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Impact of Dairy and Sweetened Beverage Consumption on Diet and Weight of a Multiethnic Population of Head Start Mothers

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Abstract

Mothers with children in Head Start play a critical role in providing healthful diets and modeling good dietary behaviors to their children, but there is little information available on their diet, especially on beverage consumption. The objective of this study was to assess the association of milk and sweetened beverage consumption with nutrient intake, dietary adequacy, and weight of a multiethnic population of Head Start mothers. Using a cross-sectional, secondary analysis, African-American (43%), Hispanic (33%), and white (24%) women (n=609) were divided into four beverage consumption groups: high milk/low sweetened beverage, high milk/high sweetened beverage, low milk/low sweetened beverage, and low milk/high sweetened beverage. Nutrient intake was determined by averaging 24-hour dietary recalls from 3 nonconsecutive days. Dietary adequacy was determined with the Mean Adequacy Ratio. Mean body mass index for the four beverage consumption groups was compared; there were no differences among the groups (overall mean $\pm$ standard error=30.8 $\pm$ 0.3). Women in the high milk/low sweetened beverage group had higher mean intakes of vitamins A, D, and B-6; riboflavin; thiamin; folate; phosphorus; calcium; iron; magnesium; and potassium ($P<0.0125$ for all) when compared with the other beverage consumption groups. Mean Adequacy Ratio was highest in the high milk/low sweetened beverage (71.8 $\pm$ 0.8) and lowest in the low milk/high sweetened beverage (58.4 $\pm$ 0.8) consumption groups ($P<0.0125$). Women in the high milk/low sweetened beverage group consumed more nutrient-dense foods. Overall consumption of milk was low. Consumption of high milk/low sweetened beverage was associated with improved nutrient intake, including the shortfall nutrients, ie, calcium, potassium, magnesium, and vitamin A.

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Head Start is a national program designed to promote school-readiness by enhancing social and cognitive development of children from birth to 5 years of age who are below the poverty line through educational, health, nutrition, and social services (1). Mothers play a vital role in determining food availability (2), encouraging specific eating practices (3), and modeling dietary behaviors (4,5) for their children. There are few published articles about the diets of Head Start mothers (6,7); one study conducted in mothers and toddlers in Early Head Start suggested that poor diet quality of the mother was associated with poor diet quality in the child (7). Virtually nothing is available on the impact that beverage intake has on overall nutrient intake and diet quality in low-income mothers. Mothers with higher calcium intakes tended to drink more milk and fewer soft drinks; these mothers had daughters who tended to drink more milk and fewer soft drinks and to have higher calcium intakes, suggesting mothers have a positive influence on the diets of young children (8). Individuals with more healthful beverage choices appear to have overall better food options.

Low-income women tend to have diets that compromise health (9–11). Poor food choices increase the likelihood of dietary inadequacies, thereby potentially adversely affecting health status (9–11). Low-income females are also more likely than high-income females to report having poorer overall health or chronic disease (12–14), and obesity rates are high (15–17).

Data from the National Health and Nutrition Examination Survey 2003–2004 showed that 28.9% and 38.8% of females 20 to 39 years of age and 40 to 59 years of age, respectively, were obese (18). African-American females had a higher prevalence of obesity than whites or Mexican Americans (18). These figures have increased dramatically from 1971 to 1974, when the prevalence of obesity for women in those age groups was 11.2% and 19.7%, respectively. There has been a concomitant shift in beverage intake (19,20); and beverages, especially sweetened beverages, have come under scrutiny as a contributor to overweight/obesity (21). Beverage intake by women 20 to 39 years of age and 40 to 59 years of age provides 19% and 15%, respectively, of daily energy intake, with no differences in total energy intake from beverages across ethnic groups (19). In the past 30 years, there has been a shift away from nutrient-dense beverages, like milk, to higher-energy, nutrient-poor beverages, like regular soft drinks (19,20), which are the single largest source of energy in the diet of Americans (22).

In some studies, sweetened beverage consumption has been associated with overall poor nutrient intake (23–27), and it has been argued that sweetened beverages “displace” milk in the diet (25,27). Other studies have failed to show an effect of sweetened beverage consumption on nutrient intake or diet quality (28,29). Sweetened beverage consumption has been linked to adverse health outcomes (30); however, the role of sweetened beverage consumption in overweight in adults is unclear (30–34).

Milk consumption improves overall diet quality (35,36). Increasing quartiles of milk-product intake were associated with increased intakes of the micronutrients except vitamin C (37). Intake of calcium, potassium, magnesium, zinc, vitamins A and D, riboflavin, and folate were improved with milk consumption (38,39). Calcium, potassium, magnesium, and vitamin A have been identified as shortfall nutrients in the diets of adults (40). Epidemiologic (41–44) and intervention (44) studies have suggested that dairy foods have favorable effects on body weight and composition. The purpose of this study was to assess the impact of milk and sweetened beverage consumption patterns on nutrient and food group intake, dietary adequacy, and weight of Head Start mothers.

METHODS

Subjects

This study was a secondary analysis of data collected for a cross-sectional assessment of mother-child dyads in Head Start families recruited from 57 Head Start centers in three geographical areas in northern rural Alabama, northern urban Alabama, and southeastern urban Texas. These sites were selected because they serve ethnically diverse populations and low-income groups in the South are understudied. The purpose of the original study was to determine and compare facilitators and barriers to fruit and vegetable intakes in preschool children from three race/ethnic groups: African American, Hispanic, and white. Inclusion criteria for this study were being a nonpregnant female 20 to 50 years of age, having a child enrolled in Head Start in his or her first year of participation, having an income at or below 100% of the poverty index, and self-identifying race/ethnicity as African American, Hispanic, or white. The response rate was 80%; however, because those participating in Head Start programs are a homogeneous population, there was no difference between respondents and nonrespondents. Ethnic breakdown of the study population reflected the racial/ethnic distribution of the Head Start districts in Houston and Alabama. An incentive of \$35 and a coupon booklet were provided. Only those who completed three 24-hour recalls ($n=620$) were initially included. Excluded from this group were those with reported mean energy intakes <600 calories ($n=6$) or $>4,000$ calories ($n=4$) (45). Another subject was deleted after reporting consuming 39 servings of sweetened beverages. The final sample size was 609.

Study Procedures

This study was approved by the Institutional Review Boards of Baylor College of Medicine and University of Alabama at Birmingham and written informed consent was obtained from all participants. During a 2-week period, data collectors trained and certified in dietary and anthropometric assessments obtained heights, weights, and demographic data. Using the multiple-pass method, three 24-hour dietary recalls (1 weekend day and 2 nonconsecutive weekdays; announced previously) were collected (46). Food models helped participants describe portion sizes (47). Heights and weights were measured twice on each participant without shoes and dressed in light clothing (48). Weight was measured to the closest 0.1 kg on a digital platform scale accurate to 500 kg within ± 0.05 kg (Befour Model PS-6600, Saukville, WI). Height was measured to the closest 0.1 cm using the Shorr Adult Height Measuring Board (Shorr Productions Growth Unlimited, Olney, MD). Body mass index (BMI) was calculated as kg/m^2 .

Diet Analysis

Dietary intake data were analyzed using Nutrient Data System for Research software (version 5.0_35, 2005, University of Minnesota, Minneapolis). Three days of dietary intakes were averaged to improve estimates of dietary intakes. Nutrient intakes from foods and beverages were determined. Added sugars were defined as all sugars eaten separately or used as ingredients in processed or prepared foods (49). Percent energy from protein, carbohydrates, total fat, saturated fatty acids, and total and added sugars was also calculated.

Mean Adequacy Ratio (MAR) of eight key nutrients was calculated as an indicator of overall dietary adequacy (6). Indicator nutrients for the MAR were good markers for consumption of fruit, vegetables, milk, whole grains, dietary fiber, vitamins A and C, folate, calcium, iron, zinc, and potassium. The nutrient adequacy ratio, or percentage of the Recommended Dietary Allowances consumed, was calculated for each nutrient and the resulting value truncated at 100 before averaging, so those consuming large amounts of food were not unfairly advantaged. MAR equals the sum of nutrient adequacy ratios divided by the number of nutrients considered

(6,50). A score of 85 was selected as the cut-point for adequacy (6) and was close to the Estimated Adequate Intake for most nutrients.

Mean intakes of foods and beverages were reported as the five main food groups: grains, fruit, vegetables, dairy, and meats. Legumes were placed in the vegetable group, and nuts were placed in the meat group (51). Food groups and serving sizes were consistent with the Nutrient Data System definitions (52).

Data Analysis

Statistical analyses were conducted using the Statistical Analysis Software (version 9.1.3., 2006, SAS Institute Inc, Cary, NC). BMI was calculated as kg/m² (53). Mean 3-day, 24-hour intakes of milk and sweetened beverage were categorized into four consumption patterns: low milk/low sweetened beverages; low milk/high sweetened beverages; high milk/low sweetened beverages; and high milk/high sweetened beverages. Low milk/high milk categories were defined: $\leq$ or $>$ median (0.312) of total milk servings per day, respectively. Low sweetened beverages/high sweetened beverage categories were defined as: $\leq$ or $>$ median (1.354) of sweetened beverage servings per day, respectively. "Milk" included all forms of milk. Sweetened beverages included soft drinks, fruit drinks/ades, sweetened tea or coffee, and sweetened water.

Mean $\pm$ standard error and frequency distributions of participant characteristics were calculated. Analysis of variance was conducted for detecting differences in milk/sweetened beverage consumption groups for continuous variables and χ^2 was used for categorical variables. A *P* value <0.05 was considered statistically significant. Analysis of covariance was used for calculating the least-squares means of dependent variables using the SAS procedure PROC GLM. Covariates were age, ethnicity, and energy intake. Because multiple comparisons were done in the post hoc analysis, the Bonferroni correction was used to decrease the probability of a type I error; the effective probability level was <0.0125 .

RESULTS

Demographics

Demographic and BMI data by milk and sweetened beverage consumption pattern groups are shown in Table 1. The low milk/high sweetened beverages and the high milk/low sweetened beverages each comprised 27.9% of the population; and the low milk/low sweetened beverages and high milk/high sweetened beverages comprised 22.0% and 22.2%, respectively. The sample distribution by location and race/ethnicity was 33% Hispanic from Texas, 43% African American from Texas and Alabama, and 24% white from Alabama. Hispanics had the highest percentages in the high milk groups and African Americans had the highest percentages in a low-milk group, regardless of sweetened beverage consumption. Mean adjusted BMI was 30.8 $\pm$ 0.3. There was no difference in mean BMI among the milk/sweetened beverage consumption groups.

Nutritional Impact of Milk and Sweetened Beverages Consumption—Energy, MAR, and Micronutrients

Energy, MAR, and micronutrient intakes by milk and sweetened beverage consumption groups are shown in Table 2. Women in the low milk/low sweetened beverage group had the lowest energy intake/basal metabolic rate (0.8), whereas women in the high milk/high sweetened beverage group had the highest (1.4) ($P<0.05$). Mean MAR scores for dietary adequacy were highest among those in the high milk/low sweetened beverage group and lowest in the low milk/high sweetened beverage group ($P<0.05$). Women in the high milk/low sweetened beverage groups had significantly higher mean intakes of vitamins A, D, and B-6; riboflavin;

thiamin; folate; phosphorus; calcium; iron; magnesium; and potassium than women in the other beverage consumption groups ($P<0.05$). Women in the low milk/high sweetened beverage group had the lowest mean intakes of vitamin B-6, thiamin, folate, phosphorus, calcium, iron, potassium, and magnesium, when compared with the other beverage consumption groups ($P<0.05$).

Nutritional Impact of Milk and Sweetened Beverage Consumption—Macronutrients

Macronutrient intakes by milk and sweetened beverage consumption groups are also shown in Table 2. Mean total fat intake in grams and percent of energy was highest in the low milk/low sweetened beverage group, and was lowest in the high milk/high sweetened beverage group. Mean saturated fatty acids and monounsaturated fatty acid intakes were lowest in the high milk/high sweetened beverage group. Dietary fiber was higher in both groups consuming low sweetened beverages than in either of the groups consuming high sweetened beverages. Intake of total and added sugars and percent of energy from total and added sugars was higher in the high sweetened beverage consumption groups when compared with the lower sweetened beverage consumption groups.

Food Group Consumption

Food group consumption data are presented in Table 3. The high milk/low sweetened beverage group consumed more servings of ready-to-eat cereals (RTEC), fruit, dark green and deep yellow vegetables, and dairy food, including fluid milk, than the other beverage consumption groups. The high milk/low sweetened beverage group also consumed more servings of whole grains, fruit, milk, and water, and fewer servings of luncheon meats than the low milk/high sweetened beverage consumption group. Both low sweetened beverage groups drank significantly more water than the two high sweetened beverage consumption groups ($P<0.05$).

DISCUSSION

This study showed that mean nutrient intake and diet adequacy was highest in the high milk/low sweetened beverage consumption group and lowest in the low milk/high sweetened beverage consumption group. The high milk/low sweetened beverage group tended to make more healthful food choices than those in the other beverage consumption groups. This finding has been unreported in populations of Head Start mothers; however, it does complement a recent study (54), which showed that adults with more healthful dietary patterns had more healthful beverage patterns. These two studies suggest that beverages, like foods, should not be studied in isolation because individuals can have different beverage consumption patterns.

This study did not show an association among milk/sweetened beverage consumption groups and weight. Historically, low-income women have been shown to be overweight in comparison with their higher-income peers (15–17); however, more recently this gap has disappeared as obesity has become more prevalent in the general population (55). Why low-income women tend to be obese is not clear, but episodic eating patterns (10,11,15), high energy-dense food choices (10,11), and disordered eating (16,10,11,56) may play a role.

Milk consumption was low, even in the high milk/low sweetened beverage group. Median intake of the population, which served as the definition of high or low milk intake, was only 0.312 servings. Eighty-one (26.6%) individuals in the low milk consumption groups reported no milk intake at all during the 3 days of diet recalls. Despite the many health advantages of consuming dairy products (57), intake by adults is low (35,36,58), and as many as 75% of women fail to meet the recommendations for calcium intake (59). Diets of low-income women (11,59,60) have been shown to be very low in dairy product consumption. There are also ethnic differences in consumption of milk; in this study, Hispanic women were more likely to be in

one of the two high milk consumption groups than either African-American or white women; conversely, African-American women were more likely to be in either of the low milk consumption groups. This supports previous findings that Hispanics have better diets when compared with other ethnic groups (61,62) and confirms other findings using data from these mothers (6). That the African-American women in the study consumed few dairy products is not surprising. Other studies have shown that these women report not consuming dairy products because of real or perceived lactose intolerance (63), lack of nutrition knowledge, the belief that they are not at risk for osteoporosis (64,65), or cultural preferences (66). African Americans had the highest percentage of participants in the low milk consumption groups, which is consistent with other studies (20,35).

This study did not show the inverse relationship of milk intake and weight that has been shown by other cross-sectional studies that looked at dairy intake (67,68), possibly because of the low number of servings of milk consumed. The risk of obesity in women consuming 3½ servings of dairy foods per day was 84% lower than in those consuming 1 serving per day (67). Others have failed to confirm this association (69,70).

The two high milk groups, especially with low sweetened beverage consumption, showed increased nutrient intake, dietary adequacy, and consumption of more nutrient-dense foods. Women in the high milk consumption groups had considerably higher intakes of several key nutrients, including calcium, magnesium, and vitamin A, which are shortfall nutrients in the diets of adults (40). Both low sweetened beverage consumption groups had higher intakes of dietary fiber, which is also a shortfall nutrient (40). That the combination of high milk and low sweetened beverage consumption contributed to a positive nutrient intake suggests that it is the overall beverage pattern that is important.

Milk is not a good source of iron or folate (57). The fact that women in the high milk/low sweetened beverage consumption group had the highest intake of these nutrients may result from their higher intake of dark green and yellow vegetables and fruit, and suggests that their overall diet is better than women in the other beverage consumption groups. Both high milk consumption groups were associated with increased consumption of RTEC, suggesting that RTEC may be a way to increase milk consumption in Head Start mothers. RTECs are usually accompanied by milk and the overall impact on diet is positive, with increased intake of protein, calcium, and vitamins A and D (71). This may be one reason why women with higher milk consumption have higher nutrient intakes.

Total number of servings of beverages was not different among the beverage consumption groups. However, women in the high milk/low sweetened beverage group tended to make more healthful beverages choices, and consumed more servings of 100% fruit juice and water than women in the other beverage consumption groups. In the low sweetened beverage groups, 47 (8%) drank no sweetened beverages and overall median consumption was <1.5 servings/day. It is difficult to make comparisons with sweetened beverage consumption of this population and other studies because of differences in age categories, the way data are presented, and how sweetened beverages are defined. However, if the servings in this study are converted to grams, the low milk/high sweetened beverage and high milk/high sweetened beverage consumed 694 g and 588 g, respectively, which are higher than the reported values for women between 20 and 39 years of age or 40 to 59 years of age for regular carbonated drinks and regular fruit drinks/ades combined (20).

This study had several limitations. The cross-sectional study design does not provide the longitudinal data needed to determine if the increased energy intake associated with increased milk and sweetened beverage consumption would lead to weight gain over time. As with any cross-sectional study, no cause-and-effect relationships can be determined. In studies using

24-hour recalls to assess dietary intake, reporting errors may have occurred. This population was relatively homogeneous for factors that typically are associated with underreporting: female (72), high BMI (73), low income (74,75), and low educational level (76). Energy intake was used as a covariate to compensate for underreporting of energy (77). A population from limited geographic areas was used; therefore, results may not be generalizable. Finally, because this was a secondary analysis of data, some information about potentially confounding information was not available; this includes physical activity levels, smoking, alcohol intake, and lactose intolerance. That these potential confounders were not included could limit the generalizability of the data.

CONCLUSIONS

In a multiethnic, low-income population of women consumption of high milk/low sweetened beverages was associated with improved nutrient intake and more healthful food choices, including fruit, dark green and deep yellow vegetables, and RTEC. Although nutrient intake and dietary adequacy were improved with increased consumption of milk, overall milk intake and MAR were generally low in these women, indicating the need for improved diet in women in all four of the beverage consumption groups. Culturally appropriate nutrition education addressing specific barriers to consuming a healthful diet, including increasing milk consumption and decreasing sweetened beverage consumption, should be designed and consumption of nutrient-dense foods should be encouraged.

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Table 1

Demographic characteristics of a multiethnic population of Head Start mothers categorized by milk and sweetened beverage consumption

	Low milk ^a /high sweetened beverage (n=170)	High milk/low sweetened beverage (n=170)	Low milk/low sweetened beverage (n=134)	High milk/high sweetened beverage (n=135)	Total (n=609)
	← n (%) →				
Race/ethnicity					
Texas Hispanic	23 (4) ^w	87 (14) ^x	27 (5) ^w	58 (10) ^x	195 (33)
African American	88 (15) ^w	56 (9) ^{xz}	84 (14) ^{wx}	32 (5) ^z	260 (43)
Alabama white	56 (9) ^w	26 (4) ^{xy}	20 (3) ^y	45 (8) ^{wx}	147 (24)
Education completed					
High school or less	94 (15)	99 (16)	66 (11)	97 (16)	356 (58)
Some college/technical	64 (10) ^w	54 (9) ^w	52 (9) ^w	30 (5) ^z	200 (33)
College graduate and higher	12 (2)	17 (3)	16 (3)	8 (1)	53 (9)
Marital status					
Married	69 (11)	88 (14)	58 (10)	67 (12)	282 (46)
Divorced/widowed/separated	39 (6)	28 (5)	23 (4)	25 (4)	115 (19)
Never married	51 (8)	39 (6)	48 (8)	31 (5)	169 (28)
Other	9 (1)	14 (2)	7 (1)	13 (2)	43 (7)
	← mean±standard error →				
Age (y)	29.2±0.2 ^w	30.3±0.4 ^{wy}	31.4±0.6 ^y	29.0±0.5 ^w	30.0±0.2
BMI ^b	31.0±0.6	30.9±0.6	31.3±0.7	29.9±0.7	30.8±0.3
Household members (n)	4.4±0.1	4.5±0.1	4.5±0.1	4.4±0.1	4.4±0.1

^aLow milk: less and equal the median (0.312) of total milk servings per day; high milk: greater than the median of total milk servings per day; low sweetened beverage: less and equal the median (1.354) of sweetened beverage servings per day; high sweetened beverage: greater than the median of total sweetened beverage servings per day.

^bBMI=body mass index (calculated as kg/m²) adjusted for age, ethnicity, and energy intake.

^{wxyz}Values with same superscript letters do not differ significantly from one another according to Bonferroni with $P<0.0125$.

Table 2

Nutritional adequacy and intake of energy and nutrients by milk and sweetened beverage consumption groups of a multiethnic population of Head Start mothers

	Low milk ^a /high sweetened beverage (n=170)	High milk/low sweetened beverage (n=170)	Low milk/low sweetened beverage (n=134)	High milk/high sweetened beverage (n=135)
← least-square mean±standard error →				
Energy (kcal) ^b	1,820±42.1 ^w	1,667±42.0 ^x	1,386±48.5 ^y	1,948±45.9 ^w
MAR ^c	58.4±0.8 ^w	71.8±0.8 ^x	62.5±1.0 ^y	64.8±0.9 ^y
Vitamin A ^d (μg)	545±55.5 ^w	1017±55 ^x	675±65.7 ^w	706±61.6 ^w
Vitamin D ^d (μg)	2.4±0.3 ^w	5.1±0.3 ^x	2.8±0.3 ^w	4.0±0.3 ^z
Vitamin C ^d (mg)	61.0±4.3 ^w	92.0±4.2 ^x	75.0±5 ^{wx}	71.0±4.7 ^w
Vitamin E ^d (α-tocopherol)	4.8±0.2 ^w	6.0±0.2 ^{xy}	6.0±0.2 ^y	4.9±0.2 ^{wx}
Vitamin B-6 ^d (mg)	1.2±0.0 ^w	1.8±0.0 ^x	1.5±0.0 ^y	1.5±0.0 ^y
Niacin ^d (mg)	16.5±0.4 ^w	19.5±0.4 ^{xy}	18.2±0.5 ^y	17.8±0.4 ^{wx}
Riboflavin ^d (mg)	1.2±0.0 ^w	2.0±0.0 ^x	1.0±0.0 ^y	1.6±0.0 ^z
Thiamin ^d (mg)	1.0±0.0 ^w	1.5±0.0 ^x	1.3±0.0 ^y	1.3±0.0 ^y
Folate ^d (mg)	307±10.6 ^w	434±10.5 ^x	361±12.5 ^y	376±11.7 ^y
Phosphorus ^d (mg)	912±16.1 ^w	1,148±16.0 ^x	1,040±19.1 ^y	1,015±17.9 ^y
Sodium ^d (mg)	2,905±56.0	2,905±55.5	3,072±66.3	2,859±62.1
Calcium ^d (mg)	494±15.8 ^w	758±15.7 ^x	588±18.7 ^y	657±17.5 ^z
Iron ^d (mg)	10.7±0.3 ^w	14.4±0.3 ^x	11.8±0.3 ^y	12.5±0.3 ^y
Magnesium ^d (mg)	176±3.7 ^w	232±3.7 ^x	215±4.4 ^y	195±4.1 ^z
Potassium ^d (mg)	1,684±35.6 ^w	2,281±35.3 ^x	1,950±42.2 ^y	1,887±39.5 ^y
Zinc ^d (mg)	8.0±0.2 ^w	9.3±0.2 ^x	8.7±0.2 ^{wx}	8.9±0.2 ^x
Protein ^d (g)	62.0±1.1 ^w	70.4±1.1 ^x	67.9±1.3 ^x	62.5±1.2 ^w
Fat, total ^d (g)	65.7±1.0 ^w	66.4±1 ^w	72.0±1.2 ^y	61.5±1.1 ^z
SFA ^e (g)	22.0±0.5 ^{wz}	23.0±0.4 ^{wx}	24.0±0.5 ^{xy}	21.0±0.5 ^z
MUFA ^f (g)	25.2±0.4 ^w	25.0±0.4 ^w	28.0±0.5 ^y	22.7±0.5 ^z
PUFA ^g (g)	13.0±0.4 ^w	12.7±0.4 ^w	14.7±0.4 ^x	12.4±0.4 ^w
n-3 fatty acid (mg)	1.2±0.1 ^w	1.3±0.1 ^{wx}	1.5±0.1 ^x	1.3±0.1 ^{wx}
Trans fat (g)	4.8±0.2	4.0±0.2	5.0±0.2	4.3±0.2
% kcal fat ^b	34.0±0.5	33.8±0.5	36.0±0.6	33.0±0.6
% kcal SFA ^b	11.0±0.2	11.8±0.2	12.0±0.3	11.4±0.2
Cholesterol ^d (mg)	253±10.7 ^{wx}	281±10.6 ^w	275±12.7 ^{wx}	236±11.9 ^x
Carbohydrate ^d (g)	219±2.8 ^{wz}	210±2.7 ^w	199±3.3 ^x	229±3.1 ^z
Dietary fiber ^d (g)	11.9±0.4 ^w	16.0±0.4 ^x	15.0±0.5 ^x	13.1±0.4 ^w
Total sugars ^d (g)	110±2.4 ^w	88.9±2.4 ^x	76.2±2.8 ^y	112±2.6 ^w
% kcal sugars ^b	26.9±0.6	21.6±0.6	18.8±0.7	26±0.7
Added sugar ^d (g)	94.3±2.2 ^w	48.0±2.2 ^x	53.0±2.6 ^x	86.3±2.4 ^w
% kcal added sugars ^b	23.0±0.6	11.3±0.6	13.0±0.7	20.4±0.6

^a Low milk=less and equal the median (0.312) of total milk servings per day; high milk: greater than the median of total milk servings per day; low sweetened beverage=less and equal the median (1.354) of sweetened beverage servings per day; high sweetened beverage=greater than the median of total sweetened beverage servings per day.

^b Adjusted for age and ethnicity only.

^c MAR=mean adequacy ratios were the %Recommended Daily Allowance for each of eight nutrients (dietary fiber, vitamins A and C, folate, calcium, iron, zinc, and potassium) but truncated at 100 prior to averaging.

^d Adjusted for age, ethnicity, and energy intake.

^e SFA=saturated fatty acid.

^f MUFA=monounsaturated fatty acid.

^g PUFA=polyunsaturated fatty acid.

^{wxyz} Means with the same superscript letters do not differ significantly from one another according to Bonferroni with $P<0.0125$.

Table 3

Mean consumption of food groups^a by milk and sweetened beverage consumption groups of a multiethnic population of Head Start mothers

Food groups	Low milk ^b /high sweetened beverage (n=170)	High milk/low sweetened beverage (n=170)	Low milk/low sweetened beverage (n=134)	High milk/high sweetened beverage (n=135)
← least-square mean±standard error ^c →				
Grain ^d	5.31±0.12	5.61±0.12	5.69±0.14	5.73±0.13
Whole grains	0.89±0.11 ^w	1.30±0.10 ^x	1.23±0.13 ^{wx}	1.22±0.12 ^{wx}
Breads and pastas	4.53±0.13	4.33±0.13	4.8±0.15	4.52±0.14
Ready-to-eat cereals	0.08±0.04 ^w	0.7±0.04 ^x	0.13±0.05 ^w	0.49±0.05 ^y
Cakes, cookies, pies, and pastries	0.41±0.05	0.37±0.05	0.48±0.05	0.38±0.05
Salty snacks	0.28±0.03 ^{wx}	0.21±0.03 ^w	0.28±0.04 ^{wx}	0.34±0.04 ^x
Fruit	0.42±0.06 ^w	0.83±0.06 ^x	0.60±0.07 ^w	0.45±0.07 ^w
Vegetables ^e	2.28±0.10	2.61±0.10	2.52±0.12	2.43±0.11
Dark green and deep yellow	0.19±0.03 ^w	0.36±0.03 ^x	0.21±0.04 ^w	0.21±0.04 ^w
Tomatoes	0.45±0.04	0.52±0.04	0.57±0.05	0.58±0.05
Starchy	0.12±0.02	0.17±0.02	0.11±0.03	0.17±0.02
Legumes	0.29±0.04	0.40±0.04	0.45±0.05	0.31±0.05
Fried vegetables	0.39±0.04	0.28±0.04	0.35±0.04	0.27±0.04
Potatoes	0.36±0.03 ^w	0.24±0.03 ^{wx}	0.33±0.04 ^{wx}	0.23±0.04 ^x
Other	0.84±0.05	0.90±0.05	0.83±0.07	0.90±0.06
Dairy (includes fluid milk)	0.72±0.07 ^w	1.65±0.07 ^x	0.96±0.08 ^{wy}	1.22±0.07 ^y
Cheese	0.50±0.06	0.50±0.06	0.63±0.07	0.40±0.07
Dessert	0.09±0.02	0.12±0.02	0.14±0.03	0.08±0.03
Meat	5.01±0.18 ^w	4.86±0.18 ^{wx}	5.43±0.21 ^w	4.20±0.20 ^x
Red	1.20±0.09	1.11±0.09	1.14±0.11	1.29±0.10
Pork	0.70±0.08	0.60±0.08	0.64±0.09	0.54±0.09
Luncheon	0.82±0.07 ^{wy}	0.51±0.07 ^x	0.70±0.08 ^{xy}	0.52±0.07 ^x
Poultry	1.29±0.13	1.40±0.12	1.52±0.15	1.02±0.14
Fish	0.51±0.1	0.57±0.10	0.58±0.12	0.44±0.11
Alternatives ^f	0.48±0.07 ^{wz}	0.67±0.07 ^{wy}	0.85±0.08 ^y	0.40±0.08 ^z
Beverages	5.32±0.20	5.80±0.20	5.49±0.24	5.40±0.23
100% fruit juice	0.43±0.08 ^{wy}	1.03±0.08 ^x	0.73±0.09 ^{xy}	0.45±0.09 ^{wy}
Milk	0.13±0.04 ^w	1.02±0.04 ^x	0.19±0.04 ^w	0.74±0.04 ^y
Sweetened beverages	2.92±0.07 ^w	0.67±0.07 ^x	0.88±0.09 ^x	2.43±0.08 ^y
Noncaloric beverages	0.44±0.08 ^w	0.75±0.08 ^x	0.98±0.10 ^x	0.37±0.09 ^w
Water	1.31±0.19 ^w	2.27±0.19 ^x	2.53±0.22 ^x	1.36±0.21 ^w

^a Food servings are based on the Nutrient Data System for Research recommended serving sizes.

^b Low milk=less and equal the median (0.312) of total milk servings per day; high milk=greater than the median of total milk servings per day; low sweetened beverage=less and equal the median (1.354) of sweetened beverage servings per day; high sweetened beverage=greater than the median of total sweetened beverage servings per day.

^c Adjusted for age, ethnicity, and energy intake.

^d Individual components of the grain category will not total to the number of servings in the overall grain group because there is duplication within the groups; eg, ready-to-eat cereals that are whole grains would have been counted in whole grains and in the ready-to-eat cereal group.

^e Individual components of the vegetable category will not total to the number of servings in the overall vegetable group because there is duplication within the groups; eg, fried potatoes presented as a group here are also included in the fried vegetable group.

^f Meat alternatives include veggie burgers, tofu, and other soy products.

^{wxyz} Means with the same superscript letters do not differ significantly from one another according to Bonferroni with $P < 0.0125$.