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Use of different international criteria to quantify under and over nutrition in children and adolescents in Ho Chi Minh City, Vietnam—the need for consensus on optimal definitions

Introduction
Consensus on the criteria by which to define and estimate the double burden of malnutrition is required, but this is lacking for Asian children for whom different criteria are being used. There is general agreement that Asian populations require lower cut-points to identify overweight and obesity than Western populations, [1-3] but these cut-points have not been well-established for children and adolescents. We therefore used data from a large nutrition survey of school-aged children in Ho Chi Minh City (HCMC) to quantify the prevalence of under-nutrition (thinness) and over-nutrition (overweight, obesity, abdominal obesity), Vietnam, comparing the different international criteria.

Methods
We estimated prevalence of under and over-nutrition in a cross-sectional survey of 10,949 school-aged children and adolescents (6 –18 years old) in HCMC, Vietnam. A representative sample of children was selected from 30 schools (primary, secondary and high schools) in the school year 2014-2015. The following criteria were used:
Definition WHO [4]
IOTF [5]
IOTF_Asian [6]

Thinness
BMI-for-age Z-score < -2 SD Age and sex –specific cut-points of BMI < 18.5 (kg/m2) Age and sex –specific cut-points of BMI < 18.5 (kg/m2)
Overweight
BMI-for-age Z-score > + 1 SD and ≤ 2 SD Age and sex –specific cut-points of BMI ≥ 25.0 (kg/m2) and < 30.0 (kg/m2) Age and sex –specific cut-points of BMI ≥ 23.0 (kg/m2) and < 27.0 (kg/m2)
Obesity
BMI-for-age Z-score > + 2 SD Age and sex –specific cut-points of BMI ≥ 30.0 (kg/m2) Age and sex –specific cut-points of BMI ≥ 27.0 (kg/m2)
Abdominal obesity
90th percentile of age and sex-specific of Chinese reference population [7] and United States reference population [8]

Summary prevalence estimates of all nutritional status indicators were weighted based on the population of students in each stratum (urban or rural) at each school level, and the proportion of surveyed students in each school, using the "svyset"command in STATA version 12 (College Station, Texas 77845 USA).

Results
Regardless of definitions used, the prevalence of over-nutrition was high, particularly in primary school-aged children (20-30% were overweight, 20-30% were obese, and about 50% had abdominal obesity). Undernutrition among school-aged children and adolescents still coexists, with the prevalence varying from 2% to approximately 20%.
The prevalence of over-nutrition, using general international criteria (WHO and IOTF) was subtantially lower than those using Asia-specific criteria (IOTF-Asia), particulary in high school children (Figure). The prevalence of abdominal obesity using a Chinese reference population was considerably higher than those using a United States reference population (45.7% vs 22.7% for primay school), and the difference was larger in secondary (42.3% vs 11.9%) and high school-aged children (33.7% vs 8.9%, respectively).

Conclusion
General international criteria may underestimate the prevalence of overweight and obesity in children and adolescents in HCMC, Vietnam. These findings highlight the need to achieve a consensus for definition of childhood obesity in Asian populations. They also highlight the urgent need for greater efforts to address the double burden of malnutrition in children and adolescents in HCMC, Vietnam.

Country

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