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Sociodemographic Differences in Selected Eating Practices Among Alternative High School Students

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Abstract

Background—Students attending alternative high schools are an at-risk group of youth for poor health behaviors and obesity, however little is known about their dietary practices.

Objective—To examine associations between gender, race/ethnicity and socioeconomic status and **selected** dietary practices, that included consumption of sweetened beverages, high fat foods, and fruits and vegetables and fast food restaurant use among students attending alternative high schools (AHS).

Design—Population-based, cross-sectional study.

Subjects/setting—A convenience sample of adolescents (n=145; gender: 52% male; age: 63% <18 years; race/ethnicity: 39% white, 32% black, and 29% other/multiracial) attending six alternative high schools in the St. Paul/Minneapolis metropolitan area completed a survey. Students were participants in the Team COOL (Controlling Overweight and Obesity for Life) pilot study, a group randomized obesity prevention trial.

Statistical analyses performed—Descriptive statistics were used to describe dietary practices. Mixed model multivariate analyses were used to assess differences in dietary practices by gender, race/ethnicity and socioeconomic status.

Results—Regular soda was consumed 5-6 times per week by more than half of students. One-half of the students reported eating or drinking something from a fast food restaurant at least 3-4 times a week. Black students had the highest consumption of sweetened beverages (p=0.025), high fat foods (p=0.002) and highest frequency of fast food restaurants (p<0.025). Mean fruit/vegetable intake was 3.6 servings/day; there were no sociodemographic differences in fruit/vegetable consumption. Higher socioeconomic status was associated with a higher consumption of regular soda (p=0.027).

Conclusion—Racial/ethnic and gender differences in the consumption of regular soda, high fat foods, and fast food restaurant use among AHS students underscores the importance of implementing health promotion programs in alternative high schools.

Keywords

Sociodemographic; Diet; Alternative High School

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Introduction

Despite considerable evidence that diet is a major factor in the development of chronic disease (1,2) and organized national efforts to widely disseminate recommended dietary guidelines for a healthier lifestyle (3,4), the diets of most adolescents are low in fruits and vegetables and high in dietary fat, saturated fat, sweetened beverages and fast foods (5-7). Furthermore, unhealthy dietary habits coincide with the increase in overweight and obesity among adolescents and young adults (8,9). Among adolescents, dietary practices differ across gender, race/ethnicity, and socioeconomic status (SES) (10-12), however findings from previous studies are not always consistent. In general, consumption of total fat and sweetened beverages has been found to be highest among black and male adolescents, and consumption of fruits and vegetables has been found to be lowest among white and male adolescents (10,12). Low SES was often associated with higher consumption of fat, and sugary beverages but lower consumption of fruits and vegetables (10,12).

Almost all studies assessing the dietary practices among adolescents have targeted students attending traditional public or private high schools (10,13,14), however, not all youth are captured in these studies. Youth at risk of academic failure often attend alternative high schools (AHS), but relatively few studies have examined dietary practices of AHS students (15,16). Alternative high schools utilize a non-traditional teaching approach for students who are at risk of school failure, have behavioral problems or have been suspended or expelled from regular high schools (17). According to the Department of Education, for the 2003-2004 academic year, there were 4,788 public alternative school programs in the U.S. with an enrollment of 533,948 students (18). Among alternative high schools, roughly two-thirds (62%) of schools enroll more than 50% minorities and close to one-half enroll greater than 20% of students below the poverty line (19). Importantly, minority and low income youth are at higher risk of unhealthy dietary practices (6,20,21), experience higher rates of overweight (22) and score the lowest in leading health indicators (21) compared to non-minority high income youth. Limited information is available about the weight status of AHS students. Using the same population examined in the present study, Kubik and colleagues found that 42% of students were overweight; more than one-half of females were overweight (23). Health programming interventions focusing on improving diet and physical activity have the potential to greatly impact the weight status of AHS students.

Findings from the 1998 Alternative High School Youth Risk Behavior Surveillance Survey indicated a higher prevalence of risk behaviors, including violence-related injuries, risky sexual behavior, substance use and suicidal behaviors, and greater than 20% prevalence of multiple risk behaviors among AHS students as compared to students attending regular high schools (15). Students in both traditional and alternative high schools reported low consumption of fruits and vegetables, with only 28% of AHS students and 29% of traditional high school students consuming 5 servings of fruits and vegetables a day (15). Other dietary practices, such as consumption of sweetened beverages, high fat foods and fast food restaurant use have not been assessed in AHS students. To date, limited research has focused on understanding determinants of dietary practices among students attending AHS and interventions targeting the dietary practices of AHS students have not been conducted.

This study examined selected dietary practices of a sample of students attending alternative high schools. Dietary practices included sweetened beverage consumption, high fat food intake, intake of fruits and vegetables and fast food restaurant use. The study also assessed the association between dietary practices and demographic characteristics that included gender, race/ethnicity and SES. The findings of this study will advance knowledge regarding the dietary practices of AHS students and contribute to the development of school health

programming in the alternative school setting that supports student development of healthy eating behaviors.

Methods

Study Design

The current study utilized a cross-sectional design. Data for this study were collected as part of the Team COOL (Controlling Overweight and Obesity for Life) pilot study, an alternative school-based, multi-component diet and physical activity intervention trial to promote healthy weight loss or prevent excess weight gain among AHS students. This study utilized baseline data collected in fall 2006 prior to randomization of schools to intervention and control conditions.

School and Student Sample

A convenience sample of four urban and two suburban alternative high schools in the Minneapolis/St. Paul metropolitan area participated in the study. Across all schools, enrollment ranged from 27 to 142 students (mean: 102 students). There was a high percentage of minority students (mean=64%; range=31% to 96%) and students receiving free/low-cost lunch (mean=61%; range=40% to 96%). All students enrolled in the schools were eligible to complete a survey and have their height/weight measured. Prior to scheduled measurement, study staff visited the schools to describe the measurement procedures, invite students to participate in the study and distribute parental consent forms to students who were younger than 18 years. Trained study staff administered the measurements after collecting student assents and parental consents from those younger than 18 years. The self-administered student survey measured demographic, personal, behavioral and school-related social-environmental factors associated with dietary and physical activity practices of adolescents. Students who completed the survey and had their height and weight measured received a \$5.00 gift card. All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee.

Across the six schools, a total of 145 students participated in the baseline data collection. Due to the variable nature of student attendance in alternative high schools, the study participation rate was derived by multiplying the prior year's attendance rate with a school's 2006-2007 student enrollment (24). Using the average adjusted attendance of 68 students (range: 16 to 107), the participation rate across schools was 36% (range: 18% to 100%).

Measures

The following dependent and independent variables were examined in this study.

Dependent Variables

Regular soda, sports drinks and other sweetened beverage consumption—

Regular soda, sports drinks and other sweetened beverages (fruit drinks, lemonade or energy drinks) were assessed by asking participants to report frequency of consumption of each type of beverage over the past month. Ten response categories ranged from 'Never' to '5 or more times a day.' For each beverage, the response options were dichotomized using the median value. The following categories were created: Regular soda: 3-4 times a week and 5-6 times a week; sports drinks: less than once a week and 1-2 times a week; other sweetened beverages: 1-2 times a week and 3-4 times a week.

Fast food restaurant use—Frequency of fast food restaurant use was measured with the question, "Outside of the school day, during a normal week (including weekend days), how

many times do you eat or drink something from a fast food restaurant, like McDonald's, Taco Bell or Pizza Hut?" Six response categories ranged from 'Never' to 'More than 7 times.' Responses were dichotomized to 1-2 times and 3-4 times using the median value.

High fat food intake—A previously validated 17-item fat screener developed by Block and colleagues was used to assess high fat food intake (25). Students were asked, "Think about your eating habits over the past year. About how often do you eat each of the following foods?" Examples of high fat food items included various meats, hot dogs, fried chicken, pizza, whole milk and cheese, French fries, and doughnuts. Five response categories ranged from '1 time a month or less' to '5 or more times a week.' A fat score was created by summing the responses of each question and modeling it as a continuous variable. The score ranged from 17 to 73 (Mean score: 43.6). Higher scores indicate a higher fat intake. The Cronbach's α for the study sample was 0.87. Students whose responses were greater than 3 standard deviations (SD) from the mean were excluded from the analysis (n=2).

Fruit and vegetable intake—Intake of fruits and vegetables was assessed with a previously validated 6-item fruit and vegetable screener (26). Students were asked: "Think about your usual eating habits over the past year. About how often do you eat each of the following foods and beverages?" Fruit and beverage items included 100% fruit juice, fruits, vegetables, green salad, potatoes excluding French fries, and carrots. Six response categories ranged from 'Less than once a week' to '5 or more times a day.' Data were recorded as daily servings and modeled as a continuous variable. The Cronbach's α for the study sample was 0.85. Students whose responses were greater than 3 SDs from the mean were excluded from the analysis (n=2).

Independent Variables

Independent variables included gender, race/ethnicity and socioeconomic status (SES). Student gender was obtained from school records. Students were asked to report their race/ethnicity with the question: "Do you think of yourself as.... (You may choose more than one) American Indian or Alaskan Native, Asian (including Cambodian, Hmong, Korean, Laotian, and Vietnamese), Black or African American, Hispanic or Latino, White, and Other." To ensure adequate sample size for analyses, the categories were collapsed to White, Black and other. The 'other' racial/ethnic category included the following groups: American Indian or Alaskan Native (1%); Asian, including Cambodian, Hmong, Korean, Laotian, and Vietnamese (6%); Hispanic or Latino (9%); multi-ethnic non-Hispanic (10%); other (3%). For most students, SES was measured with the question "Do you get free/low-cost lunches at school?" (n=135). Response categories were 'Yes', 'No', and 'I don't know.' If the response was missing or 'I don't know,' the question 'Does your family get public assistance (welfare, food stamps or other assistance?)' was used (n=8). A 'Yes' response indicated lower SES and a 'No' response indicated higher SES. Student age, modeled as a continuous variable, was included in all the models to assess significance; it was calculated from students' date of birth.

Statistical Analysis

Descriptive statistics were calculated for each dependent variable. Mixed model analysis of variance was used to examine associations between students' dietary practices and demographic variables in separate analyses for each dependent variable. The school variable was included in the model as a random effect, accounting for the additional component of variance associated with a cluster sampling design where observations from students from the same schools may be correlated (27). PROC MIXED and PROC GLIMMIX procedures were utilized for continuous and categorical outcome variables, respectively. The final

multivariate models included all three independent variables and were controlled for student age. Analyses were conducted using SAS statistical software, version 9.1 (SAS Institute, Cary, NC, USA).

Results

Among students, 52% were males and 63% were younger than 18 years (Mean age: 17.26 years; range: 14.06 to 19.81 years). The racial/ethnic distribution was as follows: White 39%; Black 32%; other 29%. Sixty four percent of students were categorized as lower SES. Regular soda was consumed more than five to six times per week by more than one-half of the students (Table 1). Similarly, well over one-half of students consumed sports drinks and sweetened beverages 1-2 times a week and 3-4 times a week, respectively (Table 1). Higher SES students were almost 2.5 times more likely than lower SES students ($p=0.027$) to consume regular soda 5-6 times a week. Compared to white students, black students were 2.6 times more likely to consume sports drinks 1-2 times a week ($p=0.04$) and almost 3 times more likely to consume other sweetened beverages 3-4 times per week ($p=0.037$).

One-half of the students reported eating or drinking something from a fast food restaurant at least 3-4 times a week (Table 1). In the adjusted model, black students were greater than 3 times more likely than white students ($p=0.007$) to eat or drink something from a fast food restaurant 3-4 times a week (Table 2). Females were almost twice as likely as males to consume regular soda and to eat or drink something from a fast food restaurant with associations that approached significance.

The average intake of high fat foods was 26 times per week ($SD=12.6$). The mean fat score for all students was 43.6 ($SD=10.8$) representing an estimated fat intake of >35% of calories (Table 3). Black students consumed high fat foods more frequently than white students ($p=0.016$) (Table 4). Twenty three percent of students consumed five or more daily servings of fruits and vegetables (males: 22%; females: 26%) with an average daily intake of 3.6 servings. In the multivariate analysis, no significant differences were observed in fruit and vegetable intake by gender, race/ethnicity or SES (data not shown).

Discussion

This study examined differences in consumption of sweetened beverages, high fat foods, fruits and vegetables and fast food restaurant use by gender, race/ethnicity and SES among students attending alternative high schools. Similar to general adolescent populations, the AHS students reported high consumption of sweetened beverages, high fat foods and low consumption of fruits and vegetables (6,10,28,29). However, a higher percentage of the AHS students consumed high fat foods and reported more frequent fast food restaurant use, and a lower percentage consumed 5 daily servings of fruits and vegetables, as compared to findings from previous studies with youth in the general US population (10,29,30). In this population of AHS students, only 23% consumed five or more daily servings of fruits and vegetables as compared to 29% of students attending traditional high schools (15).

Unlike previous studies, regular soda consumption was significantly higher among higher SES than lower SES students (12). A study that examined demographic differences of dietary behaviors among 3,201 adolescents between the ages of 11 and 20 years found high consumption of sugar added beverages among youth in low SES, as it was measured by a three-category scale of family income (12). The difference in the assessment of SES between our study and other studies may have contributed to the different outcome in the association of SES and dietary practices. In this study, females reported consuming regular soda almost twice as frequently as males, contrary to most studies indicating higher soft

drink consumption among males (31,32). Although the observed association was not statistically significant at the less than 0.05 level, this finding is worthy of further investigation.

Black students had higher consumption of sports drinks and other sweetened beverages than white students, which is similar to other studies that found higher sweetened beverage consumption among black than other adolescents (12,33). There are individual and socio-economic factors characteristic of adolescents attending alternative high schools that may contribute to high consumption of sweetened beverages. According to a national study by Miehch and colleagues (20), energy from sweetened beverage consumption among adolescents was significantly associated with higher poverty and older age (15-17 years); both of these factors are common among students in the present study. Consumption of sweetened beverages among youth is of great concern. National data suggest a 123% increase in the mean consumption of soft drinks among all children ages 6-17 years between 1977 and 1998 (34). This increase in soda consumption parallels the increase in childhood overweight and obesity (8,35).

Similar to other studies, black students in our study frequented fast food restaurants more often than all other students (6,29,36-39). Also, females frequented fast food restaurants twice as often as males; other studies have found mixed results in regards to gender and fast food restaurant use (29,36,40). In a study of black adults, women and those in the youngest age group (20-39 years) reported a higher frequency of fast food restaurant use than males and participants in all other age groups (39). Since more than one-third of students in our study were older than 18 years, it is likely that they share similar behavioral patterns with young adults, including more financial independence. High fat food consumption was significantly higher among black students than white students. In addition, the black students' mean fat score of almost 50, which represents fat intake as a percent of daily calories, indicates a high fat intake of >35% of energy from fat (25,41).

Fast food consumption is strongly correlated with consumption of total fat, saturated fat, carbohydrates, and added sugars (40). While purchasing food at a fast food restaurant does not necessarily imply eating a high fat food item, according to previous findings, hamburgers and French fries top the list in terms of sales volume in fast food restaurants (42). This finding has been further supported by the significant positive association of frequency of fast food restaurant use and high fat food intake among adolescents (29,43). In a study by French and colleagues, fast food restaurant use of three days or more a week was positively associated with adolescent consumption of high fat foods and soft drinks and negatively associated with fruits and vegetables (29). In this study, more frequent fast food restaurant use and high fat food consumption among black students may point to the excess availability of fast food establishments and the limited availability of healthier foods, especially in urban, racially diverse communities (44).

A major finding that emerges from this study is that black students reported higher consumption of sweetened beverages, high fat foods and fast food restaurant use than all other students. Unhealthy dietary practices among black youth is of great concern considering the higher rates of overweight and obesity among this group, as compared to all other youth (22). Although the diets of most adolescents can be improved, our findings emphasize that minorities, in particular will greatly benefit from nutrition education and health programming that focuses on fostering a school environment that promotes availability of healthy food alternatives.

In this study, the low percentage of AHS students that consumed five or more daily servings of fruits and vegetables was similar to findings from the Youth Risk Behavior Surveillance

Survey 2005 representing adolescents in the general population (45). According to the 2005 Dietary Guidelines for Americans, 9 servings (4.5 cups) of fruits and vegetables a day are recommended for a reference 2000 calorie diet (46). Considering the 3.6 servings of fruits and vegetables consumed a day by AHS students in this study, even fewer students would meet the new dietary recommendations of fruits and vegetables. Since there were no demographic differences in the consumption of fruits and vegetables, all students would equally benefit from innovative ways to increase consumption of these foods.

The strengths and limitations of this research should be considered when interpreting the results. Strengths of this study included a diverse sample of adolescents with respect to gender, race/ethnicity and SES and the use of measures that have been previously tested in other adolescent populations. This study is one of the few studies to report dietary practices by gender, race/ethnicity and SES among alternative high school students. Even though the student participation rate was 36%, the demographic distribution of our sample closely resembled the study schools (male= 51%; black=42%, white=39%; low SES=56%). Limitations included the cross-sectional nature of the study that only considers the associations between demographic variables and dietary practices rather than a directional or causal path. Although the demographic distribution of our sample resembles national data of AHS students (15,19), it included only students in the Twin Cities area of Minnesota, thus limiting the generalizability of the findings. The six-item questionnaire used to measure fruit and vegetable consumption assesses usual intake over the past year. As compared with the 24-hour dietary recalls, the six-item questionnaire underestimated the prevalence of fruit and vegetable intake among urban adolescents, however it performed equally to the Harvard Food Frequency Questionnaire (26). Although dietary practices may differ among racial groups, non-white and non-black groups were categorized as other due to the small sample size. Finally, students who decided not to participate may differ from the ones who participated in regard to demographic factors and dietary practices.

Conclusion

The findings of this study indicated that students attending alternative high schools report many unhealthy dietary practices, with black students reporting higher consumption of sweetened beverages, high fat foods and fast food restaurant use than students of other races. Unhealthy dietary practices are strongly correlated with an increased incidence of chronic disease and overweight that are prevalent among minorities. It is essential for nutrition and health professionals to target their efforts, especially to female and minority youth, by providing innovative ways to increase intake of healthier foods and to adopt healthier lifestyles. Alternative high schools provide access to many minority and low income youth and are especially suited as a setting to implement health promotion programs that reach high risk populations of youth. Larger scale studies with alternative high school youth are needed to confirm these findings.

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Table 1
Sociodemographic characteristics of alternative high school students by beverage and fast food restaurant use ^a

	Regular Soda		Sports Drinks		Sweetened Beverages		Fast Food Restaurant Use	
	times/week ^b	n (%)	times/week ^b	n (%)	times/week ^{b, c}	n (%)	times/week ^b	n (%)
	3-4	5-6	< 1	1-2	1-2	3-4	1-2	3-4
Total	65 (45%)	79 (55%)	57 (39%)	88 (61%)	52 (36%)	92 (64%)	70 (50%)	71 (50%)
Gender	n=144		n=145		n=144		n=141	
Female	27 (42%)	42 (53%)	31 (54%)	38 (43%)	25 (48%)	44 (48%)	28 (40%)	40 (56%)
Male	38 (58%)	37 (47%)	26 (46%)	50 (57%)	27 (52%)	48 (52%)	42 (60%)	31 (44%)
Race/Ethnicity	n=144		n=145		n=144		n=141	
Black	19 (29%)	27 (34%)	16 (28%)	30 (34%)	8 (15%)	38 (41%)	16 (23%)	29 (41%)
Other	20 (31%)	21 (27%)	14 (25%)	28 (32%)	20 (38%)	22 (24%)	20 (29%)	20 (28%)
White	26 (40%)	31 (39%)	27 (47%)	30 (34%)	34 (46%)	32 (35%)	34 (49%)	22 (31%)
SES	n=142		n=143		n=142		n=139	
Higher	18 (28%)	34 (44%)	18 (32%)	34 (40%)	22 (43%)	29 (32%)	25 (36%)	27 (39%)
Lower	47 (72%)	43 (56%)	39 (68%)	52 (60%)	29 (57%)	62 (68%)	44 (64%)	43 (61%)

^a Sample size varies across models due to missing values.

^b Responses were dichotomized using a median value.

^c Sweetened beverages included kool-aid, fruit drinks, lemonade or energy drinks (i.e. Red Bull).

Table 2

Multivariate associations between sociodemographic characteristics and beverage, and fast food restaurant use^a of alternative high school students

	Regular Soda (n=142) 5-6 times/week			Sports Drinks (n=143) 1-2 times/week			Sweetened Beverages ^b (n=142) 3-4 times/week			Fast Food Restaurant Use (n=139) 3-4 times/week		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Gender												
Female	1.80	(0.89, 3.64)	0.099	0.71	(0.35, 1.47)	0.362	1.02	(0.48, 2.15)	0.945	1.99	(0.95, 4.14)	0.065
Male	1.0	(reference)		1.0	(reference)		1.0	(reference)		1.0	(reference)	
Race/Ethnicity												
Black	1.54	(0.64, 3.66)	0.323 ^c	2.67	(1.02, 6.97)	0.044 ^c	2.94	(1.06, 8.13)	0.037 ^c	3.64	(1.42, 9.34)	0.007 ^c
Other	1.01	(0.42, 2.40)	0.975	2.33	(0.93, 5.82)	0.068	0.72	(0.30, 1.73)	0.472	1.54	(0.62, 3.79)	0.343
White	1.0	(reference)		1.0	(reference)		1.0	(reference)		1.0	(reference)	
SES												
Higher	2.36	(1.10, 5.05)	0.027	1.48	(0.67, 3.25)	0.325	0.67	(0.30, 1.47)	0.318	1.57	(0.71, 3.46)	0.260
Lower	1.0	(reference)		1.0	(reference)		1.0	(reference)		1.0	(reference)	

Note: OR=Odds Ratios, CI=Confidence Interval. OR and CI are adjusted for age

^a Sample size varies across models due to missing values.

^b Sweetened beverages included kool-aid, fruit drinks, lemonade or energy drinks (like Red Bull).

^c Global F-test for race/ethnicity: Regular soft drinks p= 0.545; Sports drinks p=0.080; Sweetened beverages: p= 0.025; Fast food restaurant use: p= 0.025

Table 3
Sociodemographic characteristics of alternative high school students by high fat food and fruit and vegetable intake

High Fat Food Intake (Fat Score) *		Fruit and Vegetable Intake (Daily Servings)		
	n (%)	Mean Score (SD)	n (%)	Mean Score (SD)
Gender				
Female	68 (48%)	43.5 (10.6)	68 (48%)	3.6 (4.1)
Male	75 (53%)	43.7 (11.1)	75 (52%)	3.5 (4.2)
Race/Ethnicity				
Black	45 (31%)	48.5 (9.9)	46 (32%)	3.6 (4.5)
Other	41 (29%)	39.9(9.7)	40 (28%)	3.4 (3.4)
White	57 (40%)	42.4 (9.9)	57 (40%)	3.6 (4.3)
SES				
Higher	51 (36%)	43.8 (10.5)	50 (35%)	3.3 (3.8)
Lower	90 (64%)	43.6 (11.1)	91 (65%)	3.7 (4.4)

* Total Sample: Mean fat score=43.65 (SD 10.83); Median fat score: 43 Fat score range: 17 - 73. Score can be divided in categories representing fat intake as a percent of daily calories. A score of 15 represents high fat intake (> 35% calories) (25).

Table 4
Multivariate associations between sociodemographic characteristics and high fat food intake of alternative high school students

High Fat Food Intake Fat Score ^a (n=141)		
	LS Means (SE) ^a	p-value
Gender		
Female	43.2 (1.5)	0.613
Male	43.9 (1.4)	
Race/Ethnicity		
Black	48.2 (1.8)	0.016 ^b
Other	40.0 (1.8)	0.256
White	42.5 (1.6)	
SES		
Higher	44.5 (1.7)	0.465
Lower	43.0 (1.3)	

* Total Sample: Mean fat score=43.65 (SD 10.83); Median fat score: 43 Fat score range: 17 -73.
Score can be divided in categories representing fat intake as a percent of daily calories. A score of 15 represents high fat intake (> 35% calories) (25).

^a LS Means and standard errors are adjusted for age

^b Global F-test; p= 0.002