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Environmental cadmium exposure is associated with higher risk of osteoporosis in postmenopausal women: a systematic review and meta-analysis

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Resumo

Introduction: Cadmium (Cd) is a widespread environmental pollutant that has long been associated to bone mineral density (BMD) loss and osteoporosis [1]. However, it is unclear whether environmental Cd exposure is a risk factor for bone disorders in postmenopausal women. **Objectives:** The study was conducted to comprehensively assess the association between environmental Cd exposure and osteoporosis (BMDT-score of -2.50 or lower) in postmenopausal women. **Methods:** An online electronic search was performed based on PRISMA guidelines [2] in Scopus, PubMed, Science Direct, and Web of Science databases for observational studies published from 2010 to 2021. The data from the retrieved eligible studies on urinary Cd (U-Cd) concentrations and osteoporosis outcome in women aged 50 years and older were included in the meta-analysis. Risk of bias tables and summary plots were built using Review Manager (RevMan) software [3]. Classification analysis, heterogeneity tests, publication bias, and forest plots were performed using MedCalc® Statistical Software [4]. **Results:** Of the 116 retrieved studies, 16 studies were included in the qualitative analysis, while 7 studies were

included in the quantitative analysis. Due to the high heterogeneity of the studies, data were separated into low polluted areas (median U-Cd concentrations of 0.5 g/g creatinine, 2 studies, n=5895) and moderately/highly polluted areas (median U-Cd concentrations of 5 µg/g creatinine, 5 studies, n=2512). The results were consistent and showed a significant positive association between U-Cd concentration and osteoporosis outcome in postmenopausal women. The pooled odds ratio (OR) were 1.951 (95% CI: 1.392–2.734; p<0.001) in the low polluted subset and 1.735 (95% CI: 1.349–2.232; p<0.001) in the moderately/highly polluted subset. The heterogeneity tests were not statistically significant (I²=72.53% (p=0.056) and I²=41.55% (p= 0.144), respectively). No evidence of publication bias was found in the moderately/highly polluted subset (p=0.580 for Egger's test), but it was found in the low polluted subset (p<0.001, for Egger's test).

Conclusion: This study indicates that environmental Cd exposure might be a risk factor of osteoporosis in postmenopausal women, contributing to the body of evidence on the adverse health effects of environmental Cd exposure.

Keywords: cadmium; osteoporosis; risk; women; meta-analysis

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