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Research report

Home food and activity assessment. Development and validation of an instrument for diverse families of young children ☆

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ABSTRACT

The purpose of this study was to refine and psychometrically test an instrument measuring the home food and activity environment of geographically and economically diverse families of preschool aged children. Caregivers of preschool aged children (n = 83) completed a modified self-report questionnaire. Reliably trained researchers conducted independent observations on 25 randomly selected homes. Agreement statistics were conducted at the item level (154 total items) to determine reliability. Frequency counts were calculated to identify item availability. Results showed Kappa statistics were high (.67–1.00) between independent researchers but varied between researchers and parents resulting in 85 items achieving criterion validity (Kappa >.60). Analyses of reliable items revealed the presence in the home of a high frequency of unhealthy snack foods, high fat milk and low frequency of availability of fruits/vegetables and low fat milk. Fifty-two percent of the homes were arranged with a television in the preschool child's bedroom. Physical Activity devices also were found to have high frequency availability. Families reporting lower education reported higher levels of sugar sweetened beverages and less low-fat dairy ($p < .05$) compared with higher education families. Low-income families (<$27K per year) reported significantly fewer Physical Activity devices ($p < .001$) compared with higher income families. Hispanic families reported significantly higher numbers of Sedentary Devices ($p < .05$) compared with non-Hispanic families. There were no significant differences between demographic comparisons on available fruits/vegetables, meats, whole grains, and regular fat dairy. A modified home food and activity instrument was found to reliably identify foods and activity devices with geographically and economically diverse families.

Introduction

The prevalence of obesity has reportedly plateaued for preschool aged children (2–5 years) according to recent epidemiological estimates (Ogden, Carroll, Kit, & Flegal, 2012). Specific sociodemographic groups of children at all ages remain consistently higher in body mass index (BMI) compared with others. For instance, preschoolers from families who identified as being Mexican American or non-Hispanic black were higher in prevalence for overweight (≥ 85th to 94.9th BMI percentile) and obesity (≥95th BMI percentile) compared with non-Hispanic white preschoolers (Ogden et al., 2012). In addition to race and ethnicity, low socioeconomic status (SES) has been related to an increased risk for obesity during childhood (Shrewsbury & Wardle, 2008). Socioeconomic status may impact lifestyle behaviors and environmental factors, including food access and types of physical activity (Wang & Lim, 2012). While the causal relationship between SES and childhood obesity is considered complex, children from disadvantaged backgrounds generally have greater levels of obesity than children from advantaged backgrounds (Sobal & Stunkard, 1989; Wang & Lim, 2012).

Diversity in geographical location (rural versus urban) represents an additional demographic focal point for obesity risk. Approximately 30 years ago, the prevalence of childhood obesity appeared higher in large, urban areas compared with rural areas (Dietz & Gortmaker, 1984). However, more recent data show an opposite finding in which rural children (and adults) are now more likely to be overweight or obese (Liu et al., 2012). The mechanisms of rural and urban differences in obesity prevalence are poorly understood and possibly moderated by SES factors. In particular, rural residents are more likely to be older, less educated, and have a lower income; factors known to associate with higher rates of obesity (Lantz et al., 1998; Martikainen & Marmot, 1999; Miller, Stokes, &

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Clifford, 1987). Structural challenges that may impact weight in rural communities include fewer services for nutrition education (e.g., access to dietitians) and physical activity (e.g., exercise facilities) as well as treatment facilities for weight management (Tai-Seale & Chandler, 2003). Thus, living in rural communities has become a health disparity (Gamm, Hutchison, Bellamy, & Dabney, 2002).

Little evidence is available, however, on validated tools identifying characteristics of the home food and activity environment among families with SES and geographical risk factors for obesity (Boles, Scharf, Filigno, Saelens, & Stark, 2013; Ostbye et al., 2013; Pinard et al., 2012). This limitation in etiological understanding can be characterized within a social–ecological theoretical view, in which obesity may result from an interactive, bidirectional influence of multiple weight-affecting factors at the individual level (e.g., temperament), within the family (e.g., feeding practices) and home environment (e.g., available foods and sedentary devices), to the community, including schools and neighborhoods (e.g., access to parks or corner stores); (see Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008 for review). While studies on the home physical environment of young children have emerged in the last decade, most have focused on white families and underrepresented families from low education and income backgrounds, the families most at risk for obesity development (Boles et al., 2013; Bryant et al., 2008; Fulkerson et al., 2008; Ostbye et al., 2013; Spurrier, Magarey, Golley, Curnow, & Sawyer, 2008). Previously published home assessments may have been conceptually limited by the types of foods and activities included in them and may not have represented foods and activities that are available for families with socioeconomic and racial and ethnic diversity. As a result, important considerations related to methodological and psychometric testing remain largely unexplored with families of SES and geographical diversity.

Pinard et al. (2012) conducted a systematic review of forty home environment measures. They noted a lack of reported instrument psychometric properties and a narrow focus (food or physical activity; not combined). Additionally, few measures were inclusive of families from geographic and socioeconomic diversity, those most at-risk for development of obesity and thus, generalizability may be limited. The present study aimed to address these limitations by developing and testing a comprehensive home environment tool for families of diverse SES and geographical characteristics, known factors to be associated with increased risk for obesity.

Methods

Participants

Families were recruited as part of the Colorado LEAP project, a longitudinal cohort study designed to test an obesity prevention program for young children (Bellows et al., 2013). Participants were recruited from four rural Colorado communities in which two areas received an intervention and were matched with two control site areas based on ethnicity, obesity prevalence, and geographic location derived from Colorado Department of Public Health and Environment (www.chd.dphe.state.co.us). Only data collected during baseline assessments are presented in the current study. Governing institutional review boards approved this study.

Measures

Demographics

Participants completed a survey of family information regarding age, race/ethnicity, family income bracket, and education level.

Anthropometrics

Parent height and weight were self-reported while child height and weight were objectively measured using a portable scale and stadiometer by trained research staff (utilizing the Harrison and colleagues method) (Harrison, Buskirk, & Carter, 1988). Adult BMI was calculated using the formula: weight (kg)/[height (m)]^2. Child BMI was determined using the CDC growth charts based on age and sex-specific references (Kuczmarski et al., 2002).

Home-Inventory Describing Eating and Activity Development (Home-IDEA)

The Home-IDEA was based on a prior validated instrument, the Home Health Environment (HHE) assessment (Boles et al., 2013; Brown et al., 2009). In order to expand the item pool to capture foods potentially purchased by families with geographical and SES diversity, new food items were taken from the Allowable Foods List from The US Special Supplemental Nutrition Program for Women, Infants, and Children (i.e., WIC Program), the Block Food Frequency Questionnaire (Block, Hartman, & Naughton, 1990), and a modified Harvard Food Frequency Questionnaire (FFQ) (Willett et al., 1983). Additional food and activity items were created from the opinions of a panel with expertise in nutrition, physical activity, and families from diverse backgrounds. The final pool of items included 126 food and drinks, 16 physical activity devices, and 12 electronic devices. The food and drink items included foods within the following categories: snacks, cereals, drinks (e.g., milk, juice, sports drinks), fruits and vegetables, meats, dairy, breads, ready to eat meals, and others (e.g., dressings, spreads). The subscales of food groups and drinks were comprehensively developed to include all food groups and not to just high value targets (e.g., fruits and vegetables) to maximize availability measurements. Physical activity devices included a single scale of devices both children and/or adults may use (bicycles, seated cars, swing sets). Finally, the electronic devices represented screens (televisions, computers) and devices that promote sedentary behaviors (e.g., DVD players).

Procedure

Parents received study information via packets sent home with preschoolers attending preschool/Head Start centers and during parent information meetings scheduled in the evenings at preschool sites. Packets were available in both English and Spanish and Spanish-speaking study staff were available for families requiring interpretation or assistance. Once written consents had been obtained, the participating parents completed a questionnaire packet and received $40.

Independent raters called randomly selected participants to arrange a home visit to complete study surveys. During the home visit, the participant was given instructions on how to complete the Home-IDEA. In addition, the independent rater completed the Home-IDEA during this visit. Instructions were provided to each participant that stated no talking could be done while completing the form to maintain independence of responses and areas of the house were conducted at different times to avoid modeling of recording (i.e., if a parent was in the kitchen looking for specific foods, the independent rater would go to a bedroom to record electronic devices.

Analytic plan

To first establish a gold-standard criterion, independent raters were trained and tested for interrater reliability. Specifically, nonstudy houses were selected for simultaneous coding between raters until substantial agreement was obtained based on agreement classifications (Kappa scores at or above .61) (Landis & Koch, 1977). Five trained coders completed home assessment training on three nonstudy homes. Each independent coder was compared with the referent coder (first author), in which all items for each category were analyzed separately for three groups (food items, electronic devices, activity devices). Next, an independent rater and parent-completed