Abstract

Objective: To assess the prevalence of risk of overweight, overweight, and the perception of hunger among Mexican children from Indian and migrant parents over the periods of 2001 and 2003.

Method: A total of 1,200 and 1,452 children were measured to assess anthropometric status and their perception of hunger experience.

Results: There was no difference between 2001 and 2003 in the total prevalence of risk of overweight and overweight in either boys or girls. The prevalence of abdominal obesity is higher in the 2003 group than in the 2001 group among girls older than 9y (p < 0.001). During 2003, the risk of hunger was higher (58%) than in 2001 (46%).

Conclusion: The prevalence shown in our study is alarming since these children suffering from food insecurity have higher risk to develop obesity and diabetes during adulthood, particularly if they show rapid catch-up fat after periods of economic recession.

Key words: Prevalence. Childhood obesity. Abdominal obesity. Hunger. Mexican migrants.
Introduction

Of particular concern for countries undergoing nutrition transition, like Mexico, is that poverty, hunger, malnutrition, and weight fluctuations earlier in life also predispose to high risks for later overweight, obesity, abdominal obesity, insulin resistance, diabetes, hypertension, high levels of cholesterol, and metabolic syndrome. Similarly, food insecurity, limited availability of nutritionally adequate and safe foods have been associated with increasing risk for obesity and health problems. Olson (1999) reported that food insecure women were >10 lb heavier on average than the comparison group.

In a study conducted in Mexico in 2001, during which we assessed the prevalence of overweight, obesity, and hunger among migrant Indigenous children (6-12 y age range) in Tijuana, we found the overall prevalence of overweight to be 38% (29% higher than that of the national prevalence), abdominal obesity to be present in 26% of the subjects, and the prevalence of hunger and being at risk of hunger to be 46%. These data underscore the coexistence of overweight and hunger among less privileged migrant children. To further characterize the prevalence of risks for obesity and co-morbidities in this population group, we report here the results of a study in which we have assessed the prevalence of obesity and the perception of hunger among Mexican children from Indigenous and migrant parents over the periods of 2001-2002 and 2003-2004.

Methodology

Children from the first to fifth grade were included in the 2001 group, and furthermore, from the first to sixth grade in the 2003 group. Anthropometrics measurements, training, questionnaires, validation, and statistical analysis were previously published. The participants in the 2001 group were 1,267 children (623 girls and 644 boys); in the 2003 group there were 1,641 children (804 girls and 837 boys). Children younger than 6 y of age or older than 12 y of age were excluded. The final population in the 2001 group contained 1,200 children (593 girls and 607 boys), and in the 2003 group there were 1,452 children (712 girls and 740 boys). In the 2001 group 20% of the families spoke one of the Mexican native language and 28% in the 2003 group. Children were classified as “hungry” if they respond affirmatively to five out of five questions, and as “at risk for hunger” if they responded positively to one or as many as four of the five food insufficiency questions. The Community Childhood Hunger Identification Project’s questions were translated and adapted for Mexican children.

Results

Table I shows data indicating the prevalence of risk of overweight (as determined by BMI 85th-95th percentile), overweight (as determined by BMI > 95th percentile), and risk for abdominal obesity (as determined by waist circumference > 80th percentile) by gender and by age-group in 2001 and 2003. As shown in table I, there is no difference between 2001 and 2003 in the total (all ages pooled) prevalence of overweight in either boys or girls. However, girls in the 8-8.9 y old range and boys in the 8-9.9 y old range showed an increase in prevalence of overweight; whereas in children in the other age-ranges (boys or girls) the prevalence of overweight was unaltered or lower in the 2003 group than in the 2001 group (table I). The data on waist circumference indicate that the prevalence of abdominal obesity is higher (by 20-45%) in the 2003 group than in the 2001 group among girls older than 9 y (p < 0.001), but indicated to be slightly lower in girls younger than 9 y. In boys, the prevalence of abdominal obesity was unaltered between 2001 and 2003 in those younger than 9 y old and showed to be lower in 2003 than in 2001 among those younger than 9 y old. During 2001, 46% had at least one positive response at the hunger questionnaire, and during 2003, 58% of the...
children had at least one positive response (fig. 1). During 2003, the risk of hunger was higher (68%) among children from Indigenous parents than among children of non-Indigenous parents (55%) \( p < 0.001 \). The risk of hunger was higher (71%) among younger than 9 y (\( P < 0.001 \)) and 48% among older than 9 y. Children without abdominal obesity had higher risk of hunger (78%) than children with abdominal obesity (22%) (\( p < 0.001 \)).

**Discussion**

The results of this study confirm the coexistence of overweight and perception of hunger among children in Tijuana. Although the prevalence of overweight (all ages combined) was slightly reduced or remained unaltered in the 2003 period than in 2001 period, the perception of hunger increased 14 percentage points in association with an increase of children from Indigenous parents. The City of Tijuana has a strong cultural and economic relationship with the state of California. Thus, fluctuations in the economy of the USA affect the economy in Tijuana. In the USA, from 2001, several indicators showed the negative effects on a faltering economy. Therefore, the slight reduction in the prevalence of overweight and the increase in the perception of hunger observed in underprivileged groups of Tijuana might be explained by the direct effect of the reduction of the economy in the bi-national region (US-Mexico).

In both the USA\(^{10}\) and in México\(^{2}\), the burden of diabetes and obesity follow a socioeconomic gradient. Analysis of data for adults by the Center for Disease Control and Prevention showed that the highest rates of obesity were associated with the lowest incomes and lowest educational level; besides obesity was most prevalent among black non-Hispanic and Hispanic adults\(^{11}\). Likewise, children from households reporting some level of food insecurity were twice as likely to have experienced perception of hunger\(^{10}\).

In California, food insecurity has also been associated with increased risk of obesity in women\(^{12}\). Even women from households with mild food insecurity were 30% more likely to be overweight than secure women.

The trends shown in our study are alarming since these children, in countries undergoing nutritional transition, suffering from food insecurity and hunger have a higher risk to develop obesity and a metabolic syndrome during adulthood, particularly if they show rapid catch-up growth or catch-up fat\(^{1} \) after periods of economic recession.

**References**