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Reference

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**Title:** Prevalence of inadequate micronutrient intake among urban Costa Rican population: results from the Latin American Study of Nutrition and Health (ELANS)

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## Background and Objectives:

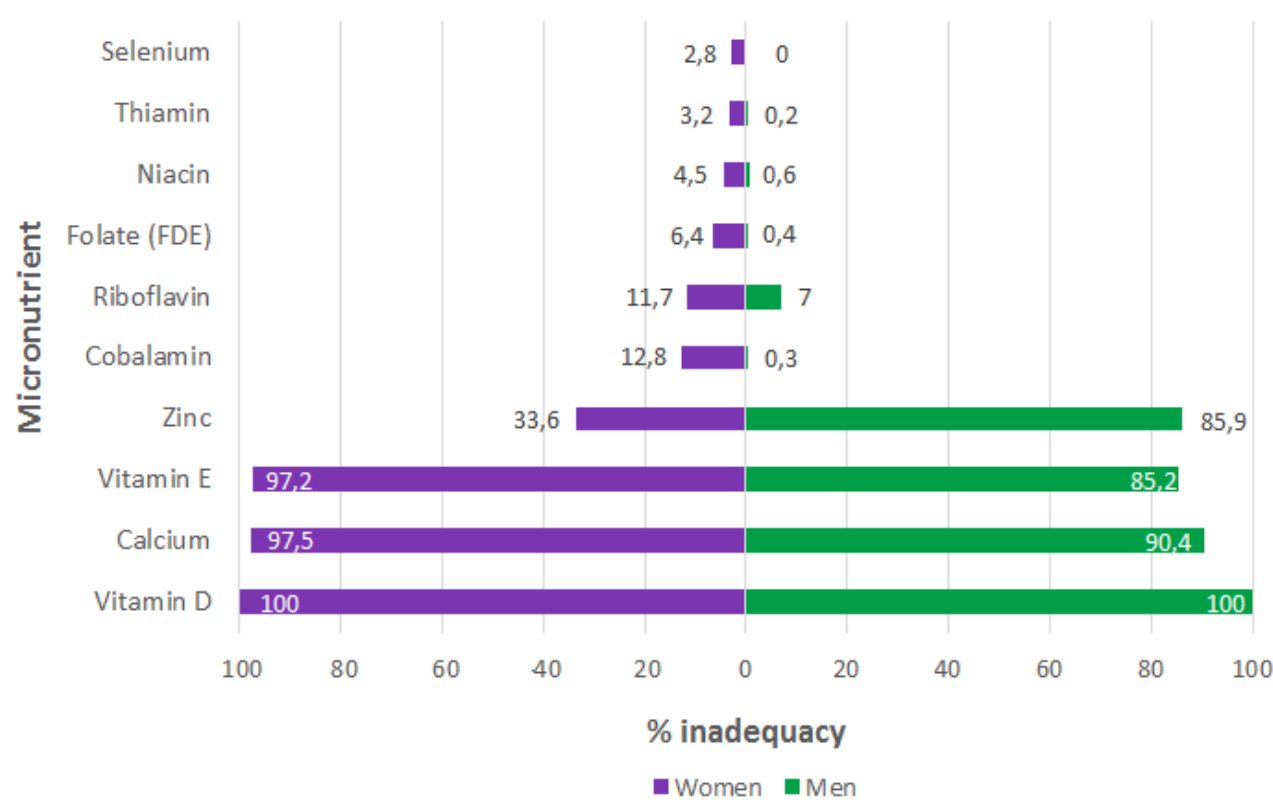
Invisible, but still very common in developing countries, micronutrient deficiencies can lead to serious health consequences. Hypovitaminosis can reduce the ability to combat diseases, diminish cell and organ function and affect the development of children and wellbeing of adults and elderly. The study aimed to estimate the prevalence of inadequate micronutrient intake in an urban Costa Rican population and to identify individuals at risk of nutritional deficiency.

## Methods:

ELANS is a multicenter cross-sectional study including a representative sample of urban population from eight LA countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Peru and Venezuela). In Costa Rica, 798 participants (15-65 years old) provided two 24-h dietary recalls. Nutritional data was entered into the Nutrition Data System for Research (NDS-R) software, after a harmonization process between local foods and NDS-R database, and adjusting for mandatory micronutrient fortification of sugar, rice, wheat flour and corn flour and milk. The rates of prevalence of inadequate micronutrient intake were estimated according to gender and age group, using the Software International Monitoring, Assessment, and Planning Program (IMAPP).

## Results:

High prevalence (>85%) of inadequate intake of vitamin D, E and Calcium was observed in both genders. The prevalence of inadequate intake of vitamin A, riboflavin and niacin were 39.8%, 24.6% and 16.5%, respectively. Lower prevalence was found for iron (3.3%), thiamin (7.8%), cobalamin (10.2%) and folate (13.9%). For all analysis, vitamins and minerals inadequacy was higher for women than men, with exception of riboflavin and vitamin A. For niacin, cobalamin, calcium and thiamin the prevalence of inadequate intake was greater in older groups ( $p < 0.005$ ).



## Conclusions:

Vitamin and mineral intake among urban Costa Rican population were lower than recommended, with a tendency of a greater inadequacy rate in older groups. Healthy eating that facilitate meeting the EAR from a variety of foods most be encourage to improve this situation.

## Keywords:

Vitamins. Minerals. Costa Rica. Inadequate intake

## Conflict of Interest:

The ELANS is supported by a scientific grant from the Coca Cola Company and support from the Instituto Pensi / Hospital Infantil Sabara, International Life Science Institute of Argentina, Universidad de Costa Rica, Pontificia Universidad Católica de Chile, Pontificia Universidad Javeriana, Universidad Central de Venezuela (CENDES-UCV)/Fundación Bengoa, Universidad San Francisco de Quito, and Instituto de Investigación Nutricional de Peru. The funders had no role in study design, data collection and analysis, the decision to publish, or the preparation of this manuscript.

## Further Collaborators:

On behalf of ELANS Study Group.