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ORIGINAL RESEARCH

Food-related practices and beliefs of rural US elementary and middle school teachers

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ABSTRACT

Introduction: Childhood obesity disproportionately affects rural populations; therefore, promoting healthy eating among rural children is essential. Teachers are important role models for children and can influence children's eating behaviors through their own behaviors and beliefs about food. This study examined the food-related practices and beliefs of rural elementary and middle school teachers.

Methods: Data were used from the SNACZ study, a school- and community-based trial conducted in rural Oregon. Kindergarten through eighth-grade teachers ($n=87$), teaching students usually aged 5–14 years, from eight rural school districts completed a baseline survey in November 2012 concerning their classroom food practices, eating behaviors at school, beliefs about the school food environment, and nutrition knowledge. Frequencies of responses to each item were calculated.

Results: Nearly all teachers (97.6%) agreed that a healthy school food environment is important, but fewer agreed that teachers' behaviors and the foods available at school influence students' eating behaviors (71.0% and 67.0%, respectively). Nearly 86% of teachers used candy as a reward for students, while 78.2% consumed unhealthy snacks and 42.5% consumed sweetened beverages in the classroom.

Conclusions: The results suggest that most rural teachers recognize that having a healthy school food environment is important, but are less aware of factors within the school that influence students' eating behaviors – including their own eating behaviors and classroom food practices – and, perhaps for this reason, many rural teachers engage in classroom practices and behaviors that do not



promote healthy eating. Teacher training and expanded school policies that focus on teacher behavior may be needed to ensure a healthier rural school food environment.

Key words: child obesity, rural schools, school food environment, school food policy, teacher classroom practices, USA.

Introduction

Childhood overweight and obesity is a serious public health problem that disproportionately affects rural populations in the USA. A recent analysis using nationally representative data found that 35.4% of rural children aged 2–19 years were overweight (body mass index values at or above the 85th percentile for age and sex) compared with 29.3% of urban youth¹. Likewise, the rates of obesity (body mass index values at or above the 95th percentile) were higher for rural children than for their urban counterparts (18.6% vs 15.1%). Helping children to establish healthy eating behaviors is an essential component of childhood obesity prevention², and may be especially important in rural areas.

Schools have a key role to play in the development of healthy eating behaviors among children both because of their ability to reach children and the great amount of time that children spend at school each day². Research has shown that factors such as the types of food available in school cafeterias and school policies that permit or deny access to competitive foods and beverages (those that are not part of the National School Lunch Program or School Breakfast Program) are influential in shaping children's eating behaviors³⁻⁸. In recent years, significant efforts have been made to improve school food environments, including passage of the *Child Nutrition and WIC Reauthorization Act of 2004*⁹ and the *Healthy, Hunger-Free Kids Act of 2010*¹⁰. However, the primary focus of efforts to date has been on ensuring that foods and beverages available within schools are nutritious, with little attention given to other important aspects of the school food environment, including teachers' classroom food practices and role modeling behaviors.

The idea that teachers' practices and behaviors influence children's eating habits is supported by ecological models of obesity^{11,12} and social cognitive theory¹³. These theories posit that the social environment plays a role in shaping behavior, in part by providing models for behavior that is normative or acceptable. Within the school setting, teachers are important role models for children and can influence children's eating behaviors through their own actions and behaviors¹². In addition, teachers are authority figures in the classroom and have ample opportunity to share their knowledge and beliefs about food with students^{13,14}. However, little is known about teachers' behaviors, practices, and beliefs relevant to food.

To the authors' knowledge, only two studies have examined the food-related behaviors and beliefs of teachers in the USA. One of these studies was conducted in an urban setting¹⁴, and the other on an American Indian reservation¹⁵. Both studies found that the use of low-nutrient foods, especially candy, as rewards or incentives for students was a common practice among teachers, and that many teachers did not role model healthy eating behaviors at school. For example, teachers often reported purchasing or consuming sweetened beverages at school. However, these studies also found that most teachers supported limiting students' access to candy and soft drinks and believed that food advertising should not be permitted in schools.

Given that rural children experience high rates of obesity, it is important to develop a more complete understanding of the rural school food environment, including teachers' behaviors and beliefs relevant to food. Thus, the objective for the present study was to examine the classroom food practices, personal eating behaviors at school, beliefs about the school food environment, and nutrition knowledge of rural elementary and middle school teachers.



Methods

Participants and setting

The participants in this study were elementary and middle school teachers (grades K–8, students usually aged 5–14 years) from eight rural school districts in Oregon that were involved in SNACZ, an intervention trial to improve the nutritional quality of children’s snack choices by creating school and community environments that support healthy snacking. The eight school districts were located in small communities with fewer than 2000 residents each in Union and Wallowa counties, two sparsely populated agricultural counties in north-eastern Oregon. All elementary and middle school teachers who were employed in these school districts were eligible to participate in the study, a total of 102 teachers.

Study instrument

The study instrument was a modified version of the Teens Eating for Energy and Nutrition at School (TEENS) teaching staff survey¹⁴. The TEENS teaching staff survey is a 100-item closed-ended questionnaire with confirmed face validity that was designed to assess middle school teachers’ personal health and eating habits, classroom food practices, beliefs about the school food environment, and nutrition knowledge. For the present study, items pertaining to teachers’ personal health and overall eating habits (ie items not specific to the school setting) were omitted. Items pertaining to teacher demographics and years of teaching experience were also omitted to enhance confidentiality and maximize teacher participation in the survey. Five items about teacher eating behavior in the classroom ('How often do you: (a) eat high fat or high sugar snacks, like doughnuts, cookies, or candy, in the classroom?; (b) eat low fat snacks, such as fruits, vegetables, or unbuttered popcorn, in the classroom?; (c) drink sweetened beverages, such as regular soft drinks, fruit drinks, or bottled tea, in the classroom?; (d) drink sugar-free soft drinks, 100% fruit juice, unsweetened tea or coffee, or skim or low fat (1%) milk drinks in the classroom?; and (e)

drink plain water in the classroom?) and two items concerning teachers’ opinions about school policy ('Students should be allowed to bring sweetened beverages, such as soft drinks or sports drinks, to school'; 'Schools should set policies to limit the type of foods and beverages that students may bring to school') were developed based on findings from previous focus groups with a subset of teachers from the same schools¹⁶ and were added to the survey.

To ensure the additional items had acceptable face validity, they were reviewed by four experts in the areas of school nutrition and elementary education. Suggestions from the experts, such as wording changes, were incorporated into the final survey. In total, there were 59 items in the modified survey, organized into four sections: (1) teachers’ classroom food practices, (2) teachers’ eating behaviors at school, (3) teachers’ beliefs about the school food environment, and (4) teachers’ nutrition knowledge. Likert scale response categories for items pertaining to the frequency of teachers’ classroom food practices were '2 or more times a day', '1 time a day', '1–3 times per week', '2–3 times per month', '1 time or less per month', and 'never'. Response categories for items pertaining to the frequency of teachers’ eating behaviors at school were '4 or more times per week', '1–3 times per week', '2–3 times per month', '1 time or less per month', and 'never', with an additional response category, 'not available at my school', for four items pertaining to vending machine purchases. Response categories for items concerning teachers’ beliefs about the school food environment and teachers’ nutrition knowledge were 'strongly agree', 'agree', 'uncertain', 'disagree', and 'strongly disagree'.

Procedures

In November 2012, all teachers in the participating schools were sent an email invitation to complete a baseline survey using Survey Monkey, a web-based survey tool (Survey Monkey; <http://www.surveymonkey.com>). The email explained that participation was voluntary, that responses would be anonymous, and that completing the survey indicated informed consent. A \$5 gift certificate to a local food store was offered as an incentive



for participation. A reminder email was sent 13 days after the initial invitation, and the survey was closed 6 days after the reminder. The electronic survey was set up so that entered data could not be linked to individual respondents. At the request of their school principal, teachers at one school were provided with a paper copy of the survey in addition to the electronic survey and were given the option of using either format. Eight teachers chose to use the paper version. The completed paper surveys were placed in an unmarked envelope and collected by a research assistant, who entered the data into Survey Monkey.

Data analysis

The data showed limited frequency within some response categories; therefore, these categories were collapsed. For items pertaining to teachers' classroom food practices, the categories '2 or more times a day', '1 time a day', and '1–3 times per week' were collapsed into a single category, '1 or more times per week'. Similarly, for items regarding teachers' eating habits at school, the categories '4 or more times per week' and '1–3 times per week' were collapsed into '1 or more times per week', and the categories '2–3 times per month' and '1 or less per month' were collapsed into 'less than 1 time per week'. Finally, for items pertaining to teachers' beliefs about the school food environment and teachers' nutrition knowledge, the categories 'agree' and 'strongly agree' were collapsed, and 'disagree' and 'strongly disagree' were collapsed. Frequencies were then calculated for each response category using Statistical Analysis Software v9.4 (SAS; <http://www.sas.com>).

Ethics approval

This study was approved by the Oregon Health and Science University Institutional Review Board, approval number 8033.

Results

Eighty-seven teachers completed the survey, an overall response rate of 85%. Response rates by school district ranged from 64% to 100%.

Table 1 presents the frequencies of teachers' classroom food practices. Most teachers (85.9%) used candy as a reward/incentive for students. Other foods used by at least one-third teachers included low fat items, such as bagels or pretzels (41.1%), fruits and vegetables (38.9%), and doughnuts or cookies (34.9%). For the most part, teachers indicated that the use of foods as rewards/incentives occurred one or fewer times per month; however, more than 42% of teachers reported using candy at least two to three times per month. In addition, nearly 66% of teachers allowed students to eat in the classroom and almost 13% permitted students to drink soft drinks in the classroom, while about 84% reported that they praised students when they saw them eating healthier snacks or beverages.

Table 2 shows the results pertaining to teachers' eating behaviors at school. Most teachers reported drinking plain water (94.3%) and eating low fat snacks (88.4%) in the classroom. However, a substantial percentage also reported consuming high fat or high sugar snacks (78.2%) and sweetened beverages (42.5%) in the classroom, although the majority of teachers reporting these behaviors indicated that the behavior occurred less than once per week. More than half of the teachers reported that high fat or high sugar food items were not available in vending machines at their school, but that sweetened beverages were available. Purchases of sweetened beverages and high fat or high sugar foods from school vending machines were uncommon.

Table 3 presents frequencies of teachers' reported beliefs about the school food environment and nutrition knowledge. Nearly all teachers agreed that it is important to have a healthy school food environment (97.6%), that the foods students eat during the school day affect their readiness to learn (94.2%), and that student food habits affect their health as adults (97.7%). However, only 71% agreed that the eating behaviors of teachers influence the eating behaviors of students, and just over 67% agreed that food and beverage items available at school and school-sponsored functions influence student eating behaviors. Even fewer teachers agreed that it is important for schools to have a written 'school nutrition policy' that addresses food related issues,



such as food in classrooms or food selections in vending machines (62.8%); that schools should set policies to limit the type of foods and beverages that students can bring to school (57.0%); and that schools should be commercial-free areas where there is no advertising allowed (41.9%). With regard to their nutrition knowledge, all teachers disagreed with the statement, 'It is okay for students to drinks lots of soft drinks because they need extra calories to grow'. At the same time, over 45% of teachers agreed or were uncertain about statements that soft drinks are high in fat, 33% agreed or were uncertain with the statement that only fresh fruit and vegetables count towards the recommended daily servings of fruit and vegetables, and approximately 22% agreed or were uncertain with the statement that sports drinks are recommended for students who are moderately active.

Discussion

This study assessed the classroom food practices, eating behaviors at school, beliefs about the school food environment, and nutrition knowledge of elementary and middle school teachers at eight rural school districts in Oregon. The findings showed that while some of the classroom practices and behaviors of teachers were healthful, others were not. For example, a high percentage of teachers reported using foods, particularly candy, as a reward/incentive for students, although most teachers indicated that this occurred once or less per month. In addition, a considerable percentage of teachers consumed high fat and/or high sugar snack foods and beverages in the classroom. Many teachers lacked nutrition knowledge concerning key foods, such as soft drinks. Similar classroom food practices and eating behaviors have been identified among teachers in urban middle schools and American Indian elementary schools^{14,15}. This is concerning given that health promotion theories indicate that teachers are important role models and authority figures for students^{12,13}.

With regard to teachers' beliefs about the school food environment, nearly all teachers agreed that it is important to have a healthy school food environment, but nearly a third of

teachers did not believe or were uncertain that the eating behaviors of teachers and the foods and beverages available at school influence students' eating behavior. In particular, there seemed to be ambivalence or uncertainty among teachers about the importance of having policies that restricted foods or advertising in the school. For example, approximately 43% of teachers disagreed or were uncertain that schools should have policies concerning the foods students can bring to the school, while more than 58% disagreed or were uncertain that schools should be commercial-free areas. In contrast, 37% of teachers in urban middle schools¹⁴ and 19% of teachers in American Indian schools¹⁵ disagreed or were uncertain that food advertising should be allowed in schools. These findings could reflect a culture of independence and resistance to regulation that may be more prevalent in rural communities¹⁷. Indeed, previous studies have shown that schools in small towns and rural locations have significantly fewer policies that support healthy eating compared with urban/suburban schools^{18,19}.

The similarity between these findings and those reported more than a decade ago by Kubik and associates¹⁴ suggests that the food-related behaviors of teachers – in this case, teachers in rural schools – have remained relatively unchanged despite significant federal efforts to improve school food environments, including passage of the *Child Nutrition and WIC Reauthorization Act of 2004* and the *Healthy, Hunger-Free Kids Act of 2010*. Thus, regulations on school food environments may need to be expanded to include a focus on teacher practices and behaviors. Equally important – and perhaps more acceptable within rural areas – is to provide training to teachers on healthful school food environments, and how their classroom practices can shape eating behavior among students and prevent childhood obesity. Although few studies to date have involved teacher training on food-related practices and beliefs, early evidence indicates that such training is effective¹⁵. Likewise, providing teachers with resources for improving their classroom practices, such as lists of healthy school snacks and ideas for non-food rewards/incentives, may be helpful. Finally, it is important to recognize teachers and schools that make positive changes to promote child health and nutrition.



Table 1: Frequencies of teachers' reported classroom food practices in rural Oregon

Do you ...	<i>n</i>	≥1 times/week (%)	2–3 times/month (%)	≤1 time/month (%)	Never
Use candy as reward, incentive or as a special treat for students?	85	15.3	27.1	43.5	14.1
Use pizza as reward, incentive or as a special treat for students?	86	0	0	22.1	77.9
Use doughnuts or cookies as reward, incentive or as a special treat for students?	86	0	2.3	32.6	65.1
Use low fat food items, like bagels or pretzels, as reward, incentive or as a special treat for students?	85	3.5	8.2	29.4	58.8
Use fruits or vegetables as reward, incentive or as a special treat for students?	85	2.4	5.9	30.6	61.2
Use sweetened drinks, like soft drinks or fruit drinks, as reward, incentive or as a special treat for students?	80	0	0	21.3	78.8
Use bottled water, 100% fruit juice or low fat milk drinks as reward, incentive or as a special treat for students?	86	0	1.2	20.9	77.9
Give out food coupons, like Pizza Hut food coupons, as reward, incentive or as a special treat for students?	86	0	2.3	18.6	79.1
Allow students to drink soft drinks in the classroom?	86	2.3	2.3	8.1	87.2
Allow students to eat food items (including candy) in the classroom?	85	23.5	5.9	36.5	34.1
Withhold a food or beverage item from a student as punishment?	86	0	0	1.2	98.8
Praise students when you see them eating healthier foods, such as fruit, fruit juice or low fat snack items?	86	34.9	32.6	16.3	16.3

Table 2: Frequencies of teachers' reported eating behaviors at school in rural Oregon

Do you ...	<i>n</i>	≥1 times/week (%)	<1 time/week (%)	Never (%)	Not available in my school (%)
Eat the school lunch?	87	40.2	34.4	25.3	–
Eat high fat or high sugar snacks, like doughnuts, cookies, or candy, in the classroom?	87	27.6	50.6	21.8	–
Eat low fat snacks, such as fruits, vegetables, or unbuttered popcorn, in the classroom?	86	55.8	32.6	11.6	–
Drink sweetened beverages, such as regular soft drinks, fruit drinks, or bottled tea, in the classroom?	87	13.8	28.7	57.5	–
Drink sugar-free soft drinks, 100% fruit juice, unsweetened tea or coffee, or skim or low-fat (1%) milk drinks, in the classroom?	87	44.8	26.4	28.7	–
Drink plain water in the classroom?	87	87.4	6.9	5.7	–
Purchase high fat or high sugar food items, like candy, chips, or cookies from school vending machines?	85	0	3.5	36.5	60.0
Purchase low fat items, like popcorn or pretzels, from school vending machines?	85	1.2	5.9	41.2	51.8
Purchase sweetened soft drinks or fruit drinks ... from school vending machines?	85	0	8.2	58.8	32.9
Purchase 100% fruit juice, bottled water or skim or low fat (1%) milk drinks from school vending machines?	85	9.4	24.7	41.2	24.7

–, 'not available in my school' was not one of the response options for the survey item



Table 3: Frequencies of teachers' reported beliefs about the school food environment and nutrition knowledge in rural Oregon

Beliefs/nutrition knowledge	n	Disagree/ strongly disagree (%)	Uncertain (%)	Agree/ strongly agree (%)
<i>Beliefs about the school food environment</i>				
The foods students eat during the school day affect their readiness to learn.	86	3.5	2.3	94.2
Vending machines at school should offer only healthy food and beverage items.	86	11.6	7.0	81.4
Selling high fat, high sugar foods, such as candy and cookies, as part of school fund-raising is okay because it helps provide revenue for school programs and school activities.	86	26.7	33.7	39.5
Students' eating behaviors are influenced by social pressures.	86	8.1	8.1	83.7
It is important for schools to have a written 'school nutrition policy' which addresses food related issues, such as food in the classroom or food selections in vending machines.	86	16.3	20.9	62.8
High fat and high sugar foods are used as reward and incentive in the classroom because students prefer these kinds of foods.	86	37.2	18.6	44.2
Students in my school seem to eat fairly healthy diets.	86	26.8	30.2	43.0
If more healthy food and beverage items were sold at school and school-sponsored functions, students would purchase them.	86	14.0	34.9	51.1
It is important to have a healthy school food environment.	86	1.2	1.2	97.6
Parents of students are concerned about the nutritional health of their children.	85	16.5	37.6	45.9
The eating behaviors of teachers influence the eating behaviors of students.	86	16.3	12.8	71.0
Food and beverage items available at school and school sponsored functions influence student eating behaviors.	86	10.5	22.1	67.4
As a teacher, I can influence school food policy.	85	13.0	23.5	63.5
Schools give adequate attention to student nutrition.	86	22.1	16.3	61.6
Most teachers use food (including candy) as a reward or incentive for students.	85	22.4	32.9	44.7
Food habits are determined before students reach middle school.	86	9.3	15.1	75.6
The nutritional health of students should be a school priority.	86	11.6	20.9	67.4
Students should be provided the foods they want at school.	85	69.4	25.9	4.7
The school environment (ie vending machines, classroom food rules, foods students see school staff eat) affects students' food choices.	86	7.0	12.8	80.2
Students should be able to bring sweetened beverages, such as soft drinks or sports drinks, to school.	85	76.5	14.1	9.4
Nutrition education should give students the skills to make healthy food choices.	86	1.2	5.8	93.0
It doesn't make sense to offer students only healthy foods in school when they can choose to eat whatever they want outside of school.	86	72.1	14.0	14.0
Students should be able to buy soft drinks and candy at school.	86	84.9	12.8	2.3
Student food habits affect their health as adults.	86	1.2	1.2	97.7
Schools should set policies to limit the type of food and beverages that students can bring to school.	86	24.5	18.6	57.0
Schools should be commercial-free areas where there is no advertising allowed.	86	20.9	37.2	41.9
Product advertising on vending machines influences students to purchase the advertised item.	86	16.3	27.9	55.8
It is okay for schools to expect students to sell candy for fundraising purposes.	86	37.2	31.4	31.4
<i>Nutrition knowledge</i>				
Fruit drinks ...count as a fruit serving.	86	91.8	5.8	2.3
It is okay for students to drink lots of soft drinks because they need lots of extra calories to grow.	86	100.0	0	0
Sport drinks are recommended for students who are moderately active.	86	77.9	15.1	7.0
It is recommended that children and adults make half their plate fruits and vegetables.	86	7.0	11.6	81.4
It is okay for students to eat without worrying about fat because they need lots of extra calories to grow.	85	91.8	7.1	1.2
Soft drinks are high in fat.	86	54.6	12.8	32.6
Only fresh fruit and vegetables count towards the recommended daily servings of fruit and vegetables.	85	67.1	7.1	25.9
Most people who are lactose intolerant need to avoid all dairy products.	85	37.7	31.8	30.6
Students are at greater risk for developing eating disorders than they are for becoming obese.	86	59.3	31.4	9.3



The findings of this study should be considered in light of their limitations. The use of a closed-ended questionnaire precluded an in-depth understanding of teacher responses. For example, a positive response to the question, 'How often do you allow students to eat food items (including candy) in the classroom?' does not necessarily mean that the foods permitted by the teacher were unhealthy. Indeed, students in the early elementary grades often receive classroom snacks for nourishment. Also, the lack of demographic data on teachers, although intentionally not collected, precluded the ability to assess whether the practices, behaviors, and beliefs of teachers varied by characteristics such as age, years of experience, and grade taught. The data were self-reported and may be subject to recall and desirability bias. Finally, the convenience sample of teachers who participated in this study may not represent the majority of teachers employed at rural schools.

Conclusions

This study contributes to the sparse literature on food-related behaviors and beliefs of teachers and, to the authors' knowledge, is the first to focus on teachers in rural schools. The results suggest that most rural teachers recognize that a healthy school food environment is important, but have less recognition or understanding of factors within the school that influence students' eating behaviors – including teachers' own eating behaviors and classroom food practices – and, perhaps for this reason, many rural teachers engage in practices and behaviors that do not promote healthy eating. Further research is needed to better understand teacher practices and the influence of these practices on students' eating behavior. Additionally, studies are needed to identify approaches that would inform and support teachers in adopting practices that are health promoting.

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