Is poverty associated with obesity among American children?

Frederick et al. (1) claim that the prevalence of obesity among high socio-economic status (SES) adolescents has decreased in recent years, whereas obesity among their low socio-economic peers continued to increase. It could suffer a potential bias, particularly with regard to the greater prevalence of overweight people in black compared with white communities and changes in the mix of race/ethnicities in the low SES bracket.

A study by Kreiger et al., drawing on National Health and Nutrition Examination Surveys (NHANES) data that examined 50-y trends in US socio-economic inequalities, found that black Americans were twice as likely to have a high school degree as their highest level of education attainment compared with white Americans, despite the fact that the black population have higher returns from college education (2). It seems black Americans make up a significant proportion of the low SES group. In addition, NHANES reports found that the number of overweight adolescents was much higher in the black population than the white population (3), making race/ethnicity an important confounding factor that should be addressed. Could the authors provide adjusted information by race/ethincity? The relative obesity increase among low SES population could be attributed to an increasing proportion of black people in the lower SES group.

Race and ethnicity could also modify the relationship between SES and obesity. NHANES data have shown that, among non-Hispanic black and Mexican-American men, those with higher income are more likely to be obese than those with low income (4). Without more convincing results on the association of SES to obesity stratified by ethnic groups, is it more likely to be racial and ethnic disparities that accounted for differences in adolescent obesity rather than simple SES. By failing to examine this relationship, it cannot be certain that SES is the lead factor that contributes to obesity.

Finally, it is suggested that SES differences in the levels of physical activity, as well as differences in calorie intake, may have contributed to the growing obesity gradient. Although it is plausible to explain the disparities due to variations in physical activity, and this line of investigation is worthy of further pursuit, the authors discussion on variations on physical activity levels equivalent to at least "10 minutes of continuous physical activity in the past 30 days" is lacking. This level would not meet recommendations for a healthy physical activity level and would not have an effect on obesity rates.

In particular, genetic difference and differences in lifestyles among race/ethic groups may contribute to the growing obesity gradient, particularly if race and ethnicity are important determinants in explaining the relationship between SES and obesity.

In fact, the NHANES study showed that socioeconomic-related disparities in pediatric obesity have not significantly changed from 2001 to 2010 (5), whereas another NHANES study noted that most obese children and adolescents are not low income (below 130% of the poverty level) (5).

***Gao Yongqing*[a], *James Gordon*[b], *and Wenjie Sun*[a,c,1]**

[a]*Guangdong Pharmaceutical University, School of Food Science, Zhongshan 528458, People's Republic of China;* [b]*Department of Economics, Tulane University, New Orleans, LA 70118; and* [c]*School of Public Health and Tropical Medicine, Tulane University, New Orleans, LA 70112*

1 Frederick CB, Snellman K, Putnam RD (2014) Increasing socioeconomic disparities in adolescent obesity. *Proc Natl Acad Sci USA* 111(4):1338–1342.

2 Krieger N, et al. (2014) 50-year trends in US socioeconomic inequalities in health: US-born Black and White Americans, 1959-2008. *Int J Epidemiol*, 10.1093/ije/dyu047.

3 Wang Y, Zhang Q (2006) Are American children and adolescents of low socioeconomic status at increased risk of obesity? Changes in the association between overweight and family income between 1971 and 2002. *Am J Clin Nutr* 84(4): 707–716.

4 Rossen LM, Schoendorf KC (2012) Measuring health disparities: Trends in racial-ethnic and socioeconomic disparities in obesity among 2- to 18-year old youth in the United States, 2001-2010. *Ann Epidemiol* 22(10):698–704.

5 Ogden CL, Lamb MM, Carroll MD, Flegal KM (2010) Obesity and socioeconomic status in children and adolescents: United States, 2005-2008. *NCHS Data Brief* (51):1–8.

Author contributions: G.Y., J.G., and W.S. wrote the paper.

The authors declare no conflict of interest.

[1]To whom correspondence should be addressed. E-mail: sunwenjie2002@hotmail.com.