Overweight Children: Assessing the Contribution of the Neighborhood Environment

Irina B. Grafova

Department of Health Systems and Policy
School of Public Health
University of Medicine and Dentistry of New Jersey
335 George Street, Suite 2200, New Brunswick, NJ 08903
Phone: (732)-235-5619
Fax: (732)-235-9780
grafovib@umdnj.edu

Abstract

Objective: To examine the effect of the neighborhood environment on the prevalence of overweight status in children.

Research Methods and Procedures: Analyses were based on 1,117 girls and 1,102 boys aged 5-18 and their primary caregivers who participated in the second wave of the Child Development Supplement (CDS-II) of the Panel Study of Income Dynamics (PSID). Data collected includes height and weight of a child, a variety of neighborhood environment characteristics, including informal social control, safety, and physical environment, as well as a wealth of family socio-economic and demographic characteristics.

Results: Results suggest that boys living in a neighborhood where residents were unlikely to intervene if someone was selling drugs to children in plain sight or, in the event a child was showing disrespect to an adult, are more likely to be overweight (OR=2.01 and 1.77, respectively). Similarly, the presence of garbage, litter, or broken glass on a street or sidewalk is associated with an increased likelihood of being overweight for boys (OR=1.96). Poor, fair or moderate condition of a street surface was also related to greater probability of being overweight for boys residing there (OR=2.24).

Discussion: The results of this study emphasize a particular importance of the built environment of the neighborhood for weight status of children and adolescents. Additional studies are needed to clarify the underlying mechanism behind this association.

Key words: built environment, informal social control, child development, Panel Study of Income Dynamics

Introduction

The prevalence of overweight children in the United States has become an increasing public health concern. Overweight children are more likely to develop various types of neurological, pulmonary, gastroenterological conditions, and other health problems (1). Previous research shows neighborhood features may affect a child's weight (2-7) by affecting a child's allostatic load (8), or by affecting a child's level of physical activity (9, 10), or by affecting a child's food consumption (13).

The studies examining the effect of the neighborhood environment on children's weight tend either to be drawn from confined geographic areas (2,4,5) or to concentrate on a single neighborhood characteristic, such as the availability of physical activity facilities (7), safety (4), or local food prices (11). Unlike the studies examining the effect of neighborhood environment on children's physical activity (9, 10), these studies do not contribute much to the understanding of whether the effect of neighborhood environment on children's weight differs by gender. Using a nationally representative sample, this study undertakes gender-stratified analysis and examines how an array of neighborhood characteristics is related to the overweight status in children.

Research Methods and Procedures

Survey Design and Sample

Data used in this study comes from the second wave of the Child Development Supplement (CDS-II) of the Panel Study of Income Dynamics (PSID). The CDS-II is a supplemental survey to the PSID, a longitudinal survey based on a nationally representative sample of the U.S. individuals and the families in which they reside that began in 1968. The CDS-II is a nationally representative subsample of 1,471 boys and 1,436 girls aged 5-17 years residing in 2,019 families. The final sample is limited to the observations that have complete data on all variables of interest and includes 1,117 girls and 1,102 boys.

Outcome Measures

Children are classified as being overweight if their Body Mass Index (BMI) is above the 95th percentile of the gender-age specific BMI distribution. BMI is defined as weight in kilograms, divided by square of height, measured in meters. Both weights and heights of children were measured directly by interviewers.

Neighborhood Measures

All neighborhood characteristic measures are subjective and come from either the primary caregiver or the interviewer. The primary caregiver reported on the difficulty of identifying strangers in the neighborhood, the safety of walking around alone after dark and informal social control. The latter was assessed using a 4-item Likert-type scale that asked how likely it was that a neighbor would do something if someone was selling drugs to children in plain sight, if children were "getting into trouble", if a child was "showing disrespect to an adult", or if a child was removing property from a neighbor's apartment, house, garage, etc.

After the interview, the interviewer recorded his or her observations on the condition, repair and upkeep of the buildings and street surface on the block, and the amount of garbage, litter, broken glass, drug-related paraphernalia, condoms, beer containers, cigarette butts, etc. in the street and sidewalk.

Statistical Analysis

To examine the effect of neighborhood characteristics on the prevalence of overweight status in children we estimated a series of logistic regressions that included one neighborhood

characteristic at a time. All analyses were conducted separately for each gender and used sample weights. Since PSID is a household-based survey, some of the children in the data are siblings. To overcome potential bias caused by the presence of siblings in the sample, standard errors were clustered within families.

Next, we estimated a series of adjusted logistic regressions that included a number of potential confounders. For example, race, ethnicity, age, and education are likely to affect nutritional knowledge and preferences. Employment and family structure place constraints on the amount of time that can be devoted to feeding the family. Food assistance program participation, income to needs ratio, and total family wealth indicate the amount of resources that a family can spend on food and physical activity. Maternal BMI reflects the genetic predisposition of a child to be overweight. Children with low birth weight may tend to remain that way. Breastfeeding may play a role in preventing overweight status in children.

Results

Table 1 demonstrates that boys living in a neighborhood where residents were unlikely to intervene if someone was selling drugs to children in plain sight or if a child was showing disrespect to an adult, are more likely to be overweight (OR=2.01 and 1.77, respectively). Similarly, presence of garbage, litter, or broken glass on a street or sidewalk is associated with an increased likelihood of being overweight for boys (OR=1.96). The poor, fair or moderate condition of a street surface was also related to a greater probability of being overweight for children of both genders (OR=2.04-2.32). However, for girls the latter association weakens and becomes statistically insignificant in the adjusted model. Similarly, the poor, fair, or bad

condition of the houses on a block is related to a greater likelihood of being overweight in boys, but only in an unadjusted model (OR=1.66).

Discussion

In this study, we examined the relationship between various neighborhood characteristics and excess weight status in children using a national sample of 1,117 girls and 1,102 boys, age 5-18 years old. We found that the poor physical condition of a neighborhood and the lack of informal social control in the neighborhood increase the likelihood of being overweight for boys.

Unfortunately, the cross-sectional nature of this study does not allow for the cause and effect relationships to be determined. It is unclear whether a better physical condition of the neighborhood has an effect on children's weight status through increased physical activity or whether parents who value high physical activity for their children choose to live in neighborhoods that are in better physical condition. Also, all of the neighborhood characteristics used are subjective and may potentially be biased.

Acknowledgements: Author thanks Jeannette Rogowski and Vicki Freedman for useful discussions.

References

1. Must A., Strauss R. S. Risks and consequences of childhood and adolescent obesity. *Int J Obes Relat Metab Disord*. 1999;23: S2-S11.
2. Lumeng J.C., Appugliese D., Cabral H.J., Bradley R.H., Zuckerman B. Neighborhood safety and overweight status in children. *Arch Pediatr Adolesc Med*. 2006;160: 25-31.
3. Burdette H.L., Whitaker R.C. Neighborhood playgrounds, fast food restaurants, and crime: relationships to overweight in low-income preschool children. *Prev Med.* 2004;38: 57-63.
4. Burdette H.L., Whitaker R.C. A national study of neighborhood safety, outdoor play, television viewing, and obesity in preschool children. *Pediatrics*. 2005;116:657-662.
5. Cohen D.A., Finch B.K., Bower A., Sastry N. Collective efficacy and obesity: The potential influence of social factors on health. *Soc Sci Med*. 2006;62:769-778.
6. Nelson M. C., Gordon-Larsen P., Song Y., Popkin B. M. Built and social environments associations with adolescent overweight and activity. *Am J Prev Med*. 2006;31:109-117.
7. Gordon-Larsen P., Nelson M. C., Page P., Popkin B. M. Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics*. 2006;117:417-424.
8. McEwen, B. S. Stress, adaptation, and disease: allostasis and allostatic load. *Annals of New York Academy of Science.* 1998;840:33–44.
9. Gomez J. E., Johnson B. A., Selva M., Sallis J. F. Violent crime and outdoor physical activity among inner-city youth. *Prev. Med.* 2004;39: 876-881.

10. Norman G. J., Nutter S. K., Ryan S., Sallis J.F., Calfas K.J., Patrick K. Community design and access to recreational facilities as correlates of adolescent physical activity and Body-Mass Index. *J Phys Activ Health*. 2006;3: S118-S128.
11. Sturm R., Datar A. Body mass index in elementary school children, metropolitan area food prices and food outlet density. *Public Health*. 2005;119: 1059-1068.

Table 1. Neighborhood characteristics and overweight status in children

	Boys		Girls	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Not at all difficult to id strangers	1.17 (0.78 - 1.76)	1.26 (0.84 - 1.90)	0.83 (0.54 - 1.29)	0.80 (0.50 - 1.27)
Informal social control: Very unlikely/unlikely that a neighbor would do something if…				
…someone was selling drugs to children	1.82* (1.12 - 2.95)	2.01** (1.21-3.34)	1.42 (0.86 - 2.34)	1.21 (0.73 - 2.00)
…your kids were getting into trouble	1.54 (0.86 - 2.79)	1.56 (0.88 - 2.76)	1.27 (0.70 - 2.31)	1.11 (0.62 - 1.99)
…a child was showing disrespect to an adult	1.63* (1.03 - 2.58)	1.77* (1.13 - 2.76)	1.55 (0.97 - 2.48)	1.34 (0.84 - 2.15)
…a child was stealing	1.75 (0.96 - 3.21)	1.67 (0.93 - 3.00)	1.20 (0.62 - 2.33)	1.07 (0.55 - 2.07)
Physical condition of the neighborhood				
Fair/poor/bad condition of houses	1.66* (1.11 - 2.48)	1.46 (0.87 - 2.44)	1.40 (0.90 - 2.19)	1.07 (0.63 - 1.82)
Moderate/fair/poor condition of the street	2.32** (1.49-3.59)	2.24** (1.37-3.65)	2.04**(1.26-3.30)	1.63 (0.96 - 2.76)
Garbage, litter, etc., in the street/sidewalk	1.92* (1.14 - 3.24)	1.96* (1.09 - 3.51)	0.69 (0.39 - 1.21)	0.53 (0.28 - 1.03)
Cigarette butts, beer canisters, signs of drugs, etc., in the street/sidewalk	1.48 (0.55 - 4.00)	1.25 (0.48 - 3.23)	0.69 (0.28 - 1.68)	0.64 (0.28 - 1.47)
Safe to walk after dark	0.99 (0.66 - 1.49)	0.95 (0.62 - 1.46)	1.23 (0.76 - 1.97)	1.55 (0.94 - 2.56)

* $p<.05$; ** $p<.01$