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# Improving the Nutrition and Screen Time Environment through Self-assessment in Family Childcare Homes in Nebraska

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# Improving the nutrition and screen time environment through self-assessment in family childcare homes in Nebraska

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## Abstract

**Objective:** To determine if family childcare homes (FCCH) in Nebraska meet best practices for nutrition and screen time, and if focusing on nutrition and screen time policies and practices improves the FCCH environment.

**Design:** A pre–post evaluation was conducted using the Go Nutrition and Physical Activity Self-Assessment for Childcare (Go NAP SACC).

**Setting:** FCCH in Nebraska, USA.

**Subjects:** FCCH enrolled in the Child and Adult Care Food Program (CACFP; *n* 208) participated in a pre–post evaluation using Go NAP SACC.

**Results:** At baseline, all FCCH met the minimum childcare standards for fifty-four of fifty-six practices in nutrition and screen time. After the intervention, FCCH demonstrated significant improvement in fourteen of the forty-four Child Nutrition items and eleven of the twelve Screen Time items. However, FCCH providers did not meet best practices at post-intervention. Lowest scores were found in serving meals family-style, promoting visible support for healthy eating, planned nutrition education and written policy on child nutrition. For screen time, lowest scores were reported on the availability of television, offering families education on screen time and having a written policy on screen time.

**Conclusions:** FCCH in Nebraska were able to strengthen their policies and practices after utilizing Go NAP SACC. Continued professional development and participation in targeted interventions may assist programmes in sustaining improved practices and policies. Considering the varying standards and policies surrounding FCCH, future studies comparing the current findings with childcare centres and non-CACFP programmes are warranted.

**Keywords**  
Go NAP SACC  
Family childcare homes  
Nutrition practices  
Screen time  
Obesity

Childhood obesity is a global health concern. In the USA, approximately 27% of children aged 2–5 years are overweight (BMI-for-age = 85th to <95th percentile) or obese (BMI-for-age ≥95th percentile) and by adolescence, these rates double<sup>(1)</sup>. Nebraska ranks fifth in the USA for obesity rates among 2- to 5-year-old children, with approximately 30.5% of children classified as overweight or obese<sup>(2)</sup>. Childhood obesity is associated with chronic diseases such as diabetes, CVD and obesity in adulthood<sup>(3)</sup>.

Childcare settings offer an ideal environment for childhood obesity prevention owing to multiple reasons: (i) more than 6 million children are cared for in childcare settings<sup>(4)</sup>; (ii) children consume half to three-quarters of

their daily energy intake while in full-day childcare programmes; (iii) early childhood is a formative period where children are developing food preferences and eating habits that track into adolescence and adulthood; (iv) childcare providers' feeding practices influence children's dietary intake; and (v) serving foods and beverages that are low in fat and sugar, childcare providers' responsive feeding practices and limiting screen time can help prevent childhood obesity<sup>(5,6)</sup>.

Numerous studies have examined nutrition-related practices and policies in childcare, including foods served, feeding practices and written policies; however, most of these studies have focused on childcare centres<sup>(6,7)</sup>. Therefore,

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there is limited research on nutrition-related policies and practices within family childcare homes (FCCH). Childcare centres are facilities in non-residential homes whereas FCCH provide care for children in the caregivers' own home. Focusing on FCCH in Nebraska is important because of the large number of FCCH compared with childcare centres. Illustratively, as of May 2017, there were nearly three times as many FCCH ( $n$  2151) as there were childcare centres ( $n$  719) in Nebraska<sup>(8)</sup>. Furthermore, FCCH have less space, fewer employees and a mixed age group of children compared with childcare centres. FCCH need particular attention as some evidence suggests that children who receive care in FCCH may be at an increased obesity risk *v.* children who receive care in centre-based childcare<sup>(9)</sup>. Little is known about the potential mechanisms including nutrition and screen time practices linking FCCH with obesity. The lack of research on FCCH, a higher number of FCCH in Nebraska, the unique characteristics of FCCH and the proportion of children in Nebraska who are overweight or obese underscore the importance of understanding FCCH programmes' nutrition-related and screen time practices to prevent childhood obesity.

Although few in number, studies have identified several obesity-related nutrition risk factors within FCCH. A stratified random sample study with 297 FCCH showed that only 14% of providers served low-fat milk and 17% reported eating unhealthy foods in the presence of children<sup>(7)</sup>. A study involving 296 FCCH revealed similar findings, with only 11% of the providers serving skimmed milk daily<sup>(10)</sup>. With regard to screen time, pre-school children aged 2–5 years also appear to engage in higher-than-recommended levels of screen time while in FCCH compared with centre-based childcare<sup>(11,12)</sup>. Sixty per cent of providers reported that the television is on for at least part of every day<sup>(7)</sup> and nearly 60% of children attending FCCH in Oregon<sup>(13)</sup> and Kansas<sup>(7)</sup> spend part of their day watching television or videos. These findings support the need to improve nutrition-related practices and screen time in FCCH as a strategy to prevent childhood obesity among children attending FCCH.

The Go Nutrition and Physical Activity Self-Assessment for Childcare (Go NAP SACC) is an evidence-based programme for improving the nutrition and weight outcomes among children through better nutrition and screen time practices and policies in childcare settings<sup>(14)</sup>. Go NAP SACC consists of five steps: (i) a self-assessment is performed by the childcare provider to assess the childcare practices and policies to identify areas of improvement; (ii) action planning; (iii) using tips and materials to put plans into action; (iv) participating in workshops and training to implement childcare environment-level change; and (v) post-assessment completed by the FCCH provider. Accumulating evidence demonstrates that Go NAP SACC significantly improves nutrition-related practices in childcare. For example, a study showed that childcare centres in Maine improved their nutrition policies and physical

activity offerings post-intervention<sup>(15)</sup>. Other research in rural North Carolina showed that centres have improved their play environment as a result of Go NAP SACC intervention<sup>(5)</sup>. The programme has also been effective in significantly improving nutrition practices for FCCH providers. As an example, the nutrition activity scores of FCCH increased for three consecutive years after participation in the programme in Kansas<sup>(16)</sup>. These findings are promising; however, evidence on the effectiveness of Go NAP SACC in FCCH in Nebraska is limited.

In addition to the unique characteristics of FCCH that need attention, it is important to focus intervention programmes on FCCH with high rates of free or reduced-price lunch participation and those that serve children from minority families, given that obesity is more prevalent in this demographic<sup>(17)</sup>. The US Department of Agriculture's (USDA) supplemental nutrition assistance programme, the Child and Adult Care Food Program (CACFP), provides reimbursement for meals and snacks to 3.2 million low-income pre-school children daily<sup>(18)</sup>. Therefore, the objectives of the present study were to determine if CACFP-funded FCCH in Nebraska provide children with environments that meet best practices for nutrition and screen time, and if focusing on nutrition and screen time best practices and policies through Go NAP SACC improves the FCCH environment.

## Methods

### Study design

The present study utilized a pre–post evaluation design to determine whether focusing on nutrition and screen time best practices and policies through Go NAP SACC improved the FCCH environment.

### Nebraska Go NAP SACC

Go NAP SACC was introduced to Nebraska in 2008 for pilot-testing in FCCH through a grant from the Nebraska Department of Health and Human Services and the Centers for Disease Control and Prevention. In 2010, Nebraska received additional funding from USDA Team Nutrition to conduct training and pilot Go NAP SACC in childcare centres. With this financial support, Go NAP SACC was expanded across the state, through collaboration with Nebraska Extension, local health departments, the health-care systems, local non-profit agencies and other partners from the community. The Nebraska Go NAP SACC state-wide coordinator, funded by the Nebraska Department of Health and Human Services, provides one-day training to the Go NAP SACC trainers, supervises trainers, and provides resources and technical assistance to all the trainers state-wide. Currently, there are thirty Nebraska Go NAP SACC trainers across the state of Nebraska.



### **Participants and setting**

Licensed FCCH providers in all ninety-three counties in Nebraska were all eligible to participate in Go NAP SACC. Approximately three months prior to offering training, providers were recruited through emails, newsletters from regional Education Service Units, trainer organizations (CACFP sponsors, health departments, health-care organizations, etc.) and the Nebraska Department of Education's Early Childhood Professional Record System. The current study utilized a convenience sampling design and if an FCCH provider was interested in participating, s/he contacted the trainer for the specific training s/he was registering for. The information on the training schedule and trainer was included on the Go NAP SACC recruitment flyer. Trainers included University of Nebraska Extension educators or professionals from CACFP-sponsoring agencies. They were trained by the Nebraska Go NAP SACC state-level coordinators during train-the-trainer events where senior state-level trainers provide a face-to-face, one-day training. Each trainer received a binder that included printed materials from the Go NAP SACC website to ensure that all trainers had access to the same materials.

FCCH providers who agreed to participate first completed the online pre self-assessment hosted via a secure online server through the University of Nebraska–Lincoln (<http://negonapsacc.unl.edu/>; step i). Providers and their staff (if applicable) then attended a six-hour training on child and adult obesity, child nutrition, physical activity, personal health and wellness, working with families, and breast-feeding and infant feeding (step ii). Trainings were typically held on a Saturday or over two weeknight evening sessions, with each training following a slightly different format depending on the FCCH's location. Next, a Go NAP SACC trainer met with the providers individually to review the pre-assessment results, to identify areas for improvement and to set the goals for the FCCH through an action plan (step iii). Trainers assisted the providers whenever necessary to help them achieve their goals (step iv). Finally, the providers completed the post self-assessment (step v). The Go NAP SACC trainers assessed fidelity by completing a fidelity checklist to monitor FCCH providers' participation in their completion of the five steps of the Go NAP SACC programme. Based on the number of goals set by the providers, the implementation of Go NAP SACC took between four and six months to complete. After completion of the post-assessment, providers received their training certificate for six in-service hours as well as child nutrition resources (nutrition posters and books) commensurate with their needs.

### **Measures**

The Go NAP SACC self-assessment is the measure used in the present study<sup>(9)</sup>. The self-assessment is completed online by the FCCH provider. The Go NAP SACC self-assessment consists of five separate instruments to assess

the following topic areas: breast-feeding and infant feeding, child nutrition, screen time, infant and child physical activity, and outdoor play. To assess the nutrition and screen time environments, the present study focused on two Go NAP SACC measures: Child Nutrition and Screen Time. The Child Nutrition section has seven categories (including foods provided, beverages provided, feeding environment, feeding practices, menus and variety, education and professional development, and policy) with a total of forty-four questions. The Screen Time section consists of four categories (including availability, teacher practices, education and professional development, and policy) with a total of twelve questions. The Go NAP SACC self-assessment tool has been previously validated<sup>(14,19)</sup> and widely used in both childcare centres<sup>(5)</sup> and FCCH<sup>(7,9,16)</sup>. The present study utilized the Go NAP SACC assessments specifically developed for FCCH<sup>(9)</sup>. Participants answered each question on a 4-point Likert scale where providers indicate the number of times per day or week a nutrition practice is being followed (e.g. '3 times per week', '4 times per week') while some items inquire frequency estimates (e.g. 'never', 'sometimes', 'often', 'always'). The response options varied based on the question and the overall 4-point Likert scale represents: 1 = barely meeting minimum childcare standards, 2 = meeting minimum childcare standards, 3 = exceeding minimum childcare standards and 4 = far exceeding minimum childcare standards or meeting best practices for childhood obesity prevention<sup>(7,9,16)</sup>. Therefore, higher scores are indicative of adherence to the best practices.

### **Data analysis**

The data for FCCH were downloaded for the pre- and post-assessments from the website (<http://negonapsacc.unl.edu/>) into a Microsoft<sup>®</sup> Excel 2016 spreadsheet and exported into IBM SPSS Statistics version 21. The data were cleaned by checking for any duplicate entries by the same childcare site. A total of 262 providers completed the pre-assessment and 208 completed the Go NAP SACC programme and the post-assessment. Therefore, 208 FCCH programmes were retained in the analysis. A primary reason for dropout was an inactive site ( $n = 21$ ) where either the director had moved or the childcare site was no longer in business. The data's normality was assessed using the Kolmogorov–Smirnov test. The results of Kolmogorov–Smirnov testing showed that the Child Nutrition and Screen Time scores were non-normally distributed ( $P < 0.05$ ). Thus, the Wilcoxon non-parametric test was conducted using IBM SPSS Statistics version 21 to examine the differences between Go NAP SACC pre-test and post-test scores. The Sidak–Bonferroni correction was applied to adjust the multiple comparisons of the Wilcoxon test. The  $P$  value for nutrition items was Sidak–Bonferroni =  $1 - (1 - 0.05)^{0.024} = 0.0012$ ; the  $P$  value for screen time items was Sidak–Bonferroni =  $1 - (1 - 0.05)^{0.083} = 0.004^{(20)}$ .



## Results

A total of 208 CACFP-funded FCCH in Nebraska participated in the Go NAP SACC programme from August 2014 to October 2017. In total, these FCCH provide care to approximately 1568 children aged 2–5 years in seventy-five out of ninety-three counties in Nebraska.

### **Child nutrition**

Table 1 lists the categories, questions and responses to the Child Nutrition items at pre-test and post-test. The FCCH met all forty-four of the Child Nutrition minimum childcare standards at pre-test (score  $\geq 2$ ). Table 1 also illustrates the changes in Go NAP SACC Child Nutrition items after the intervention. FCCH made significant improvement in the following areas; meats, fats and grains (two of eight items); family-style dining (one of one item); supporting healthy eating (two of five items); feeding practices (two of ten items); menus and variety (one of two items); nutrition education for staff, children and parents (five of six items); and nutrition policy (one of one item).

Despite these significant improvements, however, a few items scored below 3.1, indicating room for further improvement to far exceed minimum childcare standards and meet best practice. The lowest scores were found regarding serving meals family-style (2.73), promoting visible support for healthy eating (through books, posters, etc.; 3.06), planned nutrition education (3.02) and written policy on child nutrition (3.08).

### **Screen time**

Table 2 presents the item means for the Screen Time section. At baseline, FCCH met minimum childcare guidelines for ten of the twelve items. After the intervention, participating programmes made significant improvement in all the areas under Screen Time: availability (five of five items); daily practices (one of two items); education and professional development (four of four items); and policy (one of one item). Despite these improvements, a few items still scored below 3.1. The items with the lowest scores included availability of television outside the classroom (area in FCCH where children are present) or no televisions (2.36), offering families education on screen time (2.77), professional development for FCCH providers on screen time (2.80) and written policy on screen time (2.82).

## Discussion

Overall, FCCH providers reported meeting minimum childcare standards for Child Nutrition and Screen Time prior to the intervention. Given that all FCCH in the present study were participating in CACFP, this finding may be attributed to the CACFP requirements for serving

nutritious foods and beverages to children. Previous studies have reported that participation in CACFP is associated with more nutritious food and beverage offerings to children in FCCH and childcare centres<sup>(21,22)</sup>. Further, after the Go NAP SACC programme, FCCH exceeded the minimum standards (score  $\geq 3$ ) in the area of nutrition practices, particularly those related to offering meats or meat alternatives that are lean or low-fat, serving high-fibre, wholegrain foods and supporting healthy eating through responsive feeding practices. Similarly, after the Go NAP SACC programme, the FCCH providers made significant improvements in screen time availability, practices and policy. These outcomes are consistent with previous research<sup>(5)</sup> and underscore the importance of the Go NAP SACC programme in improving the nutrition and screen time practices in FCCH in Nebraska.

The results also revealed that some nutrition and screen time items did not improve at post-intervention, which merit further discussion. First, although the post-test means showed a positive trend, there were twenty-nine items in the Child Nutrition section and one item in the Screen Time section that did not significantly change from the pre-test. Upon examining these items, the non-significance of the changes may be attributed to ceiling effects given the high initial pre-test scores. For example, most of the providers reported that their programme exceeds minimum standards in offering fruit that is fresh, frozen or canned in juice even before the Go NAP SACC intervention. Also, pre-test responses exceed screen time guidelines in avoiding screen time as a reward. This highlights specific nutrition and screen time practices that FCCH are successfully enacting; hence, interventions should target different areas where post-test responses did not improve.

Regarding improvements in the post-test scores of nutrition practices, the results showed that the FCCH are yet to exceed minimum childcare standards and meet nutrition best practices related to planned nutrition education for children and written nutrition policy. These findings are concerning and identify a missed opportunity in preventing childhood obesity, because a recent study reported that higher scores on nutrition education and written nutrition policy were associated with improved dietary quality in children in FCCH<sup>(23)</sup>. Regarding nutrition education, the present study FCCH lacked visible support for healthy eating, albeit the availability of free resources from USDA Team Nutrition such as books and posters on nutrition<sup>(18)</sup>. Providers in centre-based childcare have expressed barriers such as lack of funding and resources for offering planned nutrition education and visible support for healthy eating for children<sup>(24)</sup>. The present study providers had access to free nutrition education resources from the USDA and Go NAP SACC and yet did not exceed minimum standards for nutrition education. These findings warrant a need for future studies to better understand FCCH providers' needs and barriers for meeting best practices regarding planned nutrition education for



**Table 1** Scores on Child Nutrition items at pre-test and post-test among family childcare homes (*n* 208) participating in the Go Nutrition and Physical Activity Self-Assessment for Childcare (Go NAP SACC) programme, Nebraska, USA, August 2014–October 2017

	Pre		Post		<i>P</i> value
	Mean	SD	Mean	SD	
<b>Fruits and vegetables</b>					
My programme offers fruit	3.61	0.71	3.72	0.65	0.87
My programme offers fruit that is fresh, frozen or canned in juice	3.64	0.60	3.75	0.41	0.42
My programme offers vegetables	3.21	0.73	3.44	0.64	0.03
My programme offers dark green, orange, red or deep yellow vegetables	3.12	0.81	3.34	0.78	0.02
My programme offers vegetables that are rarely/never cooked or flavoured with meat fat, margarine or butter	3.58	0.70	3.80	0.49	<0.01
<b>Meats, fats, and grains</b>					
My programme offers fried or pre-fried potatoes <2 times per week	3.51	0.73	3.74	0.56	0.01
My programme offers fried or pre-fried meats or fish <2 times per week	3.30	0.86	3.61	0.63	<0.01
My programme offers high-fat meats <2 times per week	3.16	0.88	3.52	0.66	<0.01
My programme offers meats or meat alternatives that are lean or low fat	2.85	0.78	3.17	0.73	<0.001*
My programme offers high-fibre, wholegrain foods	2.95	0.95	3.21	0.89	<0.001*
My programme offers high-sugar, high-fat foods <2 times per week	3.42	0.63	3.68	0.52	0.02
My programme offers high-salt, high-fat snacks <2 times per week	3.65	0.52	3.82	0.39	0.03
My programme offers children sweet or salty snacks outside meal and snack times <2 times per week	3.79	0.46	3.88	0.31	0.89
<b>Beverages</b>					
Drinking water is available	3.56	0.81	3.83	0.52	0.01
My programme offers children a 4–6 oz serving of 100% fruit juice <3 times per week	3.27	0.87	3.62	0.77	<0.01
My programme offers sugary drinks <2 times per year	3.62	0.80	3.70	0.67	0.67
For children aged 2 years or older, milk usually offered is 1% or skimmed	3.11	0.49	3.21	0.65	0.13
My programme offers flavoured milk <2 times per week	3.74	0.58	3.82	0.50	0.48
<b>Dining style</b>					
Meals and snacks are most to all the time served family-style	2.02	0.94	2.73	0.89	<0.001*
<b>Screen time during meals</b>					
Television or videos are sometimes or never on during meal and snack times	3.72	0.57	3.80	0.39	0.92
<b>Supporting healthy eating</b>					
Provider most to all the time eats and drinks the same foods and beverages as children	2.76	0.87	3.21	0.78	<0.001*
Provider rarely or never eats or drinks unhealthy foods or beverages in front of children	3.64	0.58	3.85	0.45	0.03
Provider most to all the time talks informally with children about trying and enjoying healthy foods	3.16	0.76	3.49	0.79	<0.01
My programme's collection of posters, books and other learning materials that promote healthy eating	2.26	0.91	3.06	0.38	<0.001*
My programme's collection of posters, books and other learning materials that promote few or no unhealthy foods	3.45	0.68	3.60	0.66	0.56
<b>Feeding practices</b>					
Provider praises children for trying new or less-preferred foods	3.77	0.46	3.82	0.65	0.67
Provider helps children determine whether they are full before removing the plates all the time	3.75	0.60	3.81	0.51	0.79
Provider helps children determine whether they are still hungry before serving more food	3.07	0.79	3.53	0.38	<0.001*
Provider rarely or never requires that children sit at the table until they clean their plates	3.58	0.72	3.89	0.57	0.02
Provider uses an authoritative feeding style	2.95	0.94	3.31	0.39	<0.001*
Provider rarely or never uses children's preferred foods to encourage them to eat new or less-preferred foods	3.42	0.74	3.73	0.65	<0.01
Provider rarely or never uses food to calm upset children or encourage appropriate behaviour	3.83	0.77	3.92	0.81	0.63
During meal and snack times, provider praises and gives hands-on help to guide toddlers as they learn to feed themselves	3.73	0.75	3.84	0.83	0.35
When toddlers are developmentally ready, provider offers beverages in an open, child-sized cup	3.31	0.43	3.65	0.44	<0.01
During indoor and outdoor physically active playtime, provider reminds children to drink water	3.15	0.58	3.48	0.49	<0.01
<b>Menus and variety</b>					
Menus are used in at least a 3-week cycle	2.68	0.86	3.11	0.79	<0.001*
Weekly menus most to all the time include a variety of new and familiar healthy foods	3.70	0.74	3.81	0.47	0.49
<b>Nutrition education for staff, children and parents</b>					
Provider leads planned nutrition education	2.43	0.92	3.02	0.85	<0.001*
Provider often talks with children informally about healthy eating	2.96	0.53	3.52	0.61	<0.001*
Provider receives training or attends workshops on nutrition ≥1 times per year	2.93	0.89	3.41	0.42	<0.001*
Provider has covered a variety number of topics as part of this professional development	3.19	0.84	3.63	0.78	<0.01
Nutrition education opportunities for families are offered	2.52	0.93	3.28	0.67	<0.001*
Information the provider offers families on child nutrition covers a variety of topics	2.63	0.91	3.38	0.64	<0.001*
<b>Nutrition policy</b>					
Provider has a comprehensive written policy on child nutrition and food service	2.23	0.95	3.08	0.65	<0.001*

Scores were reported on a 4-point Likert scale, with 1 = barely meeting minimum standard and 4 = far exceeding minimum standard to meet Go NAP SACC best practice. The response options differed depending on the question.

\*Significant difference ( $P < 0.0012$ ); Sidak–Bonferroni correction was applied.

**Table 2** Scores on Screen Time items at pre-test and post-test among family childcare homes (*n* 208) participating in the Go Nutrition and Physical Activity Self-Assessment for Childcare (Go NAP SACC) programme, Nebraska, USA, August 2014–October 2017

	Pre		Post		<i>P</i> value
	Mean	SD	Mean	SD	
<b>Availability</b>					
Televisions are located outside classrooms or no televisions	2.12	0.78	2.36	0.87	0.003*
For children 2 years of age or older, the amount of screen time allowed in my programme each week is less than 30 min or no screen time is allowed	2.80	0.81	3.34	0.84	<0.001*
For children under 2 years of age, the amount of screen time allowed in my programme each week is less than 30 min or no screen time is allowed	2.75	0.76	3.23	0.78	<0.001*
When television or videos are shown to children, this programming is educational and commercial free	3.05	0.90	3.48	0.63	<0.001*
When screen time is offered, provider gives children the opportunity to do an alternative activity	3.50	0.88	3.78	0.56	0.002*
<b>Daily practices</b>					
Provider rarely or never uses screen time as a reward	3.63	0.86	3.75	0.62	0.45
When screen time is offered, provider talks with children about what they are seeing and learning	2.97	0.84	3.36	0.78	<0.001*
<b>Education and professional development</b>					
Provider receives training or attends workshops on screen time $\geq 1$ times per year	2.09	1.01	2.80	0.92	<0.001*
Provider has covered a variety number of topics as part of this professional development	2.62	0.97	3.40	0.85	<0.001*
Screen time education opportunities for families are offered	1.89	1.02	2.77	0.92	<0.001*
Information the provider offers families on screen time covers a variety of topics	2.19	0.91	3.14	0.83	<0.001*
<b>Policy</b>					
Provider has a comprehensive written policy on screen time and food service	1.70	1.01	2.82	0.79	<0.001*

Scores were reported on a 4-point Likert scale, with 1 = barely meeting minimum standard and 4 = far exceeding minimum standard to meet Go NAP SACC best practice. The response options differed depending on the question.

\*Significant difference ( $P < 0.004$ ); Sidak–Bonferroni correction was applied.

children. Further, providers in the present study sample did not exceed minimum standards regarding have a written nutrition policy at post-intervention. This finding was unexpected given that all FCCH providers were participating in CACFP and thus they were required to meet nutrition standards for receiving reimbursement for foods and beverages served to the children in their care. These CACFP nutrition standards can serve as an example for FCCH providers to draft a written nutrition policy for their programme. Providers may benefit from continued professional development training regarding the advantages of having a written nutrition policy. Specifically, research has shown that written nutrition policies improved children's dietary quality in FCCH<sup>(23)</sup>. Furthermore, FCCH providers have reported that written nutrition policies improved their communication with parents about bringing healthy foods from home and also helped avoid parental conflict around obesity prevention<sup>(25)</sup>. FCCH providers would likely benefit from interventions teaching the importance of offering nutrition education to children and having written nutrition policies, availability of free resources from the USDA and the different strategies the FCCH providers can employ to address their barriers.

Regarding nutrition practices related to responsive feeding, FCCH providers did not exceed minimum standards at post-intervention for practising family-style dining. National guidelines recommend that childcare providers practise family-style dining, where children serve themselves and select their own portions from communal dishes and pitchers placed on the table<sup>(26,27)</sup>. Previous studies

have demonstrated that family-style dining provides opportunities for children to learn and enhance their social and motor skills and improve children's self-regulation in eating<sup>(28,29)</sup>. FCCH did not exceed minimum standards in this practice at post-intervention (score <3). One possible explanation for this finding is that although CACFP recommends family-style dining, it does allow providers to choose between family-style and pre-plated meal service<sup>(18)</sup>. FCCH also differ from centre-based care, such that they generally lack sufficient indoor space and have children with a mixed age group with varying developmental skills to serve themselves<sup>(29)</sup>. These factors may make it challenging for FCCH to practise family-style dining. Research has been conducted to explore childcare providers' motivators, barriers and facilitators to practising family-style meal service in centre-based childcare<sup>(30)</sup>. Results of this work indicate that providers were motivated to practise family-style dining because it creates opportunities to role model healthy eating and is beneficial to children's development<sup>(30)</sup>. On the other hand, some providers perceived this practice as messy, resource-intensive and not in accordance with the CACFP guidelines<sup>(30)</sup>. It is unknown whether these results generalize to FCCH in Nebraska. Future studies are needed to understand the unique experiences of childcare providers in FCCH, including their beliefs and challenges related to implementing family-style dining with children in their care.

Regarding screen time, the results showed that preschool children appear to engage in higher-than-recommended levels of screen time within FCCH. These





findings on screen time are consistent with previous studies<sup>(12,31)</sup>. We offer two reasons that may explain this finding. First, CACFP requires providers to meet standards regarding nutritional quality of foods and beverages served to children but does not have a set of prescribed guidelines on screen time. Consequently, it is possible that FCCH do not consider screen time as an important factor that contributes to obesity or they may not be particularly motivated to change their practices given the lack of CACFP requirements in this area. As mentioned, FCCH represent unique characteristics such as serving children from different ages<sup>(7)</sup> and having limited indoor and outdoor play space<sup>(31)</sup>. These FCCH characteristics may restrict children's physical activity and inadvertently support screen time use, in which children of various ages can easily participate at a given time. Lastly, Nebraska's winter weather conditions may limit children's outdoor activities, and providers may use screen time as a resort when children cannot comfortably and safely spend time outdoors. Given that screen time is a risk factor for childhood obesity and key screen time practices did not exceed minimum guidelines at post-intervention, reducing children's screen time in FCCH in Nebraska is an important target for CACFP policy and future interventions.

In summary, results of the present study suggest that CACFP-funded FCCH in Nebraska provide children with environments that meet minimum childcare standards for nutrition and screen time, and that focusing on nutrition and screen time policies and best practices through Go NAP SACC can improve the FCCH environment. The study also identified specific areas that did not exceed minimum childcare standards at post-intervention and could serve as targets for future interventions, including family-style dining, planned nutrition education, visible support for healthy eating, written policy for nutrition and screen time, and screen time availability in FCCH and education for parents and providers. Given the lack of research on FCCH, these findings also imply the necessity of state-wide partnership between state agencies such as the Nebraska Department of Education, the Nebraska Department of Health and Human Services and Cooperative Extension to deliver Go NAP SACC to improve policies and practices in state-wide FCCH. More studies are needed to identify the factors specific to FCCH, such as the number of children and child age in FCCH, geographic location, ethnicity of both providers and children served, and the number of years the FCCH has been in operation, for developing effective interventions. Childcare centres ( $n = 645$ ) in Nebraska serve more than 55 000 children<sup>(8)</sup>. Therefore, future studies are also needed to compare the centre-based and home-based childcare environments to deliver targeted interventions based on the childcare context. The present study found that most FCCH are meeting minimum childcare standards, which may be attributed to the CACFP nutrition requirements regarding foods and beverages served to the children in childcare. Future studies

are required to assess the nutrition and screen time environment of FCCH that do not participate in CACFP. Although the Go NAP SACC programme improved the nutrition and screen time practices in FCCH, future studies are needed to determine whether meeting nutrition and screen time best practices result in an improvement in children's dietary intake.

### **Limitations and strengths**

The present study should be interpreted in the light of its limitations. It employed a non-experimental pre-post design and therefore causality cannot be determined. Although we used data from two time points which increases the study's predictive validity, we were not able to control for other contextual factors (e.g. geographical location, season) that may have impacted the post-intervention results and this warrants future examination. Nevertheless, we believe that this did not greatly affect the results as the majority of the educators were trained by a state-wide coordinator and the resources were commensurate to the needs of each provider. Next, while Go NAP SACC involves professional trainers during the assessment, training and goal-setting phases of the intervention, we relied on the FCCH providers' self-report which is subject to social desirability bias. Further, it is possible that FCCH providers who were initially more motivated to participate in the intervention may have contributed to self-selection bias. Nevertheless, results on reliability and validity of the Go NAP SACC self-assessment tool showed that it is a stable and accurate measure of the childcare environment<sup>(19)</sup>. Lastly, our study included only CACFP-funded FCCH in Nebraska, which have many characteristics that differ from other childcare settings in other states. We acknowledge that this potentially limits the generalizability of our findings. Despite these limitations, our study contributes to the existing literature in at least two ways. First, the present study employed the evidence-based Go NAP SACC intervention and self-assessment that has not been previously studied in FCCH in Nebraska. Therefore, our findings provide information about the nutrition and screen time practices in FCCH, an understudied group. Policy makers and researchers can draw from the present study's results to understand the unique characteristics of FCCH and their specific areas for improvement through policy and interventions. Another strength of the study includes the focus on an understudied sample, the ongoing intervention for a period of three years, large geographic area, as well as involving state-wide collaboration across multiple partners for improving the nutrition and screen time environment for FCCH.

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## References

- Ogden CL, Carroll MD, Kit BK *et al.* (2014) Prevalence of childhood and adult obesity in the United States, 2011–2012. *JAMA* **311**, 806–814.
- Centers for Disease Control and Prevention (2012) Nebraska state nutrition, physical activity, and obesity profile. <http://www.cdc.gov/obesity/stateprograms/fundedstates/pdf/Nebraska-State-Profile.pdf> (accessed June 2017).
- Spruijt-Metz D (2011) Etiology, treatment, and prevention of obesity in childhood and adolescence: a decade in review. *J Res Adolesc* **21**, 129–152.
- Laughlin L (2013) *Who's Minding the Kids? Childcare Arrangements: Spring 2011. Current Population Reports: Household Economic Studies* no. 135, pp. 70–135. Washington, DC: US Census Bureau.
- Battista RA, Oakley H, Weddell MS *et al.* (2014) Improving the physical activity and nutrition environment through self-assessment (NAP SACC) in rural area childcare centers in North Carolina. *Prev Med* **67**, Suppl. 1, S10–S16.
- Alkon A, Crowley AA, Benjamin Neelon SE *et al.* (2014) Nutrition and physical activity randomized control trial in childcare centers improves knowledge, policies, and children's body mass index. *BMC Public Health* **14**, 215.
- Trost SG, Messner L, Fitzgerald K *et al.* (2009) Nutrition and physical activity policies and practices in family childcare homes. *Am J Prev Med* **37**, 537–540.
- Nebraska Department of Health and Human Services (2017) Early childhood totals of type and capacity. <http://dhhs.ne.gov/publichealth/Documents/statewidedata.pdf> (accessed May 2018).
- Ward D, Morris E, McWilliams C *et al.* (2014) *Go NAP SACC: Nutrition and Physical Activity Self-Assessment for Child Care*, 2nd ed. Chapel Hill, NC: Center for Health Promotion and Disease Prevention and Department of Nutrition, University of North Carolina at Chapel Hill; available at <https://gonapsacc.org/resources/nap-sacc-materials>
- Natale R, Page M & Sanders L (2014) Nutrition and physical activity practices in childcare centers versus family childcare homes. *Early Child Educ J* **42**, 327–334.
- Tandon PS, Garrison MM & Christakis DA (2012) Physical activity and beverages in home-and center-based childcare programs. *J Nutr Educ Behav* **44**, 355–359.
- Christakis DA & Garrison MM (2009) Preschool-aged children's television viewing in childcare settings. *Pediatrics* **124**, 1627–1632.
- Gunter KB, Rice KR & Trost SG (2012) Nutrition and physical activity policies and practices in family childcare homes in Oregon: baseline findings from the healthy home childcare project. *J Ext* **50**, 3FEA3.
- Ward DS, Benjamin SE, Ammerman AS *et al.* (2008) Nutrition and physical activity in child care: results from an environmental intervention. *Am J Prev Med* **35**, 352–356.
- Martin SL, Martin MW, Cook B *et al.* (2015) Notes from the field: the evaluation of Maine Nutrition and Physical Activity Self-Assessment for Childcare (NAPSACC) experience. *Eval Health Prof* **38**, 140–145.
- Trost SG, Messner L, Fitzgerald K *et al.* (2011) A nutrition and physical activity intervention for family childcare homes. *Am J Prev Med* **41**, 392–398.
- Wang Y & Beydoun MA (2007) The obesity epidemic in the United States – gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol Rev* **29**, 6–28.
- US Department of Agriculture (2012) Child and Adult Care Food Program (CACFP). Nutrition Standards for CACFP Meals and Snacks. [http://www.fns.usda.gov/cnd/care/ProgramBasics/Meals/Meal\\_Patterns.htm#Child\\_Breakfast](http://www.fns.usda.gov/cnd/care/ProgramBasics/Meals/Meal_Patterns.htm#Child_Breakfast) (accessed April 2012).
- Benjamin SE, Neelon B, Ball S *et al.* (2007) Reliability and validity of a nutrition and physical activity environmental self-assessment for child care. *Int J Behav Nutr Phys Act* **4**, 29.
- Abdi H (2007) Bonferroni and Sidak corrections for multiple comparisons. In *Encyclopedia of Measurement and Statistics*, pp. 103–107 [NJ Salkind, editor]. Thousand Oaks, CA: SAGE Publications, Inc.
- Ritchie LD, Boyle M, Chandran K *et al.* (2012) Participation in the Child and Adult Care Food Program is associated with more nutritious foods and beverages in child care. *Child Obes* **8**, 224–229.
- Erinosho T, Vaughn A, Hales D *et al.* (2018) Participation in the Child and Adult Care Food Program is associated with healthier nutrition environments at family child care homes in Mississippi. *J Nutr Educ Behav*. Published online: 7 February 2018. doi: 10.1016/j.jneb.2017.11.004.
- Benjamin-Neelon S, Vaughn AE, Tovar A *et al.* (2018) The family child care home environment and children's diet quality. *Appetite* **126**, 108–113.
- Dev DA, Carraway-Stage V, Schober DJ *et al.* (2017) Implementing the Academy of Nutrition and Dietetics Benchmarks for Nutrition Education for Children: childcare providers' perspectives. *J Acad Nutr Diet* **117**, 1963–1971.
- Rosenthal MS, Crowley AA & Curry L (2013) Family child care providers' self-perceived role in obesity prevention: working with children, parents, and external influences. *J Nutr Educ Behav* **45**, 595–601.
- American Academy of Pediatrics, American Public Health Association & National Resource Center for Health and Safety in Childcare and Early Education (2011) *Caring for Our Children. National Health and Safety Performance Standards: Guidelines for Early Care and Education Programs*, 3rd ed. Elk Grove Village, IL and Washington, DC:



American Academy of Pediatrics and American Public Health Association; available at [http://cfoc.nrckids.org/files/CFOC3\\_updated\\_final.pdf](http://cfoc.nrckids.org/files/CFOC3_updated_final.pdf)

27. Neelon SEB & Briley ME (2011) Position of the American Dietetic Association: benchmarks for nutrition in childcare. *J Am Diet Assoc* **111**, 607–615.
28. Fletcher J, Branen LJ & Price E (2005) Building Mealtime Environments and Relationships: An Inventory for Feeding Young Children in Group Settings. <http://www.cals.uidaho.edu/feeding/pdfs/BMER.pdf> (accessed September 2013).
29. Kim J, Shim JE, Wiley AR *et al.* (2012) Is there a difference between center and home care providers' training, perceptions, and practices related to obesity prevention? *Matern Child Health J* **16**, 1559–1566.
30. Dev DA, Speirs KE, McBride BA *et al.* (2014) Head Start and childcare providers' motivators, barriers and facilitators to practicing family-style meal service. *Early Child Res Q* **29**, 649–659.
31. Tandon PS, Zhou C, Lozano P *et al.* (2011) Preschoolers' total daily screen time at home and by type of childcare. *J Pediatr* **158**, 297–300.