

Household Factors, Family Behavior Patterns, and Adherence to Dietary and Physical Activity Guidelines Among Children at Risk for Obesity

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ABSTRACT

Objective: To describe the proportion of children adhering to recommended physical activity and dietary guidelines, and examine demographic and household correlates of guideline adherence.

Design: Cross-sectional (pre-randomization) data from a behavioral intervention trial designed to prevent unhealthy weight gain in children.

Participants: A total of 421 children (aged 5–10 years) at risk for obesity (body mass index percentile, 70–95).

Main Outcomes Measured: Physical activity (accelerometry), screen time (parent survey), and fruit and vegetable and sugar-sweetened beverage intake (24-hour dietary recall).

Analysis: Proportions meeting guidelines were calculated. Logistic regression examined associations between demographic and household factors and whether children met recommended guidelines for (1) physical activity (≥ 60 min/d), (2) screen time (≤ 2 h/d), (3) fruit and vegetable intake (≥ 5 servings/d), and (4) sugar-sweetened beverage avoidance.

Results: Few children met more than 1 guideline. Only 2% met all 4 recommended guidelines and 19% met none. Each guideline had unique sociodemographic and domain-specific household predictors (ie, availability of certain foods and beverages, media, and active play and exercise equipment).

Conclusions and Implications: Families equipped to promote healthy child behavior patterns in 1 activity or dietary domain may not be in others. Results have implications for the development of interventions to affect children's weight-related behaviors and growth trajectories.

Key Words: physical activity, diet, guidelines, child, home environment (*J Nutr Educ Behav.* 2015; ■:1-10.)

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INTRODUCTION

Children's activity patterns and dietary intake are associated with important aspects of their health and well-being. Prior studies suggest that physically active children have stronger cognitive/academic functioning, higher self-esteem, and lower adiposity than less active peers.¹⁻⁴ Sedentary behaviors (eg, watching television [TV]) have also been

associated with overweight and obesity⁵ and metabolic syndrome markers.^{6,7} Sugar-sweetened beverage (SSB) intake has been associated with obesity,⁸ and fruit and vegetable consumption has been linked to lower risk of chronic health conditions.^{9,10} Activity and dietary patterns established during childhood often persist into adulthood,¹¹ which underscores the importance of identifying who is at risk for maladaptive

patterns early on and what modifiable factors may mitigate this risk.

Guidelines for physical activity and healthy eating have been established for obesity prevention in children and endorsed by the American Academy of Pediatrics.¹²⁻¹⁵ These guidelines include recommendations for minimum levels of moderate to vigorous physical activity (ie, at least 60 min/d), limiting screen time (to no more than 2 h/d), eating at least 5 servings of fruits and vegetables per day, and avoiding SSBs. Numerous population-based studies have examined demographic correlates of physical activity and dietary intake patterns in children.¹⁶⁻²⁰ Some have included rates of adherence to guidelines nationally, with a focus on whether guideline adherence varies as a function of sociodemographic and child characteristics.²¹⁻²³

Most prior studies examined guideline adherence in isolation (ie, a single

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guideline) or within a single domain (eg, either activity or dietary intake). A recent parent survey study from a nationally representative dataset²¹ found that 70% of children aged 6–11 years met physical activity recommendations and 54% met screen-time viewing guidelines. Older children (aged 9–11 years) and those who were obese were less likely to meet these guidelines. Rates of adherence to dietary guidelines are much lower. Population-based survey studies estimate that between 16% and 26% of elementary school-aged children meet fruit and vegetable intake guidelines, with obese children showing lower adherence rates.²³ Although SSB consumption has decreased over the past decade, a recent study found only 36% of children aged 2–19 years met guidelines for SSB avoidance.²² Demographic factors such as lower levels of parental education and socioeconomic status have been associated with greater consumption of SSBs by children^{24–26}; other studies found that soda intake increases with increasing age.^{27–29}

Fewer studies have examined the impact of modifiable household factors and family behavior patterns on children's adherence to both activity and dietary guidelines. Nonetheless, several studies have examined the role of these factors on children's weight-related behaviors more generally. Such studies have found that media equipment at home, and specifically in the bedroom, is positively associated with children's sedentary behavior.^{30–32} Exercise and play equipment availability have been inversely associated with sedentary behavior (eg, media use) but inconsistently associated with physical activity levels.³³ Parents' engagement in physical activity with the child has been inconsistently linked to children's physical activity and sedentary behavior.¹ The availability of certain food groups (eg, fruits and vegetables, SSBs) in the home has also been associated with children's intake of these foods^{34–37} and family behavior patterns such as higher fast-food frequency and having the television on during meals have been associated with lower child intake of fruits and vegetables and higher intake of unhealthy foods, such as salty snacks and soda.^{38,39} These studies have shown correlations among household factors,

family behavior patterns, and children's dietary and activity levels. However, such studies have not established whether these factors contribute significantly to a meaningful level of engagement in these weight-related behaviors, as reflected by whether children are meeting recommended guidelines, and have not examined guideline adherence across physical activity and dietary domains. Identifying household and family behavior patterns that are associated with children's adherence to both activity and dietary recommendations would support the development of more effective obesity prevention interventions.

This study used data from the Healthy Homes/Healthy Kids trial⁴⁰ to examine the proportion of children meeting dietary and activity guidelines, and associations with demographic and household patterns in a cohort of children aged 5–10 years who are at risk for obesity. In addition to examining adherence to individual dietary and activity guidelines (ie, objectively measured moderate to vigorous physical activity, screen-time viewing, fruit and vegetable intake, and SSB consumption), the proportion adhering to multiple guidelines is also described, to provide a more complete picture of weight-related behaviors within this cohort. To date, there is a paucity of studies that have examined adherence to multiple dietary and activity guidelines in this age group. This is a major gap in the literature given that the combined influence of dietary and activity patterns is believed to contribute to childhood obesity risk and often is targeted concurrently in interventions.^{41,42} It was hypothesized that overweight children (body mass index [BMI] between the 85th and 95th percentiles) would have lower adherence rates to single and multiple guidelines than children at risk for overweight (defined here as the 70th to 84th percentile), and further that key household variables (availability of media, exercise and play equipment, and specific food and beverage items), family behavior patterns that comprise the home food, eating, and activity environment (eating fast food, family meals with the TV on, and shared parent-child physical activities), and demographic characteristics (child's age, child's sex, and

parent education) would be associated with children's adherence to these guidelines.

METHODS

Participants

The researchers used baseline (pre-randomization) data from a behavioral intervention trial (Healthy Homes/Healthy Kids Study) designed to prevent unhealthy weight gain among children who were overweight or at risk for becoming overweight. The study recruited families scheduled for a well-child visit at clinics in the Minneapolis–St Paul area. Eligible children were aged 5–10 years with BMI percentiles between 70th and 95th for age and gender; parents were English-speaking and willing to complete measures and participate in a parent-targeted intervention. Children with a chromosomal abnormality or chronic medical condition, who consistently used of steroid medication, or who were participating in other child health research were excluded. Parent informed consent and child assent were obtained. Study protocol and procedures were approved by the HealthPartners Institute for Education and Research institutional review board. Further details of the trial are described elsewhere.⁴⁰

Dependent Variables

Physical activity guidelines. Children were asked to wear ActiGraph GT1M accelerometers (ActiGraph LLC, Pensacola, FL) for 7 full days during waking hours to measure physical activity. The devices were placed on elastic belts and fitted on the right hip. Children were included in analyses if they recorded at least 4 valid monitoring days, defined as ≥ 10 hours of wear time per day (77%). Non-wear time was defined as a string of ≥ 60 minutes of zero counts, allowing for a 2-minute interruption interval of ≤ 100 counts. To estimate minutes spent in moderate to vigorous activity, data were aggregated into 1-minute epochs. The researchers developed cut points using the equations of Evenson et al⁴³ and dichotomized them to reflect subjects who were meeting guidelines (≥ 60 minutes of moderate to vigorous

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