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Differential impact of lifestyle habits on gout incidence based on genetic risk levels

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Gout, a form of inflammatory arthritis triggered by the deposition of monosodium urate crystals, is becoming increasingly prevalent in Korea, largely due to the rapid aging of the population. This study aims to explore the combined influence of genetic predisposition and lifestyle habits on the risk of developing gout, utilizing data from a representative Korean cohort. Early identification of individuals at high risk for gout is critical for preventing the condition. The research utilized data from the Korean Genome and Epidemiology Study-Urban Health Examinees cohort (KoGES-HEXA), a large-scale population-based cohort study. Genetic information for each participant was gathered at the baseline of the study, and gout cases were identified through self-reported diagnoses at either the baseline assessment or the first follow-up. A Polygenic Risk Score (PRS), a measure of genetic susceptibility, was calculated using data from nine independent cohort datasets, integrating multiple genetic variants associated with gout risk. In addition to genetic risk, the study also considered key lifestyle factors such as alcohol consumption, dietary habits, smoking status, and physical activity, along with metabolic syndrome indicators, which were measured for each participant. The analysis employed logistic regression models to estimate the odds ratios (ORs) for gout in relation to genetic risk, lifestyle factors, and metabolic health status. These models were adjusted for potential confounders, including participants' age and sex. Findings from this study underscore the importance of considering both genetic and environmental factors when assessing gout risk. The integration of a PRS with detailed lifestyle and metabolic data offers a more comprehensive understanding of the risk factors for gout, providing valuable insights for early prevention strategies and personalized interventions aimed at high-risk individuals.