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Demographic, Cognitive, Affective, and Behavioral Variables Associated With Overweight and Obesity in Low-Active Girls[1]

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This study examined personal, cognitive, affective, and behavioral variables related to body mass index (BMI) among 73 6th and 7th grade girls, and differences between categories of healthy weight, overweight, and obese in the variables. BMI was correlated with barriers to physical activity, enjoyment of physical activity, light physical activity, moderate to vigorous physical activity, vigorous physical activity, and sedentary time. As compared to obese girls, those who were non-obese perceived greater enjoyment of physical activity, engaged in more light and vigorous physical activity, and had fewer minutes/hour of sedentary time. Findings can inform interventions.

OVER ONE THIRD (35.2%) of girls, aged 6 through 11 years, are overweight or obese, and 19.1% are obese (Ogden, Carroll, Kit, & Flegal, 2014). Being overweight is associated with various cardiovascular disease risk factors in girls (Friedemann et al., 2012). Causes of an overweight and obesity problem in children and adolescents are related to both genetics and lifestyle (Haug et al., 2009; Heber, 2010). While altering an individual's genetic make-up may not be possible, some behavioral causes related to lifestyle are indeed modifiable, particularly physical activity.

United States Department of Health and Human Services (USDHHS), 2008) recommendations for children and adolescents call for at least 60 minutes daily of moderate to vigorous physical activity (MVPA), however, only 34.7% of girls, ages 6 to 11, attain this level, and the percentage drops to between 3.4 and 5.4% during adolescence (Troiano et al., 2008). Inadequate physical activity is problematic among young girls, putting them at increased risk for becoming overweight or obese during adolescence (Costigan, Barnett, Plotnikoff, & Lubans, 2013) with progression of the problem into adulthood (Gordon-Larsen, The, & Adair, 2010). The purpose of this pilot study, which served as an important step toward intervention development, was two-fold: (1) to examine demographic, cognitive, affective, and behavioral variables related to body mass index (BMI) among low-active 6th and 7th grade girls; and (2) to determine differences between girls who were (a) healthy weight versus overweight or obese, (b) overweight versus obese, and (c) non-obese versus obese in the variables. Low-active girls were selected to ensure inclusion of an adequate number of overweight or obese girls, while avoiding stigmatization (Rukavina & Li, 2008).

Theoretical Framework and Review of the Literature

The Health Promotion Model (HPM; Pender, Murdaugh, & Parsons, 2011) guided the selection of demographic,

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cognitive, affective, and behavioral variables that might be related to overweight and obesity. According to the HPM, demographic variables include age, academic grade, race, ethnicity, and socio-economic status (SES). Cognitive variables of the HPM (Pender et al., 2011) specifically reported to influence adolescent physical activity include perceived benefits, barriers (Robbins, Sikorskii, Hamel, Wu, & Wilbur, 2009; Robbins, Wu, Sikorskii, & Morley, 2008), physical activity self-efficacy (Wu, Robbins, & Hsieh, 2011), and social support (Robbins, Stommel, & Hamel, 2008). Two other cognitive variables not included in the HPM (Pender et al., 2011) were also assessed because of their reported influence on physical activity in this young age group and interest to the investigators. These two cognitive variables are perceived importance (Whitehead, Biddle, O'Donovan, & Nevill, 2006) and current physical activity self-definition (e.g., perception of being "an exerciser" at the present time; Robbins, Pis, Pender, & Kazanis, 2004a). The HPM also indicates that affective variables are related to physical activity. Evidence supports that enjoyment, an affective variable, is a major factor influencing girls' physical activity (Robbins, Pis, Pender, & Kazanis, 2004b).

Behavioral variables associated with overweight and obesity among children and adolescents include (a) inadequate physical activity (Eaton et al., 2010; Troiano et al., 2008), (b) excessive sedentary time, such as screen time (Costigan et al., 2013), and (c) unhealthy eating habits, including drinking sugar-sweetened beverages (Welsh, Sharma, Cunningham, & Vos, 2011), eating fried foods at or from a fast food place (Andreyeva, Kelly, & Harris, 2011), and not eating daily breakfast (Eaton et al., 2010; Haug et al., 2009). In a representative sample of 4659 girls, those who met the criteria for healthy behavior (being physically active on at least 5 days of the week, having less than 2 hours of screen time per day, and eating at least one serving of a fruit or vegetable per day and less than one serving per day of sweets, sweetened soft drinks, chips or French fries) were less likely to be obese compared to girls who did not meet these criteria (Iannotti & Wang, 2013).

Whether positive perceptions related to these potentially modifiable cognitive and affective variables are associated with a healthier BMI among adolescent girls is unknown. Knowledge of demographic, cognitive, affective, and behavioral variables related to overweight and obesity among girls in 6th and 7th grade can be used to identify those at risk and target specific areas for intervention.

Methods

A descriptive design with convenience sampling was used. The sample included 6th through 7th grade girls from two Midwestern U.S. urban public middle schools whose students were comparable regarding certain demographic characteristics. According to the Center for Educational Performance and Information (2009) school data, close to half of the students in the two schools were female. Approximately one-fourth of the students were White, slightly over half were African American, and those remaining were of other races. Close to 79% of the students in each school were economically disadvantaged.

Girls completed baseline data measures prior to their involvement in either a physical activity intervention, "Girls on the Move," at one of the schools or an attention control condition at the other school. The investigators did not share information with the girls about each school's randomization status until after the baseline data were collected. Results of the intervention study are reported elsewhere (Robbins, Pfeiffer, Maier, Lo, & Wesolek, 2012).

A total of 209 girls from the two schools were invited to participate in the study. Girls who expressed an interest in participating received information packets from the investigators. Each packet contained a study flyer, an informational letter for parents/guardians, consent and assent form, and a brief screening tool for determining a girl's eligibility for participation. Girls in 6th or 7th grade were included in the study if they met the following inclusion criteria: (a) reported not meeting national MVPA recommendations; (b) were available and willing to participate in the 6-month study; and (c) were able to read, understand, and speak English. Exclusion criteria included: (a) involvement in school or community sports or other organized physical activities or lessons that involved MVPA and required participation three or more days a week during the school year; and (b) a health condition limiting ability to perform safe MVPA. Seventy-three assented girls who had written permission to participate from their parents/guardians completed baseline measures. A flow diagram depicting recruitment and enrollment information has been reported elsewhere (Robbins et al., 2012).

Measures

Girls responded to survey items that focused on demographic, cognitive, affective, and behavioral variables and wore an accelerometer to measure physical activity and sedentary time. Survey items related to the demographic and behavioral (e.g., screen time and intake of fruits and vegetables) variables were obtained from the 2009 Youth Risk Behavior Surveys that involved middle and high school students (Youth Risk Behavior Surveillance System [YRBSS]; Centers for Disease Control and Prevention [CDC], 2009). Additional single items that assessed other eating behaviors (e.g., intake of sugar-sweetened beverages, fried foods at or from a fast food place, and breakfast) were obtained from published studies involving a similar age group (Bauer, Larson, Nelson, Story, & Neumark-Sztainer, 2009; Nelson, Neumark-Sztainer, Hannan, & Story, 2009; Timlin, Pereira, Story, & Neumark-Sztainer, 2008).