

# Do High-Risk Preschoolers or Overweight Mothers Meet AAP-Recommended Behavioral Goals for Reducing Obesity?

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Received for publication November 1, 2012; accepted January 8, 2013.

## ABSTRACT

**BACKGROUND:** The American Academy of Pediatrics (AAP) has issued specific behavioral recommendations to prevent obesity. It is unclear how often high-risk preschoolers and overweight mothers meet recommended behavior goals and whether meeting these goals is negatively associated with overweight/obesity.

**OBJECTIVE:** To describe the proportion of preschoolers and mothers that meet AAP-recommended behavior goals and examine the associations of meeting goals with weight-status, and mothers meeting goals and children meeting corresponding goals.

**METHODS:** Secondary analysis of baseline data (before an intervention) from mother-preschooler dyads in a weight-control study. Mothers were overweight or obese. Preschoolers were 2–5 years old. Dietary and feeding practices were assessed by the use of questionnaires. Activity was measured directly using accelerometry. Outcomes included preschooler overweight and maternal obesity.

**RESULTS:** The respective proportions of children and mothers that met behavior goals were: 17% and 13% for  $\geq 5$  fruits/vege-

tables/day, 46% and 33% for zero sugar-sweetened beverages/day, 41% and 13% for fast-food  $< 1 \times$ /week, and 46% and 13% for screentime  $\leq 2$  hours/day. Moderate-to-vigorous physical activity did not exceed 60 minutes/day in any participant. A total of 49% ate family meals together  $7 \times$ /week. For each additional goal met, the adjusted odds for preschooler overweight was 0.9 (95% confidence interval 0.8–1.1) and for maternal obesity, 0.8 (95% confidence interval 0.6–0.9). Preschoolers had significantly greater odds of meeting each goal when mothers met the corresponding goal.

**CONCLUSIONS:** Few high-risk preschoolers or overweight mothers meet AAP-recommended behavior goals. Meeting a greater number of behavior goals may be particularly important for maternal weight. Preschoolers have greater odds of meeting behavior goals when mothers meet behavior goals.

**KEYWORDS:** behavioral modification; childhood obesity; maternal child health; obesity prevention

**ACADEMIC PEDIATRICS** 2013;13:243–250

## WHAT'S NEW

Study findings indicate that few preschool-age children or overweight mothers meet the American Academy of Pediatrics-recommended behavior goals to prevent obesity. Meeting more behavior goals appears to be particularly important for maternal weight. Preschoolers have greater odds of meeting behavior goals when mothers meet recommended behavior goals.

obesity increase with age.<sup>1</sup> One in 10 preschool-age children are obese, yet the proportion with obesity increases to 1 in 5 among adolescents, and to 1 in 3 among adults.<sup>2,3</sup>

Recognizing the importance of early prevention and treatment, the American Academy of Pediatrics (AAP) recommends that clinicians assess and advise parents about specific behavior recommendations for their children.<sup>4</sup> Recommended behaviors include: limit sugar-sweetened beverages (SSB); eat at least 5 servings of fruits and vegetables per day; be moderate to vigorously physically active (MVPA) for at least 60 minutes a day; limit screentime to no more than 2 hours per day; remove televisions from children's bedrooms; eat breakfast every day; limit eating out, especially fast food; have regular family meals; and

## INTRODUCTION

EARLY OBESITY PREVENTION and management strategies may forestall the development of obesity because the proportions of children, adolescents, and adults with

limit portion sizes. Parents are encouraged to role model recommended behaviors.

Few data exist regarding the proportion of high-risk preschoolers (considered at greater risk for overweight due to maternal overweight/obesity<sup>5</sup>) and overweight mothers who report meeting each AAP-recommended behavior goal, and it is unknown whether meeting these goals is associated with overweight/obesity. Parental behaviors and the early home environment influence children's behaviors and adult body weight. Children born to parents who are obese (body mass index [BMI]  $\geq 30$  kg/m<sup>2</sup>) are at increased risk for developing obesity.<sup>5</sup> Family meals are associated with a decreased risk of obesity in children.<sup>6</sup> Parents and children share similar activity patterns and food preferences,<sup>7,8</sup> and there is evidence for associations between mother's and preschooler's dietary and lifestyle habits.<sup>9,10</sup> Although it may be equally important to recommend that parents adopt these behaviors for themselves to ensure that preschoolers meet AAP-recommended behavior goals, not enough is known about the proportions of preschoolers and mothers that report meeting these goals and the relationship of meeting these goals with preschooler and maternal weight status.

The study objectives were to describe the proportions of high-risk preschoolers and overweight mothers who report meeting AAP-recommended behavior goals, examine whether meeting the goals is associated with child overweight and maternal obesity (vs maternal overweight), and evaluate the likelihood of a preschooler meeting each behavior goal by whether the mother meets the goal.

## PATIENTS AND METHODS

This study used cross-sectional baseline data (before an intervention) from mothers and 2- to 5-year-old preschoolers who were enrolled in a behavioral weight-control study (Kids and Adults Now: Defeat Obesity! [KAN-DO]<sup>11</sup>). The purpose of the study was to evaluate whether an 8-month, low-intensity intervention could improve healthy-weight attainment (weight maintenance among normal-weight, and relative weight reduction among overweight children) among preschoolers that were considered at greater risk for overweight due to maternal overweight or obesity. Reduction in the mother's BMI was a secondary outcome of the study. Study eligibility criteria for mothers included: (1) had at least one child between 2 and 5 years of age, (2) had recently delivered a baby (within 2–7 months before study entry; the postpartum period was reasoned to be a period when mothers would be more open to behavioral change<sup>12</sup>), (3) were overweight pre-/postpartum (measured postpartum BMI  $\geq 25$  kg/m<sup>2</sup> and reported BMI  $\geq 25$  kg/m<sup>2</sup> before pregnancy), (4) were English-language proficient, (5) had an accessible telephone number and mailing address, and (6) had no contraindications to exercise. The study design and rationale have been published.<sup>11</sup>

Four hundred mother–preschooler dyads were recruited at 2 sites (Duke University and University of North Carolina Greensboro) by the use of publicly displayed flyers

and postcards sent to mothers older than 18 years of age who recently had applied for birth certificates in 1 of 14 counties in central North Carolina and were known to have applied for another birth certificate 2–5 years previously. A purchased list of publicly available phone numbers was matched with birth certificate applications to contact potentially eligible mothers. Eligible, interested mothers were sent a self-administered baseline questionnaire (written at an 8th-grade literacy-comprehension level) to be completed before an individual baseline-assessment visit. Of 4445 women who had state birth records, were sent recruitment postcards, and were screened by telephone, 496 eligible women attended the enrollment visit and provided written informed consent; of these, 80 were not eligible because of a measured BMI  $< 25$  kg/m<sup>2</sup>, and 16 did not complete the baseline assessments.

All recruitment and enrollment procedures were approved by the institutional review boards at both study sites, and all procedures were in accordance with the ethical standards for human experimentation established by the Declaration of Helsinki.

## MAIN OUTCOMES

Outcome measures for this study (and the overall KAN-DO study) were preschooler overweight (including obesity, BMI  $\geq 85$ th percentile) and maternal obesity (BMI  $\geq 30$  kg/m<sup>2</sup> vs overweight [BMI  $\geq 25$ – $< 30$  kg/m<sup>2</sup>]). Height and weight were measured at the baseline-assessment visit. BMI was calculated for all participants by the use of measured height (standardized 214 portable stadiometer; seca, Birmingham, UK) and weight (BSB-800S digital scale; Tanita Corporation of America, Arlington Heights, IL). Preschooler BMI was converted to BMI percentile for age and gender by use of the Center for Disease Control and Prevention reference data.<sup>13</sup>

Outcome measures for the study's second objective (to evaluate the likelihood of a preschooler meeting each behavior goal by whether the mother meets the goal) were each of the AAP-recommended behavior goals (described herein). These goals were dependent variables for the second study objective and independent variables for the primary study objective.

## INDEPENDENT VARIABLES

AAP-recommended behavior goals included: (1) eat  $\geq 5$  servings of fruits/vegetables/day, (2) limit screentime to  $\leq 2$  hours/day, (3) aim for  $\geq 1$  hour/day of physical activity (PA), (4) eliminate consumption of SSB, (5) limit fast-food consumption and eating out, and (6) regularly eat family meals together.<sup>4</sup> We did not assess breakfast consumption, the presence of televisions in bedrooms, or portion sizes because they were not measured in both mothers and preschoolers.

To determine dietary intake, mothers completed a questionnaire regarding daily intake of food items for themselves and preschoolers. Specific questions, used extensively in North Carolina public health programs,<sup>14</sup> were used to assess servings of fruits/vegetables, SSB,

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