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Prevalence and associations between micronutrient deficiencies and growth indicators of 10-18-year-old female adolescents living in Vietnam

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Although in recent decades progress has been made in reducing the global burden of micronutrient deficiencies (MNDs), nonetheless MNDs prevalence remains high in some populations⁽¹⁾. Among the micronutrients, deficiencies in iron, zinc and vitamin A are particularly prevalent, and causally associated with adverse health outcomes for children and adolescents. The aim of this study was to examine the prevalence and associations between MNDs and components of the double burden of malnutrition in female adolescents utilizing the nationally representative Vietnam General Nutrition Survey 2020.

1,471 female adolescents were included and categorised into: pre-adolescent (10-12-year-old), middle-adolescent (13-15-year-old), and late-adolescent (16-18-year-old) groups. Biomarkers of micronutrients, anthropometry, and sociodemographic data were selected for analyses. WHO growth reference values were applied to define stunting (height-for-age z-score (HAZ) < -2 SD), thinness (BMI-for-age z-score (BAZ) < -2 SD) and overweight (BAZ > 1). Iron deficiency was defined as serum ferritin < 15 µg/L (< 70 µg/L for individuals with inflammation), vitamin A insufficiency (VAI) as serum retinol < 1.05 µmol/L, zinc deficiency was based on Zinc International Consultative Group Recommendation, and inflammation as C-reactive protein > 5 mg/L or α1-acid glycoprotein > 1 g/L. One or multiple MNDs were defined as individuals with ≥ 1 MNDs.

Data were analysed by STATA 17 (STATA Corporation, US). Descriptive and logistic regression analyses were performed based on the sampling weight adjustments for the estimation at population level. Multivariate logistic regressions between MNDs and growth indicators were presented as crude (COR) and 95% confidence intervals or adjusted odds ratio (AOR), after adjusting for sociodemographic variables (age, ecological area, demographic, ethnicity, and wealth index) and inflammation.

Compared to the pre-adolescent group, prevalence of stunting doubled in late adolescence (12.4% to 26.8%). Meanwhile, the prevalence of overweight and thinness decreased with age (29.7% to 22.0% and 9.4% to 2.7%, respectively). Overall, the prevalence of MNDs increased with age. Zinc deficiency occurred most often in the entire cohort (39.8% in 10-18) and contributed the most to multi-MNDs. Prevalence of one or multiple MNDs increased with age, from 58.1% in pre-adolescence to 80% in late adolescence. In logistic regression analyses adjusting for inflammation and sociodemographic factors, stunting increased the risk of having ≥ 1 MNDs (AOR: 1.94 (1.3, 2.88), p=0.002), but not individual MND alone. Thinness increased the risk of VAI (AOR: 2.38 (1.34, 4.22), p=0.005). No association was found between any MND and overweight, although overweight was protective against zinc deficiency (COR: 0.76 (0.59, 0.99), p=0.04) in the unadjusted model.

Female late adolescents in Vietnam had a higher prevalence of stunting and MNDs, but lower prevalence of thinness and overweight in comparison to pre-adolescents. Stunting was a risk factor associated with having one or multiple MNDs. Thinness was associated with higher risk of VAI. No association was found between overweight and MNDs in this cohort.

Reference

1. Han X, Ding S, Lu J *et al.* (2022) *E Clin Med* 44.