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Middle School Stakeholder Perceptions of School Nutrition Reform Since the Healthy, Hunger-Free Kids Act of 2010

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ABSTRACT

Background: School nutrition reform continues to be of interest to many due to the potential for widespread benefits for students who eat at school. However, disparities still exist in implementing the mandates resulting from the 2010 Healthy, Hunger-Free Kids Act.

Purpose: The purpose of this study was to investigate middle school stakeholders' perspectives on the school food environment since the initiation of school nutrition reform.

Methods: Stakeholders from 14 public middle schools participated in interviews on topics related to school nutrition reform.

Results: Major themes included benefits, barriers and recommendations to improve the food environment. Reciprocal determinism provided a framework for understanding the interactions of behavior, the environment and personal factors affecting the implementation of school nutrition reform.

Discussion: Key informants felt that if schools had more flexibility and decision-making power in what school nutrition reform looked like for their particular community, the program would be more successful.

Translation to Health Education Practice: Insights from this investigation emphasize the interaction of the home and school environment, on personal and behavioral factors of students. For reform to be successful, schools must involve stakeholders, use local resources, and conduct periodic needs assessment to determine the appropriate strategies to improve the school food environment.

A AJHE Self-Study quiz is online for this article via the SHAPE America Online Institute (SAOI) <http://portal.shapeamerica.org/trn-Webinars>

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Background

School nutrition reform continues to be of interest to researchers and school health advocates due to its potential for widespread impact on students who eat at school, as well as deepening concerns that children and adolescents are not meeting current nutritional recommendations.¹ In 2010, the Healthy, Hunger-Free Kids Act (Public Law 111–296 HHFKA) set more rigorous standards for school nutrition programs. These mandates included increasing the required number of fruits, vegetables, and whole grains served every day; limits to the levels of sodium, saturated fat, and trans fat allowed in meals; prohibiting foods from being fried; limiting milk to include only fat-free and low-fat; and reducing portion sizes of meals and calorie limits according to age.² The HHFKA also required that schools adhere to strict nutrition standards (referred to as Smart Snacks standards) for competitive foods and beverages, defined as foods and beverages sold to students on school campus during the school day outside the reimbursable meal program. Finally, as part of the 2010 HHFKA, schools

were required to revise and strengthen their local school wellness policy (SWP) with stricter guidance on implementation and evaluation. School districts were required to comply with HHFKA beginning July 1, 2012.

Despite enthusiasm among many public health advocates over these historic HHFKA changes, others have voiced concerns and it remains a “hot button” issue for some stakeholders, including food service directors, legislators, local school boards and others.³ Whether school nutrition reform has resulted in better health outcomes for children has yet to be determined. Research by Kinney and colleagues⁴ found no significant association between the legislation and childhood obesity trends overall. Some research suggests that students now consume more fruit, vegetables, and whole grains and fewer starchy vegetables than before the HHFKA revisions.^{5,6}

Disparities in implementing the HHFKA mandates exist in schools across the nation, and have been explained by a lack of resources in terms of time and money, training deficits, accountability, and culture.^{7,8} In rural, small or low SES districts, key school personnel

often have numerous responsibilities and cite lack of time, resources, and knowledge as barriers to implementation of school nutrition reform.^{8,9} These districts may also face resource constraints for use of funds, limited training, and infrastructure challenges.¹⁰ Recent research suggests that utilizing stakeholders in the beginning phases of nutrition reform is essential.¹¹ Key stakeholders include school district administration, child nutrition personnel, teachers, parents and students who will consume the meals. A better understanding of these disparities is needed in order to fully implement the HHFKA mandates.

Today, most health researchers agree that using a theoretically driven framework is essential to understanding the complexities of health behavior.^{12,13} Social Cognitive Theory (SCT) is a behavioral theory that provides a structure for understanding how various dynamics can influence the success of policies and practices in a school environment. Reciprocal determinism, a key principle of SCT, emphasizes the simultaneous and dynamic interaction of personal, behavioral, and environmental factors on behavior.¹⁴ These relationships can be positive or negative. Although researchers have investigated nutrition education implementation and school policies related to school nutrition, many of these studies were quantitative in nature. Qualitative methodologies however may better elucidate the perspectives of stakeholders on the topic. Further, utilizing a theoretical lens may be necessary so local level strategies can be developed to improve the school environment and implementation of school nutrition reform.

Purpose

The purpose of this qualitative investigation was to investigate middle school stakeholders' perspectives on the school food environment since the initiation of school nutrition reform. This qualitative investigation was part of a larger study examining the relationships between school nutrition policies and practices and student diet, emotional and behavioral functioning and academic outcomes in grades 6–8.

Methods

Participants and recruitment

Fourteen public middle schools serving grades 6–8 across six school districts, from both urban and rural areas in a southern state, agreed to participate in this study. On average, the student body of these schools were comprised of 51% African American, 16% Hispanic, with 54% receiving free, reduced school

breakfast and lunch. All schools in this study had their own cafeteria, cooks, and food preparation equipment, and all food was prepared on site. Researchers recruited three faculty and/or staff from each school to participate in key informant interviews. This was accomplished by contacting the principal of each school and requesting the names of three or four faculty and/or staff that had knowledge of the nutrition-related policies, practices and procedures of that school. These individuals were then contacted and agreed to participate in the qualitative portion of the study. In total, forty-two faculty and staff completed the key informant interviews. A non-probability convenience sample was used for this study.

Procedures

The study protocol was submitted to the Institutional Review Board (IRB) at the university and approved prior to start of study. An interview guide was developed by researchers based on the aims of the research study and a thorough review of the literature. Interviews were conducted by researchers with key stakeholders individually in person and in a quiet location. Prior to the interview, all stakeholders received a list of the questions to provide them the opportunity to address concerns or ask researchers for any needed clarification.

All interviews were audiotaped for accuracy. The interview protocol included questions focusing on school nutrition reform since the 2010 HHFKA federal mandates. These questions were designed to elucidate stakeholders' perceptions of: a) awareness and attitudes toward school nutrition reform; b) benefits and barriers to school nutrition reform; c) opinions on school food quality and taste since HHFKA; d) perspectives on whether students' eating behaviors had improved; and e) recommendations to improve school-related nutrition policies and practices.

Data analysis

Interview recordings were transcribed verbatim and uploaded into the NVivo 12 data analysis software. Researchers decided on an exploratory inductive approach, whereby interview codes would be derived from the data. Using a grounded theory approach, two researchers worked together to code, compare and sort data. Grounded theory was developed by Barney Glaser and Anselm Strauss who believed that theory could emerge through qualitative data analysis.¹⁵ Grounded theory allows perspectives to emerge without the bias of an established theory influencing the emerging themes. First, researchers used open coding to develop categories emerging from the data. Next, through axial

coding, researchers eliminated or combined categories, looking for emerging themes and sub-themes. As themes emerged, selective coding allowed for systematic refinement of the data, which was compared to established behavioral theory and determined a good fit.

Results

Of the 42 participants (71% female) who were interviewed, 48% were White-non-Hispanic, 41% were African American, and 2% were Hispanic; 10% did not answer the question about their race and ethnicity. Historically, child nutrition managers were the only staff with the responsibility for knowing about the child nutrition program at each school. Their primary role is to work with the child nutrition director for the district to oversee the breakfast and lunch program at the local level and ensure that every child receives a nutritious meal that meets the requirements from the USDA. However, with the changes in federal nutrition policy came a stronger emphasis on child health in schools, including wellness policy mandates specifically targeting nutrition and physical activity. These policy changes broadened the breadth of school personnel responsible for facilitating nutrition-related policies and programs in their school. Therefore, for this study, the stakeholders who were interviewed included assistant-principals/principals (37%), child nutrition managers (21%), teachers (21%), school nurses (10%), and other staff (librarian, counselor) (12%). In terms of educational background, 45% held a master's degree, 17% held a high school diploma, 14% held an associate's degree, 12% held a doctorate, 5% held a bachelor's degree and 7% did not answer the question.

To begin the interviews, participants were asked several general questions related to school wellness policies and school nutrition reform. The purpose of these opening questions were to gauge general awareness of nutrition policies and their impact on eating habits of students. When asked if they were aware that the school

had a school wellness policy, 80% said yes they were aware, but only 29% had ever read the school wellness policy (SWP) to know what elements were contained. When participants were asked whether school nutrition reform had a positive/negative/no impact on student eating habits, a majority felt it had a positive impact (64%), while 18% felt the HHFKA changes had a negative impact and 18% felt it had no impact on student eating habits. When asked whether school food offerings had gotten better/worse/same after school nutrition reform, an overwhelming majority (86%) felt the food offerings were better. Lastly, an overwhelming majority (88%) felt that school nutrition reform was important and necessary, with many citing that children eat too much fast food, have working parents who do not cook at home and that healthy eating is not a priority to many parents.

Analysis of key informant interviews revealed three main categories of stakeholder comments: (1) benefits of school nutrition reform, (2) barriers to school nutrition reform and (3) recommendations to improve school nutrition reform success. From these categories, a number of themes and sub-themes emerged further describing participant perspectives on school nutrition reform. These main themes converged into one of three constructs of reciprocal determinism: behavior, environmental factors or personal factors, which are expanded upon in the following pages.

Benefits of school nutrition reform (Category 1)

Researchers identified eight themes as benefits of school nutrition reform. As seen in Figure 1, the framework of reciprocal determinism was used to organize the themes reported by participants as being beneficial to school nutrition reform.

Behavioral factors

Behavioral factors are actions taken by the individual, which can be health enhancing, leading to better health,

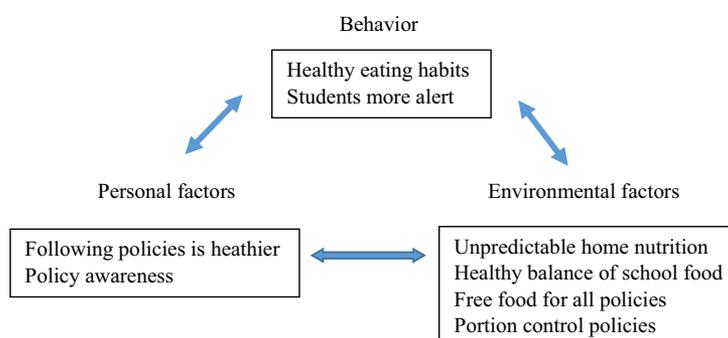


Figure 1. Applying social cognitive theory to benefits of school nutrition reform themes.

or health compromising, leading to poorer health. Key informants reported two health-enhancing behaviors beneficial to school nutrition reform.

Healthy eating habits. Stakeholders overwhelmingly believed that because of school nutrition reform, more students were developing healthy habits, which would positively contribute to their health and academic performance over time. It was important, many felt, that students learn how to eat healthy foods and make better decisions regarding food choices. Furthermore, exposure to a variety of different types of healthy foods, as well as encouragement by school staff to try new foods was viewed as essential to the development of healthy eating habits.

More alert. Another theme reported as a benefit of school nutrition reform was that participants felt that students eating healthier school meals were more alert and attentive in class. Specifically, key informants felt that students who ate breakfast at school were more alert and engaged in the classroom. They also felt that the reduction in sugar and unhealthy snacks helped students perform and behave better in the classroom. One participant noted that “I have noticed a lot that the kids are more alert when they get through eating. Because when they walk in here, some look like they never get sleep at night.”

Environmental factors

The environmental component of reciprocal determinism refers to the context in which the behavior occurs. Participants identified four sub-themes in the environment that were seen as a benefit of school nutrition reform.

Unpredictable home nutrition. Key informants believed that many students had unpredictable home situations and therefore providing healthy foods at school was vitally important. One participant summarized this theme by stating, “For many (students), this is their only healthy meal of the day. And for some of them, this might be their only meal of the day.” A majority of key informants felt that many families were low-income working parents who did not have time/money to provide healthy foods or did not understand the importance of providing healthy snacks and meals at home.

Healthy balance of school food. It was common for key informants to cite the importance of “healthy balance” in school food options. Examples of this included incorporating whole wheat grains, requiring fruits and vegetables and meeting all requirements of USDA guidelines that result in well-rounded school meals. One participant

stated, “At least we know they’re getting healthy stuff here, and a well-balanced meal. I mean, when we having baked potatoes we do have cheese, sour cream, butter and bacon bits offered.” Another participant summarized the healthy balance theme by saying, “We’re giving them more choices. I mean, you know, just take our menu, this week alone, they’ve had chicken, tacos, lemon pepper chicken, country fried steak, and then bean and beef burritos, so there’s a variety and more balance.”

Free food for all policies. Part of the HHFKA 2010 mandates included provisions for schools to provide more breakfast programs and an expansion of free and reduced meal plans for more families. This was thought by many key informants to be a positive and significant change. Essentially, more children would have access to school meals, thereby decreasing hunger throughout the day and helping students be more attentive during the school day. Again, concern over the quality and quantity of food children were likely getting at home was another reason for many participants to mention the importance of children receiving low/no cost meals during the school day.

Portion control policies. Another benefit reported by key informants was the standardization of portion sizes for breakfast and lunch foods. They felt that childhood obesity was a concern, with more children being overweight or obese over time. As a result of HHFKA, many key informants felt the emphasis on portion sizes was not only important from an educational standpoint, but also key in helping children better monitor their food intake. For example, one participant stated, “I like the standard portion sizes now. The kids are learning that, yes, I can have one hot dog and a bag of chips and I’ll be fine. Instead of just eating it because it’s there.” Another participant added, “I think it’s actually gotten better because they’re limiting the portion sizes, and that’ll help with the obesity.”

Personal factors

Personal factors include characteristics of the individual such as beliefs, attitudes and preferences. According to reciprocal determinism, these factors shape behavior and are influenced by the environment.

Following policies is healthier. The majority of participants made multiple comments related to their perception that following the HHFKA mandates resulted in healthier practices for child nutrition. Data analysis revealed 105 comments related to this theme. These comments were further divided into nine sub-themes. Table 1 provides selected quotes from each of the sub-themes. A vast majority of participants described how

Table 1. Selected quotes from following policies is healthier theme.

Categories	Selected Quotes
Meal makeup	"I know that they have to get a meat and two items of fruit or either a vegetable every day. And the lunch room manager makes sure that the children get all the required selections to make a complete meal."
Baked not fried	"... nothing is fried, everything is baked now, and I think that is good."
Smart snacks, healthier snack options	"Now when they have parties they are encouraged to do healthier snacks, the fruits, and things like that. I like that. I think we do a better job providing the nutritional equivalents that they need."
Fewer sweets	"So they've taken away a lot of the sweet snacks and sugary snacks that we had, I think that's better for the kids."
More fruit/vegetables	"Now we give them more fruits and vegetables, you know, and I think it's better."
No vending	"I think taking out the drink machines and vending machines, you know, that probably has helped a lot."
Less outside food	"There are certain policies, if they bring lunch from home, it's going to have to be in a lunch box or a bag. We don't allow them to bring McDonald's right off the street."
Less sodium/fat/sugar	"They've cut down on the salt and fat in a lot of our recipes."
Water	"... now the kids, if you offer a bottle of water, they say I'd love a bottle of water. So I think that's good."

students were now required to select certain foods, such as a meat, fruits and vegetables (meal makeup). This change in practice was viewed positively by most, with many commenting that students could no longer 'skip' the healthy foods. Many also felt that the change from frying to baking was a healthy step to reduce fat intake for everyone. Many also commented that being required to use the Smart Snacks standards was a healthy change in practice. Having fewer sweets, more fruit and vegetable offerings, and banning vending were all policies that, while difficult in the beginning, were starting to make a difference in student eating behaviors. Prohibiting outside food, limiting sodium/fat/sugar in meals served at school and allowing more opportunities to drink water were also viewed as positive practices that contribute to a healthy school environment.

Policy awareness. As a result of the HHFKA mandates, key informants felt that more awareness was now placed on the importance of eating more fruits and vegetables, eating fewer high fat/sodium foods, and consuming less fast food and processed snacks. Many cited specific features of HHFKA mandates such as eliminating fried foods, increasing fruit and vegetable offerings, and emphasizing the significance of adhering to the school

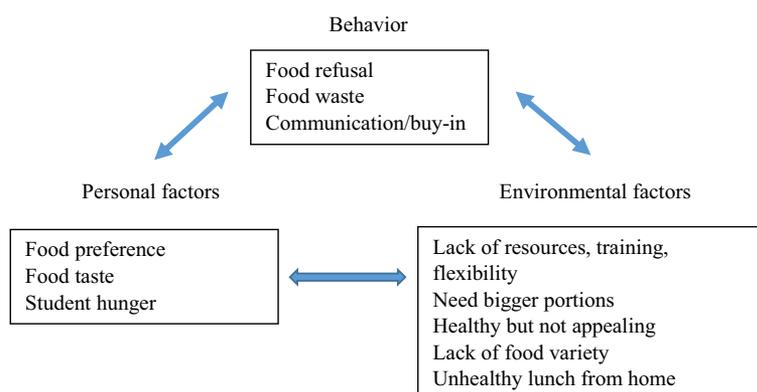
wellness policy as important standards in creating a healthier food environment at school. This was effectively summarized by one participant who said, "... the snacks we sell, they have to go by certain criteria -the Smart Snacks standards. So we don't sell anything that is not on that list. It has to be approved and it's, you know, certified on that sheet."

Barriers to school nutrition reform (Category 2)

The second major category derived from the data were the barriers to successful implementation to school nutrition reform. A total of 11 themes were identified as barriers. Constructs of reciprocal determinism were once again used as a framework for understanding the interactions of behavior, the environment and personal factors negatively affecting successful implementation of school nutrition reform, as seen in Figure 2.

Behavioral factors

Key informants reported the following three health-compromising themes that were seen as barriers to school nutrition reform. Two of the themes, food refusal and food waste, were reported as student behaviors. The

**Figure 2.** Applying social cognitive theory to barriers of school nutrition reform themes.

third theme, communication and buy-in, related to faculty, administration and parents.

Food refusal. An overwhelming number of key informants cited concerns over decreased participation of students in the child nutrition program since the initiation of the HHFKA mandates. Many reported that some students who typically purchased the school lunch did not like the changes in the food and simply would not eat it. One participant stated, “In some ways it’s worse now because kids don’t want to eat if they don’t like what you are fixing them or how it tastes.”

Food waste. A large majority of those reporting barriers described that food being thrown away was a concerning issue. Key informants indicated that students were receiving their food in the school cafeteria but instead of eating it, were throwing it in the garbage. In particular, fruit, whole wheat products and milk were noted as being wasted most often. Some did report that this issue was getting better over time, but was still a significant concern among participants.

Communication and buy-in. Some key informants felt that poor communication from the state, school district and school administration has made school nutrition reform more difficult. Some reported that there was a lack of effort from school nutrition personnel and administration in communicating what changes were occurring and why they were occurring. Many felt that this lack of transparency and awareness made it more difficult for faculty, staff and students to ‘buy-in’ to healthier changes to the school food environment.

Environmental factors

The environment can be defined in terms of the place that the behavior occurs; it can also include policies and practices that happen in the physical environment. Environmental factors negatively affecting school nutrition reform were broken down into three categories (federal and state policy, school district practice, and home environment) and five themes. The themes included: (1) lack of resources, training and flexibility in mandates, (2) need bigger portions, (3) healthy but not appealing, (4) lack of food variety, and (5) unhealthy lunches brought from home.

Lack for resources, training and flexibility in mandates – federal and state policy. Many felt that at the federal and state level, there was a lack of resources and funding to support the key mandates handed down. For example, many felt that funding is needed to better train child nutrition personnel to modify their food preparation

methods to incorporate the strict mandates while providing good tasting, quality meals. Some felt that cooking more from scratch and using less prepackaged foods would improve the quality and likability of foods offered. However, this could only occur if child nutrition personnel were better trained in these food preparation methods. Participants also felt that there needed to be more flexibility in the mandates, with less strict requirements for sodium, fats and whole wheat products. They strongly believed that if the strict mandates had more flexibility, food quality would improve and student participation would increase.

Need bigger portions – federal and state policy. Key informants also felt that although the portion sizes required by the HHFKA helped to support healthy eating behaviors, the mandates were too strict and did not account for differences in students’ ages, weight or activity levels. Participants reported that some students, particularly males, complained that they were still hungry after lunch/breakfast, and wanted snacks during the day. As one participant stated, “I know that the portions are geared toward having a standard, but when you look at what is appropriate for a sixth grader, and then what is appropriate for these eighth grade boys; some of them are bigger and taller than I am. And then you give them a portion that you would give a sixth grader . . . those students are still hungry when lunch is over.”

Healthy but not appealing – school district practice.

Many key informants reported that when the food contained less fat, sugar and salt, it was less palatable and therefore less appealing to students. Although some of the comments were general about the lack of taste, the majority of comments in this theme focused on two mandates: banning fried foods and requiring the use of whole wheat in bread products. Comments such as, “. . . why can’t we fry chicken instead of having to bake it?” and “. . . no matter what they do, baked fries do not taste good.” In addition, participants complained about whole wheat products, in particular whole wheat noodles, biscuits and pizza, and reported that numerous students refuse to eat these foods and they get thrown away. This theme is a consequence of both federal policy and school district practice. The federal mandates require that schools use whole grains to make wheat products such as noodles, biscuits and pizza. These policies have also banned the use of fryers in schools. As a result, school district child nutrition directors put together menus that all schools in the district must follow. The recipes and food preparation methods utilized by each school then influence how the food tastes.

Lack of food variety – school district practice. This theme was influenced by the menus provided by the school district. Many participants cited a lack of variety in breakfast and lunch menus. Several key informants reported having the same combination of vegetables every week and they were tired of the lack of food choices. As one participant stated, “I would like to see a better variety, better choices than what we get; it’s the same thing every week.” Some suggested offering ‘grab n go’ salads as an option, or exposure to different fruits and vegetables.

Unhealthy lunches brought from home – home environment. The last theme cited as being a barrier to school nutrition reform was unhealthy lunches brought from home. Stakeholders reported that as a result of lower participation rates of the school nutrition program by students, more students were bringing lunch from home. However, those meals were described by most as being highly processed, designer meals such as Lunchables and other prepackaged cheese and cracker snacks. Some felt that bringing these types of foods into the school takes away from the healthy messages the school is trying to promote. As one participant stated, “Parents want to save time, so they spend extra money to buy these designer meals – Lunchables and microwavable meals . . . for the students. These prepackaged meals are processed, and not as healthy.”

Personal factors of students

Data analysis revealed the following three themes related to personal factors that were viewed as barriers to school nutrition reform.

Food preference. Key informants described their impressions of what students preferred. Many comments agreed that students are not used to ‘baked’ French fries, whole wheat pasta and pizza and steamed vegetables, as these are not typically how foods are prepared at home. They described student preferences were more accustomed to fried foods, fast foods and more processed foods. Other participants reported that students did not like the baked chicken and preferred foods such as chicken nuggets and hot dogs.

Food taste. Comments derived from this theme focused more on perceptions that the food was bland, lacked seasonings, and did not taste fresh. Many reported that the food tasted poorly since the changes in policy included lower sodium, fat and sugar. One participant responded, “I get the thing on sodium and sugar. But, if they could use some type of herbs or seasoning to

compensate for the lack and sodium or sugar it would taste better and more students would eat it.”

Student hunger. Key informants reported that student hunger was a serious concern. Participants stated that a variety of the aforementioned sub-themes most likely contributed to the issue of student hunger. Some felt that because of the policies such as stricter portion control and lack of access to vending machines, students complained of being hungry during the day. Others believed student hunger was a result of refusing to eat the school lunch because of taste and preference issues and because students were not being fed properly at home.

Recommendations to improve school nutrition reform success (Category 3)

The following four themes were derived from the recommendations category: (1) more flexibility at local level, (2) more education, (3) more resources, and (4) greater awareness, communication, and buy-in. Many of the themes reported as barriers to school nutrition reform are reflected in these recommendations.

More flexibility at local level

By far, the majority of the recommendations related to a desire for more flexibility and control at the local level. Key informants felt strongly that if schools had more decision making power in what school nutrition reform looked like for their particular community, the program would be more successful. Rigorous data analysis found that the ninety comments related to this theme could be further broken down into eight sub-themes. See [Table 2](#) for a listing of sub-themes and selected quotes from the flexibility theme.

Most of the more flexibility sub-theme are self-explanatory. However, a few warrant further discussion. For example, the sub-theme ‘more diversity in foods’ included comments about the lack of variety in weekly food choices (e.g., pizza every Thursday), but also included a number of suggestions for a menu containing more culturally diverse options, depending upon the student population. One participant stated, “I think we need foods that are more culturally diverse. We have the same basic menu across the county; but if they allowed for foods that incorporated more cultures, then I think more kids would want to eat.” Another sub-theme needing further discussion is ‘alternative programs.’ This sub-theme was defined as school food options outside of the regular breakfast and lunch nutrition program. A number of participants wanted to save leftover food that would typically become food waste (e.g., apples or grapes), and offer food giveaways for hungry students

Table 2. Selected quotations of more flexibility at local level theme.

Sub-Theme	Selected Quotations
More diversity in foods	"I would like to see a better variety of food choices than what we normally get, you know, it's the same thing over and over again. Who wants to eat meat loaf every Thursday?"
Stakeholder decision making	"Why don't they ask the children what would they like to see more of? What type of fruit or vegetables would you like to have more of? They need to take into account their preferences."
Drink options	"... when we went from offering juices to water. Now they have milk, but they don't have many choices anymore."
More salad bars	"We have a lot of kids who would love to have a salad every day."
Alternative Programs	"... I don't know why we can't give the extra food from lunch away to kids at the end of the day! What a waste."
Less whole wheat	"... more white flour for some things. Regular noodles for example. The wheat noodles just don't taste good."
Food vendors	"... once we had a problem with the bananas, you know, we couldn't get them, as fresh as we like. There are some foods we just can't get from our vendors."
Portion variation	"I think they should have flexibility in portion sizes. A big eighth grader needs more food than a little sixth grader!"

during the day or over the weekend. Also, several suggested having 'food tasting' events for students during the day, to try new foods before they were introduced into the school nutrition menu. Another idea under alternative programs was to incorporate more local foods into the menu (e.g., catfish or peaches). Lastly, several key informants suggested extending the breakfast program into first period so students coming late could have a healthy breakfast.

More education

An urgent need for more education was articulated by the participants, who felt this would be essential to the success of school nutrition reform. First, many felt there was a need for more classroom nutrition education. Participants agreed that although some nutrition education is taught, there was a need for a greater focus on the importance of proper nutrition, what that looks like and awareness of the HHFKA mandates as part of an effort to reduce childhood obesity, thus improving the overall nutrition environment in schools. Second, many key informants expressed the need for additional training for child nutrition personnel (CNP). In particular, they described the need to improve CNP training to create healthy, tasty and appealing menus that were not highly processed, to have more recipes that were prepared 'from scratch' and include meals that included local in-season produce. Participants maintained this would not be possible without more substantial training and education for CNP professionals.

More resources

Overall, many felt that for school nutrition reform to be a success, more resources to support the effort are needed. Participants generally thought that schools were doing what they could to adhere to the HHFKA mandates. However, more resources were needed such as money to provide healthy snacks during the day, using more organic produce, advertising and awareness campaign money to support healthy eating, funding for family nutrition programs, and new kitchen equipment to meet the changes in food preparation methods.

Greater awareness, communication and buy-in

Key informants described the need for more broad-based communication from school administration and CNP about the HHFKA mandates which resulted in the various changes in school food offerings. Additionally, many felt that marketing campaigns and consistent messaging on the importance of school nutrition reform would increase awareness among students, teachers and families and thus help explain why the nutrition changes were happening. Increased awareness and understanding would likely improve buy-in and support from students, faculty and families.

Discussion

This study used a grounded theory approach to investigate middle school stakeholders' perspectives on the food environment since the initiation the 2010 HHFKA mandates requiring historic school nutrition reform. These data were gathered as part of a larger study examining school nutrition policies and practices related to middle school students' diet, behavior, and academic outcomes. Constructs of reciprocal determinism were used to provide context for the behavioral, environmental and personal factors affecting school nutrition reform. Interviews with stakeholders revealed complex feelings toward school nutrition reform that were not always consistent. Overall, respondents were aware of school nutrition reform and that their school had a school wellness policy. Most also felt that school nutrition reform was important and necessary; in particular due to perceptions of lack of access to healthy foods in schools and at home, and children being hungry during the school day. Importantly, there is research informing this topic since the HHFKA mandates were initiated. Several recent studies have focused on the challenges to implementing school wellness policies, which focus on nutrition, physical activity and wellness initiatives in the school.^{11,16,17} Other studies have focused on school nutrition reform from the perspective of teachers,¹⁸ parents,¹⁹ and child nutrition personnel.^{1,8,20} However, no studies have used

an inductive approach with a rich diversity of stakeholders including CNP, school administrators, teachers and school nurses to examine perspectives on school nutrition reform with a theoretical lens.

Overall, stakeholders felt that the mandates set forth by the 2010 HHFKA were philosophically an important step in improving the school food environment. A key benefit reported by participants focused on the belief that the mandates created policies that better support students' health, which is consistent with previous research.^{17,21} However, our research produced specific sub-themes elucidating which mandates were seen to be both beneficial and healthy. Surprisingly, many reported that the removal of vending machines, requiring healthier snack options, adhering to more strict requirements for sodium, sugar and fat, and increased standardization of fruit and vegetables were beneficial to child health. Another unexpected finding was the support of baking instead of frying foods, and banning outside foods from school. Previous studies support the finding that competitive foods such as vending and food brought in from outside the school competes with and is a barrier to participation in the school nutrition program.^{22,23} Overall, these findings demonstrate that many stakeholders understand the implications of school nutrition reform on the larger problem of childhood obesity and long-term health. More research in this area would help equip health advocates working in schools to change perceptions of ambivalent school leaders. Other themes consistent with the literature include the importance of 'healthy balance,'⁴ the development of health supporting eating habits,²³ and the connection between healthy, nutrient-dense foods and attention or focus in the classroom.²⁴ In fact, research suggests that middle school is an essential time when students develop eating patterns that will persist into adulthood.^{4,13}

An interesting finding in this study related to hunger and food insecurity among students. Participants reported 'student hunger' as a personal barrier to school nutrition reform. In other words, results revealed a belief that smaller portion sizes, fewer snack options, and food being healthy but not appealing resulted in more students refusing to eat the school food and therefore being hungry during the school day. However, at the same time, participants felt that many students suffered from food insecurity and therefore school nutrition reform was a benefit, since students were at a minimum receiving healthy foods in school. Research does suggest that food insecurity remains a pervasive problem in the U.S.²⁵ According to recent USDA data, 13.6% of households with children experienced food insecurity in 2019.²⁶ In the current study, stakeholders used the term 'unpredictable home nutrition' and comments

suggested broader issues in the home environment related to food beyond food insecurity. Many reported that working parents did not have time to cook so children ate fast food and prepackaged foods, and that many children were left at home to cook for themselves. Stakeholders also felt that healthy eating efforts in the schools were not being translated to the home and that parents either did not care, were not aware or did not emphasize the importance of healthy eating. These findings suggest that students would benefit from schools expanding their educational and awareness campaigns to families in order to support school nutrition reform and healthy eating environments.

Food waste and food refusal by students was of concern to many who felt this negatively impacted school nutrition reform. Most research does agree that plate waste among middle school students is high, but many studies suggest that it has not significantly changed since the adoption of the HHFKA mandates and has actually improved over time.^{1,9,27,28} Early critics of school nutrition reform cited anecdotal evidence that participation decreased after HHFKA, however this perception has not been substantiated.

A general lack of communication and buy-in from administration and other school stakeholders was identified as a barrier, consistent with current literature.^{21,29} A good strategy to improve buy-in is to share evidence with stakeholders reporting that healthy students are more alert and achieve better grades. This would encourage more support and collaboration from teachers and school administrators to encourage nutrition education in the classroom.¹⁸ Also having regular updates on wellness and nutrition-related initiatives at teacher inservices, faculty meetings, parent meetings and school board meetings would increase awareness and raise the profile of school nutrition reform.

Previous research suggests that a lack of flexibility in the HHFKA mandates is a major barrier to implementation, as was reported in this study.^{1,8} These environmental and policy constraints may exist at the federal, state or local level and can hinder the acceptance and success of reform. In this study, participants reported needing more flexibility in the federal mandates (e.g., less whole wheat, more drink options). However, the majority of the recommendations in flexibility were decisions at the district or local level. For example, using local food vendors, having more variety in the weekly menu, including salad bars, and extending the breakfast options are all district and/or local level decisions and not bound by federal mandates. These findings suggest a gap between what is required by federal mandates, and how those mandates are interpreted and implemented at the local level. A few strategies that may

reduce these barriers include having stakeholder investment early in the process; a wellness committee to oversee the implementation and evaluation of nutrition policy and programs; and more collaboration and communication between school stakeholders, community members (e.g., grocery stores, food vendors, farmers, and health organizations) and families.^{11,25}

Two other interesting findings were the barrier themes of food preferences and food taste. Research suggests that taste and flavor perception are primary drivers of food preferences early in life.³⁰ The development of food preferences begins at conception and continues over time based on a complex array of biological and environmental influences.^{31,32} Studies have shown that repeated exposure to a food increases familiarity and is a primary determinant of acceptance and eventual preferences for those foods.^{30,32} One important recommendation that should be noted from this study is the suggestion from participants to have weekly food tasting events where students are introduced to new and different fruits and vegetables. This approach, if adopted by a school, has the potential for several positive outcomes. First, the repeated exposure of new foods might increase student participation in the school nutrition program. Additionally, due to repeated exposure, food preferences for healthy foods may improve, resulting in better health overall. Lastly, students may ask for healthy options at home, which may have a positive impact on the home food environment.

Previous studies have found that a parent's choice of food served at home exerts a powerful influence on food preference and taste perception among children.^{31,32} In the current study, many participants complained that although schools work hard at promoting and maintaining a healthy food environment through policy and practice changes, many students are exposed to high fat, high sodium, and processed foods at home, negating the efforts at school. This finding provides important justification for schools to work with families to encourage and support healthy eating habits at home, which can then affect food preference at school. This is an excellent example of reciprocal determinism, whereby personal factors (taste preference) are affected by the environment (healthier food options at school and at home) which affects behavior (eating healthier foods).

Another example of the interaction between personal, behavioral and environmental factors is the recommendation for more CNP training, education and resources. Improvements in these areas could improve food taste and quality, which could decrease food refusal and food waste, and positively affect food preference for students. Studies have found that many CNP had limited knowledge of cooking whole-grains and poor understanding of the role of dry beans/legumes in a healthy diet.²⁰

Another study found that providing continuing education for CNP on whole grains improved awareness and menu placement, suggesting that increased education for CNP can improve food preparation methods.³³

There are several limitations to consider when interpreting the results of this qualitative study. First, convenience sampling was used so the results may not be generalizable to the wider population. Also, self-reported data from interviews can contain potential sources of bias, including recall error and transparency. To mitigate these biases, researchers provided a list of questions to the participants ahead of time so they could reflect on their answers and seek any additional information.

Translation to Health Education Practice

Since the passage of Healthy, Hunger-Free Kids Act of 2010, evidence suggests that there are still gaps in how federal nutrition policies are translated to local practice, given the needs and preferences of the school community. Health educators are trained to conduct needs assessments, and appropriately plan, implement and evaluate health programs to better inform policy and practice. Our findings demonstrate a need to include stakeholders in assessing needs of the priority population as well as when developing targeted strategies for school nutrition reform (The National Commission for Health Education Credentialing, Inc. (www.nchec.org) [NCHEC] sub-competency 1.1.5). For this study, constructs of reciprocal determinism were used to organize the findings of personal, behavioral and environmental influences on school nutrition reform (NCHEC sub-competency 1.3.3). From these research findings, a social-ecological lens can be used to structure the needed strategies to inform better practices for school nutrition (NCHEC sub-competencies 2.2.2 and 2.4.3). The social-ecological model (SEM) illustrates the connections between people and their environments,³⁴ depicting five levels of influence that include the individual, interpersonal, organizational, community and societal levels. Findings from this study clearly support the important connections between all levels of SEM influence in determining the success of school nutrition reform (Table 3).

As part of the HFFKA 2010 mandates, schools were required to establish wellness councils or committees to oversee school wellness initiatives focusing on nutrition and physical activity. Despite the federal mandates, it is well documented that many schools have difficulty implementing these changes.^{18,29} Totura and colleagues

Table 3. Study findings using SEM lens.

SEM Levels	Examples of SEM	Interesting Study Findings
Individual	Attitude, preference, behavior	Food waste, food preference, food taste, student hunger
Interpersonal	Friends, family, peers	Lack of communication & buy-in
Organizational	Policy, practices, norms of the school	Lack of food variety, healthy but not appealing, more flexibility at local level
Community	Collaboration between school, neighborhood, businesses	Using local community vendors & local foods, stakeholder decision making
Societal	State and federal policies	Lack of flexibility in mandates, more resources

found that only 28% of Pennsylvania schools had identified a wellness coordinator to oversee wellness efforts.³⁵ In the absence of a ‘health champion’ to advocate and lead, it becomes difficult for a school to sustain quality and makes it challenging to identify needs. A thorough needs assessment of the school community to include students would identify changes needed to improve the nutrition program (NCHEC sub-competency 5.1.3). From those results, wellness council members could plan appropriate strategies for program improvement (NCHEC sub-competency 5.2.3). Often, health educators who teach health in the school become the natural health champions to lead these efforts. In the state in which this research was conducted, there are no trained school health educators, and few if any resources or training efforts from the districts or state exist to support wellness efforts at the local level.

Understanding school stakeholders’ perspectives is key to advancing school nutrition reform in a sustainable manner. Insights from this qualitative investigation emphasize the interaction of the home and school environments on personal and behavioral factors of students. These findings also suggest that in order for school nutrition reform to be successful, schools must involve stakeholders, use local resources, and conduct periodic needs assessment to determine the appropriate strategies to improve the school food environment.

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