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**TRACE ELEMENTS BETWEEN DEFICIENCY AND
TOXICITY:
UPDATE AND PERSPECTIVES**

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P2 - Assessment of selenium and cadmium levels in serum and toenails: A cross-sectional study in Modena, Northern Italy

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Background and aims

Cadmium (Cd) is a heavy metal established as a human carcinogen while selenium (Se) is a metalloid showing an intriguing relation with human health, particularly with cancer. Se is usually present both in the environment and in living organisms in various inorganic and organic forms, having considerable variations in both their toxicological and physiological properties. The aim of this study was to assess their reference values and individual determinants influencing their content in fifty adults randomly drawn from the municipality of Modena, by determining Se and Cd levels in plasma and in toenails.

Methods

We determined Se and Cd in serum samples using anion exchange chromatography (IEC) coupled with inductively coupled plasma mass spectrometry according to methodologies previously established for biological matrices. We measured toenail Se and Cd content using a Zeeman-effect corrected graphite-furnace atomic absorption spectrometer. Pearson's correlations with their 95% Confidence Intervals (95% CI) were performed between serum and toenails content.

Results

In serum, median (25th-75th) levels for total, inorganic and organic Se forms were 119.0 µg/L (109.0-136.0), 21.6 µg/L (8.9-38.7) and 66.4 µg/L (33.0-89.3), respectively. In general for all Se species, levels were higher in men; total and inorganic Se forms were higher older subjects, while organic in younger ones. In toenails Se levels was 0.93 µg/g (0.82-1.15), with higher content in men. Pearson's correlations between serum Se species and toenails content were 0.023 (95% CI -0.254, 0.297; P=0.606) for total Se, -0.040 (95% CI -0.312, 0.238; P=0.780) for inorganic Se species, -0.045 (95% CI -0.317, 0.233; P=0.752) for organic forms.

Cd serum median content was 40.6 ng/L (30.1-53.5), and results were similar for both sexes with higher levels in younger participants. Toenails Cd level was 5.70 ng/g (0.50-11.78), with major content in women and older participants. In general, all values were higher in overweight subjects. Correlation between serum and toenails levels was -0.071 (96% CI -0.340, 0.208; P=0.619).

Conclusions

Our cross-sectional study provided reference values of Se and Cd for the Modena municipality residents, even if the estimate are imprecise due to the limited number of study subjects. The null or inverse correlations between serum and toenails levels could reflect the different window of exposure showed by the matrices, because serum content is largely related to recent exposure with half time of a few days, while toenails matrix could reflect medium or long-term exposure. Alternatively, they may reflect a different distribution of selenium and cadmium in the vary body districts. Overall, these factors should be considered for the selection of the indicator in the assessment of Se and Cd exposure.