

Child Ultra-Processed Food Consumption in a Mixed Indigenous Rural Community in Ecuador: Associations with Linear Growth, Weight Status, and Bone Maturation

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Objectives: Frequent ultra-processed food (UPF) consumption is associated with poor health and nutrition outcomes throughout the lifespan. This study examines the relationship between child UPF consumption and growth indicators—linear growth, weight status, and bone maturation—in children from rural Ecuador.

Methods: This study analyzed data from the Lulun II study, a follow-up to a randomized controlled trial testing the effect of egg feeding on growth. Bone age was assessed using tablet-based ultrasound methods and subsequently adjusted for age and sex and converted to bone age z-scores (BAZ) using Greulich and Pyle's standards. Child heights and weights were converted to height-for-age (HAZ) and weight-for-age (WAZ) z-scores according to WHO Growth Standards. UPF consumption was determined by a 24-hour food frequency recall of different product categories (sugar-sweetened beverages, sugary foods,

savory snacks) meeting the NOVA classification of UPFs. Regression models assessed the relationships between UPF consumption and indicators of bone maturation and anthropometry.

Results: In this sample (N = 125; mean age = 33.92 ± 1.75 month), the median frequency of UPF consumption was 3 servings per day. After adjusting for confounders, the analysis showed that children who consumed 4–12 UPF servings per day (highest tertile) had significantly higher BAZ scores on average compared to those in the lowest tertile (0–1 serving of UPF per day) [$\beta = 0.58$, P = 0.03]. Savory snack consumption was also positively correlated with BAZ [$\beta = 0.77$, < 0.001]. On average, HAZ scores were lowest for the highest tertile of UPF consumption, trending towards significance [$\beta = -0.36$, P = 0.06]. The odds of stunting were significantly higher for children in the highest tertile of UPF consumption, relative to those in the lowest tertile [OR: 3.07; 95% CI: 1.11–9.09]. No statistical significance was detected for weight-related outcomes.

Conclusions: UPF intake is often associated with overnutrition outcomes. However, evidence from this analysis suggests that frequent UPF consumption in children may also drive stunted growth, despite positive associations with bone maturation. Further research is needed to better understand this paradoxical relationship.

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