Physical Activity Resource Attributes and Obesity in Low-Income African Americans Living in Public Housing

Kristen M. McAlexander, Jorge A. Banda, Joshua W. McAlexander, and Rebecca E. Lee
Texas Obesity Research Center, University of Houston

This research was funded by the Robert Wood Johnson Foundation's Active Living Research program

BACKGROUND: As American obesity prevalence reaches epidemic proportions, health promoters and researchers have begun to explore environmental influences on obesity (1). Obesity continues to be more prevalent among individuals with lower socioeconomic status (SES) (2). Ecological models of health behavior suggest that environmental factors may be an important factor to facilitate health behaviors that in turn, lead to health outcomes, including obesity (3). Residents from lower SES neighborhoods have displayed higher obesity prevalence as compared to residents of higher SES neighborhoods (4). Earlier data suggest that neighborhood physical activity resources (PARs) and their attributes and the built environment are important determinants of health behaviors that contribute to obesity (2). Although several studies have associated aspects of the built environment with physical activity, these linkages to the health outcome of BMI has not been well defined.

PURPOSE: The purpose of this study was to measure direct associations between PAR attributes (density, accessibility, incivilities, feature and amenity quality) and sidewalk connectivity with BMI and body fat in African Americans residing in public housing developments.

METHODS: Both aggregate neighborhood-level and individual-level, cross-sectional data were collected in the HOUSTON (Healthful Options Using Streets and Transportation in Our Neighborhoods) Project, conducted in a large, southern metropolitan city. Our neighborhood sample consisted of 12 housing developments in Houston, Texas that were identified and located using Geographic Information Systems (GIS) data in the Spring of 2005. For the purpose of measuring exposure to environmental determinants of overweight and obesity, neighborhoods for the 12 housing developments were each defined as the area within an 800m radius surrounding the housing development. The resident sample included African American housing development residents who were 18 years of age or older, ambulatory and English literate. Trained research assistants conducted the following measurements for each participant: height, weight, BMI and bodyfat percentage. Obesity prevalence was described as a percentage for each housing development. GIS data were used to measure the number of PARs, and the Physical Activity Resource Assessment instrument (PARA) (5) measured accessibility, incivilities and the quality of features and amenities of each facility. The PARA was used to categorize each resource into one of seven types (e.g. fitness club, sport facility, community center, school, park, church, trail, combination) and assign measures of accessibility (e.g., free = accessible, pay = not accessible). Twelve incivilities were rated using an operational classification on a four-point scale (e.g. 0=none, 1=some, 2=medium, 3=excessive) and included examples like unattended dogs, litter and no grass. The quality of PAR features designed for physical activity (i.e. exercise

stations, swimming pool, etc.) and amenities (e.g. bathrooms, picnic tables, lighting) were objectively rated using operational definitions on a three-point scale (i.e., 1=poor, 2=mediocre and 3=good). Sidewalk connectivity (the number of connections between walking paths at each end of the sidewalk) was measured using the Pedestrian Environment Data Scan (PEDS) instrument. Ecological multivariate regression models measured the associations between the built environment attributes and BMI and body fat the neighborhood level.

RESULTS: A total of 105 PARs were identified and assessed in the 12 neighborhoods. Four neighborhoods contained five or fewer PARs, and one neighborhood contained 18. Eighty-nine percent of the resources were accessible (i.e. free to use). Although one neighborhood had only 25% accessible PARs, all other neighborhoods contained PARs that were 75% or more accessible. Average incivilities (i.e. deterrence of PAR use) per resource ranged from .3 to 9.5 with a mean of 5.9 (*SD*=2.8) per PAR. For both features (e.g. basketball court, soccer field) and amenities (bench, lighting) that were found, average ratings were 2.2 (*SD*=.3) and the number of neighborhood sidewalk connections per segment ranged from 1.7 to 5.0 (*M*=2.8, *SD*=.9). Body Mass Index (*M*= 31.3) from 216 residents (*M* age=43.5, 63.9% female) was associated with sidewalk connectivity ($p<.05$). Sidewalk connectivity and PAR accessibility was also associated with body fat percentage ($p<.05$).

CONCLUSION: These data add to earlier findings suggesting that built environment attributes can affect BMI and body fat using a direct environmental measure. Although sidewalk connectivity and PAR accessibility predicted higher BMIs and/or body fat, these data do not necessarily suggest that the built environment does not positively affect health outcomes. Seventy-five percent of housing developments were located in zip codes with high crime rates, especially on sidewalks and streets. The high crime rate in the neighborhoods may be discouraging residents to use sidewalks or walkways to access parks and other physical activity sites regardless of how well connected they are. Additional neighborhood information, like neighborhood safety and crime rates, should be considered when conducting studies in low SES neighborhoods. This study's findings suggest that, regardless of increased PAR accessibility and connections for pedestrians, other important neighborhood factors may also be affecting residents' health attitudes and behaviors.

REFERENCES:

[1] Bedimo-Rung A, Mowen A, Cohen D. The significance of parks to physical activity and public health: a conceptual model. Am J Prev Med. 2005; 28: 159-168.

[2] USDHHS. A report of the surgeon general: physical activity and health. Washington, DC:USDHHS; 1996: 1-4.

[3] Spence J, Lee R. Toward a comprehensive model of physical activity. Psychol Sport Exerc. 2003; 4: 7-24.

[4] Law C, Power, C., Graham, H., Merrick, D. Obesity and health inequalities. *Obes Rev*. 2007;8:19-22.

[5] Lee C, Booth, K., Reese-Smith, J., Regan, G., Howard, H. The Physical activity resource assessment (PARA) instrument: evaluating features, amenities and incivilities of physical activity resources in urban neighborhoods. *Int J of Behav Nutr and Phys Act*. 2005;2:13.