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The relationships of blood lead level, body mass index, and osteoarthritis in postmenopausal women

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Abstract

Objectives: It is unclear whether blood lead level (BLL) is associated with osteoarthritis (OA). The objectives of this study were to address the relationship between BLL and OA and to assess whether degree of obesity, evaluated as body mass index (BMI), mediates BLL-related OA.

Study design: This study was performed using data obtained from 884 postmenopausal women (≥55 years old) in the Korea National Health and Nutrition Examination Survey 2010-2012. OA in back, hip, and knee was assessed by radiographic examination (rOA) and radiographic examination and symptoms (sxOA). Multivariable logistic regression analyses were performed to investigate the BLL-OA relationship. Mediation analyses were performed to address the contribution of BMI to BLL-related OA.

Results: Odds ratio (OR) for knee rOA with the highest tertile of BLL was 1.56 [95% confidence interval

(CI) = 1.08-2.25] compared with the lowest tertile; there were significant linear trends across tertiles. With adjustments for confounders without BMI, continuous BLL was significantly associated with rOA (OR = 1.89, 95% CI = 1.27-2.80) and sxOA (OR = 1.69, 95% CI = 1.03-2.80) in the knee. After further adjusting for BMI, however, these significances were attenuated or disappeared. BMI was significantly associated with BLL, rOA of knee, and sxOA of knee and back. BMI significantly mediated the BLL-rOA association of the knee (21.1%) and back (46.5%) and the BLL-sxOA association of the knee (22.0%). The population-attributable fraction of rOA caused by BLL greater than the median (2.216 μg/dL) was 8.7% (95% CI = 1.1%-16.2%, P value = 0.024).

Conclusions: BLL was significantly associated with knee OA in Korean postmenopausal women. BMI considerably mediated the effects of BLL on knee OA.

Keywords: Arthritis; Body mass index; Lead; Osteoarthritis; Pb.

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