Revisiting the Independent Effects of Income on the Risk of Obesity

Dear Editor:

We are writing in reference to the article by C. A. Monteiro et al. published in 2001 (1). Monteiro and associates conducted a secondary analysis of the 1996–1997 World Bank Living Standards Measurement Survey carried out in the Northeast and Southeast regions of Brazil. These 2 regions encompass a large proportion of the Brazilian population. They also represent the lower and upper extremes of economic development in Brazil, respectively. The authors observed a significant positive association between income and the risk of obesity among women (≥20 y old) in the less developed region and the opposite association in the more developed region.

Figure 1 illustrates the information presented by Monteiro et al. (1) across the full range of income (in a natural log scale). There is enough overlap of income between the regions to see that both regions behave similarly in the zone of their overlap. A clear inverse U curve was observed in the relation between household income and the prevalence of obesity. This is presented by a LOWESS figure, with smoothing, and using a normal kernel and a bandwidth multiplier of 2.5 in SPSS version 11.5. This relation was postulated in a description of the nutrition transition by Popkin (2), in an analysis of the effects of the costs of consuming vs. those of expending energy on weight by Philipson and Posner (3), as well as by Monteiro et al. but not shown graphically.

Figure 1 illustrates for the first time how the association of obesity with income across a wide range of income follows the expected inverse U curve in data collected in a national survey in which the measuring and sampling methods were the same across the regions.

The implications of the information presented in Figure 1 are 2-fold: 1) Interpretations of any assessment of the effects of income on obesity risk must take into account the nonlinearity of association between socioeconomic status and obesity; and 2) an unexpected finding in Figure 1 is the width of the range for the plateau across the income range in Brazil. Instead of a rise to a peak as one moves from a low to a high income range, there appears to be a wide range of income in which the prevalence of obesity remains constant and high. It is likely that this represents a range of income in which positive and negative marginal effects of income produce a net zero influence on obesity.

Income continues to influence obesity, but the marginal effects of each additional increment in income level in the distribution of obesity in the population diminish, whereas there is an increase in the marginal effects of each increment in income level on awareness of risks associated with obesity and the ability to afford healthier energy-sparse nutrient-dense foods, and the leisure time and investments required to burn off excess energy consumed. These 2 competing influences lead to the net zero change in obesity prevalence in the population over this income range. This broad plateau, in any case, has implications for both the interpretation of study findings as well as for designing, targeting, implementing, and evaluating programs and interventions.

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