

THE RATE OF BONE DEMINERALIZATION WITH AGE DEPENDS ON THE URINARY CADMIUM CONCENTRATION

Jong-Won Kang, *College of Medicine, Chungbuk National University, Korea*

Sang-Yong Eom, *College of Medicine, Chungbuk National University, Korea*

Heon Kim, *College of Medicine, Chungbuk National University, Korea*

Geun-Bae Kim, *National Institute of Environmental Research, Korea*

Chung-Hee Park, *National Institute of Environmental Research, Korea*

Chul-Ho Lee, *National Institute of Environmental Research, Korea*

Seung-Do Yu, *National Institute of Environmental Research, Korea*

Purpose: Janghang Refinery which was built in 1936 and operated for 50 years had emitted great amount of pollutants including cadmium (Cd), a heavy metal which has been reported to be associated with decrease in bone mineral density (BMD). This study was aimed to evaluate the relationship between urinary cadmium concentration and decrement in bone mineral density in residents having lived in the vicinity of Janghang Refinery.

Materials and Methods: The study subjects included 450 males and 619 females who were living within 20 km from Janghang Refinery. Bone mineral density was measured with ultrasonic method at the calcaneus area. Urinary cadmium concentration was evaluated using an atomic absorption spectrophotometer and adjusted with urinary creatinine concentration. The correlation between urinary Cd level and BMD was statistically tested according to age group (<50 yrs, 50 – 59 yrs, 60 – 69 yrs, >70 yrs) and sex, and the decreasing rate of BMD as age was estimated according to urinary Cd level (< 2, 2 – 5, 5 – 10, > 10 •g/g creatinine).

Results: As the age increased, BMD decreased and urinary Cd concentration increased. Urinary Cd concentration was significantly correlated with BMD in young males aged less than 60 years, and in females aged less than 50 years after controlling effects of age and menopause using multiple regression models. Neither in males aged 60 years or more, nor in females aged 50 years or more, were those correlations found. BMD was more strongly correlated with age in females than in males and, it decreased more rapidly as the urine Cd increased in female subjects.

Conclusion: These results suggest that cadmium exposure increases the rate of bone demineralization, especially in women.