Background: Hyperuricemia, the predisposing condition for gout, is associated with hypertriglyceridemia and diabetes mellitus, and is a risk factor for developing coronary artery disease. Studies report that PCDD/Fs cause renal toxicity and elevate uric acid. PCDD/F exposure as a preventable risk factor has drawn the attention of public health officials worldwide.

Objectives: To investigate and clarify the effect of moderate-to-high PCDD/F exposure on hyperuricemia risk.

Methods: This cross-sectional study recruited 1657 healthy participants living near a deserted pentachlorophenol factory. We examined associations between serum PCDD/F levels and (a) renal function-related factors and (b) hyperuricemia risk, and compared estimated glomerular filtration rates (eGFR) in both men and women.

Results: eGFR decreased significantly with serum PCDD/F levels in both men and women (men: β = -8.484, p < 0.001; women: β = -10.459, p< 0.001). Serum PCDD/F and UA levels were higher in men than in women and were significantly correlated (men: β = 0.253, p = 0.003; women: β = 0.080, p = 0.467; All: β = 0.180, p = 0.011). In addition, men with higher serum PCDD/F levels had a higher hyperuricemia risk than did the reference group (serum PCDD/F levels < 11.4 pg WHO98-TEQDF/g lipid) after adjusting for confounding factors (25th to < 50th percentile, adjusted odds ratio (AOR) = 1.73 [95% confidence interval (CI) = 1.05-2.85]; 50th to < 75th percentile, AOR = 2.50 [1.50-4.15]; ≥ 75th percentile, AOR = 3.25 [1.88-5.62]). These data show that serum PCDD/Fs affected the risk of hyperuricemia risk in healthy men.

Conclusions: We hypothesize that accumulated PCDD/Fs reduce urate excretion and heighten the risk of hyperuricemia in the general population.