

Research Article

Low-income, African American Adolescent Mothers and Their Toddlers Exhibit Similar Dietary Variety Patterns

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ABSTRACT

Objective: To examine the relationship between maternal and toddler dietary variety.

Design: Longitudinal; maternal and toddler dietary data were collected at 13 months; anthropometry was collected at 13 and 24 months.

Setting: Data were collected in homes.

Participants: 109 primiparous, low-income, African American adolescent mothers and toddlers.

Main Outcome Measures: Maternal and toddler dietary variety and toddler obesity at 24 months.

Analysis: Correlations were computed to estimate associations between maternal and toddler dietary variety at 13 months; multiple logistic regression analyses were conducted to estimate associations between maternal and toddler diet and toddler growth.

Results: Maternal and toddler fruit, vegetable, snack, meat, dairy, and soda variety were significantly correlated. There was no association between maternal and toddler dietary variety and obesity at 24 months. Adolescent mothers who purchased groceries consumed more fruits and vegetables and provided more variety for their toddlers than those who relied on others to purchase groceries.

Conclusions and Implications: Adolescent mothers and toddlers exhibited similar dietary patterns; consuming more sweets and less fruits and vegetables than recommended. Toddlerhood is an optimal time to address healthful dietary patterns and to help adolescent mothers influence grocery purchasing decisions. Goals are to establish healthful dietary patterns and reduce pediatric obesity.

Key Words: adolescent mother, toddler, African American, dietary variety, obesity (*J Nutr Educ Behav.* 2009;41:87-94.)

INTRODUCTION

Childhood obesity (body mass index [BMI] \geq 95th percentile) is an important public health problem with serious long-term consequences. In the past 3 decades, the prevalence of childhood obesity has nearly tripled and continues to increase each year.¹⁻⁵ Among preschool children, the prevalence of obesity (10%) has doubled over the last 2 decades,¹ particularly among African American children and low-income populations.⁶ A recent study of low-income

children in cities found that 9% of infants from birth to 12 months of age and 14% of toddlers aged 13 to 36 months were obese, far more than the expected rate of 5%.⁷

The recent increase in obesity among young children may be explained, in part, by changes in dietary consumption patterns. Infants and toddlers often have energy intakes that exceed mean energy requirements, receive solids within the first 3 months of life, do not routinely consume whole fruits and vegetables, and have more sweetened food and beverages

(including fruit juices) than recommended.⁸⁻¹¹ These patterns may lead to unhealthy eating habits, nutrient deficiencies, and obesity during childhood.

Children born to adolescent mothers may be at increased risk for poor dietary consumption. Poor diets are common among adolescents, with over half not meeting United States (US) dietary guidelines for intakes of fruits and vegetables, and about two thirds consuming more dietary fat than recommended.¹²⁻¹⁴ In a previous analysis conducted within the current sample, poor dietary quality was evident among low-income African American adolescent mothers,¹⁵ including a diet that was higher in sweets and snacks and lower in fruits and vegetables than recommended.

Dietary variety has been associated with positive nutritional status among toddlers, as measured by length-for-age z scores.¹⁶ In a sample of middle-class families with healthful dietary patterns, dietary variety in infancy has been associated with an increased

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acceptance of fruits and vegetables in later ages.¹⁷ Maternal dietary habits, such as frequent consumption of vegetables, play an important role in the dietary variety of their school-aged children.¹⁷ However, it is not clear when maternal dietary habits begin to influence the dietary variety of children and if these relationships appear as children transition to the family diet. Further, it is unknown how the dietary habits of low-income, African American adolescent mothers relate to the dietary variety provided to their toddlers. The purpose of this study was to examine the association between the dietary variety of low-income, African American adolescent mothers with high rates of obesity and unhealthy dietary behaviors (eg, high snack intakes)¹⁵ and the dietary variety and growth patterns of their children. The authors hypothesized that adolescent mothers with unhealthy dietary behaviors have toddlers with low dietary variety and high rates of obesity.

METHODS

Study Participants

Participants were low-income, African American adolescent mothers who were part of a longitudinal randomized controlled trial of a home intervention designed to promote parenting and adolescent development.¹⁸ Eligibility requirements included age less than 18 years, first-time delivery, African American, low-income (defined as eligible for the Special Supplemental Nutrition Program for Women, Infants, and Children [WIC]: family income under 185% of poverty level), no chronic or mental illnesses that would interfere with parenting or adolescent development, and intention to be the primary caregiver. Because national policies require that eligibility for public assistance be restricted to adolescent mothers who are in the guardianship of an adult,¹⁹ recruitment was limited to adolescent mothers who were living with their mothers. Infants of eligible mothers had to be full-term, to have had a birth weight greater than 2500 grams, and to have no congenital problems, chronic illnesses, or disabilities.

Procedures

Mothers were recruited from 3 urban hospitals in Baltimore, MD between June 1997 and September 1999. They were approached shortly after delivery and given a brochure explaining the study. Those who expressed interest in enrolling in the study were scheduled to receive a baseline home evaluation 3 weeks after delivery. The baseline evaluation included standardized questionnaires on family demographics, personal health and mental health, mother-grandmother relationships, access to services, and early adjustment to parenting. The evaluation was programmed onto laptops that presented questions aurally through headphones and visually on the screen. Adolescent mothers completed the computerized questionnaires using a mouse.

Mothers completed consent forms approved by the Institutional Review Boards of the participating institutions. Over 83% (181/219) of the eligible mothers agreed to participate and completed the baseline evaluation. There were no differences in maternal age or education between those who completed the baseline evaluation and those who did not. After the baseline evaluation, mothers were randomized into intervention or control groups. For families in the intervention group, home visits were scheduled every other week after the baseline assessment, beginning when the infants were 4 to 6 weeks of age and continuing until infants were 12 months of age. Families in the control group received no further contact until the evaluation visits.

In-home, follow-up evaluations were conducted when the toddlers were 6 (n = 148, 82%), 13 (n = 127, 70%), and 24 months old (n = 146, 81%). At the 13- and 24-month evaluations, mothers and toddlers were weighed, and their heights and lengths were measured. At 13 months, dietary data were gathered. Complete data were available for 118 mothers (65% of the sample) with both 13- and 24-month visits.

There were no differences in maternal age and education or infant birth weight and gender between mothers who completed both evaluations and mothers who did not. Since dietary requirements differ for pregnant and

lactating women, the investigators eliminated 9 mothers who were pregnant or had given birth (n = 7) or were lactating (n = 2) at the 13-month assessment, which resulted in a final analytic dataset of 109 mothers and toddlers.

Measures

Demographics. Background characteristics, including the mother's age, education, marital status, and residence with the baby's grandmother were collected at each assessment. Questions to assess the toddler's age, gender, birth weight, and breast-feeding history were also asked. Breast-feeding may be an important protective factor against childhood obesity.²⁰ Initiation of breast-feeding, measured as a dichotomous variable (yes or no), was included as a covariate in all models.

Dietary patterns. Toddler dietary variety was measured with a 73-item feeding checklist based on an instrument used previously in a similar population.²¹ The original instrument was developed based on ethnographic reports from urban African American mothers participating in WIC,²² and it was expanded to incorporate food items introduced into the diet of children between 6 and 13 months of age. Adolescent mothers completed the checklist, which asked whether their toddlers consumed each type of food over the past week. A summary score was computed by adding the total number of different food types the toddler consumed within each of 6 categories (fruits, vegetables, snacks and desserts, meat, soda, and dairy). Higher numbers indicate more dietary variety within each category.

Maternal dietary variety was measured with the Youth Adolescent Food Frequency Questionnaire (YAQ), an instrument that was developed and validated for use with adolescents.²³⁻²⁷ The YAQ was self-administered, and mothers reported on the food items they consumed over the past year. Response categories differ by food. For example, response categories for snacks and desserts range from never or less than once per month to 5 or more times per week. For juices, response categories range from never or less than one glass per

month to 2 or more glasses per day. A previously determined standard food portion size is listed alongside each food item.²³ For example, most of the servings of snacks refer to a serving size of 1 small bag, and respondents indicate the number of bags consumed in a month or week. Participants were also asked to report any other food item that they eat at least once a week, and these food items were recorded and incorporated into the YAQ score. The YAQ contains 131 total items and yields estimated scores on energy intake, macro- and micronutrients, and daily servings of each food item consumed. Total kilocalories and the number of servings consumed per day in 6 categories (fruits, vegetables, snacks and desserts, meats and main dishes, soda, and dairy) were examined. To reduce the possibility of reporting errors, the investigators identified 7 mothers who had out-of-range values (< 500 kilocalories [n = 1] and > 5000 kilocalories [n = 6]) for caloric intake. The authors examined the impact of out-of-range caloric values by conducting all analyses both with and without these 6 adolescent mothers. There were no differences in the results, so their data were retained in all analyses.

Anthropometry. Weights and lengths were obtained for all toddlers at the 13- and 24-month evaluations. Toddlers were weighed with a portable Tanita digital baby scale (20 g graduation) (Tanita, Tokyo, Japan), and length was measured using a Pediatric Infantometer (Measure Mat, Stadiometer.com, Snoqualmie, WA) (0.5 cm graduation). Standard procedures from the National Health and Examination Survey were used,²⁸ and a registered dietitian trained research assistants. Weight-for-length percentiles and z scores were calculated according to the Centers for Disease Control and Prevention (CDC) age- and gender-specific reference growth curves.²⁹ Based on the CDC guidelines, children with a weight-for-length $\geq 85^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile were classified as overweight, and children with a weight-for-length $\geq 95^{\text{th}}$ percentile were classified as obese.

Mothers were weighed with a portable Tanita scale (100 g graduation).

Standard procedures were used to collect weight and height.²⁸ Research assistants were trained by a registered dietitian to ensure accuracy and reliability. Body mass index was calculated as body weight/height² (kg/m²). Body mass index values were converted to z scores and percentiles based on the 2000 CDC age- and gender-specific tables using algorithms provided at <http://www.cdc.gov/growthcharts>.³⁰ Overweight was defined as a BMI $\geq 85^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile, and obesity was defined as a BMI $\geq 95^{\text{th}}$ percentile.

Maternal food purchasing. The Who Does What scale was administered to measure the division of household responsibilities between adolescent mothers and other household members.³¹ A food purchasing item from this scale ("Who buys groceries?") was used in exploratory analyses. The item was scored on a 9-point scale, ranging from "someone else does it all" (1) to "I do it all" (9). Responses were divided into 3 groups: someone else's responsibility (1-3), shared responsibility (4-6), and adolescent mother's responsibility (7-9).

Analysis Plan

Associations between toddler dietary variety and maternal dietary variety were calculated using paired sample correlation coefficients. Multiple logistic regression analyses were conducted to estimate the odds of being obese at 24 months of age associated with maternal dietary variety of fruits, vegetables, snacks and desserts, meats and main dishes, soda, and dairy, as well as toddler dietary variety. Toddler dietary variety included total variety of fruits, vegetables, snacks and desserts, meat, soda, and dairy. Estimates were adjusted for potential confounding variables including maternal age, education, BMI z score, intervention status, breast-feeding initiation, and infant birth weight, gender, and weight-for-length z score at 13 months. The investigators examined whether findings were moderated by intervention status by introducing intervention status by maternal dietary variety into the models. The investigators conducted an exploratory analy-

sis using analysis of variance to examine whether dietary variety differed by the household member who purchased food. All analyses were conducted using SPSS, version 15.0 (SPSS, Inc., Chicago, IL, 2006).

RESULTS

One year after delivery, over half of the mothers (53%) were either overweight (18%) or obese (35%). The mothers' age at the time of interview ranged from 14.6 to 19.3 years, with a mean of 17.5 years (standard deviation [SD] = 1.0). The majority of adolescent mothers were in high school (62%), single (94%), and still residing with their mothers (89%). Nineteen percent (n = 21) of mothers initiated breast-feeding, though most stopped in the first 3 months. The mean toddler birth weight was 3107 grams (SD = 447), and 49% were male.

Dietary Variety Patterns

As reported in a previous analysis examining dietary quality,¹⁵ the adolescent mothers reported consuming a diet that deviates from the recommended number of calories and daily servings within each food group. Few mothers (34%) reported eating the recommended 5 servings of fruits and vegetables per day. When french fries were not counted as a vegetable, this number decreased to 29%. Orange juice and french fries were the most commonly consumed fruit and vegetable, respectively. The mothers reported frequent consumption of snack food, including cookies, potato chips, corn chips, and chocolate, eating an average of 4 servings per day (Table 1).

At 1 year of age, feeding recommendations include table food and cow's milk.³² Seventy-five percent of adolescent mothers reported giving cow's milk to their toddlers within the past week. Additional beverages consumed included juice (94%), Kool-Aid (69%), and non-diet soda (61%). The majority of toddlers received a variety of snack food and fried food. Similar to the adolescent mothers, the most commonly consumed snack food items among toddlers were cookies (81%), puffed cheese snacks (75%), and potato chips (72%). Seventy

Table 1. Means and Standard Deviations (SD) of Maternal and Toddler Dietary Habits for 109 Low-income African American Adolescent Mothers 13 Months after Delivery

	Mean (SD) n = 109
Maternal Dietary Pattern (servings per day)	
Fruit (without fruit juice) ^a	1.3 (1.2)
Vegetables (without french fries) ^a	1.4 (1.3)
Snacks and desserts ^a	4.1 (3.8)
Meats and main dishes ^a	2.9 (1.9)
Soda (non-diet) ^a	0.8 (0.7)
Dairy ^a	1.9 (1.5)
Kilocalories per day	2618 (1479)
Toddler Dietary Variety (number of different food items per week)	
Fruit ^b	3.3 (1.5)
Vegetables ^b	6.7 (2.6)
Snacks and desserts ^b	8.1 (3.6)
Meats and main dishes ^b	6.9 (3.8)
Dairy ^b	2.6 (0.9)
Soda (% yes) ^c	61%

^aAverage number of servings per day; ^bTotal number of different foods offered over the past week; ^cGave infant non-diet soda in the past week.

percent of toddlers consumed french fries in the past week, and 74% consumed fried chicken. Mashed potatoes were the most commonly consumed vegetable, with almost all mothers (94%) giving their toddler this food in the past week. Other commonly consumed vegetables included corn (80%), green beans (79%), and carrots (67%). Bananas were the most commonly consumed fruit, with 69% of toddlers eating bananas in the past

week, followed by apples (64%) and oranges (64%). Toddlers did not frequently receive jarred baby fruit (33%).

Because of the non-normality of the dietary variety data, Spearman correlation coefficients were computed to assess the association between maternal and toddler dietary variety. Maternal dietary variety was statistically significantly associated with toddler diet (Table 2). Maternal

consumption of fruit, vegetables, snacks and desserts, and meats and main dishes were positively associated with toddler dietary variety of these same food items ($r = 0.26, 0.40, 0.50, 0.29$, respectively, all $P < .05$). Maternal and toddler soda intake were also correlated ($r = 0.25, P < .05$). The correlation between maternal dairy consumption and toddler dairy variety was borderline statistically significant ($r = 0.18, P < .08$). Mothers who consumed more daily servings of fruits and vegetables provided more dietary variety within almost all categories of food types, including fruit, vegetables, snacks and desserts, meats and dairy. Maternal consumption of fruits and vegetables was not associated with giving the child non-diet soda ($P > .3$), whereas maternal consumption of soda, snacks and desserts, and dairy were associated with offering non-diet soda to their toddlers (all P values $< .05$).

The association between specific dietary thresholds for the adolescent mothers and dietary variety in their toddlers was investigated. Thirty-four percent of mothers consumed at least 5 fruits and vegetables a day, and 73% drank fewer than 2 sodas per day. Adolescent mothers who met the dietary guidelines of consuming at least 5 fruits and vegetables per day were statistically significantly more likely to give their toddlers a greater variety of fruits ($\beta = .64$; 95% confidence interval [CI]: 0.03, 1.24, $P < .05$) and

Table 2. Correlation between Maternal Dietary Consumption and Dietary Variety for 109 Adolescent African American Mothers and Their 13-month-old Children

Maternal Dietary Pattern (servings per day)	Toddler Dietary Variety (number of food types offered per week)					
	Fruit	Vegetables	Snacks/desserts	Meats	Dairy	Soda (non-diet)
Fruit	0.26***	0.32***	0.29***	0.32***	0.18*	0.08
Vegetables	0.26***	0.40***	0.26***	0.33***	0.18*	0.07
Snacks and desserts	0.13	0.16	0.50***	0.34***	0.26***	0.26**
Meats and main dishes	0.06	0.15	0.21**	0.29***	0.09	0.08
Dairy	0.08	0.07	0.36***	0.30***	0.18*	0.32***
Soda (non-diet)	0.06	-0.05	0.19*	0.21**	0.04	0.25**

* $P < .08$; ** $P < .05$; *** $P < .01$.

vegetables ($\beta = 1.9$; 95% CI: 0.91, 3.0, $P < .001$) than mothers who consumed fewer than 5-A-Day. Mothers who drank at least 2 sodas per day were more than twice as likely to give their toddlers soda, compared with mothers who drank fewer than 2 sodas per day (Odds Ratio [OR] = 2.6; 95% CI: 1.00, 6.7, $P = .05$). Associations were not moderated by intervention status.

Anthropometry

At 13 months, 5% of toddlers were overweight and 9% were obese. By 2 years of age, 12% of toddlers were overweight, and 16% were obese.

The authors examined the association between maternal and toddler characteristics and dietary variety patterns and the odds of obesity within a multivariable logistic regression model. Toddlers with higher birth weights (OR = 1.002; 95% CI: 1.001, 1.004) and greater weight-for-length z scores at 13 months (OR = 1.4; 95% CI: 1.01, 2.00) were more likely to be obese at 24 months compared to toddlers with lower birth weights and lower weight-for-length z scores at 13

months. After adjusting for maternal age, education, BMI z score, breastfeeding initiation, intervention status, toddler birth weight, gender, and weight-for-length z score at 13 months, there were no statistically significant associations between maternal and toddler dietary habits and weight status (Table 3). The interactions with intervention status were not significant, indicating that intervention status did not moderate the relation between dietary variety and obesity. Maternal consumption of 5-A-Day (OR = 0.76; 95% CI: 0.3, 2.4) and drinking more than 2 sodas a day (OR = 1.2; 95% CI: 0.5, 2.9) were not associated with obesity in toddlers.

As reported previously,¹⁵ the adolescent mothers gained an average of 3.9 kilograms (8.6 pounds) between 1 and 2 years after delivery. The investigators examined whether maternal weight gain, measured as a change in BMI z score from 13 to 24 months, was associated with toddler obesity. The investigators did not find any evidence of an association between maternal weight gain and toddler obesity (OR = 0.98; 95% CI: 0.9, 1.1, $P = .7$).

Maternal Food Purchasing

Eight percent ($n = 8$) of adolescent mothers reported that they bought groceries for their household. Forty-seven percent ($n = 48$) reported that grocery buying was shared, and 45% ($n = 46$) reported that someone else bought groceries.

Adolescent mothers who bought groceries ate a higher number of fruits (mean = 2.36) than adolescent mothers in families where someone else bought groceries (mean = 1.06; $F[2,101] = 4.17$, $P = .02$). Vegetable consumption was also higher in families where adolescent mothers bought groceries (mean = 2.60) than in families where grocery buying was shared (mean = 1.36) or someone else's responsibility (mean = 1.19; $F[2,101] = 4.87$, $P = .01$). Maternal intake of snacks and desserts, meats and main dishes, dairy, soda, 5-A-Day, and total number of calories per day were not associated with the division of responsibility for grocery buying (all P values $> .19$).

Toddlers were more likely to receive a greater variety of fruit if groceries were purchased by the adolescent mother (mean = 4.57) or the responsibility was shared (mean = 3.75) than toddlers in families where groceries were purchased by someone else (mean = 2.84; $F[2, 98] = 7.29$, $P = .001$). Toddler vegetable, dairy, meat, snack variety, and soda intake were not associated with the division of responsibility for buying groceries (all P values $> .10$).

DISCUSSION

The current study investigating associations between maternal and toddler dietary variety and growth patterns conducted within a low-income, African American population of adolescent mothers and their toddlers revealed several major findings. First, adolescent mothers with unhealthy dietary behaviors had toddlers with low dietary variety. Both adolescent mothers and toddlers consumed diets high in fat and sugar. The present findings extend research from other samples that document poor dietary habits among adolescents³³⁻³⁵ and the similarity between maternal and child diets³⁶ to demonstrate that

Table 3. Adjusted Associations between Maternal Dietary Intake and Toddler Dietary Variety and Obesity in the Second Year of Life

	Obesity	
	Odds Ratio ^a	95% Confidence Interval
Maternal Dietary Intake		
Fruit	0.80	0.27, 2.43
Vegetables	0.74	0.31, 1.8
Snacks and desserts	0.85	0.52, 1.39
Meats and main dishes	1.1	0.38, 3.18
Dairy	0.91	0.42, 1.97
Soda (non-diet)	2.0	0.64, 6.3
Kilocalories per day	1.00	0.99, 1.003
Toddler Dietary Variety		
Fruit	1.89	0.87, 4.16
Vegetables	0.72	0.46, 1.11
Snacks and desserts	1.14	0.80, 1.63
Meats	0.96	0.72, 1.29
Soda (non-diet)	0.99	0.19, 5.34
Dairy	0.94	0.32, 2.75

$P < .05$.

^aCovariates include maternal age, education, body mass index z score, intervention status, breast-feeding initiation, and infant birth weight, gender, and weight-for-length z score at 13 months.

adolescent mothers and toddlers share similar diets.

Although most mother-child comparisons have focused on preschool and school-aged children, this study illustrates that the similarity in maternal and child diets begins by the second year of life, when children are transitioning through the weaning period into the family diet and developing food preferences. The present findings suggest that caregivers play an important role in influencing dietary habits among their children by providing food options and acting as role models for dietary choices early in life, long before children enter school. Infant and toddler dietary preferences are influenced by environmental factors including role modeling and the frequency of food exposure. For example, when 2-year-olds are given opportunities to taste new food, their preferences increase with frequency of exposure.^{36,37} Young children learn through imitation, showing interest in their mother's food and mimicking their mother's eating behaviors.³⁷ The toddlers in the present sample were introduced to unhealthy food choices at a very early age. Nearly two thirds were offered non-diet soda as a beverage choice. Soda consumption continues throughout toddlerhood, with national data indicating that sodas contribute one third of the added sugar intake for children 2 years of age and older.³⁷ The increase in sugar-sweetened beverage intake and provision of soda at such a young age is concerning, given the link to dental caries and childhood obesity.^{37,38}

The snack consumption among the adolescents and their toddlers in this study is also of concern. Adolescent mothers who were frequently consuming snack food were more likely to offer snack food to their children. The most commonly offered snack food items were of low nutrient quality and included cookies, puffed cheese snacks, and potato chips. These findings are consistent with reports from the Feeding Infants and Toddlers Study³⁹ and document that toddlers are socialized into high consumption of sweets and snacks.

Second, neither maternal nor toddler dietary consumption at 13 months was associated with weight status when toddlers were 24 months

of age. However, growth patterns exhibited by this sample of low-income, African American toddlers displayed a trend toward increasing obesity. From 13 to 24 months, the proportion of children whose weight-for-length exceeded the 95th percentile almost doubled (from 9% to 16%). The rates of obesity found within this population are consistent with recent evidence that the epidemic of obesity occurs as early as toddlerhood.^{1-5,40,41} Obesity experienced early in life increases the risk for obesity later in life when it occurs in the context of parental obesity.⁴² With high rates of obesity among the adolescent mothers, coupled with unhealthy dietary choices for themselves and their toddlers, the likelihood of continued obesity among the children is high. Given the development of obesity and the poor dietary habits established by 13 months of age, interventions to promote healthful eating habits among low-income, African American toddlers should be targeted to mothers of infants and toddlers. Although there was no association between dietary variety and toddler weight status at 24 months, the effects of poor dietary patterns on subsequent obesity may be evident later in childhood.

Third, over half of the adolescent mothers were involved in purchasing groceries for their household. Evidence suggests that adolescent mothers who purchased food made healthful choices because their fruit and vegetable consumption was higher and they reported providing greater dietary variety for their toddlers, compared with households in which someone else purchased food. One possible explanation for this finding is that adolescent mothers' healthful choices were based on nutritional advice provided by the WIC program. The majority of adolescent mothers in this sample participated in WIC.

Several methodological limitations should be considered when interpreting these findings. First, although the YAQ has been validated among adolescents, the only validation study the authors located specific to minority adolescents was conducted among a small sample of seventh- and eighth-grade African American and Hispanic youth. It revealed adequate reliability, although some validity coefficients

were low.⁴³ In keeping with YAQ guidelines, the authors allowed adolescents to report food items not listed on the questionnaire and incorporated them into the scoring protocol. Second, maternal dietary variety was measured as a frequency of food items consumed over the past year,²³⁻²⁵ and toddler dietary variety included the dietary diversity of the food items consumed over the previous week. Thus, the metrics differed and may have yielded conservative results. Although toddlers consumed many high-calorie food items such as snacks and desserts, data were not available on the quantity of each food consumed. Third, the relatively small sample size and exclusive focus on low-income, African American adolescent mothers and toddlers limits the generalizability of the findings to other populations. Fourth, data on physical activity were not collected, limiting the authors' ability to examine how physical activity may impact the relation between dietary variety and weight gain. Finally, dietary data were not available at 24 months. Nevertheless, findings of similar dietary variety patterns are consistent with findings from other samples of mothers and children at older ages.³⁷

IMPLICATIONS FOR RESEARCH AND PRACTICE

The present results revealed that mothers and toddlers consumed similar food and approximately one sixth of toddlers were obese by the second year of life. Further studies are needed to examine the mechanisms linking maternal and toddler dietary habits with subsequent obesity early in life and to develop strategies to prevent obesity among toddlers, potentially by modifying family diets.

At recruitment, adolescent mothers were required to live with their own mothers in an effort to parallel the living conditions of many low-income adolescent mothers following the passage of welfare reform. Adolescent mothers living in multigenerational households may have limited control over the household food choices available for themselves and their children. Most adolescent mothers reported sharing responsibility for

buying groceries, suggesting a need for research assessing grandmother involvement and family-level interventions that help adolescent mothers influence decisions at the purchasing level.

Multiple factors affect adolescent dietary choices, including availability, convenience, and preference. Based on adolescent mothers' current dietary choices, toddlers are at risk for diets high in fat and sugar, which suggests the need for education to inform adolescent mothers of the nutritional requirements of toddlers. The transition through the weaning period to the family diet is an optimal time for the development of healthful food choices. Dietary advice should focus on healthful dietary patterns in multigenerational households, with the goals of establishing healthful eating patterns early in life, and ultimately reducing the prevalence of pediatric obesity.

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