Urinary concentrations of non-essential and essential elements during weaning in infants from the NELA Cohort in Spain

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SANTIAGO CHILE

ISEE 2024

1. INTRODUCTION

- Essential elements are vital for infant growth and development, while non-essential elements can be harmful even in trace amounts.

- Breastfeeding minimizes toxic metal(loids) exposure, but solid foods introduction, especially rice-based products, can introduce harmful metal(loids) levels.

AIM

To investigate infant exposure to essential and non-essential elements at 3 months by feeding type and the changes following solid food introduction from 3 to 18 months.

2. METHODS

Study population:
We used data from the Nutrition in Early Life and Asthma (NELA) birth cohort. **NELA** *Nutrition in Early Life and Asthma*

Paired samples

3 months **n = 490**

n =175

18 months **n =216**

Metals exposure:
Inductively coupled plasma mass spectrometry (ICP-MS) was used to measure urine concentrations of essential (Co, Cu, Mo, I, Fe, Mn, Se, Zn, and Ni) and non-essential elements (Al, V, As, Cd, Sb, Tl, and Pb) at 3 and 18 months of age.

Dietary assessment:
Infant diet at 18 months of age was assessed with a validated food frequency questionnaire (FFQ).

Statistical analysis:
Differences in urinary elements concentrations by feeding type (exclusively breastfeeding, mixture, and exclusively formula) we assessed by ANOVA at 3 months of age.

Differences in urinary elements concentrations at 3 and 18 months of age were assessed by paired t-test analysis.

3. RESULTS

Figure 1. Logarithm transformed urine metal concentrations at 3 months of age by type of feeding (*n=490*). The elements shown presented significant differences through ANOVA-one way test analysis with p-value <0.05.
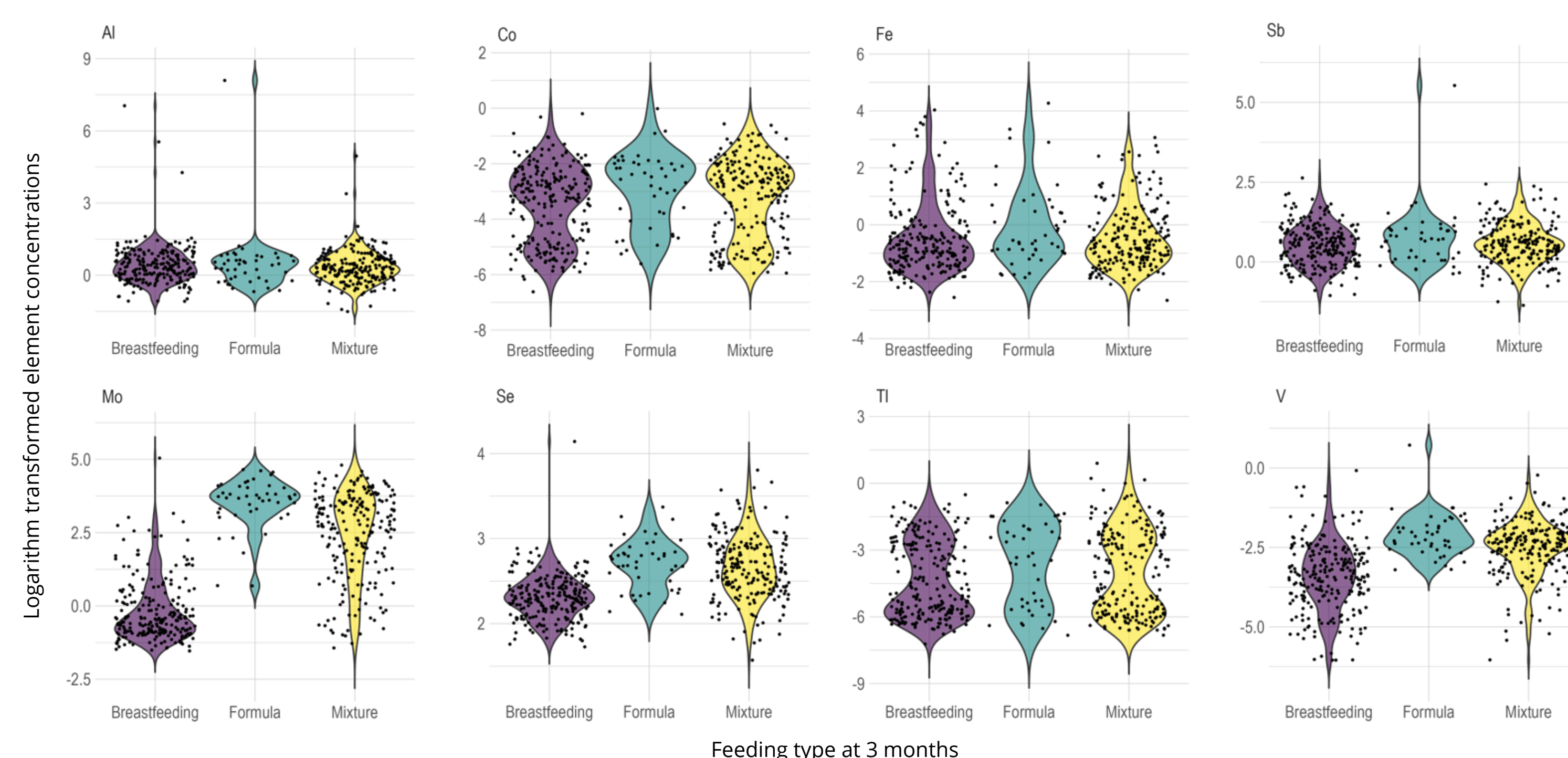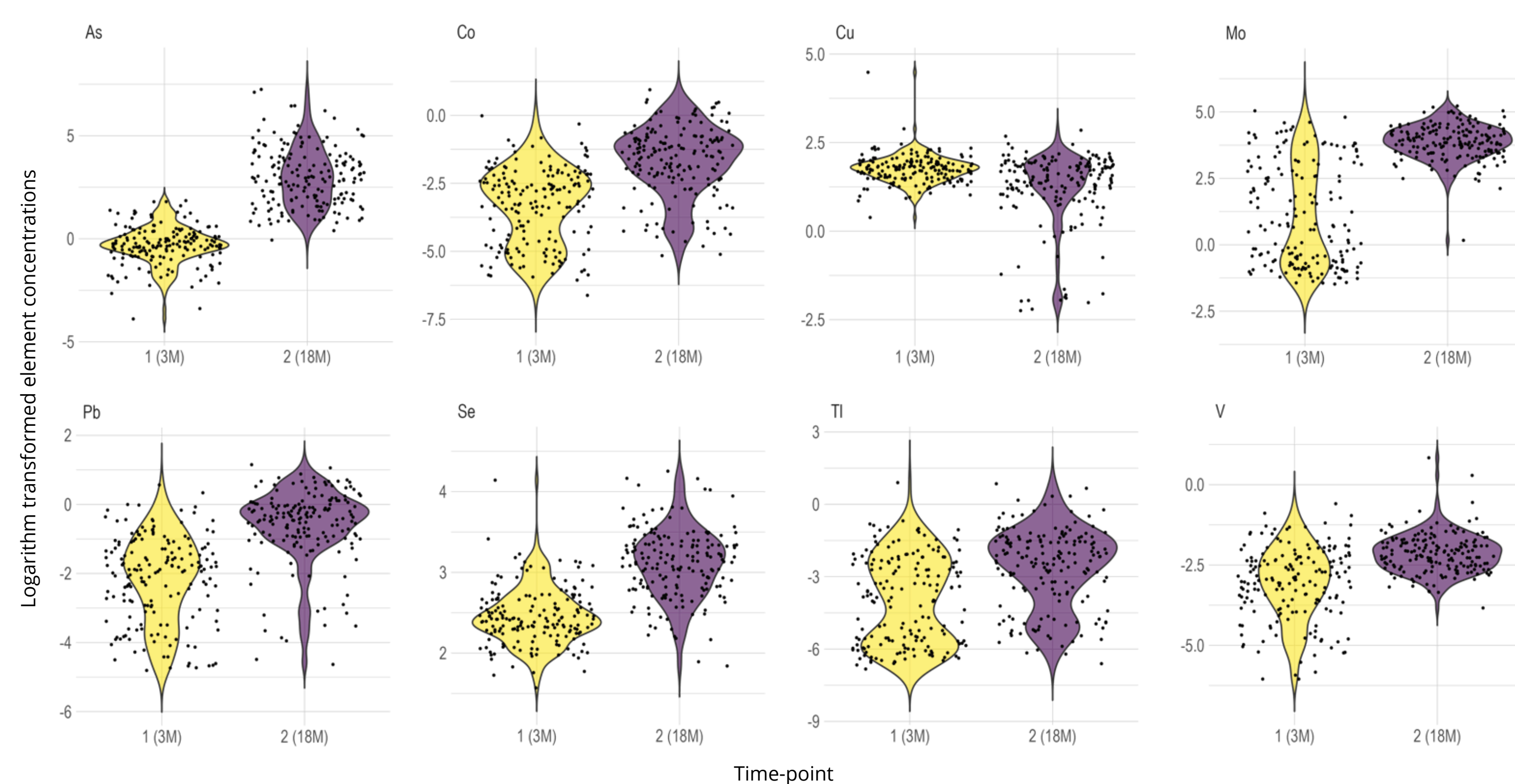

Figure 2. Logarithm transformed urine metal concentrations at 3 and 18 months of age (n=175). The elements shown presented significant differences through paired t-test analysis with p-value <0.05.

4. CONCLUSION

- Infant's diet is a primary source of both essential and toxic metals
- Breastfeeding minimizes toxic metal exposure compared to formula feeding.
- Infants' urine shows increased As, Pb, Mo, and other metals with solid food intake
- These findings highlight the importance of minimizing non-essential element exposure.
- Ensuring adequate intake of essential elements is crucial for long-term infant health.

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