School food service directors' perceptions of barriers to and strategies for improving the school food environment in the United States.

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Key Words: Food service directors; school food environment; healthy choices; barriers; facilitators.

Abstract

Objective: Despite school food service directors' (FSDs) important role in the school food environment, little research has been conducted to assess their perceptions of barriers to and strategies for improving the nutritional status of the nation's school children. The aim of this study was to examine FSDs' perceptions about the school food environment at the elementary, junior high, and high school levels.

Design: A cross sectional survey of the school FSDs in the United States was conducted. The sampling frame was a total of 5,146 FSDs included in a list maintained by the School Nutrition Association. From this list, a random sample of 508 FSDs were selected. The self report questionnaire was conducted via mail and included the following three sections: (1) social and demographic characteristics of FSDs, (2) perceived barriers to improving healthy food choices in the school food environment, and (3) perceived strategies for improving healthy food choices in the school food environment. The overall response rate was 58.5% (n = 297), of which data was analyzed for the 259 respondents responsible for directing food services at the elementary, junior high school, and high school levels.

Results: Of the 15 barriers presented, lack of nutrition education for parents (80%) and pressure to serve foods that children enjoy versus healthy foods (75%) had the greatest proportion of FSDs agreeing that they were probably or definitely barriers to improving the school food environment. Of the 16 presented, the strategies upon which there was the greatest agreement that would likely have a positive or very positive effect on the school food environment were encouraging taste testing of healthy dishes (95%) and increasing the availability of fresh fruit (87%). In general, FSDs' perceptions about barriers to and strategies for improving the school food environment were similar across the three school levels. Future policy initiatives may benefit from seeking the input of FSDs. FSDs can offer unique perspectives on where the attention should be focused in order to create healthier school environments.

Introduction

Prevalence of overweight and obesity in children and adolescents in the United States (U.S.) has risen to epidemic levels over the past 15 years (Hedley *et al.*, 2004; Narayan *et al.*, 2003; Ogden *et al.*, 2002; Strauss and Pollack, 2001). Major health consequences of childhood overweight and obesity include asthma (Belamarich *et al.*, 2000; Gilliland *et al.*, 2003), diabetes (Arslanian, 2000; Schwimmer *et al.*, 2003; Swallen *et al.*, 2003; Pontiroli, 2004; Marcovecchio *et al.*, 2005; Arif and Rohrer 2006), cardiovascular risk (Balagopal, 2006; Schiel *et al.*, 2007), sleep apnea (Ng *et al.*, 2004; Gordon *et al.*, 2006), psychosocial burdens (Eisenberg *et al.*, 2003; Strauss and Pollack, 2003, Swallen *et al.*, 2005), and adult overweight (Guo and Chumlea, 1999). Health care costs associated with pediatric obesity, especially adolescent obesity, are substantial and have increased dramatically over the years (Goodman *et al.*, 2003). Understanding the many causes linked to childhood overweight and obesity are many and complex. One factor that has come under scrutiny is the nutrition provided to children in schools.

The National School Lunch Program follows the U.S. Department of Agriculture (USDA) guidelines; however, decisions about what specific foods to serve and how they are prepared are made locally (USDA, n.d). These guidelines are for school meals, but do not apply to foods sold in school stores and vending machines, or to a la carte items in the school cafeteria. The Institute of Medicine (IOM) recently issued recommendations for the availability, sale, content, and consumption of these foods and beverages offered in competition with federally-reimbursable meals and snacks (IOM Report, 2007).

An important, and often neglected, audience to consider in conceptualizing and implementing policies and practices related to the school food environment is FSDs. FSDs make important decisions including what foods are to be served, how foods are to be prepared, and which food service personnel to hire. It is hypothesized FSDs have unique perspectives on the barriers to improving nutrition in schools, as well as potential solutions.

A recent search of published literature revealed that little research has been conducted to assess school FSDs' perceptions about barriers to and strategies for improving the nutritional status of the nation's school children. The aim of this study was to examine FSDs' perceptions about the school food environment at the elementary, junior high, and high school levels.

Methods

The design for this study was cross sectional. Responses represent FSDs' reports on a single survey instrument. The target population for the study was the nation's school FSDs. The sampling frame was a total of 5,146 FSDs included in a list maintained by the School Nutrition Association. From this list, a random sample of 508 was selected using an on-line random number generator called the Research Randomizer (http://www.randomizer.org/). This proposal was approved by the Human Subjects Committee at the State University of New York at Oswego.

The self report questionnaire included the following three sections: (1) social and demographic characteristics of the FSDs, (2) perceived barriers to improving healthy food choices in the school food environment, and (3) perceived strategies for improving healthy food choices in the school food environment. The cover letter accompanying the survey instrument outlined the purpose of the study, explained how the respondents were selected, promised that individual responses would be kept confidential, and encouraged the respondent to complete the survey and return it in the pre-addressed stamped envelope. After the initial mailing, follow up mailings were sent to non-respondents approximately three and six weeks later. The survey was conducted in the spring of 2006.

Social and Demographic Variables

The following social and demographic variables were assessed: gender, education level, whether or not FSDs had a credential as a registered dietitian or dietetic technician, the number of years worked as a FSD (total and at current location), and the geographic region where the participant was employed. Demographic data is shown in Table 1.

TABLE 1 Social and demographic characteristics of the study sample (N = 259)

	N (%)
Gender	
Female	210 (81.1)
Male	49 (18.9)
Education	
Less than High School	0
High School Graduate or GED	24 (9.3)
More than High School	235 (90.7)
Background in nutrition	
% Registered Dietitian (RD) (n=258)	51 (19.7)
% Dietetic technician (n=255)	8 (3.1)
Geographic region	
New England	29 (11.2)
Mid Atlantic	29 (11.2)
East North Central	29 (11.2)
West North Central	23 (8.9)
South Atlantic	43 (16.6)
East South Central	25 (9.7)
West South Central	18 (6.9)
Mountain	22 (8.5)
Pacific	41 (15.8)
District participates in USDA National School Lunch Program	
% yes	258 (99.6)
	MEAN (SD)
Years FSD at Current location	10.1 (7.6)
Years FSD (total)	14.5 (8.9)

Perceived barriers to improving healthy food choices

Perceptions of barriers to improving healthy food choices in the school food environment were measured using 15 items. The individual items are presented in Table 2. Responses were based on a four-point scale (definitely, probably, probably not, definitely not). Items were collapsed into two categories (definitely/probably and probably not/definitely not) for analysis.

Perceived strategies to improving healthy food choices

Perceptions of strategies to improving healthy food choices in the school food environment were measured using 16 items. The individual items are presented in Table 3. Responses were based on a five-point scale (very positive, positive, no effect, negative, very negative). Items were collapsed into three categories (very positive/positive, no effect, negative/very negative) for analysis. The data was analyzed using descriptive statistics, including frequencies and percentages, means, and standard deviations (SPSS). Only FSDs that reported being responsible for directing food service at elementary, junior high school, and elementary schools were included in the analysis.

Results

The overall response rate was 58.5% (n = 297), of which 259 were FSDs responsible for directing food service at elementary, junior high, and high schools. Social and demographic information and the distribution of respondents across the United States is shown in Table 1. The overwhelming majority of respondents (n = 210) were female. There were a similar number of respondents from most regions throughout the United States, with the exception that there were fewer respondents from West North Central, Mountain, East, and West South Central regions. A Chi-Square analysis revealed that there were no significant differences based on geographic location for those that responded to the survey, and those that did not (Chi-Square = 9.47 (8), P = 0.304). Almost the entire population (90.7%) had more than a high school education and 19.7% were registered dietitians. Virtually all of the respondents (99.6%) reported working in a district that participates in the USDA National School Lunch Program. The mean number of years that the respondents worked in food service was 14.5, with a mean of 10.1 years worked at their current location.

FSDs' perceptions about the 15 barriers presented were very similar across all three school levels, as shown in Table 2. Of the barriers presented, the items upon which there was greatest agreement that they were probably or definitely barriers to improving food choices in the school food environment were lack of nutrition education for parents (80%) and pressure to serve foods that children enjoy versus healthy foods (75%). More than one-half of FSDs agreed that nine of the barriers were probably or definitely impediments to improving the school food environment. In contrast, the items that were least perceived as barriers were using standardized recipes (~20%), lack of nutrition education for food service workers (~33%), and using government commodities in menus (~35%).

FSDs' perceptions about what effect various strategies would have on the school food environment were generally similar across all three school levels (Table 3). There were, however, some exceptions. FSDs indicated that only one strategy, more vegetarian meals, would have a more positive effect in junior high (38.3%) and high schools (47%) than in elementary schools (27.5%). Three intervention strategies were perceived as being somewhat more

TABLE 2 Percent of FSDs reporting whether or not they perceived items as barriers to improving healthy food choices in the school food environment (N = 259); 1=Definitely/Probably, 2=Probably Not/Definitely Not.

	Elementary School			Junior High School			High School		
Barrier	1	2	X(SD)	1	2	X(SD)	1	2	X (SD)
Lack of time (N = 258, 255, 254)	53.9	46.1	1.5(0.5)	54.1	45.9	1.5 (0.5)	54.7	45.3	1.5(0.5)
Lack of trained staff (N = 259, 257, 256)	37.1	62.9	1.6(0.5)	35.0	65.0	1.6(0.5)	35.5	64.5	1.6(0.5)
Lack of space (N = 258, 256,255)	43.8	56.2	1.6(0.5)	39.5	60.5	1.6(0.5)	39.6	60.4	1.6(0.5)
Lack of nutrition education (NE) for Food Service Workers (N = 259, 257, 256)	32.4	67.6	1.7(0.5)	33.1	66.9	1.7(0.5)	32.8	67.2	1.7(0.5)
Lack of NE for students (N = 259,257, 256)	68.7	31.3	1.3(0.5)	68.9	31.1	1.3(0.5)	67.6	32.4	1.3(0.5)
Lack of NE for staff (N = 257, 255, 254)	58.8	41.2	1.4(0.5)	58.4	41.6	1.4(0.5)	57.9	42.1	1.4(0.5)
Lack of NE for parents (N = 258, 255, 254)	80.6	19.4	1.2(0.4)	80.4	19.6	1.2(0.4)	79.9	20.1	1.2(0.4)
Lack of NE for community. (N = 256, 254, 252)	67.6	32.4	1.3(0.5)	67.3	32.7	1.3(0.5)	67.5	32.5	1.3(0.5)
High cost of fresh fruit (N=258, 256, 255)	63.6	36.4	1.4(0.5)	63.3	36.7	1.4(0.5)	63.5	36.5	1.4(0.5)
High cost of fresh vegetables (N = 259, 256, 254)	61.8	38.2	1.4(0.5)	62.5	37.5	1.4(0.5)	63.0	37.0	1.4(0.5)
Using government commodities in menu (N = 257, 255, 254)	34.6	65.4	1.7(0.5)	34.5	65.5	1.7(0.5)	34.3	65.7	1.7(0.5)
Using standardized recipes (N=259, 256, 256)	20.5	79.5	1.8(0.4)	21.1	78.9	1.8(0.4)	21.1	78.9	1.8(0.4)
Making food appealing to children (N = 259, 257, 256)	49.8	50.2	1.5(0.5)	47.1	52.9	1.5(0.5)	47.7	52.3	1.5(0.5)
Pressure to serve foods kids enjoy vs. healthy foods (N = 259, 257, 256)	73.7	26.3	1.3 (0.4)	75.1	24.9	1.2(0.4)	75.4	24.6	1.2(0.4)
Financial pressures compromise healthy eating (N = 257, 253, 253)	64.6	35.4	1.4(0.5)	66.8	33.2	1.3(0.5)	67.6	32.4	1.3(0.5)

Note: The 'Ns' represent the N used in the frequency calculation for Elementary school, Junior HS, and HS respectively.
Ns do not total 259 due to missing data.
SD = Standard Deviation

TABLE 3 Percent of FSDs reporting what effect the following strategies would have on improving healthy food choices in the school lunch program; 1-VERY Positive/positive, 2= No effect, 3 =Negative/VERY Negative.

	Elementary School				Junior High School				High School			
Strategy	1	2	3	X (SD)	1	2	3	X(SD)	1	2	3	X(SD)
More vegetarian meals (N = 251, 248, 247)	27.5	38.2	34.3	2.1(0.8)	38.3	33.1	28.6	1.9(0.8)	47.0	28.7	24.3	1.8(0.8)
More fresh fruit available (N = 254, 253, 253)	87.8	9.1	3.1	1.2(0.4)	86.6	9.5	4.0	1.2(0.5)	87.4	9.5	3.2	1.2(0.4)
More meals with fiber/w.grains (N = 253, 252, 251)	70.4	15.0	14.6	1.4(0.7)	70.2	14.7	15.1	1.4(0.7)	72.1	13.9	13.9	1.4(0.7)
More non-dairy sources of Ca (N = 252, 250,2 52)	66.3	23.8	9.9	1.4(0.7)	66.4	22.0	11.6	1.5(0.7)	67.2	22.0	10.8	1.4(0.7)
Restrict high cholesterol foods (N = 252, 250, 250)	54.4	16.3	29.4	1.8(0.9)	53.2	14.0	32.8	1.8(0.9)	52.4	14.0	33.6	1.8(0.9)
Restrict foods high in total fat (N = 252, 249, 249)	59.1	10.3	30.6	1.7(0.9)	56.6	8.4	34.9	1.8(0.9)	53.8	8.8	37.3	1.8(0.9)
Restrict foods high in SFAT (N = 252, 249, 248)	61.1	10.7	28.2	1.7(0.9)	58.6	9.6	31.7	1.7(0.9)	57.3	9.3	33.5	1.8(0.9)
Restrict unhealthy foods at class parties (N = 253, 251, 251)	59.3	9.5	31.2	1.7(0.9)	56.6	12.0	31.5	1.7(0.9)	55.4	15.5	29.1	1.7(0.9)
Restrict fatty foods in vending (N = 246, 247, 244)	66.3	20.3	13.4	1.5(0.7)	66.4	15.8	17.8	1.5(0.8)	67.6	13.9	18.4	1.5(0.8)
Encourage school gardens (N = 251, 250, 250)	66.5	25.1	8.4	1.4(0.6)	63.2	27.6	9.2	1.5(0.7)	58.4	31.2	10.4	1.5(0.7)
Encourage cooking classes (N = 251, 250, 250)	75.7	17.5	6.8	1.3(0.6)	78.0	15.2	6.8	1.3(0.6)	76.4	16.4	7.2	1.3(0.6)
Encourage taste testing healthy dishes (N = 253, 252, 252)	94.1	4.0	2.0	1.1(0.3)	93.3	3.6	3.2	1.1(0.4)	93.3	4.0	2.8	1.1(0.4)
Eliminate vending machines (N = 247, 248, 249)	51.0	27.5	21.5	1.7(0.8)	51.2	18.1	30.6	1.8(0.9)	50.6	12.9	36.5	1.9(0.9)
Involve students in menu planning (N = 252, 250, 250)	80.2	10.7	9.1	1.3(0.6)	81.2	9.2	9.6	1.3(0.6)	80.4	10.0	9.6	1.3(0.6)
Feature a fruit/vegetable of month (N = 253, 251, 252)	83.0	15.0	2.0	1.2(0.4)	80.1	17.1	2.8	1.2(0.5)	74.6	21.4	4.0	1.3(0.5)
Partner with local farmers (N = 248, 247, 247)	72.6	22.6	4.8	1.3(0.6)	71.3	23.9	4.9	1.3(0.6)	70.4	24.3	5.3	1.3(0.6)

SD = Standard Deviation, Ca = Calcium, SFAT = Saturated Fat, HS = High School
Note: The 'Ns' represent the N used in the frequency calculation for Elementary school, Junior HS, and HS respectively.
Ns do not total 259 due to missing data.

effective in the elementary school and junior high schools compared with the high schools. These were: restricting foods high in total fat, encouraging school gardens, and featuring a fruit/vegetable of the month. The two strategies that FSDs thought would have the most positive effect on the school food environment across all school levels were encouraging taste testing of healthy dishes (~95%) and increasing the availability of fresh fruit (~87%). Finally, it should be noted, that with only one exception (more vegetarian meals), the majority of FSDs felt that all strategies would have a positive or very positive effect on the school food environment.

Discussion

Children and adolescents consume a considerable portion of their daily dietary intake at school. School FSDs play a pivotal role in planning food for the millions of youth in the nation's schools. Because of their experience and their ability to readily observe what food children and adolescents are likely to consume, understanding FSDs opinions would be, we believe, one important step in improving the school food environment. Nevertheless, there has been relatively little research among school FSDs, especially using a national probability sample, which is generalizable to the thousands of FSDs serving the nation's schools.

Of interest, FSDs perceived the barriers to improving the school food environment as similar across the elementary, junior, and senior levels. Because these barriers impact all three levels, there will be less of a need to tailor interventions to the various grade levels. The barriers that were viewed as most important were the lack of nutrition education

for parents and the pressure to serve foods that children enjoy versus healthy foods. These findings are consistent with another study that surveyed school foodservice personnel who reported family education as the most important factor in increasing awareness of a healthy school nutrition environment (Rainville *et al.*, 2005). Our findings are also consistent with a qualitative study examining the views of seven high school dietitians and food service personnel on the school food environment (Nollen *et al.*, 2007). In this study, food service personnel felt strongly that the school food environment should be a shared responsibility between the home and the school, and wanted more involvement with parents. Also consistent with our findings, a recent study of school nurses identified a lack of parental support as a main barrier in their being able to have a more effective part in preventing and treating obese children in the school district. In this study, nurses reported counseling and referring children for outside help only when the parent made a request that this be done (Moyers *et al.*, 2005).

Another barrier that had high agreement among FSDs was the pressure to serve foods that children enjoy versus healthy foods. These findings are consistent with a study of qualitative data from food service personnel who reported food items offered were based largely on student preference, as well as the need to maintain high participation rates and minimize cost and spoilage (Nollen *et al.*, 2007).

The strategies that had the most agreement among FSDs were encouraging taste testing of healthy dishes and increasing the availability of fresh fruit. We expect that issues related to cost and minimizing spoilage often impede a FSDs decision to implement these strategies. For many schools, strategies such as these may be recommended as part of their district's wellness policy, established as a requirement of school districts that participate in federally funded school meal programs (http://www.nyc.gov/html/doh/downloads/pdf/cdp/cdp-pan-programs-schoolwellness-policy.pdf; Accessed 12/05/07). FSDs may play a key role in helping schools prioritize how best to implement a wellness policy within a school.

Conclusion

Schools are an incredibly important place to teach, encourage, and practice healthy eating. Professionals within the school are in a unique place to facilitate this. It is not clear which professionals have the potential to have the most impact, but we suspect it is highly variable. This is not a process that should be confined to schools. Learning about nutrition and practicing health habits should take place within a child's social environment and this entails creating healthy environments at home, in after school programs, at sporting events, etc. Making healthier choices appeal to children requires thoughtfulness and creativity, but is an essential component of attaining healthier practices.

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