

# **Increasing Socioeconomic Inequality in Child Overweight/Obesity in China**

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## **Abstract**

The greater burden of being overweight is shifting from the upper to the lower social classes in a few developing nations (e.g., Brazil and Chile). Guided by the framework of previous studies, this article analyzes the socioeconomic forces operating in China from the past two decades that have been shaping the SES gradients in child overweight/obesity. SES gaps in access to high energy density diets, the penetration of obesogenic environments, general awareness and incentives to prevent overweight/obesity are investigated as potential predictors of how SES factors affect rates of child overweight/obesity in China. Using CHNS data for 1991-2006, we estimated GEE models and found an increasing SES gap, especially after 1997, in the prevalence of child overweight/obesity with the increasing gap in purchasing power playing a prominent role. Gap between knowledge concerning obesity and health promotion behaviors, also identified, calls for comprehensive interventions that could address the obesogenic environment and help bridge this gap to prevent further increases in obesity among China's youth.

**Key words:** child overweight/obesity, energy intake/expenditure, purchasing power, social and economic reforms in China, Fundamental Social Causes of Disease, SES, obesogenic environments.

## 1. INTRODUCTION

## **1.1 Child Overweight/Obesity on the Rise in China**

Over the past two decades, China has witnessed the fastest economic growth in its history. During this same period, owing to the nutrition transition and the decline of physical activity, the prevalence of childhood overweight/obesity in China has risen (Popkin et al., 1998; Du et al., 2001; D'Arcy et al., 2006). For 7- through 18-year-old boys, the percentage of overweight/obesity rose from less than 2% in the early 1990s to 15% in 2005. For same-aged girls, it rose from less than 2% to more than 8% (Ji et al., 2010). Wang and Lobstein (2006) compared the annualized change in prevalence of overweight/obesity for school-aged children from 1970 to 2005 and found that China had one of the highest growth rates in the world. Given the country's greater population, the growth rate makes this a critical problem for China with implications for the rest of the world as well, developing nations in particular.

Childhood obesity has significant adverse effects on health in later life. Longitudinal studies (Must, 1999; Lobstein, 2004) show that the onset and severity of childhood obesity is related to adulthood obesity as well as obesity-related morbidity and mortality (Wabitsch, 2000). In China, overweight children were 1.8 times more likely than other children to become overweight adolescents (Wang et al., 2000), and overweight adolescents were more likely to grow up to be overweight adults (Cheng, 2004). Childhood overweight/obesity has an especially harmful effect on children in developing countries because early malnutrition or intrauterine disadvantages amplify the detrimental effects of later excess weight gain (Barker, 1992). Hypertension, heart disease and type II diabetes associated with obesity inflict significant costs on individuals and society. From 1986 to 1999, the age-specific mortality rates from circulatory disease increased between 200% to 300% among individuals aged 35 to 44 years (Bumgarner, 2004). Diabetes

already afflicted 10% of Chinese adults—almost identical to the U.S. rate of 11%, corresponding to approximately 93 million Chinese with diabetes (Yang et al., 2010). The related economic costs of overweight and obesity represent as much as 8 percent of China’s economy (Popkin et al., 2004).

## **1.2 Understanding the SES Gradients of Childhood Overweight/Obesity in China Context**

It is well documented that family SES is associated with child overweight/obesity (eg., Wang et al., 2001; Murasko, 2009; Bilaver, 2010). However, the pathways that SES affects overweight/obesity are highly conditioned by development stage. An inverse relationship between SES and obesity is typically observed among adults and children in developed countries (Ball and Crawford, 2005); whereas within China and many other developing countries, family SES factors appear to have a different effect on the risk of childhood overweight/ obesity (e.g., Wang et al. 2001). Currently, overweight/obesity is concentrated among socioeconomic elites in most developing countries (Sobal and Stunkard, 1989; Wang et al., 2001; Neuman et al., 2010; Jones-Smith et al., 2011). Monterio (2004) even found that the shift of the sign occurs as a country’s per capita national product (GNP) arrives 2500 in 1995 US dollars. What specific contextual factors are behind the association between the sign of SES gradients and development stage? What is the relative importance among these factors? What would happen if these contextual factors exert controversial influence on the SES profile of overweight/obesity as a country is going through rapid changes? The China context provides an opportunity to explore these questions using China Health and Nutrition Survey (CHNS) data from 1991 to 2006.

Previous studies on SES gradients of child overweight/obesity are based on single year data and returned mixed results (Wang, 2000; Li et al., 2007; Xie et al, 2007; Shankar, 2010). No study has thoroughly identified the factors that contribute to the *change* of SES gradients of overweight/obesity among children and adolescents in developing countries. A thorough examination of this trend in China during a dramatically changing macro-social environment could provide important insights for other developing nations. The context in china could also challenge some hidden assumptions of Fundamental Social Cause of Disease (FSCD)

Besides, most of the previous studies on the temporal or spatial heterogeneity of SES gradients in developing countries focused on adults (Monterio, 2004; McLaren, 2007; Subramanian et al., 2009; Jones-Smith et al., 2001). However, it is arguably easier to interpret the direction of causality between SES and obesity for children since their SES status is predetermined by their parents' status (Wang et al., 2001), while among adults the causality could run either direction (Sobal 1991; 1994; Stunkard, 1993). For example, wage penalty was found among obese women (Averett and Korenman, 1996; Baum and Ford, 2004).