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# Relationship of BMI to the incidence of hypertension: a 4 years' cohort study among children in Guangzhou, 2007–2011

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## Abstract

**Background:** In China, there has been a dramatic increase in overweight and obesity among children and adolescents in recent decades. However, little longitudinal studies reported BMI in relation to the risk for hypertension among children in China. We examined the longitudinal relations between BMI and hypertension in Chinese schoolchildren via a retrospective cohort study.

**Methods:** The cohort study was carried out in 7203 children (3821 boys and 3382 girls) in Guangzhou aged 6–8 years, with a continuous 4 years of follow-up. The participants, evaluated by body mass index (BMI), were categorized as thinness, normal weight, overweight, and obesity groups. The age and gender-specific BMI cutoffs newly developed by the Working Group on Obesity in China (WGO) were used to define overweight and obesity. The thinness was defined by the international age- and gender-specific cut-off points for BMI for thinness grade 1. Hypertension was defined by using percentiles of systolic and diastolic values on the basis of height percentile, age, and gender. The Cox proportional hazards model was used to estimate the single or joint effect of BMI on the risk of hypertension. This study was approved by The Ethical Committee of School of Public Health, Sun Yat-sen University.

**Results:** During a follow-up of 4 years, a shocking high cumulative incidence of hypertension was found in Chinese overweight (50.1 %) and obesity (70 %) schoolchildren. The incidence of children hypertension were markedly higher among overweight and obesity group than normal weight and thinness group (24.3 %, 18.5 % vs 11.1 %, 7.4 %). Compared with the children in the normal weight group, the adjusted HRs and 95 % CIs of developing hypertension in thinness, overweight, and obesity group were 0.972 (0.851, 1.110), 1.313 (1.179, 1.461), and 1.816 (1.634, 2.081), respectively. Additionally, the protective effect of thinness on hypertension was observed in boys 0.808 (0.666, 0.981), but not in girls 1.158 (0.966, 1.389).

**Conclusions:** The 4-year longitudinal study indicated that the overweight and obesity can predict the higher risk of hypertension in Chinese children, whereas, the thinness predict the lower risk of hypertension only in boys.

**Keywords:** Pediatric, Hypertension, Obesity

## Background

Overweight and obesity were now considered as serious health problems, with an increasing prevalence worldwide. In China, there has been a dramatic increase in overweight and obesity among children and adolescents worldwide in recent decades [1]. The prevalence for overweight in 2002 was 22.8 % and for obesity 7.1 %, has

increased by 40.7 % and 97.2 %, respectively, since 1992 [2]. However, the prevalence of stunting and thinness among Chinese children and adolescents aged 5–19 years has reached 13.8 %, and 7.4 % in 2007, respectively [3]. This novel and complex problem challenges governments and health organizations to tackle opposite ends of the malnutrition spectrum. The dual burden may manifest within a community, household, or individual, but these different levels have not been addressed collectively [4].

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