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The food and activity environments of childcare centers in Rhode Island: a directors' survey

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Abstract

Background: The food and activity environments of childcare have been identified as promising areas in which to improve nutrition and activity for children.

Methods: Of the 292 centers caring for children 18–60 months of age, 107 randomly selected directors completed a survey. The survey queried nutrition and physical activity practices, attitudes of providers and staff, and demographics of the enrolled children and the center, including participation in the federal Child and Adult Care Food Program (CACFP). Responses were compared for CACFP compared with non-CACFP participating centers.

Results: CACFP center directors reported serving more fruit, fried potatoes, beans, 100 % fruit juice, non-fat milk and water compared with non-CACFP directors. Sixty-four percent of CACFP centers and 87 % of non-CACFP centers served no vegetables the previous day ($p = .0973$).

There were no differences in the amount of physical activity time reported by CACFP status. Also, 81 % of directors reported never or rarely allowing screen time in the previous week.

Directors of Non-CACFP centers were more likely (93 %) to strongly agree that they were able to identify healthy foods and (87 %) that healthy foods are available where they shop than CACFP center directors (65 %, $p = 0.0088$, 54 %, $p = 0.0354$, respectively).

Discussion: More nutritious foods (fruit, beans, 100 % fruit juice, non-fat milk and water) were provided in CACFP centers, compared with non-CACFP centers, but no differences in physical activity were identified. However, non-CACFP directors were better able to access and identify healthy foods. CACFP guidelines regarding food served were likely responsible for the more nutritious foods, though CACFP providers may be challenged by fewer skills and lower educational background.

Conclusions: Stronger guidelines supporting both food and activity would bolster policies for childcare centers and improve the nutrition and physical activity environments in this setting.

Keywords: Food, Diet, Physical activity, Childcare, Centers, CACFP, Toddler, Preschool

Background

While the growing trends in obesity among the general population are concerning, [1] the rapid increase and early onset among young children in recent decades is particularly alarming [2]. About a quarter of children 2–5 years old are overweight or obese [1] with a greater likelihood of becoming obese in adulthood. Thus, developing

healthy eating and activity habits earlier in life is critical to reversing the obesity epidemic [3, 4].

Nationally, 64.6 %, [5] and in Rhode Island (RI) 73 % [5] of children under 6 years old have both parents in the workforce. More than 11 million children under the age of 5 are in childcare, and for children whose mothers work, the average time spent in childcare is 35 h per week [6]. These children consume 50–75 % of their daily calories while in childcare, so it is important to focus obesity prevention efforts on young children in the childcare setting (up to 5 years old) [7] by ensuring that they are served healthy foods and have ample opportunities for structured

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and unstructured physical activity [8, 9]. While childcare settings provide a ripe environment for developing healthy lifestyle habits that can carry into adulthood, [10] insufficient research about the food and physical activity environments among children 0 through 5 years old has been conducted [11, 12]. However, existing data indicate that the childcare settings often fall short of providing optimal nutrition and physical activity environments for children [13].

To evaluate the current state of policies governing food and activity in childcare centers nationally, a panel of nutrition and early childhood experts measured state regulations against ten model nutrition and physical activity standards for the childcare setting [14]. Over 80 % of states received a grade lower than “B”—Rhode Island received a grade of “C+” for healthy eating and a “C” for physical activity for an overall grade of “C+,” for the 2009 regulations. Rhode Island regulations, administered by the Department of Children, Youth and Families (DCYF), met the recommended guidelines regarding sanitary drinking water, nutrition education for providers and children, and policies regarding the use of food as a reward or punishment. Existing regulations did not include policies that limit serving foods of low nutritional value, prohibit serving sugar-sweetened beverages (SSBs), and prohibit serving 2 % and whole milk to children older than 2 years. Rhode Island regulations required daily physical activity, ensure outdoor active playtime, and prevent being seated for long periods of time as were recommended, but has had weak regulations around physical education being offered to providers and children and television, video and computer time limitations [14].

Virtually all states have room for improvement in food and activity environment regulations. Federal regulation may directly affect the food served in childcare with participation in the USDA Child and Adult Care Food Program (CACFP). CACFP is a federally funded program that provides roughly 3.3 million lower income children per day with meals and snacks in childcare settings [15]. Day care centers may receive cash reimbursement for up to two meals and one snack per day that meet CACFP nutritional guidelines. Providers who care for lower income children receive free or reduced cost meals. Centers qualify for CACFP reimbursement if 25 % or more of their children meet the income qualifications. Children in Head Start and children receiving SNAP (Supplemental Nutrition Assistance Program) benefits are automatically eligible for free meals. CACFP does not provide guidelines for physical activity. CACFP guidelines for nutrition are not currently aligned with the 2010 Dietary Guidelines for Americans [16]. As a result, providers are allowed to serve 2 % and whole fat milk to children over 2 years, more sugary beverages, and less fruits and vegetables than are recommended by

federal guidelines. Consequently, states like Arizona, Delaware, and New York have issued additional state specific CACFP requirements. Alaska, Delaware, and Massachusetts have created stricter childcare licensing standards that apply to all childcare sites regardless of their involvement with CACFP [16]. The Rhode Island Nutrition Requirements (RINR) [17] provide strict nutrition guidelines for food served in schools, but are not applied to the childcare setting. RINR aim to meet or improve upon the Dietary Guidelines, focusing on limiting juice intake, serving a variety of fruits and vegetables, decreasing sugar and artificial sweeteners, and imposing sodium restrictions.

Other national organizations and initiatives make stricter recommendations for nutrition and physical activity than those set forth in current childcare regulation. Caring for Our Children released Preventing Childhood Obesity in Early Care and Education Programs in 2012 delineating the best food and activity practices for children, endorsing CACFP guidelines for meals and snacks [18]. For toddlers 60–90 min, and for pre-schoolers 90–120 min of moderate to vigorous activity is recommended per 8 h day [18]. Both Let’s Move Child Care and the National Association for Sport and Physical Education (NAPSE) recommend 1–2 h per day of activity (60 min of structured, 60 min unstructured) [19, 20]. Let’s Move Child Care prompts providers to limit screen time, serve a fruit and vegetable at every meal, provide water at every meal and limit 100 % fruit juice to 4–6 ounces per day [20].

Moving beyond the regulations, the purpose of this study is to assess the current state of food served and physical activity practices of Rhode Island childcare centers to identify potential areas for improvement in the DCYF regulations and implementation, by comparing centers with and without CACFP participation to assess the potential influence of guidelines in the environments of childcare centers.

Methods

Survey instrument

Key informant interviews were conducted with childcare stakeholders from across the state including center directors and state agency representatives during Fall 2010 to gather information and guidance on the content of the survey. Previous literature on similar evaluation instruments was also reviewed [21–24]. A survey instrument was developed to administer to directors of childcare centers. The instrument contained 12-center specific questions including characteristics of the respondents’ backgrounds in education and childcare. Directors were asked to approximate the racial and ethnic background (one question) and income status of the children they serve. A question was also included

regarding whether or not the center participated in the USDA CACFP.

There were 62-nutrition-related questions. Selected food questions were adapted from the California Child Care Food Assessment's *Survey of Child Care Providers of 2–5 Year Old Children* [22]. Food servings were assessed by asking directors about a list of nine foods or beverages that were or were not provided at the center during the previous day. The director could also respond, "unknown", if he or she was not sure if the item was served. The responses were coded to describe serving of that food or beverage item between zero and four times in the day to represent the serving of the food at breakfast, lunch, dinner and/or at a snack. Nutrition questions also included director-reported staff, child, and parent involvement in nutrition, center nutrition practices and policies, and their own personal attitudes [21–24]. The majority of these questions contained response options "Strongly Agree", "Agree", "Disagree", and "Strongly Disagree". A few questions regarding child involvement in nutrition were structured to be "Never", "Rarely", "Sometimes", and "Often".

The physical activity section of the survey included 47 questions. Time spent per day in structured activity and non-structured activity were estimated with response options of less than 30 min, 31 to 45 min, 45 to 60 min, greater than 60 min, and don't know. Time spent per week in sedentary time was approximated with response options of never or rarely, 2 h or less, 3–4 h, 5 or more hours or don't know [21]. Finally, directors answered questions regarding staff, child, and parent involvement in physical activity, center physical activity practices and policies, and personal attitudes [21–23]. These questions contained response options "strongly agree", "agree", "disagree", and "strongly disagree". All questions were based on previous survey instruments [21–24].

Study sample

The Rhode Island Department of Children, Youth, and Families (DCYF), which licenses childcare providers in RI, provided a full database of all childcare providers, telephone contacts, and the age of children for which the center was licensed to provide care. The database of 384 licensed childcare centers was then filtered to include those with services listed as: Infant/Toddler, Toddler, or Pre-School, resulting in a total of 292 centers. Twelve batches were created to work each sample to completion avoiding the potential bias of contacting early responders only. Centers that were listed as duplicates ($n = 5$) or Spanish-speaking only ($n = 1$) were excluded from the sample.

Survey administration

During Spring 2011, childcare centers received a telephone call from a trained research assistant inviting

them to participate in the survey. The survey's aims were explained to the director or another representative of the center designated by the administration. Participants were asked complete the survey online, but if this was undesirable to the respondent or not feasible (no internet access) the respondent was given the option to complete it by phone, by a paper/pencil mailed survey, or in person. Consenting was conducted commensurate with the methods the survey was completed. Online, participants were asked to read and electronically agreed to ("signed") the consent before the survey began; by phone, the consent was read and the participant agreed verbally before the survey was started; and mailed surveys were accompanied by a hard copy survey to read, sign and return with the completed survey.

The research assistant worked through each batch of childcare centers, which ranged from 16 to 32 childcare centers per batch. Centers were called up to 15 times until they were coded as not successful. The Principal Investigator followed up with administrators that were hesitant to take the survey.

Data analysis

Fisher's Exact tests were calculated to determine differences in reported attitudes or policies by CACFP status. Data was analyzed using SAS 9.4, Cary, NC.

Results

Of the 191 centers called, 160 were found to be eligible after eliminating 13 that did not have a working telephone number, 2 centers that had closed, 5 duplicates in the original list, and the one center that did not employ anyone who spoke English. Directors from 107 (56 % of the total, 67 % of eligible) centers were interviewed. Of those that did not participate, twelve centers partially completed the survey, but their responses are not included; fifteen centers refused to take the survey due to lack of interest, time, or not having permission from the owner of the facility; 36 centers were not able to be reached despite numerous calls and messages left.

Foods served and physical activity in childcare

Overall servings of food and differences in food servings by CACFP status are presented (Table 1). CACFP center directors reported serving more other fruit (neither juice nor fruit canned in syrup), fried potatoes, beans, 100 % fruit juice, non-fat milk and water compared with non-CACFP directors. Fruit was not served at all by 44.9 % of non-CACFP centers, whereas for CACFP centers, "other" fruit was served twice (reported by 27.8 %) and three times (reported by over 30 %) the previous day ($<.0001$). Most centers (86.1 % of CACFP and 98.6 % of non-CACFP centers) did not serve fried potatoes even once the previous day, but 13.9 % of CACFP centers and

Table 1 Percentage of center directors reporting the number of occasions foods/ beverages were served at their childcare center ($n = 292$) the previous day

Food/beverage item	All centers %					CACFP %					Non-CACFP %					<i>p</i> value*
	Number of times per day					Number of times per day					Number of times per day					
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	
Fruit canned in syrup (heavy or lite)	100.0	0	0	0	0	100.0	0	0	0	0	100.0	0	0	0	0	
Other fruit including fresh, canned in water or own juice, dried or frozen	30.8	43.9	13.1	12.2	0	5.5	36.1	27.8	30.6	0	44.9	46.48	5.8	2.9	0	<0.0001
French fries, tater tots, hash browns, or other fried potatoes	94.4	5.6	0	0	0	86.1	13.9	0	0	0	98.6	1.5	0	0	0	.0174
Beans	88.8	11.2	0	0	0	69.4	30.6	0	0	0	100.0	0	0	0	0	<0.0001
Other vegetables including fresh, frozen, or canned	78.5	16.8	3.7	0.9	0	63.9	25.0	8.3	2.8	–	87.0	11.6	1.5	0.0	0	.0167
Sweetened drinks	96.3	3.7	0	0	0	97.2	2.8	0	0	0	95.7	4.4	0	0	0	1.000
100 % fruit or vegetable juice	44.9	36.5	12.2	6.5	0	22.2	44.4	25.0	8.3	0	56.5	33.3	4.4	5.8	0	.0007
Non-fat or 1 % milk	33.6	22.4	26.2	15.0	2.8	11.1	13.9	41.7	25.0	8.3	46.4	26.1	18.8	8.7	0.00	<0.0001
Water	20.6	19.6	19.6	32.7	7.5	5.6	19.4	11.1	52.8	11.1	29.0	18.8	23.2	23.2	5.80	.0030

**p* value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable

–indicates no responses in that category

only 1.5 % of non-CACFP centers served fried potatoes once the previous day ($p = .0296$). No non-CACFP centers served beans the previous day, compared with 69.4 % of CACFP centers reporting no servings, and 30.6 % reporting a single serving the previous day ($p < .0001$).

Fruits and vegetables were served by a small proportion of centers overall. Servings of other (non-potato) vegetables were reported by very few center directors, and were not different based on CACFP status. Sixty four percent of CACFP center directors and 87 % of non-CACFP center directors reported serving no vegetables (excluding potatoes) the previous day ($p = .0973$), with no differences between the groups. Centers identified as CACFP and non-CACFP were not different in the servings of fruit canned in syrup; no centers reported serving fruit canned in syrup during the previous day.

Servings of beverages were also reported. One hundred percent fruit juice was not served at all by 56.5 % of non-CACFP centers, with one third reportedly serving once the previous day. This compares with only 22.2 % of CACFP centers not serving 100 % juice, 44.4 % serving it once, and 25 % serving it twice the previous day ($p = .0045$). The highest proportion of non-CACFP centers (46.4 %) reported serving no non-fat milk the previous day with 26.1 %, 18.8 % and 8.7 % serving one, two and three servings the previous day respectively. This compares with only 11.1 % of CACFP centers serving no non-fat milk, with 13.9 %, 41.7 % and 25.0 % serving one, two and three servings per day respectively ($p = .0004$). The highest proportion of CACFP centers (52.8 %) served water three times per day, with another 11.1 % serving water four times per day. Only a few centers served

sweetened drinks (3.7 %), and no differences between CACFP and non-CACFP centers were found.

Structured and un-structured activity descriptions are presented in Table 2. There were no differences in the amount of structured and unstructured physical activity time reported by CACFP status. The highest proportion for both types of centers (41.1 %) reported 31–45 min of structured physical activity, and 41.1 % reported more than 60 min of unstructured physical activity. The highest proportion of centers (81.3 %) reported never or rarely allowing screen time in the previous week.

Director Attitudes Regarding Nutrition in Childcare

Directors' attitudes and reports about staff, parents and children regarding nutrition are presented in Table 3. The majority of directors strongly believed that it was important to offer healthy foods to children (79 %) and let children see them (directors) enjoying the same healthy foods they are eating (70 %). Cost was also identified as a concern with 63 % reporting that it is important to compare prices among healthy foods. Almost 20 % of directors reported choosing a less healthy option because it is more affordable, and almost 20 % reported concern about wasting food because the children won't eat healthy foods. Non-CACFP center directors were more likely (93 %) to strongly agree that they were able to identify healthy foods to prepare than CACFP center directors (65 %, $p = 0.0088$). Also, significantly more non-CACFP center directors (87 %) strongly agreed that healthy foods are available at the store where they do their food shopping than CACFP center directors (54 %, $p = 0.0354$).

Staff engagement in nutrition education and with children in healthy eating was low. Over 40 % of directors

Table 2 Center director reported time in physical activity and sedentary time at their childcare centers ($n = 292$)

Question	All centers (%)					CACFP (%)					Non-CACFP (%)					<i>p</i> value*
	Minutes					Minutes					Minutes					
	Less than 30	31–45	46–60	More than 60	Don't know	Less than 30	31–45	46–60	More than 60	Don't know	Less than 30	31–45	46–60	More than 60	Don't know	
Minutes of structured physical activity that the children engaged in during the previous day	28.0	41.1	14.0	15.9	0.9	22.2	41.7	16.7	19.4	0.0	30.4	40.6	13.0	14.5	1.5	.8416
Minutes of unstructured physical activity that the children engaged in during the previous day	7.5	26.2	22.4	41.1	2.8	8.3	30.6	19.4	41.7	0.0	7.3	21.7	24.6	42.0	4.4	.7208
Amount of screen time that the children engaged in during the previous week	Never or rarely		2 h or less			Never or rarely		2 h or less			Never or rarely		2 h or less			.3002
	81.3			19.7		75.00			25.00		84.06			15.94		

**p* value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable

Table 3 Director attitudes regarding nutrition, staff, parents and children in the childcare center (*n* = 292)

Question	All centers (%)				CACFP (%)				Non-CACFP (%)				<i>p</i> value*
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Directors													
I believe it is important to offer healthy foods to children in my care	79.4	20.6	–	–	80.6	19.4	–	–	79.7	20.3	–	–	1.000
I believe it is important to let children see me enjoying the same healthy foods they are eating	69.8	27.4	2.8	–	71.4	25.7	2.9	–	71.0	26.1	2.9	–	1.000
I am concerned that enrollment will drop if I begin serving healthier snacks and meals	–	0.9	43.9	55.1	–	0.0	41.7	58.3	–	1.5	44.9	53.6	.8922
I believe it is important to communicate with parents regarding nutrition	47.2	50.9	1.9	–	50.0	50.0	0.0	–	44.1	52.9	2.9	–	.7174
I discuss with parents if lunches or snacks sent in are not healthy.	25.0	57.3	15.6	2.1	25.9	55.6	11.1	7.4	25.0	58.8	16.2	0.0	.2160
It is difficult to encourage children of a variety of ethnic backgrounds to eat the food at the center	–	47.2	50.9	1.9	–	25.0	63.9	11.1	–	10.0	65.0	25.0	.0709
I am concerned about wasting food because the children won't eat healthy food	2.8	16.0	61.3	19.8	5.6	13.9	66.7	13.9	1.5	17.7	57.3	23.5	.3846
Healthy foods are available at the store where I do my food shopping	75.0	23.6	1.4	–	53.9	42.3	3.8	–	86.7	13.3	0.0	–	.0047
I am able to identify healthy foods to prepare	83.3	16.7	–	–	65.4	34.6	–	–	93.3	6.7	–	–	.0061
I use the nutrition facts on food labels to make purchasing decisions	59.1	29.6	11.3	–	42.3	46.2	11.5	–	68.2	20.4	11.4	–	.0747
I compare prices among healthy foods.	62.8	31.4	2.9	2.9	46.1	46.1	3.9	3.9	72.1	23.3	2.3	2.3	.0920
I often choose a less healthy option because it is more affordable	4.2	14.1	45.1	36.6	8.0	12.0	44.0	36.0	2.2	15.6	46.7	35.6	.7503
Staff													
On average my staff has very limited or no education or training in nutrition	2.9	16.4	51.9	28.8	0.0	8.8	61.8	29.4	4.4	20.6	45.6	29.4	.2434
Nutrition education is regularly offered to the staff	9.5	48.6	36.2	5.7	17.1	60.0	22.9	0.0	5.9	42.6	42.6	8.8	.0161
Staff members sit with the children during snacks and meals	63.6	30.8	4.7	0.9	52.8	44.4	2.8	0.00	71.0	21.7	5.8	1.5	.0765
Staff members rarely eat the same foods and have the same drinks as the children	15.4	26.9	44.2	13.5	11.4	22.9	45.7	20.0	17.9	26.9	44.8	10.4	.5351
The staff at my center are highly motivated to serve healthy foods to the children	44.2	51.0	3.8	1.0	35.3	58.8	5.9	0.0	48.5	47.1	2.9	1.5	.4659
Children are encouraged to finish the food on their plate	9.4	50.9	30.2	9.4	5.6	47.2	33.3	13.9	11.8	52.9	27.9	7.4	.5194
Parents													
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Parents demand that their children be served healthy foods	8.7	42.7	40.8	7.8	5.6	50.0	33.3	11.1	10.8	40.0	44.6	4.6	.3537
Parents care more about the quantity of food that their children are eating	4.1	27.5	60.2	8.2	6.1	42.4	45.4	6.1	3.1	20.3	67.2	9.4	.0853
Parents care more about the quality of food that their children are eating	14.3	58.2	25.5	2.0	6.2	59.4	34.4	0.0	18.5	58.5	20.0	3.0	.1909
Snacks and meals supplied by parents are checked to make sure that they meet the nutrition standards of the facility	18.7	44.8	29.2	7.3	23.1	42.3	23.1	11.5	17.6	45.6	30.9	5.9	.6452
From conversations with parents and children, it seems that parents are knowledgeable about healthy foods to serve to children	10.7	61.2	22.3	5.8	3.0	45.5	39.4	12.1	14.7	67.7	14.7	2.9	.0029
From conversations with parents and children, it seems that parents reinforce nutrition education at home	6.9	52.5	31.7	8.9	0.0	35.5	45.2	19.3	10.3	60.3	25.0	4.4	.0028
It seems that parents are concerned about the quality of fruits and vegetables	8.6	40.9	41.9	8.6	0.0	40.0	46.7	13.3	12.9	41.9	38.7	6.5	.1251
When parents bring outside meals for their children, the food brought in is often healthy.	7.3	60.4	22.9	9.4	0.0	42.3	34.6	23.1	10.1	68.1	17.4	4.4	.0028
Children													
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Children like to try new foods	11.4	61.9	25.7	1.0	14.7	61.8	20.6	2.9	10.1	63.8	26.1	0.0	.4378

Table 3 Director attitudes regarding nutrition, staff, parents and children in the childcare center (n = 292) (Continued)

	N	R	S	O	N	R	S	O	N	R	S	O	
Children are involved in structured nutrition education (based on lesson plans, books, experiential activities)	-	7.6	46.2	46.2	-	2.8	42.7	54.3	-	10.1	46.4	43.5	.3525
Children are involved in cooking activities and hands-on sensory food experiences	2.8	6.5	45.8	44.9	0.0	8.3	55.6	36.1	4.3	4.3	40.6	50.7	.2402

SA Strongly Agree, A Agree, D Disagree, SD Strongly Disagree, N Never, R Rarely, S Sometimes, O Often

*p value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable

-indicates no responses in that category

disagreed that nutrition education was regularly offered to staff, and close to 20 % reported that their staff had limited to no education or training in nutrition. Most directors (64 %) strongly agreed that staff members sit with the children during snacks and meals. However, directors agreed (27 %) or strongly agreed (15 %) that the staff rarely ate the same food and drinks as the children.

Parent interaction and impressions reported by directors differed by CACFP status. Based on conversations with parents, 49 % of directors from CACFP centers agreed or strongly agreed that parents are knowledgeable about healthy foods to serve to children compared with 82 % of directors non-CACFP centers ($p = 0.0188$). Further, according to directors, parents whose children attended non-CACFP centers (71 %) were more likely than parents from CACFP centers (35 %) to reinforce nutrition education at home ($p = 0.0258$). Also, directors from CACFP centers (78 %) reported agreement that when parents brought meals from outside for their children, the food was healthy compared with 42 % of directors from non-CACFP centers ($p = 0.0071$).

Involving children in food decisions and nutrition education was reported by most directors. Over all centers, 27 % of centers reported disagreement that children like to try new foods. However, most directors reported that children are sometimes or often involved in structured nutrition education (92 %) and cooking activities (91 %).

Directors' attitudes and reports about food service and nutrition policies are presented in Table 4. Most directors of CACFP centers (87 %) reported that they have input on menus written by food service providers compared with 60 % of non-CACFP directors ($p = 0.0620$). Over 95 % of directors reported satisfaction with the quality of food provided. However, only 12.5 % of CACFP directors reported strong agreement that the food provided is healthy compared with 40 % of non-CACFP directors ($p < 0.0001$).

Directors overwhelmingly agreed that there should be efforts to ensure nutritional quality of food served (94 %), and would support changes to state regulations that would establish a new standard for improved

Table 4 Attitudes regarding food service providers and nutrition policies in childcare centers food service providers

Question	All centers (%)				CACFP (%)				Non-CACFP (%)				p value*
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Food Service Providers													
I have input on menus written by my food service provider	36.4	40.9	18.2	4.5	31.2	56.2	12.5	0.00	60.0	0.0	20.0	20.0	.0520
I am NOT satisfied with the quality of the food that my food service provider is providing to my center	-	4.5	59.1	36.4	-	6.2	56.2	37.5	-	0.0	60.0	40.0	1.000
In my opinion, the food provided by my food service provider is healthy	18.2	77.3	4.5	-	12.5	87.5	0.0	-	40.0	60.0	0.0	-	.2281
Nutrition Policies													
There should be efforts made to ensure the nutritional quality of foods served	61.9	32.3	4.8	1.0	68.6	31.4	0.0	0.0	60.3	30.9	7.3	1.5	.3920
I would support changes to state regulations that would establish a new standard for improved nutritional quality of foods served	50.0	39.2	5.9	4.9	55.9	38.2	2.9	2.9	47.8	38.8	7.4	6.0	.7854
My center's staff/teachers would support changes to state regulations that would establish a new standard for improved nutritional quality of food	44.7	44.7	5.8	4.8	44.1	47.1	5.9	2.9	46.2	41.8	6.0	6.0	.9408
Parents would support changes to state regulations that would establish a new standard for improved nutritional quality of food	31.3	50.0	12.5	6.3	28.1	56.3	9.4	6.3	33.3	46.0	14.3	6.4	.8409
Staff/teachers at my center will require information and training needed to implement changes to my center's nutrition standards	28.7	39.6	24.8	6.9	32.4	38.2	23.5	5.9	27.7	40.0	24.6	7.7	.9762

SA Strongly Agree, A Agree, D Disagree, SD Strongly Disagree

*p value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable

-indicates no responses in that category

nutritional quality of food (89 %). Most directors also felt that parents (81 %) and staff (89 %) would share their support of these types of initiatives for both nutrition and physical activity, but 68 % reported that staff would need information and training to implement such changes.

Director Attitudes Regarding Physical Activity in Childcare

Directors' attitudes and reports about staff, parents and children regarding physical activity are presented in Table 5. Directors perceived the indoor and outdoor space at their center to be conducive to physical activity. More directors strongly agreed that the outdoor space at their center was adequate for supporting physical activity (55 %) than those who agreed about adequacy of indoor spaces (26 %). Almost all directors (99 %) believed that children behave better when they are given plenty of activity and felt it was important to limit screen time for children, both the television and computer. Most (89 %) strongly agreed or agreed that children's active play should not be shortened as a punishment. Directors also shared the belief that it is important to communicate with parents regarding physical activity with 52 % agreeing and 47 % strongly agreeing.

Non-CACFP directors reported strong disagreement (70 %) that they have a shortage of staff to engage children in structured activities, compared with 42 % of CACFP directors ($p = .0427$). For all centers, 23 % of directors agreed that their staff had very limited or no training/education in physical activity. Furthermore, 57 % of directors agreed or strongly agreed that physical activity training (other than playground safety) was offered. The majority of directors reported disagreement that their staff members were physically unable (96 %) and agreed that staff enjoy (91 %) participating in active play with the children.

The concept that, "parents demand that their children are physically," active was agreed upon by 40 % of directors, and with another 9 % strongly agreeing. However, 62 % of directors agreed and 38 % disagreed that parents dress their children appropriately for outdoor physical activity. Over 40 % of directors also agreed that parents do not want children to go outside when it gets cold with 68 % of CACFP directors and only 27 % of directors of non-CACFP centers agreeing or strongly agreeing with this statement ($p = 0.0087$).

The majority of directors (97 %) agreed that children go outside every day, but only 60 % agreed that children go out during winter months as much as summer months. When inclement weather prevents children from being able to go outside, 18 % of directors strongly agreed or agreed that it was difficult to keep children physically active indoors. Most (95 %) directors report that children who are not moving during unstructured

playtime are prompted to be active. More than half of directors used extra time for physical activity as a reward for children.

Directors' attitudes and reports about physical activity facilities and policies are presented in Table 6. All directors reported having an on-site play area at their center; however, 56 % of centers had an indoor play area. Strong agreement was reported for having an outdoor play area by 100 % of non-CACFP center directors, but only 86 % of CACFP directors ($p = .0057$). The majority of directors disagreed that their centers had a lack of stationary playground equipment (87 %), portable playground equipment (89 %), and agreed that they had plenty of wheeled toys (79 %). However, 35 % of directors felt that most play equipment was too expensive for their center to afford.

Directors were united in reporting agreement that there should be efforts to ensure physical activity standards at their center (92 %), and would support changes to state regulations that would improve physical activity standards (89 %). Most directors also felt that parents (83 %) and staff (85 %) would share their support of these types of initiatives for both nutrition and physical activity, but 70 % reported that staff would need information and training to implement such changes.

Discussion

Overall, differences were found between reports of CACFP and non-CACFP center directors that could not be accounted for by the economic requirements of that program.

Foods Served in Rhode Island Childcare Centers

Few Rhode Island childcare centers are providing healthy food options including vegetables, unsweetened fruit, and low-fat milk. Most childcare center directors, however, report avoiding fruit in syrup, fried potatoes and SSBs. Overall, the nutritional quality of foods served can be improved across all centers. The American Dietetic Association recommends that full-time childcare programs serve one-half to two-thirds of the foods and beverages that are consistent with the Dietary Guidelines for Americans [25] in a day. This translates into centers serving at least 2.5 or more servings of a variety of fruits and vegetables, and 1 % or non-fat milk for children over 2 years of age [25].

Centers that receive assistance from CACFP provide more fruit, beans, 100 % juice, low fat milk and water compared with non-CACFP centers. Previous research among home-based centers also found higher mean nutritional adequacy among centers receiving higher CACFP reimbursements compared with those with lower reimbursements [26].

Table 5 Director attitudes regarding physical activity, staff, parents and children in the childcare center

Question	All centers (%)				CACFP (%)				Non-CACFP (%)				p value*
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Directors													
I am concerned about the children's safety outside	13.1	7.5	39.3	40.2	16.7	5.6	41.7	36.1	11.6	8.7	37.7	42.0	.8101
I believe children's active play should not be shortened as a punishment.	61.7	27.1	4.7	6.5	63.9	22.2	8.3	5.6	62.3	27.5	2.9	7.3	.6279
I believe it is important to communicate with parents regarding physical activity	46.7	52.3	-	0.9	58.3	41.7	-	0.0	42.0	56.5	-	1.5	.2026
I believe the outdoor space at my center is adequate to support physical activity	55.1	39.3	4.7	0.9	55.6	38.9	2.8	2.8	55.1	39.1	5.8	0.0	.6313
I believe the indoor space at my center is adequate to support physical activity	26.4	54.7	14.2	4.7	22.9	51.4	17.1	8.6	29.0	55.1	13.0	2.9	.5264
I believe children behave better when they are given plenty of activity.	66.4	32.7	0.9	-	72.2	25.0	2.8	-	65.2	34.8	0.0	-	.2517
I believe it is important to strictly limit the amount of time children spend watching television or playing on the computer.	81.3	18.7	-	-	77.8	22.2	-	-	82.6	17.4	-	-	.6047
I believe it is important to strictly limit children's access to television or movies regardless of the content.	75.7	21.5	2.8	-	72.2	25.0	2.8	-	76.8	20.3	2.9	-	.8299
Staff													
On average, my staff has very limited or no training or education in physical activity	0.9	22.9	61.0	15.2	0.0	20.0	71.4	8.6	1.5	24.6	55.1	18.8	.3379
Physical activity training (other than playground safety) is offered to child-care staff	8.6	48.6	40.0	2.8	8.3	63.9	25.0	2.8	8.8	39.7	48.5	2.9	.0809
On average, my staff is physically unable to participate in active play with the children	3.7	-	39.3	57.0	2.8	-	52.8	44.4	4.4	-	30.4	65.2	.0647
There is a shortage of staff to engage children in structured physical activities	0.9	0.9	39.3	58.9	0.0	2.8	55.6	41.7	1.4	0.0	29.0	69.6	.0089
The staff members at my center enjoy joining in with the children in play	40.6	50.9	7.5	0.9	31.4	57.1	11.4	0.0	46.4	46.4	5.8	1.4	.3290
The staff encourages children to go outside when it is cold out.	41.1	51.4	6.5	0.9	30.6	52.8	13.9	2.8	47.8	49.3	2.9	0.0	.0359
It would be difficult to make sure the children are active for at least 1 h per day	1.9	-	40.2	57.9	2.8	-	44.4	52.8	1.5	-	36.2	62.3	.4705
Parents													
Parents demand that their children are physically active.	8.7	40.4	46.1	4.8	0.0	40.0	51.4	8.6	13.4	41.8	41.8	3.0	.0547
Parents dress their children appropriately for outdoor physical activity	11.2	51.4	33.6	3.7	5.6	41.7	47.2	5.6	14.5	58.0	24.6	2.9	.0670
Parents do not want children to go outside when it gets cold.	7.7	33.7	51.9	6.7	14.3	54.3	28.6	2.9	4.5	22.4	64.2	9.0	.0006
Children													
Children go outside every day (not including days when extreme weather conditions don't allow for outdoor play time)	79.4	17.8	2.8	-	63.9	30.6	5.6	-	87.0	11.6	1.4	-	.0149
Children go outside during the winter months as often as they do during the summer months	29.2	30.2	39.6	0.9	33.3	25.0	41.7	0.0	27.9	32.4	38.2	1.5	.8393
During child-led (or unstructured) active playtime, children who are not moving are prompted to be active	50.0	45.3	4.7	-	48.6	45.7	5.7	-	50.7	44.9	4.4	-	1.000
As a reward, we often allow children extra time for physical activity	17.3	41.3	30.8	10.6	12.1	57.6	18.2	12.1	18.8	34.8	36.2	10.1	.1242
When bad weather prevents the children from going outside, it is difficult to keep the children physically active indoors	0.9	16.8	54.2	28.0	0.0	13.9	50.0	36.1	1.5	18.8	55.1	24.6	.6476
Parents are encouraged to provide children with appropriate clothing for going out in the snow	69.8	25.5	2.8	1.9	62.9	28.6	5.7	2.9	73.9	23.2	1.5	1.5	.3573

SA Strongly Agree, A Agree, D Disagree, SD Strongly Disagree

*p value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable
-indicates no responses in that category

Table 6 Attitudes regarding physical activity facilities and physical activity policies

Question	All centers (%)				CACFP (%)				Non-CACFP (%)				<i>p</i> value*
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD	
Physical activity facilities													
There is an on-site outdoor play area	95.3	4.7	-	-	86.1	13.9	-	-	100.0	0.0	-	-	.0039
There is A LACK OF stationary playground equipment	1.9	11.2	29.0	57.9	2.78	19.44	25.00	52.78	1.5	5.8	30.4	62.3	.1373
There is A LACK OF portable playground equipment	1.9	9.3	37.4	51.4	0.0	16.7	36.1	47.2	2.9	4.3	37.7	55.1	.1659
Our center has plenty of wheeled toys	37.4	41.1	17.8	3.7	22.2	52.8	19.4	5.6	46.4	34.8	15.9	2.9	.0794
The outdoor play area has a large open space for group game	55.1	36.5	5.6	2.8	47.2	47.2	2.8	2.8	59.4	30.4	7.3	2.9	.5483
There is an on-site indoor play area	30.8	25.2	24.3	19.6	33.3	36.1	11.1	19.4	30.4	18.8	30.4	20.3	.0970
Most play equipment is too expensive for our center to afford.	11.3	23.6	42.5	22.6	11.1	27.8	44.4	16.7	11.6	20.3	42.0	26.1	.3424
Physical activity policies													
There should be efforts to ensure there are physical activity standards at my center	61.0	31.4	5.7	1.9	65.7	31.4	2.9	0.0	60.3	29.4	7.4	2.9	.7657
I would support changes to state regulations that would establish increased physical activity standards at my center	48.5	40.4	5.0	6.1	50.0	44.1	2.9	2.9	48.4	37.5	6.3	7.8	.7345
My teachers and staff would support changes that would establish increased standards for physical activity at my center	42.2	43.1	8.8	5.9	44.1	47.1	5.9	2.9	42.4	40.9	9.1	7.6	.8417
Parents would support changes to state regulations that would promote increased physical activity at my center	30.1	52.7	9.7	7.5	21.9	65.6	6.3	6.3	35.0	45.0	11.7	8.3	.3307
Staff/teachers at my center will require information and training needed to implement changes to my center's physical activity standards	26.7	43.6	24.7	5.0	35.3	44.1	20.6	0.0	23.1	43.1	26.1	7.7	.2709

SA Strongly Agree, A Agree, D Disagree, SD Strongly Disagree

**p* value indicates Fisher's Exact Test differences between the Child and Adult Care Food Program (CACFP) and non-CACFP distributions for each variable
-indicates no responses in that category

Overall nutritional quality of food served across all centers, regardless of CACFP status was not strong. Others have found less than optimal nutrition in the childcare setting, especially with regard to vegetable intake. A study of 3-day food records from fifty 3 to 5 year old children in childcare revealed insufficiencies. Food intake was compared to two-thirds of the daily intake recommended by the Food Guide Pyramid for Young Children (FGPYC). Children received 18.2 % of two-thirds FGPYC for dairy, 40.9 % meat, 72.7 % for fruits, but 0 % for vegetables. Only 12 % of the children met the recommended intake for vegetables [27].

Director Attitudes Regarding Nutrition

Directors value serving healthy foods to children and realize the importance of eating healthy in front of the children. Though non-CACFP center directors are better able to access and identify healthy foods to prepare, their centers still serve less nutritious foods than CACFP centers. We found that directors are aware of food costs and compare prices among healthy foods with up to 20 % opting for a less healthy food choice because it is more affordable. In a recent study, directors reported that nutritional content, cost, availability, and convenience were all factors that affected what foods were served to children [28].

Staff also value serving healthy foods; however, center practices and staff behaviors do not necessarily reflect

this. Over 40 % of childcare centers do not regularly offer nutrition training to staff. This is consistent with another study that found in which less than 24 % of staff received more than yearly training about feeding children, with CACFP centers more likely to train their staff with nutrition professionals than non-CACFP centers [29]. It is important to identify opportunities in childcare for nutrition training focused on improving staff knowledge, attitudes, and behaviors.

Staff behaviors assessed during meal and snack times included caregiver food modeling, which can impact a child's willingness to eat the same healthy food or try new foods [30]. Staff members were likely to sit with children during meals, but did not necessarily eat the same foods as children. Across the literature, food modeling in childcare varied [30–32]. In one study, less than one-fourth of Hispanic providers sat with children during meals [31]. Other studies were congruent with our results in that staff members sat with children during mealtimes and even refrained from consuming less healthy foods than the children [30, 33].

The statistically significant differences between CACFP and non-CACFP centers regarding parental practices and knowledge may indicate that socioeconomic factors prevent parents from packing healthy meals and engaging children in nutrition. Directors from non-CACFP centers were more likely to agree that the foods brought

in by parents were often healthy. Yet, other research has shown that even parents that understand the importance of packing healthy foods do not consistently send nutritious meals to the center with their child [34]. Availability, accessibility, and affordability of healthy foods can have implications on the meal a parent packs in addition to other issues such as culture, parental food preferences and convenience.

Directors from non-CACFP centers were more likely to agree that parents reinforce nutrition education at home and that parents are knowledgeable about healthy foods to serve to children. Parental nutrition knowledge is a strong predictor for child nutrition knowledge ($p < 0.001$), [35] which has implications in the home and childcare environment. Outreach to parents might be delivered through childcare providers whether it is through educational opportunities or regarding specific concern about a meal packed for a child.

Physical Activity in Rhode Island Childcare Centers

Rhode Island childcare centers also have room for improvement when it comes to achieving recommended amounts of both structured and unstructured physical activity. Best-practice guidelines set forth by NAPSE recommends that pre-school aged children accumulate at least 60 min of unstructured and 60 min of structured physical activity each day [36]. The majority of directors reported less than 45 min of structured physical activity during the previous day. A narrower portion of directors reported that children engage in less than 45 min of unstructured physical activity. The highest proportion of both CACFP and non-CACFP centers reported never or rarely allowing screen time during the previous week.

Our results suggest that children should receive more opportunities for physical activity, specifically in the form of adult-led activities. Previous work in other geographic areas corroborates our findings. A study of 96 North Carolina childcare centers found that only 13.7 % of the enrolled centers achieved a total of 120 min of active playtime [36]. Structured time is important for ensuring that children achieve vigorous activity levels. Direct observations of pre-school aged children during the childcare day indicated that they spent less than 3 % of the observation intervals engaged in moderate-to-vigorous and were sedentary for over 80 % of the observation intervals, [37] indicating a wide margin for improvement.

Director Attitudes Regarding Physical Activity

There were few significant differences between CACFP and non-CACFP centers when it came to physical activity. Our findings highlight the importance of improving policies that would affect the physical activity standards of all centers regardless of participation in CACFP.

Directors perceived the outdoor environments at their childcare center to be supportive of physical activity. However, centers did not have an on-site indoor play area (44 %), which could serve as an impediment to children's physical activity throughout the day. One study using a pedometer to measure children's physical activity found a trend toward a positive association between size of indoor play area and child step counts (not statistically significant) [38].

Centers had sufficient amounts of stationary equipment, portable playground equipment, and wheeled toys. Previous studies have identified the importance of portable and fixed playground equipment on physical activity [39–41]. Approximately one-fourth of directors felt that play equipment was too expensive for their center to afford, which can serve as a barrier to low-income centers' ability to engage children in different types of active play.

The childcare interpersonal environment is crucial to cultivating healthy physical activity behaviors in children. Directors reported that staff participate in and enjoy active play with the children. However, significant differences existed between CACFP and non-CACFP centers when it came to having enough staff to engage children in structured physical activities. Staff presence and behavior have been found to be important components to children's active play [39, 41–43]. Another predictor of a child's engagement in physical activity is staff training and education [39, 41]. Approximately one-fourth of directors reported that their staff had very limited or no training/education in physical activity.

While interpreting these results, it is important to consider the limitations of the study design and methods. First, this survey relies on data reported by the childcare center director, which may be biased toward a more socially desirable response, or may be incorrect due to lack of contact by directors with the specifics of food served and activity schedules. Others have found that there are inconsistencies between actual foods served and childcare menus [44]. Other studies have addressed the self-report issue by measuring physical activity through direct observation, [37] or using a pedometer [45]. Both of these methods offer more objective measurement, but they are both time and cost intensive.

Providers who did not respond to the survey request despite numerous attempts at reaching them, may have represented a more time or resource constrained group of centers, which may have introduced a selection bias to our sample. However, the high proportion of centers reached (67 % of eligible) indicates that this bias is likely small. Also, foods provided and physical activity time schedules were asked in the form of a recall of the activities the day before the survey. This format may have resulted in responses that were not typical of a "usual."

The benefit of this method is that it may result in a more concrete response, rather than the potential for biased estimation of a “usual” pattern. Additionally, reasons for use of CACFP (or choosing to not use CACFP) were not explored, and might have implied incorrectly that use of CACFP was the, “cause,” of behaviors or attitudes. As a cross-sectional study, no element of causation or change can be inferred.

Conclusions

Overall, more nutritious foods were provided in CACFP centers, compared with non-CACFP centers, but no differences in physical activity were identified. Although non-CACFP directors reported that they were better able to access and identify healthy foods, they did not necessarily serve these in centers. The guidelines requiring specific menu plans in CACFP centers might explain a difference found for food provided, but no difference in physical activity between CACFP v. non-CACFP centers. Across the board, staff training and education in nutrition and physical activity could be a way to mediate change in behaviors such as increasing structured physical activity, modeling healthy eating behavior, and communicating with parents regarding nutrition. Finally, stronger guidelines supporting both food and activity would bolster actual policies for childcare centers in Rhode Island and improve the nutrition and physical activity environments in this setting.

Abbreviations

CACFP, Child and Adult Care Food Program; DCYF, Department of Children, Youth and Families; FGPYC, Food Guide Pyramid for Young Children; NAPSE, National Association for Sport and Physical Education; RI, Rhode Island; RINR, Rhode Island Nutrition Requirements; SNAP, Supplemental Nutrition Assistance Program; SSBs, sugar-sweetened beverages

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Availability of data and materials

All non-identifying data for this manuscript are available upon request to the lead author, at patricia_risica@brown.edu.

Authors' contributions

PMR oversaw all aspects of study design, data collection, analysis, and manuscript preparation. SA conducted telephone interface with Directors and collected all data. AA and EL made substantial contributions to conception and design and interpretation of data, as well as manuscript preparation and approval. All authors meet the four criteria for authorship as they have made Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; have been integrally involved in drafting the work or revising it critically for important intellectual content; have made final approval of the version to be published; and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors approved the final version of the manuscript.

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Competing interests

The authors declare that they have no competing interests.

Consent for publication

“Not applicable”.

Ethics approval and consent to participate

This study was approved by the Research Protections Office Institutional Review Board of Brown University. Participants completed a consent form by telephone, web or paper/pencil prior to completing the survey by the same communication channel.

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