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School and District Wellness Councils and Availability of Low-Nutrient, Energy-Dense Vending Fare in Minnesota Middle and High Schools

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Abstract

The Child Nutrition and WIC Reauthorization Act of 2004 required school districts participating in the federal school meals program to establish by the start of the 2006–2007 school year policies that included nutrition guidelines for all foods sold on school campus during the school day and policy development involving key stakeholders. For many schools, policy development was done by wellness councils. This study examined the association between having a wellness council and availability of low-nutrient, energy-dense foods/beverages in school vending machines following enactment of the federal legislation. In 2006–2007, Minnesota middle ($n=35$) and high ($n=54$) school principals reported whether their school and district had a wellness council. Trained research staff observed foods/beverages in vending machines accessible to students. Low-nutrient, energy-dense foods/beverages (snacks >3 g fat or >200 calories/serving, and soda, fruit/sport drinks and reduced-fat/whole milk) were grouped into seven categories (eg, high-fat baked goods) and a food score was calculated. Higher scores indicated more low-nutrient, energy-dense vending fare. Multivariate linear regression, adjusted for school characteristics, was used to examine associations between scores and a three-category council variable (district-only; district and school; no council). Among schools, 53% had district-only councils, 38% district and school councils, and 9% had no council. Schools with both a district and school council had a significantly lower mean food score than schools without councils ($P=0.03$). The potential of wellness councils to impact availability of low-nutrient, energy-dense vending fare is promising. There may be an added benefit to having both a school and district council.

Intervening to effect the wellness of the school food environment is considered an essential component of the Institute of Medicine's prevention-focused action plan to decrease childhood obesity (1). Both theory and research suggest that a healthy school food environment provides meaningful physical and social support to students that enables and encourages more nutritious food choices (2–4). A well school also recognizes the benefit of engaging school staff, students, parents, and key community stakeholders in the process of creating a healthier school environment (5). Health advisory or wellness councils have long been advanced as a means for facilitating sustainable school environmental change through policy making that supports healthy lifestyle behaviors (6). The enactment of the Child Nutrition and WIC Reauthorization Act of 2004, which required school districts participating in the federal school meals program to establish by the start of the 2006–2007

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school year wellness policies that included nutrition guidelines for all foods available at school and policy development involving parents, students, school personnel, and the public moved nutrition policy and establishment of wellness councils to the forefront of many district and school agendas (7). Considering that most US public schools participate in the federal school meal program (8), the potential of this legislation to positively impact the nutritional integrity of the nation's schools is considerable.

For more than a decade, school vending machines and the mostly low-nutrient, energy-dense vending fare offered for sale to students have jeopardized the nutritional integrity of the school food environment, especially in middle and high schools (9,10). The School Health Policies and Programs Study 2006, the largest, most comprehensive assessment of school health programs nationwide, found that 62% of middle schools and 86% of high schools had one or more vending machines available for student use, and that sugar-sweetened beverages and high-fat, calorie-dense foods were among the most common items available for sale (10). Given the widespread availability of low-nutrient, energy-dense vending fare, it would be reasonable to expect that the nutrition-focused policies developed by wellness councils would include the foods and beverages sold to students in school vending machines.

The aims of the present study were to examine the prevalence, characteristics, and vending-related policy actions of wellness councils after the enactment of the Child Nutrition and WIC Reauthorization Act of 2004 and to assess the association between having a wellness council and the availability of low-nutrient, energy-dense foods/beverages in school vending machines. In addition, because the legislation only required a policy-making body at the district level, this study also examined whether availability of low-nutrient, energy-dense vending fare differed if a school had a wellness council in addition to a district-level council.

METHODS

Sample and Procedures

Data were collected as part of the Identifying Determinants of Eating and Activity study, a longitudinal measurement study of youth and their environments to assess obesity-related factors conducted in the Minneapolis/St Paul, MN, metropolitan area during 2005–2010 (11). Youth were recruited from three sources that included an existing cohort participating in the Minnesota Adolescent Community Cohort Tobacco Study (12), a Minnesota Department of Motor Vehicle listing of 14- to 17-year-olds applying for a learner's permit or driver's license, and a convenience sample of community-residing adolescents.

At the time of study enrollment, youth participants (n=349) were asked to identify the school they would attend during the 2006–2007 school year. Youths identified 143 different schools (some youths attended the same schools). District and school-level administrative staff from all schools were contacted and invited to participate in the study. For schools, study participation included the completion of self-administered surveys by the principal and coordinators of nutrition services and physical education. Study participation also included permitting trained research staff to visit the school to observe and record food and beverage items offered for sale to students from vending machines, à la carte programs, and school stores. Of the 143 schools contacted, 116 agreed to participate in the Identifying Determinants of Eating and Activity study (response rate, 81%), which consisted of 92 public schools and 24 private schools.

For the present study, the school sample was limited to public schools. Among the public school sample, 47 had a district-only wellness council, 34 schools had both a district and school council and 8 schools had no council. Three public schools with school-only councils were excluded from the analysis because of small sample size. The final school sample

(n=89) consisted of 35 middle and 54 high schools. This research used only school-level data and included vending machine observations and select items from the principal survey related to wellness councils. The principal survey was a 46-item survey that focused on school-wide policies and practices. The survey included items obtained from previously published surveys, as well as items developed specifically for this study (4,13). Content validity was confirmed by experts in community-based nutrition and school-based research. The study was approved by the University of Minnesota Human Subjects Research Committee.

Measures

Wellness Council—The principal survey included questions about wellness councils. Principals were asked, “Does your school district have a health or wellness advisory council?”, and, “Does your school have a health or wellness advisory council?” For both council types, respondents were asked how often the council met, who participated on the council (eg, principal, students) and whether the council had addressed food-related policy concerning food and beverages sold in school vending machines. For analysis purposes, a three-category wellness council variable was created as follows: district-only council; district and school council; and no council.

Food Score—Using direct observation, trained research staff collected information about package size and kilo-calories and grams of fat per package for all food and beverage items offered for sale in vending machines accessible to students. (Fiber, sodium, and other nutrient information were not collected). Accessibility was defined as one or more vending machines turned on for student use during any of the following times: before school, from the beginning of first class until the beginning of the first lunch period, during lunch, from the end of the last lunch period until end of school day; and after school. Data collection occurred on 1 nonrandomly selected school day during the 2006–2007 school year.

For the current study, low-nutrient, energy-dense foods and beverages were defined as snacks containing >3 g fat per serving or >200 calories per serving and soft drinks (regular and diet), fruit drinks that were not 100% fruit juice, sport drinks, and reduced-fat or whole milk (plain or flavored). These criteria were consistent with the School Health Policies and Programs Study 2006 definition of low-nutrient density foods and beverages as items that “provide calories primarily through fats or added sugars and have minimal amounts of vitamins and minerals” (10,13). For the current study and similar to the School Health Policies and Programs Study 2006, each low-nutrient, energy-dense food and beverage were grouped into one of the following categories: chocolate; other kinds of candy; crackers, cakes, pastries, or other baked goods not low in fat; salty snacks not low in fat; reduced-fat or whole milk (plain or flavored); soda pop (regular and diet) or fruit drinks that were not 100% fruit juice; and sport drinks (10,13). Two categories from the School Health Policies and Programs Study 2006, water ices/frozen slushes that do not contain juice and ice cream/frozen yogurts not low in fat were excluded from the analysis as only one and two schools, respectively, offered these items.

For analysis purposes, a food score (range=0 to 7) was calculated for each school based on the number of categories of low-nutrient, energy-dense vending items offered. Schools without vending machines (n=5) and schools with vending machines that sold only items considered healthy, such as water and 100% fruit juice (n=6) received a score of 0. Higher scores indicated more low-nutrient, energy-dense vending fare. Among the school sample (n=89), the Spearman correlation between the mean number of low-nutrient, energy-dense food/beverage items and the food score was 0.84 ($P<0.001$).

School Demographics—The following school demographic characteristics were assessed: school type (middle vs high schools), location (urban vs suburban), student enrollment (dichotomized as large vs small based on median cut point), percent of students participating in the free/reduced price school meals program, and percent of white students (assessed as a continuous variable). School demographic information was obtained from the Minnesota Department of Education Web site, and when necessary supplemented by a school representative.

Analysis

Descriptive statistics were used to examine variables of interest. Multivariate linear regression was used to examine the association between the dependent variable (food score), assessed as a continuous variable and the independent variable (wellness council structure), modeled as a three-category variable (district-only; district and school; and no council), adjusting for school type, school size, and participation in the free/reduced price school meals program. Because of the small sample size, the significance level for the primary analysis was established ad hoc as $P \leq 0.10$. School location (urban/suburban) was excluded from the final multivariate model as it was not statistically associated with the outcome. Because the percent of white students and participation in the free/reduced price school meals program were highly correlated, only the latter was included in the multivariate analysis. Analyses were performed using SAS statistical software (version 9.1, 2003, SAS Institute, Cary, NC).

RESULTS

Most schools were high schools and located in suburban areas. The mean student enrollment was 1,385 (standard deviation=709) and about one half of schools were categorized as large schools. On average, 76% of students were white and 23% qualified for the free/reduced price school meals program. Among schools, 53% had district-only wellness councils, 38% had school and district councils, and 9% had no council (see Table 1). School councils met more often than district councils and involved more stakeholders. A similar proportion of district and school councils had policies that addressed food and beverages sold in school vending machines (see Table 2). In contrast, only 25% of schools with no wellness council had policies addressing the nutrient quality of vending machine items (data not shown).

Across all schools ($n=89$), the median number of low-nutrient, energy-dense foods/beverages was lower in schools with district and school councils (median=52) and district-only councils (median=93) than schools with no council (median=108) (see Table 3). Among schools ($n=78$) that sold low-nutrient, energy-dense vending fare, the most prevalent food categories were soda pop/fruit drinks that were not 100% juice and sport drinks, sold by 91% and 90% of schools, respectively. More than three out of four schools sold baked goods that were not low in fat and almost two thirds sold both salty snacks not low in fat and chocolate candy (data not shown).

In adjusted multivariate analysis, having a wellness council was inversely associated with the food score ($\beta=-1.6$ [district and school]; $\beta=-1.3$ [district-only]; F test=0.09). High schools had higher food scores than middle schools ($\beta=1.8$; $P<0.01$). Large schools had higher food scores than small schools ($\beta=1.0$; $P=0.05$). Participation in the free/reduced price school meals program was inversely related to the food score ($\beta=-.05$; $P<0.01$). Post hoc adjusted analysis revealed that compared to schools with no councils, the mean food score was lower in schools with both district and school councils (5.64 vs 4.04; $P=0.03$) and schools with district-only councils (5.64 vs 4.39; $P=0.08$). The food score for schools with district and school councils and district-only councils was not significantly different ($P=0.40$).

DISCUSSION

This study is among the first to assess the association between having district and school wellness councils and the availability of low-nutrient, energy-dense foods/beverages in vending machines in middle and high schools, following enactment of the Child Nutrition and WIC Reauthorization Act of 2004. Study results support an inverse association between having a wellness council and the availability of low-nutrient, energy-dense foods/beverages in school vending machines. The mean food score was significantly lower in schools with both district and school councils as compared to schools with no council ($P=0.03$). For schools with district-only councils, the mean food score was lower than schools with no councils, although the difference was not statistically significant. Only two of the eight schools with no council reported policies addressing the nutrient quality of vending machines items as compared to nearly three of every four schools with a wellness council, suggesting most councils identified vending machine fare as a policy priority during the 2006–2007 school year.

The School Health Policies and Programs Study 2006 defined a school health council as “a group that offers guidance on the development of policies or coordinates activities on health topics” (14). Similar to the current study, the School Health Policies and Programs Study 2006, which included a nationally representative sample of US schools and school districts, found that school health councils were more prevalent at the district than school level, 70% vs 40%, respectively, and district councils met less often than school councils (14). Although not required by federal legislation, findings from the current study suggest an added benefit to having a local school council in addition to a district council. For example, although a similar proportion of district and school councils reported policies addressing food and beverages sold in school vending machines, the median number of low-nutrient, energy-dense food and beverage items available in vending machines were lower in schools with both a school and district council (median=52) than schools with a district-only council (median=93). Study data suggest this added benefit may be a result of a broader representation of key stakeholders on local school councils, as well as more frequent council meetings. These factors likely contribute to improved policy implementation and oversight at the local school level, issues that have been cited as a cause for concern when assessing the outcomes of district-level policy making (15,16). Dietetics practitioners and other school health professionals are well positioned to advocate for the establishment of local school councils, as well as to contribute to the ongoing work of policy making, policy dissemination, and the monitoring and evaluation of policy-related outcomes at both the school and district level.

In the current study, vending machines that sold low-nutrient, energy-dense foods/beverages to students during the school day were present in a majority of middle and high schools after enactment of the federal legislation and in spite of a substantial, well-disseminated body of knowledge that links consumption of low-nutrient, energy-dense food and beverages to lower fruit consumption, higher total energy intake, and an increased risk for obesity (17–20). Many feel that decreasing and ideally eliminating student access to low-nutrient, energy-dense foods/beverages during the school day will have a positive impact on students' dietary practices and ultimately over-weight and obesity prevalence (16,17,21). The current study suggests that progress is being made. However, even among schools with wellness councils, low-nutrient, energy-dense foods/beverages and particularly soda pop and fruit and sport drinks remained common vending fare.

Strengths and Limitations

The current study has several strengths. Data collection occurred in fall/spring of 2006–2007, allowing assessment of the school vending machine environment in a sample of

middle and high schools during the first year of implementation of the Child Nutrition and WIC Reauthorization Act. Information on food and beverage items available for sale to students in school vending machines was collected by direct observation by trained research staff and categorization of foods was based on criteria used by the School Health Policies and Programs Study 2006 (10,13).

There are also study limitations. Schools were a convenience sample of mostly suburban schools located in one metropolitan area in the upper midwest, and attended by mostly white students who did not qualify for the free/reduced price school meals program, thus limiting generalizability. The school response rate for the primary study was good, although response bias cannot be ruled out. Social desirability may have influenced responses to the principal survey. The small sample size may have limited our ability to detect a significant association between the food score and other council structures. The type of food/beverage items observed in one cross-sectional assessment may not be representative overall of the type of items offered for sale to students throughout the school year. In addition, availability of low-nutrient, energy-dense vending items may not relate to item consumption at the individual level. Finally, the use of cross-sectional data precludes assumptions related to causality.

CONCLUSIONS

Policy is considered an important environmental strategy to address obesity among school-aged youth (22,23). Policy that targets the school food environment has the potential to improve children's diets and contribute to healthy weight outcomes today and in the future (16,21). The current study supports the potential of wellness councils and the policy-making work done by council participants to impact the availability of low-nutrient, energy-dense foods/beverages in school vending machines. However, substantial work remains to be done if the goal of eliminating low-nutrient, energy-dense vending fare is to be reached. Additional research will be needed to assess whether councils are a sustainable mechanism for promoting and monitoring meaningful school nutrition policy that results in improved dietary practices among students and ultimately contributes to a reduction in childhood obesity.

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Table 1

Characteristics of school sample (n=89), by wellness council structure, Minneapolis/St Paul, MN, 2006–2007

	All schools (n=89)	District-only (n=47)	District and school (n=34)	No council (n=8)	P value
	$\longleftrightarrow n (\%) \longleftrightarrow$				
Type					
High school	54 (61)	33 (70)	17 (50)	4 (50)	
Middle school	35 (39)	14 (30)	17 (50)	4 (50)	0.15
Location					
Urban	13 (15)	6 (13)	7 (21)	0 (0)	
Suburban	76 (85)	41 (87)	27 (79)	8 (100)	0.3
Size					
Large	45 (51)	29 (62)	15 (44)	1 (13)	0.02*
Small	44 (49)	18 (38)	19 (56)	7 (87)	
	$\longleftrightarrow mean \pm SD \longleftrightarrow$				
% White	76.3 $\pm$ 21.4	77.3 $\pm$ 22.1	75.0 $\pm$ 22.4	75.8 $\pm$ 14.2	0.89
% Free/reduced price school meals program	23.1 $\pm$ 18.7	21.1 $\pm$ 18.2	25.0 $\pm$ 20.8	22.0 $\pm$ 12.0	0.51
Student enrollment	1,385 $\pm$ 709	1,501 $\pm$ 693	1,306 $\pm$ 727	1,039 $\pm$ 636	0.17

* Statistically significant P value.

Table 2

Characteristics of district and school wellness councils^a in a sample of middle and high schools, Minneapolis/St Paul, MN, 2006–2007

	District councils (n=47)	School councils (n=34)	<i>P</i> value
Members			
Principals	30	38	0.43
Parents	17	32	0.11
Students	19	15	0.16
School nurses	23	47	0.03*
Teachers	32	53	0.06
Foodservice staff	21	38	0.09
Meeting frequency			
≥Monthly	15	44	<0.10*
SVM ^b policy			
Yes ^c	74	71	0.7

^aSchools with wellness councils at the local school-level were located in school districts that have a district-level wellness council.

^bSVM=school vending machine.

^cSchool councils categorized as “Yes” met one of the following criteria: a school-only SVM policy (n=1), a district-only SVM policy (n=11), or both a school and district SVM policy (n=12).

* Statistically significant *P* value.

Table 3

Median number of low-nutrient, energy-dense food/beverage items in schools (n=89), by food score category and council structure, Minneapolis/St Paul, MN, 2006–2007

	District-only councils	District and school councils	No council
	← median (minimum, maximum) →		
Chocolate candy	7 (0, 38)	0 (0, 57)	7 (0, 24)
Other kinds of candy	8 (0, 77)	0 (0, 52)	7 (0, 25)
Baked goods not low in fat	12 (0, 49)	7 (0, 107)	15 (0, 38)
Salty snacks not low in fat	11 (0, 49)	2 (0, 101)	8 (0, 37)
Reduced-fat or whole milk (plain or flavored)	0 (0, 37)	0 (0, 23)	0 (0, 37)
Soda pop or fruit drinks	30 (0, 102)	17 (0, 107)	28 (9, 70)
Sport drinks	10 (0, 107)	10 (0, 92)	14 (2, 24)
Total (all categories)	93 (0, 327)	52 (0, 489)	108 (11, 172)