of sodium, potassium intake and PRS on the new-onset hypertension in Asians.

Methods: We used Korean Genome and Epidemiology Study (KoGES) data, and calculated PRS_{SBP}. In test set data, we excluded participants with hypertension history at baseline, or loosed follow-up. We conducted multivariable logistic and Cox regression modelling to evaluate association between new-onset hypertension and PRS_{SBP}, and sodium, potassium intake.

Results: A total of 35,214 participants in test set, and 3,757 participants in validation set were analyzed. Compared to the non-hypertension group, the hypertension group was significantly older, had a higher BMI, had higher proportions of current smoker, diabetes, and CVD, had a higher daily sodium intake, and had a lower potassium intake. The K-M curve showed that the risk of hypertension was significantly higher in the group with high PRS group. Multivariate logistic regression model revealed that the risk of hypertension was significantly associated with higher PRS, higher daily sodium intake, and lower daily potassium intake, even after adjusting for covariates. Subgroup analysis showed that the higher daily sodium intake, the higher the effect of PRS on hypertension. In addition, subgroup analysis on the effect of daily potassium intake on hypertension was significant in the age of less than 65, obese, never smoker, non-DM, and physical activity (+) groups.

Conclusions: Daily sodium intake, potassium intake, and PRS were significantly associated with the development of hypertension in Asians. Specially, daily sodium intake had a significant effect on the occurrence of hypertension in the group with relatively low clinical risk of hypertension. As sodium intake increased, the effect of PRS on hypertension increased significantly.