

The Impact of Neighborhood Characteristics on Physical Activity and Rates of Obesity among Child Medicaid Recipients

The prevalence of childhood overweight/obesity has received much attention in recent years as a serious public health issue. According to the Centers for Disease Control and Prevention, “The percentage of children who are overweight has more than doubled, and among adolescents the rates have more than tripled since 1980.”⁷ Recent studies have shown that there is a higher rate of obesity among low-income populations and this trend is also apparent among children.⁶⁻⁷ For example, Strauss et al. found that children with low socio-economic status were almost twice as likely to develop obesity than children from the highest 15% of socio-economic status.⁶

There is a growing body of research concerning the environmental factors that impact rates of obesity and physical activity among different populations. Several studies have examined the impact of the built environment on transportation choices and activity levels in adults.^{1,4-5,8} Elements that have been found to contribute to “walkability,” include street connectivity, low dead end density, high population density and land use mix.⁹ Studies have shown that, in adults, these elements are related to a higher incidence of active transportation choices, such as walking or biking, and lower rates of overweight and obesity.^{4,8,9} These elements have also been found to effect the likelihood of children walking or biking to school.¹

Neighborhood safety has also been studied for its effects on physical activity and obesity rates in adults and children. In a few studies, lower levels of perceived neighborhood safety have been associated with lower rates of physical activity and higher rates of obesity in children. Lumeng, et al. found that “neighborhood safety ratings in the lowest quartile were associated with higher risk of overweight compared to safety ratings in the highest quartile.”¹⁰ Safety has also been shown to have a greater effect on the physical activity choices of women than of men.⁸

While the connections between both neighborhood characteristics, such as walkability and safety, have each been shown to have an impact on physical activity and overweight/obesity, the interaction between these variables is not fully understood. In addition, little is known about the physical activity patterns of low-income children, and more specifically, how both of these neighborhood factors may influence physical activity and overweight status among this population.

The purpose of the proposed study is to examine how two neighborhood characteristics, safety and the built environment, may affect the overweight status and physical activity levels of low-income children, a population with an elevated risk for overweight and obesity. The study will compare the levels of physical activity and overweight status among low-income children with perceived neighborhood safety and elements that have been found to contribute to overall “walkability,” including, residential density, street connectivity and land use mix,⁹ as well as other neighborhood factors such as proximity to school and parks. The study will also examine the interaction between neighborhood

safety and the built environment, in order to determine if one variable may have a stronger impact on physical activity and levels of obesity than the other.

The study will be based on three primary research questions:

- Do neighborhood safety and the built environment have an impact on low-income children's physical activity levels?
- Do these variables have an impact on the overweight status of low-income children?
- Does either neighborhood safety or the built environment have a stronger association with physical activity or overweight status than the other?

Methods

Data

The data will be collected from a cross-sectional survey of 800 parents of children receiving Medicaid, who live in one of four Florida Counties: Broward, Duval, Palm Beach, or Escambia. Medicaid is the state-administered program that provides health coverage for low-income children and families. The survey will be collected in the summer of 2006, and will include questions about perceived neighborhood safety, certain neighborhood characteristics, health status of the child, and questions about physical activity.

Measures

The independent variables in the study will be the factors contributing two broad neighborhood characteristics – neighborhood safety and the built environment. Neighborhood safety will be measured by the parent's perceptions of the level of safety in the neighborhood. Parents will be asked to rate the overall safety of nearby playgrounds and parks, as well as to answer such questions as, "In the last seven days, was there ever a time that you kept your child inside because you were concerned about the safety of playing outside?"

The parents surveyed will also be asked to provide the zip code of their residence. This will allow us to obtain publicly available data on characteristics of the built environment. Characteristics that will be measured include street connectivity, residential density and land use mix. In addition, we will rely on self-report of other neighborhood characteristics including proximity to school, parks and playgrounds.

The dependent variables in this study will be the frequency in which the child engages in the physical activity, as well as the weight status of the child. Physical activity will be measured by the answers to survey questions about general exercise, participation in team sports and the frequency of walking or biking to school. Questions will include, "How many times a week does your child play or exercise enough to make him/her sweat or

breathe hard?” and “ Compared with most children the same age, how would you rate the activity level of your child?”

Parents will also be asked to rate their child’s overall health, and to provide the height and weight of the child, in order to calculate the child’s Body Mass Index (BMI). The BMI is a widely excepted measure of determining overweight status among adults and children. In general, children with BMI’s over the 85% percentile are considered overweight and children with BMI’s over the 95% are considered to be obese.

Analytic Approach

First, we will examine the overall characteristics of the survey sample. We will use univariate analysis to describe the gender, age, and racial/ethnic distribution, general trends in rates of overweight/obesity and physical activity, and the number of respondents for each zip code.

The study will then examine the bivariate relationships between the independent variables, neighborhood safety and characteristics of the built environment, and the dependent variables of physical activity and weight status. This analysis will show the raw percentages of children from each neighborhood category that engage in different levels of activity and that are overweight or obese. For example, this analysis will answer the questions, “ What percentage of children from neighborhoods with a low-level of perceived safety are overweight?” or “What percentage of children from neighborhoods with a high-level of street connectivity frequently walk or bike to school?”

Finally, we will use a multivariate linear regression model to examine the effect neighborhood safety and the built environment on the dependent variables. We will be controlling for the effects of the independent variables as well as for gender, age, race/ethnicity, overall health of the child, and parent’s education.

In sum, this study seeks to build on the growing research concerning the relationship between neighborhood characteristics and increasing rate of obesity among low-income children. Gaining a stronger understanding of these potential obstacles and how they affect physical activity for low-income children could help to inform the design of policies and programs targeted at encouraging physical activity and overall health among this population.

References

- 1.) Schlossberg, Marc, Jessica Greene, et al. Getting to and from School: Urban Form, Distance and the Role of Planning in Transportation Decision Making. December 9, 2005.
 - 2.) Centers for Disease Control and Prevention. Neighborhood safety and the prevalence of physical inactivity. *Journal of the American Medical Association*. 1999; 281: 1373.
 - 3.) Brennan, LK, HA Baker, et al. Linking the Perceptions of the Community to Behavior: Are Protective Social Factors Related to Physical Activity? Prevention Research Center website: <http://prc.slu.edu/articles.htm>, accessed 5-26-2006: 2003.
 - 4.) Humpel N., Owen N., and Leslie E. Environmental Factors Associated with Adults' Participation in Physical Activity: A Review. *American Journal of Preventative Medicine*. 2002 Apr; 22: 208.
 - 5.) Brownson, Ross, Elizabeth Baker, et al. Environmental and Policy Determinants of Physical Activity in the United States. *American Journal of Public Health*. 2001; 91: 1995-2003.
 - 6.) Strauss, Richard and Judith Knight. "Influence of the Home Environment on the Development of Obesity in Children." *Pediatrics*. 1999; 103: 85.
 - 7.) Ogden, Cynthia and Katherine Flegal et al. Prevalence and Trends of Overweight Among U.S. Children and Adolescents, 1999 – 2000. *Journal of the American Medical Association*. 2002; 288: 1728-1732.
 - 8.) Doyle, Scott, Alexia Kelly-Schwartz, Marc Schlossberg and Jean Stockard. Active Community Environments and Health. *Journal of the American Planning Association*. 2006; 72: 19-29.
 - 9.) Saelens, BE, JF Sallis, et al. Neighborhood-based Differences in Physical Activity: An Environmental Scale Evaluation. *American Journal of Public Health*. 2003; 93: 1552-1558.
 - 10.) Lumeng, Julie, Daniel Appugliese, et al. Neighborhood Safety and Overweight Status in Children. *Archives of Pediatric and Adolescent Medicine*. 2006; 160: 25-31.
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