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Results from the 2013 Georgia Farm to Preschool Survey

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Abstract

Results from the 2013 Georgia Farm to Preschool Survey

By Memorie Nichols

Background Diets high in fruits and vegetables (FV) may decrease the risk of obesity and other chronic diseases as well as provide important nutrients needed for periods of rapid development; however, many preschool age children in the US are not meeting recommended intakes for FV.

Objective A primary goal of Farm to Preschool (F2PS) programs is to increase FV consumption in early childhood when food preferences are being formed. The purpose of this study was to assess F2PS participation, interest in, and barriers to F2PS among preschool facilities in the state of Georgia.

Design This was an online survey of all preschool facilities licensed and monitored by Bright From the Start Georgia Department of Early Care and Learning (DECAL). A link to the online survey was emailed to the contact email provided by for DECAL for each facility. Multiple follow ups were made.

Main Outcome Measures Outcomes included prevalences of previously conducted F2PS activities, challenges with activities, locally produced foods served in facilities, and interest in adding or expanding F2PS activities.

Statistical Analyses Performed Descriptive statistics were generated for frequencies, means, proportions, and standard deviations.

Results 969 facilities participated in the survey. The distribution of respondents was similar to the distribution of facilities in the target population by county and facility type. 94.2% of facilities reported conducting some type of F2PS activity within the past year, with educating children about food and nutrition being the top reported activity. Cost was the most prevalent challenge (46.8% of facilities). 86.8% of facilities reported purchasing and serving some type of locally produced food. Facilities were most interested in educating children about food, nutrition, or where food comes from (73.9%).

Conclusions Many preschool facilities in Georgia were involved in and interested in F2PS activities. However, many actions are needed to expand F2PS, with funding being of most concern. Other actions include networking events, lists of available F2PS curricula, trainings, lists of local farmers, chefs, F2PS experts, and increased connections with available resources within and outside of communities in which facilities are located.

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Introduction

Childhood obesity is an epidemic, specifically among preschool age children in the US and Georgia. Although obesity among children ages 2-5 years in the United States decreased from 12.1% in 2010 to 8.4% in 2012, obesity among preschool age children is still a major public health concern (1, 2). In 2008, 31.4% of low-income children in Georgia ages 2-5 were overweight or obese (3). Obese children are more likely to be obese adults, and obesity is a risk factor for many chronic diseases, such as heart disease, type 2 diabetes, and certain cancers (4-6). Further, food preferences and dietary behaviors formed during preschool years track into adulthood (7-9). Diets high in fruits and vegetables (FV) may decrease the risk of obesity and many chronic diseases (10-18). The current daily minimum recommendations for FV intake are 1 cup of fruit and 1 cup of vegetables for 2-3 year olds and 1 to 1 ½ cups of fruit and 1 ½ cups vegetables for 4-8 year olds (19); however, these recommendations are not being met (20-25). In 2014, Kim et al found that that 2-5 year olds' mean intake of fruit was 0.97 cups and vegetables was 0.48 cups (21). In the US in 2001-2004, 31.5% of 2-3 year olds did not meet minimum recommendations for total fruits, and 80.3% did not meet minimum recommendations for total vegetables (22). Fox et al reported that more than one-fourth of children ages 2-3 in the US did not consume a full portion of vegetables in a day in 2008 (25).

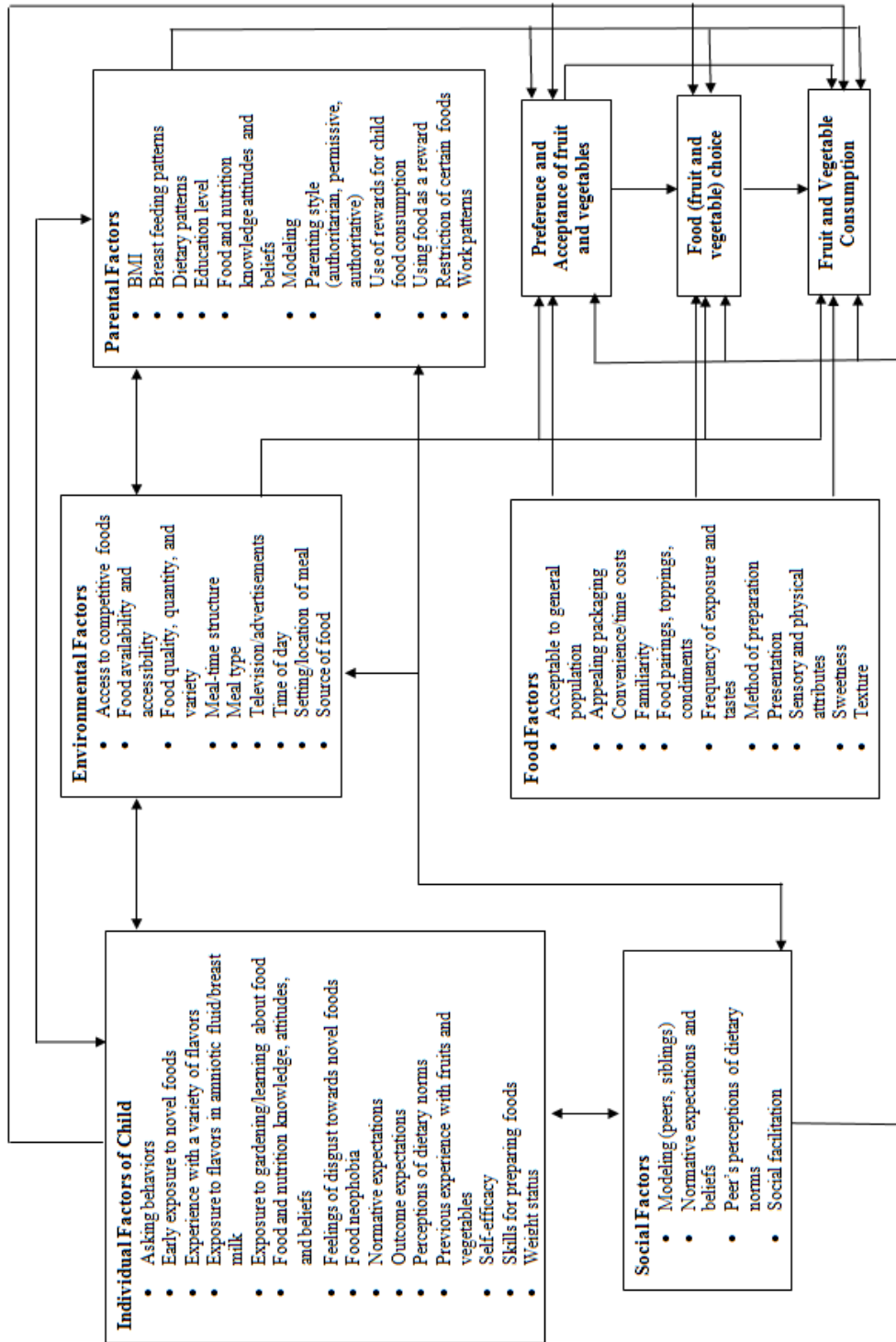
Moreover, identifying factors that promote or prohibit FV consumption helps understand how to improve the proportion of preschoolers meeting recommendations. The social cognitive theory (SCT) posits the idea that behavior, including dietary behavior, has a dynamic and reciprocal relationship with the physical environment, family behavior, peer behavior, and personal factors (26). This theory can be expanded

upon to understand the multitude of influences on children's food choices. Environmental factors that influence food consumption may include day of the week, meal type and setting, time of day, cost of food, television advertisements, source of food, and food availability and accessibility (26-32). Family or parental influences on children's dietary intake are modeling, normative expectations, knowledge, beliefs, attitudes, food preferences, work patterns, breast feeding patterns, and parenting style (26, 29, 32-40). Peer and social factors that contribute to children's dietary patterns include modeling, normative expectations, attitudes, beliefs, behaviors, perceptions of dietary norms, and cultural norms (26, 32, 41-44). Personal and demographic factors that are associated with food intake are age, race, socioeconomic status, weight status, self-efficacy, outcome expectations, perceptions of dietary norms, food neophobia, previous exposure to certain foods and flavors, including through amniotic fluid and breast milk, knowledge, attitudes, beliefs, and food and taste preferences (26-28, 31-34, 37, 40, 42, 43, 45-49). The conceptual model shown in Figure 1 shows modifiable factors within the different overarching domains described above. Although many studies have been conducted to identify factors that influence food choices and consumption among children, few have focused specifically on preschool age children and few have explored the relationships between variables.

Specific factors that play an extremely important role in FV consumption patterns are food availability and accessibility (26, 37, 43, 46, 50, 51). Food insecurity and poverty are associated with decreased availability, accessibility, and consumption of FV as well as poor general health and nutrient inadequacies among children (52-58). In 2013, USDA's Economic Research Service found that 14.3% of all households in the US

were food insecure. Of those, 5.6% were found to have very low food security (59). Further, 20.9% of US households with children under the age of 6 years were food insecure. Specifically in Georgia, 16.6% of all households were found to be food insecure, with 6.0% of those having very low food security (59). Therefore, interventions that increase availability and accessibility of FV while circumventing issues of household food insecurity may play a crucial role in increasing FV consumption among children.

Figure 1: Modifiable factors associated with fruit and vegetable consumption among children



Literature Review

Previous Interventions to Increase FV Consumption among Preschool Age Children

In 2003, Wardle et al evaluated the effectiveness of an exposure-based intervention to increase children's liking and consumption of a previously disliked vegetable among 143 children 2 to 6 years and their principal caregivers (60). Prior to intervention, all children participated in a pre-intervention taste test of six whole, raw vegetables (carrot, celery, tomato, red pepper, green pepper, and cucumber) after which a "target" vegetable was selected by a low ranking of child's preference for the vegetable. In the exposure group, parents gave their child a taste of this vegetable daily for 14 days and were given suggestions to encourage tasting. In the information group, parents were given nutritional advice and a leaflet that included suggestions for increasing children's FV consumption. The control group received no further intervention after the baseline taste test. All children participated in a post-intervention taste test at the end of the 14 days (60).

The study found that the exposure group was the only group for which increase in consumption of the target vegetable was significant ($p < 0.001$) where intake of the target vegetable increased by 4.9 grams. This study supports the evidence that repeated exposure to a previously disliked or unfamiliar vegetable increased children's liking and consumption of that vegetable (60).

In California, Farfan-Ramirez et al evaluated the Nutrition Matters! (NM!) program. NM! is an age-appropriate nutrition education program integrating nutrition, gardening, and physical activity, with the goal of increasing FV consumption as well as physical activity in children aged 3-5 years. It consisted of three modules I) Nutrition II)

From Garden to the Classroom, and III) Physical Activity, and NM! included components, such as taste tests, parent letters and recipes, story books related to lessons, classroom and outdoor gardening lessons, and age appropriate physical activities. In 2007, six sites implemented Modules I and II (n = 91), six sites implemented Module I only (n = 94), and six sites served as a control group with no lessons and no on-site garden (n = 81) (61). Outcomes measured included children's eating behaviors using a pre- and post-test design. Trained observers conducted direct observations in the classroom at regular snack time and scored children's behaviors based on their willingness to try four different FV. Evaluation results showed that the combination module children and the nutrition module only children both showed a significant increase in preference for three of the four FV tested. The control group showed a significant decrease in preference for one vegetable (61). This study showed promising results for garden-based nutrition education programs to increase preference and willingness to try FV among children aged 3-5 years.

Also in 2007, Reinaerts et al measured the effects of two school-based interventions on children's intake of FV (62). The study was conducted among children ages 5 to 14 years attending 12 different primary schools in Limburg, The Netherlands. Six primary schools were randomly assigned to either 1) a free FV distribution program or 2) a multicomponent program consisting of a classroom curriculum and parental involvement. Six other primary schools were designated as control schools (62).

In the distribution program, children received one serving of fruit, fruit juice, or raw vegetables during their morning break during. Children were instructed to consume the fruits, vegetables, or fruit juice together with their teacher in the classroom. In the

multicomponent program, children received a lunchbox designed to bring FV to school. Classroom activities were also developed and adapted to children's age, and every two months, new activities were distributed among the teachers. Parents were motivated to promote FV consumption at home through recurrent newsletters and homework activities taken home by the children. In addition, posters were displayed at local supermarkets to remind parents to purchase FV for their children (62).

Children's parents completed a pre-structured food recall and a food-frequency questionnaire including only FV at before intervention and after intervention completion. Multi-level logistic regression was used to analyze results. The study found that the distribution program significantly increased the fruit, vegetable, or fruit juice consumption in the previous day by 0.1 times per day among children age 5 years ($p < 0.05$). The multicomponent program increased the number of times children age 5 consumed vegetables as a snack by 0.1 times per day, but this was not a significant increase. Overall, this study showed that increasing children's exposure to fruits, vegetables, and fruit juices in the classroom setting may increase the consumption of these food items (62).

In 2008 Sharma et al tested a pilot garden-based preschool curriculum, called PLANT Gardens (Preschoolers Learn About Nutrition Through Gardens) for feasibility and acceptability in Head Start centers (63). The study included 103 children aged 3 to 5 years at two Head Start centers in Houston, Texas, and the program lasted for eight weeks. The PLANT Gardens program consisted of weekly teacher-led classroom activities that emphasized gardening and nutrition where children grew and tasted herbs and greens and also explored the outdoors. Data regarding feasibility and acceptability

were obtained through post-intervention focus groups with teachers and parents, weekly lesson plan evaluation forms completed by project staff, and post-intervention teacher surveys. Parents also completed pre- and post-intervention surveys to evaluate the effects of the program on their child's FV preferences. Results showed strong acceptability and feasibility of the PLANT Gardens program. Parent surveys showed a significant increase in children's willingness to try new FV at home (63). This study supports the positive impact that gardening-themed programs and interventions can have on preschool-aged children's FV preferences and consumption.

Another study conducted in the United Kingdom evaluated the impact of the School Fruit and Vegetable Scheme on FV consumption among 3703 children ages 4-6 years (64). Over 10 months, children received a daily piece of fruit or vegetable. In addition, educational materials and activities that focused on the benefits of FV consumption were promoted. Children's FV consumption was measured at baseline, 3 months, and 7 months using an adult-completed assessment tool to record children's dietary intake over the past 24 hours. Among 4-year-olds, the study found a significant increase in fruit consumption by 0.4 portions at 3 months and 0.2 portions at 7 months. The study also found a significant increase of fruit consumption by 0.6 portions at 3 months and 0.3 portions at 7 months among 5-year-olds as well as a significant increase of fruit consumption by 0.5 portions at 3 months only among 6-year-olds. This study showed promising effects on fruit consumption from an intervention that offered daily servings of fruits and vegetables in a school setting (64).

In 2009, Vereecken et al examined the effects of a dietary intervention called "Beastly Healthy at School" on FV consumption among preschool aged children (65).

The study included eight control preschools and eight intervention preschools in Flanders, Belgium. *Beastly Healthy at School* targeted preschool aged children, their parents, teachers, and school staff. Strategies targeting children included experiential learning (taste tests), nutrition education, role modeling by teachers, stories, and characters, availability of healthy foods, and availability of cooking equipment at school. Parents received newsletters, work sheets, and attended parent evenings and other school activities. Teachers received training sessions, manuals, newsletters, and attended group discussions with other teachers. Other school staff also received newsletters, help on demand via e-mail, and examples of good practices. Data was collected at intervention and control schools at the start of the program and six months later (65).

To measure outcomes, teachers recorded the children's available food and beverages during the morning and afternoon breaks, and parents were asked to complete a food frequency questionnaire on their children's general consumption at both time points. The study found a significant increase in fruit consumption according to parental report with an increase of 6 grams of fruit per day among intervention children, and a decrease of 1 gram per day among controls. Teacher records also showed that fruit consumption increased among intervention children in comparison with control children, with an increase of 0.11 portions per day among intervention, and an increase of 0.04 portions per day among controls, although this effect was not significant. Results also indicate that the increase in fruit consumption was mainly due to the increased availability of fruits at school. This study implies that the increased availability of and exposure to fruits at school may increase preschool aged children's consumption of fruits (65).

In 2010, Carroll et al evaluated the effectiveness of FreshStart, a pilot food-based intervention, to address two barriers to FV access and consumption (cost and time constraints) among low-income parents of preschool-aged children in New York (66). The FreshStart intervention was carried out over four weeks and was comprised of 1) food sampling and 2) vegetable ordering and delivery where on Mondays, food samples with recipe cards were available and vegetable orders were completed in the lobby of a child care center for staff, parents, and children. On Fridays, vegetable orders were delivered to the child care center for pick up. Coupons were also offered for each order. Data was collected via formative research interviews, order forms, and post-intervention interviews. The study found that 14.5% of parents and staff at the child care center purchased vegetables through the FreshStart program. The majority of those reported that they, as well as their children, were happy with the cost and taste of the vegetables. Many also reported that the intervention increased the amount of vegetables their children consumed (66). This study showed that providing lower cost access to vegetables among low-income parents of preschool-aged children may lead to increased vegetable consumption among parents and their children.

In 2011, De Bock et al implemented a six month intervention among 377 healthy preschool aged children (ages 3-6) that attended 18 preschools from three south German regions (67). The intervention was carried out during 15 weekly two-hour nutrition modules over a 6-month period. Five of the modules also involved parents by focusing on them alone or together with their children. Intervention modules that targeted only children included teaching children about FV, food/ crop production, food variety, food preparation, food cultures, food's effect on health, the importance of water, and common

meals. Intervention modules that focused on parents or children and parents taught about balanced nutrition, children's eating behaviors, sharing experiences, preparing FV snacks, and father's baking with children. During the intervention, children were also repeatedly exposed to FV as snacks (67).

The primary outcome was FV intake among children. Outcomes were assessed at baseline, 6 months after intervention implementation, and 12 months after intervention implementation. Outcomes were measured by a questionnaire completed by parents. Parents were asked to rate their child's FV intake based on a six-point ordinal scale ranging from none to more than three portions per day. A change of one on the six-point ordinal scale approximates one portion difference. The study found that fruit intake increased significantly by 0.23 points on the ordinal scale ($p = 0.001$), and vegetable intake significantly increased by 0.15 points ($p = 0.027$). Through this multi-faceted intervention, study authors were able to significantly increase FV intake among children ages 3-6 (67).

Also in 2011, Hoffman et al evaluated the efficacy of the Farm to Family (F2F) program in facilitating access to affordable produce among low-income families with preschool children in four Head Start programs in Boston, Massachusetts (68). In the F2F program, low-cost weekly farm shares were offered and delivered to each Head Start facility over 5 months. Each farm share contained English/ Spanish educational materials. Children also participated in classroom field trips to a farm. A mixed-method evaluation was used including percentages of F2F participants, open-ended interviews with staff, and parent surveys. Study evaluation found that 12% of families and 49% of staff participated in the F2F program. Staff identified many strengths of the program,

such as making produce available at affordable prices and providing families with opportunities to eat vegetables in new ways. As well, staff also identified challenges, including parents not picking up farm shares and discomfort collecting money from parents. Parents reported that the F2F program allowed their family to eat more and a wider variety of FV (68). This study also shows that providing low-income parents access to low-cost, fresh, locally-produced FV can have positive impacts on FV consumption among parents and their children.

Another study conducted in New South Wales, Australia evaluated a preschool-based intervention (Tooty Fruity Vegie) aimed to decrease overweight and obesity prevalence among children by improving fundamental movement skills, increasing fruit and vegetable consumption, and decreasing unhealthy food consumption (69). Subjects included children aged 3-6 years from 18 intervention preschools and 13 control preschools. The Tooty Fruity Vegie intervention included healthy eating and physical activity interventions. The healthy eating interventions included strategies such as revision of food and nutrition policies, communication with parents about the new policies, colorful posters on “better foods,” an interactive DVD, parent workshops, taste testing, and staff acting as role models. The intervention was conducted for ten months and pre- and post-intervention evaluations were conducted at control and intervention preschools (69).

Outcomes that were measured were fundamental movement skills testing, lunch box audits, anthropometric measures, and parent-completed surveys regarding children’s food intake, physical activity, and sedentary behaviors. Lunch boxes were inspected by two researchers who recorded their contents. The study showed that children in

intervention preschools significantly increased their servings of FV in their lunch boxes by 0.63 servings ($p = 0.001$) compared to controls, which corresponded with a 32.7% improvement compared to baseline (69).

In the United States, Harnack et al conducted a study to evaluate the effects of two meal service strategies on the intake of FV among 53 children aged 2-5 years recruited from three preschool classrooms from a single Head Start Center in Minneapolis, Minnesota (70). The two-meal service interventions under evaluation were 1) serving FV in advance of other menu items as part of a traditional family style meal service 2) serving meals portioned and plated by providers. The intervention was implemented during lunch time over a six week time span. During week one, providers portioned and plated children's meals. Week two consisted of the control condition of a traditional family style meal with all menu items served at once. During week three, FV were served in advance of other menu items as part of a traditional family style meal service. Week four was another control condition. During week five, the FV first condition was again implemented, and week six consisted, again, of the provider portioned condition (70).

Outcomes included food and nutrient intake during lunch on each day of the six-week period. Intakes were observed and recorded by trained study staff. The study found that fruit intake was significantly higher (0.40 servings per meal, $p < 0.01$) when FV were served in advance of other meal items compared to the control period when children consumed 0.32 servings of fruit per meal. No significant difference was found for vegetable intake in the FV first condition compared to the control condition. Authors found that FV intake were significantly lower when meals were portioned and plated by

providers compared to the control meal service style (70). In conclusion, this study found that serving fruits prior to other meal items increases fruit consumption among children 2-5 years old in a preschool setting.

In 2012 in Boise, Idaho, Witt et al evaluated the effect of the Color Me Healthy program on FV consumption among 263 children aged 4-5 years in childcare centers (71). Childcare centers were randomly assigned to either intervention or control condition. The intervention centers received the Color Me Healthy program, which is a 6-week program designed to provide learning opportunities about healthy eating and physical activity. The intervention included two 15-30 minute circle-time lessons and one imaginary trip. Lessons largely focused on FV, and several lessons allowed children to taste, touch, and feel FV (71).

Outcomes of interest were FV consumption. Children were given fruit and vegetable snacks one week before the intervention began, one week after the program was completed, and three months after the intervention completion. At each time point, individual servings of FV were weighed in grams before and after snack time to assess how much of the FV each child consumed. The percentage of FV snack consumed was then calculated for each child. Data was analyzed using repeated measures of analysis of variance and hierarchical linear modeling. The study found that children who received the Color Me Healthy intervention significantly increased their consumption of fruit by 20.8% and vegetables by 33.1%. This study shows that programs that allow preschool aged children in childcare centers to learn about, touch, and taste FV can increase consumption of these food items (71).

Also in 2012, Meinen et al evaluated the effects of a statewide school gardening initiative, Got Dirt? (72). Twenty-eight elementary schools and early childhood sites were recruited for the study. Classrooms at each site were randomly assigned to an intervention (garden) or control (no garden). Pre- garden and post-garden surveys were completed by students in third through seventh grade and parents of children in second grade or below (aged 2-8 years). Among the parent survey respondents, 303 parents whose children participated in the intervention completed surveys at pre-test, and 226 completed surveys at post-test. For the control group, 264 parents completed pre-test surveys and 202 post-test surveys. Among the parent-completed surveys for children, study results showed a significant increase in liking of tomatoes, spinach, Swiss chard, and peppers as well as a significant increase in consumption of FV among children 2-8 years (72). The results of this study support the idea that garden-based interventions can have a positive impact on preference for and consumption of FV.

In 2013, Brouwer et al evaluated the effects of a garden-based intervention, Watch Me Grow, on FV intake among children 3 to 5 years old that attended child care (73). In this randomized controlled trial, four child care centers located in central North Carolina were randomized into either a control or intervention group. Two-day dietary assessments of three children from one classroom per center were conducted prior to randomization (baseline) and five months after baseline at the end of the intervention. Centers in the intervention group participated in the Watch Me Grow program, which included a “crop-a-month” curriculum, consultation by a gardener, and technical assistance from a health educator. The intervention was implemented over a four-month time period, and during the four months, providers and children in the intervention

centers grew lettuce in month one, strawberries in month two, spinach in month three, and broccoli in month four. Also, classrooms received corresponding curriculum materials highlighting the fruit or vegetable of the month, and a health educator also met with the center provider that was responsible for food purchasing and menu planning in order to reinforce integration of garden produce into the child-care menu (73).

Outcomes included mean servings of FV served to and consumed by the preschool aged children. Outcomes were assessed using a structured dietary observation by a trained Registered Dietitian blinded to group assignment who observed and recorded all meals and snacks served, consumed, and wasted among the three target children for two full days of care. Servings of food groups served and consumed were analyzed and scored using the Nutrition Data System for Research (NDS-R), the United States Department of Agriculture MyPlate recommendations, and the Dietary Guidelines for Americans 2005 (73).

Results showed that post-intervention, children in intervention centers increased their consumption of vegetables by 0.25 servings; whereas, children in control centers decreased their consumption of vegetables by 0.18 servings. The study also found that although children in intervention centers consumed more fruits pre- and post-intervention compared to control centers, children in intervention centers decreased their fruit consumption by 0.32 servings while children in control centers increased their fruit consumption by 0.15 servings. The finding of increased consumption of vegetables but not fruits are consistent with results from other garden-based intervention studies in older children. In conclusion, the Watch Me Grow pilot intervention showed potential for

garden-based interventions to increase vegetable consumption among 3-5 years old in a childcare setting (73).

Farm to Preschool as a Strategy to Increase FV Consumption among Preschool Age Children

One common theme of many of the previous interventions to increase FV consumption among preschool age children was repeated exposure to and tastes of FV, with increased vegetable consumption being more dependent on these repeated exposures than fruit consumption. Increased fruit consumption was more readily achieved through less rigorous strategies, such as education and serving fruits prior to other food items, which may be due to children's natural taste preference for sweet food items. Further, many of these interventions involved multiple components that not only allowed children to learn about and taste FV but also involved growing FV, cooking FV, parent and teacher education and support, and role modelling by peers, teachers, staff, and parents, all of which can be included as components of a Farm to Preschool Program.

One intervention to increase FV consumption among school-age children that has gained much recent attention is Farm to School (F2S). F2S is a school-based program that includes a variety of activities, such as serving locally sourced foods in school meals and taste tests, increasing agriculture, health, and nutrition education and experiential opportunities through classroom lessons, school gardens, chef and farmer visits, farm tours, and educational sessions for parents and community members (74). The United States Department of Agriculture has recently recognized and begun supporting F2S as a legitimate strategy to decrease childhood obesity and improve child health and nutrition (75). Research has shown that F2S programs increase FV consumption and knowledge

about gardening, agriculture, and healthy eating; however, taste preference often remains unchanged (76, 77). Food and taste preferences begin to develop during preschool years and are extremely important determinants of FV consumption, and these preferences and dietary behaviors persist into adulthood (7-9, 27, 28, 34, 37, 42, 43). However, many children experience food neophobia during preschool ages. Food neophobia, defined as “the reluctance to eat or the avoidance of new foods,” begins to emerge towards the end of the 2nd year of life and wanes around age six but can be mitigated through peer modeling and repeated exposure to certain foods (28, 33, 34, 36, 40, 43, 45, 78). Children ages 2-5 are also in a period of transition and rapid motor and cognitive development where they no longer seek food out of deprivation but begin responding to environmental and social cues for eating, learn to feed themselves, and acquire the ability to ask for specific foods (79-85). Therefore, adapting F2S to a preschool setting will influence children during a critical time period in which food preferences and dietary patterns are being shaped.

A recent survey found that more than 60% of children ages 0-5 participate in weekly care in a day care center, Head Start program, preschool, pre-kindergarten, and other early childhood program (86). Targeting preschool age children with programs delivered through these settings, such as Farm to Preschool, can circumvent issues related to poverty and food insecurity, capitalize on peer and social influences, help to overcome food neophobia, and influence food preferences. Farm to Preschool programs are an expansion of the National Farm to School Model to child care facilities. Activities may include sourcing local foods in snacks and meals, promoting and increasing access to local foods for providers and families, offering nutrition and/or garden-based curricula,

school gardening, in-class food preparation and taste testing, field trips to farms, farmers' markets, and community gardens, and parent workshops (87). With Georgia's 47,846 farms and its rich agricultural history, Farm to Preschool is a relevant strategy for the state of Georgia to enhance FV consumption among young children (88). However, since Farm to Preschool is a newer movement in the US, more formative research is needed to help develop and shape F2PS programs.

Results from the 2013 Georgia Farm to Preschool Survey

INTRODUCTION

Although obesity among children ages 2-5 years in the United States decreased from 12.1% in 2010 to 8.4% in 2012, obesity among preschool age children is still a major public health concern (1, 2). Obese children are more likely to be obese as adults, and obesity is a risk factor for many chronic diseases, such as heart disease, type 2 diabetes, and certain cancers (4-6). Diets high in fruits and vegetables (FV) may decrease the risk of many chronic diseases as well as contribute to weight management and obesity prevention as FV may serve to replace more energy-dense food items (10-18, 89). Fruits and vegetables also provide children with important nutrients and phytochemicals that are especially needed during periods of rapid growth and development, such as vitamin A, vitamin C, vitamin K, potassium folate, and fiber (89). However, many preschool age children in the US are not meeting recommended intakes of FV as set by the Dietary Guidelines for Americans (19-25).

Many factors contribute to poor diets in children. Two factors that are critical for FV consumption are FV availability and accessibility (26-32). Food and taste preferences, which begin to develop during preschool years, are also important determinants of FV consumption, and these preferences and dietary behaviors persist into adulthood (7-9, 27, 28, 34, 37, 42, 43).

Although Farm to School (F2S) programs consistently increase FV consumption and knowledge about gardening, agriculture, and healthy eating in school aged children, they have had limited effect on taste preference (71-72, 90). Adapting F2S to preschools may influence children during a critical developmental period when food preferences and

dietary habits are being formed. Results from the Farm to Preschool (F2PS) programs that have been implemented are promising. Children have shown an increase in food knowledge, preference for vegetables, and acceptability of FV, while parents have shown an increase in consumption of FV (91-92). Just as F2S programs are expanding nationwide and yielding positive outcomes, F2PS programs have this same potential, especially since more than 60% of children ages 0-5 participate in weekly care in a day care center, Head Start program, preschool, pre-kindergarten, and other early childhood program (86). Further, preschool age children spend between 21 to 36 hours per week in a child care setting (93). However, more formative research is needed to help develop and shape F2PS programs. Therefore, the aim of this study was to not only assess what F2PS activities are already being conducted, but also to assess opportunities for, challenges, and interest in F2PS.

MATERIALS AND METHODS

Study Design

This study was a cross-sectional survey of all licensed child care learning centers (CCLCs) (n = 447), family day care homes (FDCHs) (n = 385), and group day care homes (GDCHs) (n = 27) in the state of Georgia licensed and monitored by Bright from the Start Georgia Department of Early Care and Learning (DECAL). Contact information for all licensed preschool facilities was obtained from DECAL and included one contact email address for each facility. The survey was sent electronically through SurveyMonkey (SurveyMonkey, Palo Alto, California) to the listed contact e-mail for

5,425 licensed CCLCs, FDCHs, and GDCHs in the state of Georgia. This study was approved by the Emory University Institutional Review Board and DECAL.

Instrument Development

The survey instrument and questions were developed using the National Farm to Preschool survey as a model (89). After initial development, the survey instrument was reviewed by members of DECAL's Nutrition and Research Departments and was pre-tested on key informants at the Rollins School of Public Health at Emory University as well as on members of the National Farm to School Network Farm to Preschool Subcommittee. Survey questions and response options were then revised. We pilot-tested the survey with four preschool facilities in the Atlanta area and again revised questions and answer choices. The final electronic survey instrument consisted of 25 questions of which six questions were open-ended.

Measures

The survey questions were divided among the following five modules: general facility information, previous or current involvement, interest in F2PS, opportunities to serve locally produced foods, and questions and comments. The first module of the survey asked about general facility information including facility type, county in which the facility is located, community type in which the facility is located, total children enrolled, and percentage of low income children enrolled. The second module of the survey inquired about involvement with F2PS activities within the past year. Respondents were asked about F2PS activities in which they had participated, coordinators of the activities, foods served that were procured from a local source, challenges implementing F2PS activities, curricula used, and funding sources for F2PS

activities. The third module of the survey asked about interest in conducting, adding, or expanding F2PS activities. Respondents were able to choose F2PS activities in which they were interested, motivations for wanting to add or expand F2PS activities, and types of assistance and support needed to add or expand activities. The fourth module contained questions related to opportunities to serve locally produced foods. Respondents were asked about eligibility for Child and Adult Care Food Program (CACFP) funding and whether this funding aided in F2PS activity participation, meals and snacks served at the facility, where the facility purchased food items, and types of kitchens, and access to kitchens. The final module of the survey allowed respondents to leave questions or comments and allowed them the option to enter in their contact information for possible future follow up. Outcomes of interest included previously conducted specific F2PS activities, challenges with F2PS activities, types of foods served that were locally produced, and interest in adding or expanding specific F2PS activities.

Definitions

We defined “Farm to Preschool activities” as varying but inclusive of purchasing local food to serve during meals or snacks; conducting taste tests of locally grown foods; taking children on farm and farmers’ market tours; inviting farmers and chefs to visit children; teaching children how to cook or prepare locally grown food; teaching children about nutrition or certain foods; and growing food with children or teaching children about food through edible gardens. For the purposes of the survey, “local” was defined as the county in which the facility is located, the state of Georgia, or neighboring states of Florida, Alabama, South Carolina, or Tennessee. These definitions were provided in the survey as a reference for survey respondents.

Procedure

In September, 2013, DECAL e-mailed an informational letter to the contact email address listed for each facility explaining the survey and encouraging participation in the survey. One week later, the survey was sent to the same contact email address using SurveyMonkey. Three reminder emails were sent to all facilities over 8 weeks in which responses were collected. Two extra reminder emails were sent to family day care home facilities during the 8 weeks as initial participation from this sub-group was low.

Data Analysis

We used SAS 9.4 (SAS Institute Inc., Cary, North Carolina) for all data analyses. Descriptive statistics, including frequencies, means, proportions, and standard deviations were generated.

RESULTS

Of the 5,425 facilities contacted, 969 participated in the survey, a response rate of 17.9%. The distribution of respondents by county was similar to the distribution of facilities in the target population by county (Figure 1). The distribution of respondents by facility type resembled the distribution of facilities in the target population by facility type (Table 1). Thirty of all facilities classified themselves as an Early Head Start or Head Start facility. Twenty-two percent of respondents reported their facility was located in an urban location; 40.8% in a suburban location; 25.2% in a rural location. Seventy-one percent of facilities that participated in the survey received CACFP funding; 18.5% were not eligible for CACFP funding, and 10.9% were eligible for but did not receive CACFP funding.

Farm to Preschool Activities Conducted Within the Past Year

Ninety-four percent of facilities reported that they had conducted some type of F2PS activity within the past year, with the most frequently conducted activities being educating children about food, nutrition, or where food comes from, cooking or preparing food with children, and serving meals or snacks with at least some locally grown food (Table 2). Of these, 17.6% of responding facilities used a set curriculum or set of resources for their F2PS activities, and only 1.1% of facilities received funding to support their F2PS activities. The top reported coordinators of F2PS activities were facility administrators (85.9%), teachers (74.0%), and general center staff (59.7%). Of the nearly 71% of facilities receiving CACFP funding, 40.1% agreed that receiving CACFP funding increased their ability to buy local food and/ or participate in F2PS activities; 26.5% reported that CACFP made no difference; and 6.6% reported that CACFP funding made their ability to purchase local food more difficult.

Challenges with Implementing Farm to Preschool Activities

The most frequently reported challenges with conducting F2PS activities were cost of activities, lack of resources, and no or little contact with local farmers (Table 2).

Foods Served

Most facilities reported serving a meal or snack. Eighty-eight percent served breakfast, 41.4% served a morning snack, 97.0% served lunch, 97.3% served an afternoon snack, 18.4% served dinner, and 0.7% served an evening snack. Further, 86.8% of respondents reported that they purchased and served some type of locally produced food within the past year, with FV being the most frequently reported food items (Table 2).

Interest in Farm to Preschool

The top F2PS activities in which facilities reported interest in adding or expanding were educating children about food, nutrition, or where food comes from; serving meals or snacks with at least some locally grown food; cooking or preparing food with children; inviting a farmer to visit children; and planting or working with children on an edible garden (Table 2). The most frequently reported motivations for wanting to add or expand F2PS activities included teaching children about where food comes from and/ or how it is grown (70.2%); improving children's health and nutrition (66.3%); and providing children with experiential learning opportunities (50.0%). The top forms of assistance desired to help with conducting or adding F2PS activities were supplies to get started (62.8%); information on how to get started (47.3%); and grant funding/ financial assistance (47.0%).

DISCUSSION

Strategies to increase consumption of FV among preschool age children are needed for many reasons including weight management, prevention of chronic diseases, establishment of healthy eating patterns, and provision of important nutrients. F2PS may serve as one of these strategies as it increases availability of, access to, knowledge of, exposure to, and tastes of FV. Many results from the present survey are similar to findings from the National Farm to Preschool survey. The National Farm to Preschool survey, which followed a snowball sampling approach, was conducted in June 2012 and surveyed 494 preschool facilities across the United States (94). The national survey asked similar questions to the 2013 Georgia Farm to Preschool Survey. Both surveys found that the top F2PS activities already being conducted were educating children about food, nutrition, or where food comes from and serving meals or snacks with at least some locally grown food (94). Also consistent across both surveys were some of the main

concerns and challenges with F2PS, which were lack of resources, need for supplies, and no or few contacts with local farmers (94). As well, the top motivations reported for wanting to add or expand F2PS activities were the same across both surveys, including teaching children about where food comes from and/ or how it is grown; improving children's health and nutrition; and providing children with experiential learning opportunities (94).

Many findings from the 2013 Georgia Farm to Preschool survey will help to inform key stakeholders in F2PS initiatives as well as shape the direction of F2PS programs in Georgia and elsewhere. There is a great need for funding for F2PS activities in Georgia, as the majority of facilities received no financial support for their activities despite cost being the top reported challenge with F2PS participation. As a result, many facilities conduct activities based on accessible resources.

There are many simple, first steps that can be taken to expand F2PS initiatives. Many facilities are already educating children about food, nutrition, and where food comes from; however, the number of facilities doing this could be increased by providing facilities with lists of available curricula or by providing trainings. Also, specific needs and challenges found were a lack of resources available for F2PS and no or few contacts with local farmers. These issues could be ameliorated by providing facilities with lists of local farmers, chefs, F2PS experts, and other locally available resources.

This study was not without limitations. Instead of being distributed to a simple or stratified random sample, the survey was sent to all CCLCs, FDCHs, and GDCHs in the state of Georgia licensed and monitored by DECAL. This methodology could have produced a group of respondents that were not representative of the state of Georgia or

may have produced results that were not generalizable. However, responses for county and facility type were continuously monitored and compared to population distributions during the 8 week survey period, and two extra reminder emails were sent to family day care home facilities as initial participation from this sub-group was low. This ensured that the distribution of survey respondents by county and facility type was similar to corresponding distributions of total facilities licensed and monitored by DECAL. Despite our efforts to recruit all child care centers licensed and monitored by DECAL, the survey received a response rate of 17.9%, which may decrease the generalizability of results. Also, because the topic of the survey, F2PS, was made apparent to all facilities contacted, those facilities with more of an interest in F2PS may have been more likely to respond. In addition, the survey was only sent to the one contact email address listed by DECAL for each facility. The titles and roles of the email recipient for each facility may have been different and therefore, survey respondents may have had differing knowledge of F2PS programs and activities depending on their specific title or role, which may influence survey results. However, to allow for a similar general knowledge of F2PS among survey respondents, definitions of F2PS and the term “local” were provided in the initial informational letter, survey introduction, and relevant survey questions. This study is specific to the state of Georgia, but its findings are likely applicable and useful to other states interested in developing and implementing F2PS programs

CONCLUSION

This study highlighted the top F2PS activities already being conducted, the leading challenges with implementing F2PS activities, the top locally purchased foods, and the F2PS activities in which facilities are most interested among preschool facilities in the

state of Georgia. Of particular note, cost of F2PS activities was the most prevalently reported challenge. Although these study results provide greater insight into the current state and possible future of F2PS, more research in the form of case studies and qualitative interviews may be needed to greater understand the different needs of each facility type based on funding, size, and geographic location/ community type. The resources available and unique needs of different preschool facilities and communities in which they are located may guide the types of F2PS activities conducted at each facility.

Figure 2: Distribution of preschool facilities in the state of Georgia licensed, monitored, and reported by the Georgia Department of Early Care and Learning in 2013 (N = 5,425 facilities) by county compared to the distribution of 2013 Georgia Farm to Preschool survey respondents (n = 969 facilities) by county.

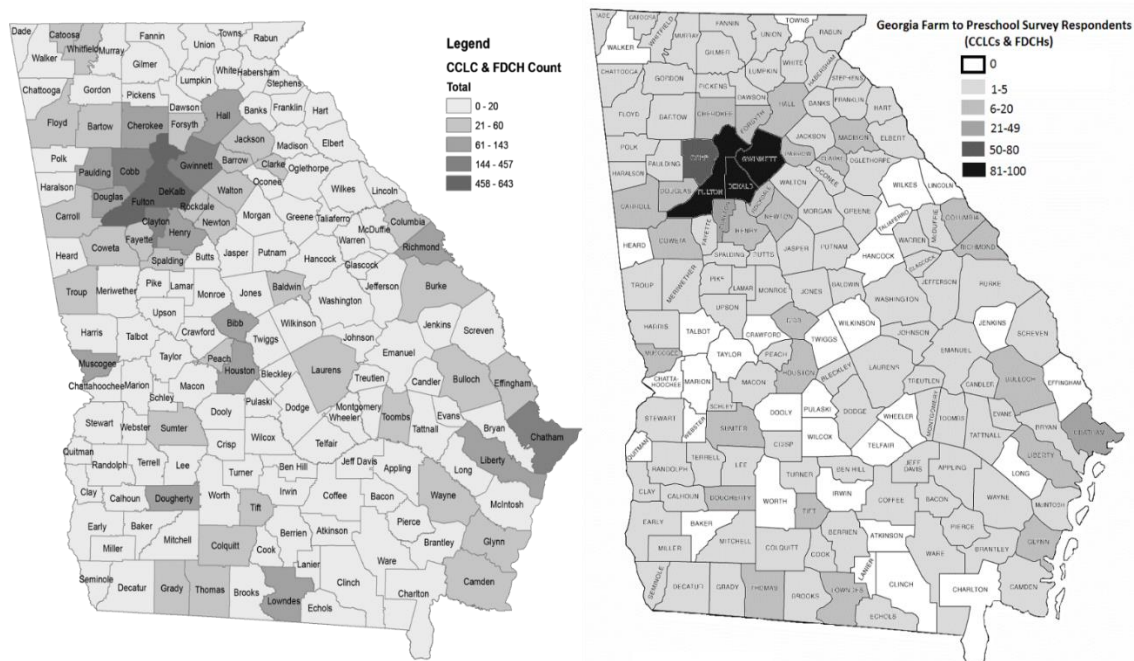


Table 1: Distribution of preschool facilities in the state of Georgia licensed and monitored by the Georgia Department of Early Care and Learning by facility type (N = 5,425 facilities) compared to the distribution of survey respondents by facility type (n = 859 facilities that responded to the survey question regarding facility type).

Facility Type	Population (%)	Sample (%)
CCLC ^a	50.9	52.0
FDCH ^b	44.9	44.8
GDCH ^c	4.2	3.1

^aChild care learning centers

^bFamily day care homes

^cGroup day care homes

Table 2: Percentages of specific Farm to Preschool (F2PS) activities conducted, challenges experienced with implementing activities, and food items that were purchased locally among respondents that had participated in any type of Farm to Preschool activity within the past year (n = 867). Percentages of specific F2PS activities in which respondents were interested in beginning, adding, or expanding regardless of previous participation in F2PS (n = 831).

F2PS Activities Conducted Within the Past Year	(%)
Educated children about food, nutrition, or where food comes from	85.9
Cooked or prepared food with children	74.0
Served meals or snacks with at least some locally grown food	59.7
Planted or worked with children on an edible garden on site	35.3
Took children to visit a farm, community garden, or farmers market	31.3
Conducted taste tests for children to try locally grown foods	26.3
Hosted a special event, special day, or special unit related to farms and food	24.2
Invited a chef to visit children	10.7
Conducted activities with a chicken coop (or other farm related animals) on site	8.4
Invited farmer to visit children	8.3
Challenges Experienced with Implementing F2PS Activities	
Cost of activities	46.8
Lack of resources	28.4
No or few contacts with local farmers	26.4
Difficulty purchasing local foods	21.7
Time concerns	16.4
Lack of access to locally grown foods	16.4
Inadequate storage space in which to store locally purchased foods	14.6
Food safety concerns of locally produced foods	14.6
Lack of a coordinator	8.7
Lack of volume of locally purchased foods	8.4
Labor concerns	8.4
Acceptability to children	5.5
Lack of preparation facilities or equipment to prepare local foods	5.5
Acceptability to parents	5.1
Locally Purchased Food Items	
Fruit	74.0
Vegetables	71.9
Eggs	34.1
Dairy products (milk, yogurt, cheese, etc.)	33.2
Meat	25.6
F2PS Activities in Which Facilities are Interested	
Educating children about food, nutrition, or where food comes from	73.9
Serving meals or snacks with at least some locally grown food	69.2
Cooking or preparing food with children	62.9
Inviting farmer to visit children	62.4
Planting or working with children on an edible garden on site	60.3
Conducting taste tests for children to try locally grown foods	56.8
Taking children to visit a farm, community garden, or farmers market	52.9
Inviting a chef to visit children	51.5
Hosting a special event, special day, or special unit related to farms and food	48.5
Conducting activities with a chicken coop (or other farm related animals) on site	27.6

Discussion, Conclusion, and Recommendations

Strategies to increase consumption of FV among preschool age children are needed for many reasons. F2PS may serve as one of these strategies as it either circumnavigates or positively impacts many modifiable factors related to increased FV consumption among preschool age children. Issues pertaining to food availability and accessibility, food insecurity, and household poverty levels are eliminated as F2PS provides access to FV in a non-household setting. Food neophobia is mitigated as children are provided with frequent exposures to FV and observe their peers tasting or eating FV with F2PS activities. However, many steps are needed to further explore and evaluate F2PS programs.

This study showed that many preschool facilities in Georgia are already involved in some type of F2PS activity and many are interested in adopting new and expanding current F2PS activities. The top activities already being conducted are educating children about food, cooking or preparing food with children, and serving meals or snacks with some locally grown food.

However, the major challenge reported was cost of activities. This challenge could be alleviated by increasing funding sources from national, state, and local governments and organizations. In addition, facilities could focus on adding or expanding F2PS activities that may not require financial resources, such as increasing FV education, having volunteer farmers and chefs visit classrooms, or having parent volunteers visit to help children prepare or cook FVs. Another challenge highlighted by this study was a lack of resources available for F2PS and little contacts with local farmers. This challenge could be lessened by creating a centralized list of farmers, farms, chefs, and F2PS experts in each county or city as well as creating an on-line marketplace.

Further research on F2PS is also needed to better understand and shape F2PS programs. Case studies and qualitative interviews with parents, preschool teachers, administrators, and staff, local farmers and chefs, and F2PS experts may provide different or more insight into opportunities, interests, challenges, and solutions for F2PS program activities. As well, because F2PS is a newer movement in the US, limited work has systematically monitored, evaluated, and documented the process and effectiveness of Farm to Preschool programs, especially those targeted at food insecure or low income households. Implementation and systematic evaluation of a pilot Farm to Preschool program would fill a critical gap in understanding the feasibility of and potential for Farm to Preschool as a strategy to improve the dietary practices and nutrition of preschool age children. Results from this current study together with future qualitative studies and F2PS program evaluations will provide a strong knowledge base on which to develop effective, cost-efficient F2PS programs.

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