



Improving Breastfeeding Environments and Feeding Practices in Family Child Care Homes with the Go NAP SACC Program

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Abstract

Purpose Breastfeeding and responsive feeding are important practices that support the health of infants and women. In the United States, breastfeeding continuation rates remain lower than recommended, and working women face additional challenges with breastfeeding continuation. Providers in a family child care setting are uniquely positioned to support and provide important resources to families in their breastfeeding and infant feeding practices.

Methods The Go NAP SACC program was designed to improve the nutrition and physical activity environments and practices in child care settings serving infants and young children. This evaluation focuses on Breastfeeding and Infant Feeding in Nebraska Family Child Care Homes (FCCH).

Assessment Paired-sample t-tests were used to examine differences in pre-post evaluation scores. A repeated measure ANCOVA was used to examine differences between rural–urban settings. Nebraska FCCH met recommendations at pre-test, and exceeded recommendations at post-test ($p < .05$). Rural and urban FCCH performed equally well in 18 of 22 items, indicating little difference in the ability to provide supportive environments and adhere to best practices in both settings. Improvement in family engagement items were significant at the $p < .001$ level. Family engagement in FCCH is an important area for intervention that was well-received by provider participants.

Conclusion This evaluation shows that the Go NAP SACC program improves breastfeeding and infant feeding environments and practices in rural and urban FCCH. Interventions should continue to focus on basic and practical education and professional development for FCCH providers, with emphasis on intentional family engagement and support.

Keywords Child care · Infant · Nutrition · Breastfeeding · Responsive feeding · Family child care home · Family engagement

Significance Statement

The Go NAP SACC program is a valuable and comprehensive intervention that supports positive changes in nutrition and physical activity environments and practices across

a range of domains for children of varying ages. Breastfeeding and infant feeding practices are important for the health and wellbeing of both infants and women. This study adds support for the Go NAP SACC program by providing evidence that it improves breastfeeding and infant

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feeding environments and best practices in both rural and urban Family Child Care Homes. Additionally, it indicates that family engagement is a key area for intervention and improvement for family home child care providers.

Introduction

Breastfeeding and responsive feeding are central to a variety of health related outcomes for women and infants. Breastmilk composition adapts to the nutritional needs of infants as they develop, supports their immune system in response to illness, and is associated with fewer illnesses throughout life (Ballard and Morrow 2013; Victora et al. 2016). Breastfeeding is protective against breast and ovarian cancer for women and helps establish a positive emotional bond between mother and infant (Victora et al. 2016). Responsive feeding practices during infancy, such as responding to the child's hunger and fullness cues, are important in establishing good self-regulation in eating behaviors as children develop (Hetherington 2020). Further, increasing evidence indicates that breastfeeding and responsive feeding practices may help prevent overweight and obesity in young children (Shloim et al. 2017).

Breastfeeding is a desired practice among many women who give birth. Approximately 83.2% of women in the United States initiate breastfeeding (CDC 2018). By six months, only 57.6% of women are exclusively breastfeeding in the United States. In the state of Nebraska, 82.2% of women initiate breastfeeding, and only 25.4% are exclusively breastfeeding at six months (CDC 2018). Although the reasons for discontinuing breastfeeding are varied, returning to work and lack of support from social systems contribute to this decision (Brand et al. 2011). For working parents, child care policies, environment, and provider practices play an important role in breastfeeding continuation (Batan et al. 2013; Lundquist et al. 2019). One contextual factor is residing in a rural or urban community. Nationally, infants in urban areas are more likely to have been breastfed than infants in rural areas (CDC 2017). This lack of demand from parents (Lucas et al. 2013) combined with the challenge of accessing recommended foods and other nutrition and physical activity resources are barriers to providing support for breastfeeding and infant feeding best practice in rural settings (Battista et al. 2014; Dev et al. 2017; Dinkel et al. 2018; Foster et al. 2015).

Breastfed and formula fed infants who are typically developing can self-regulate their energy intake and will communicate their needs through hunger and fullness cues (Hetherington 2020). This ability to self-regulate energy intake can continue throughout the child's life if their hunger and fullness cues are recognized and supported by adult caregivers (Dev et al. 2017). For example, infants may show they

are hungry by fussing or biting their fists and communicate fullness by ejecting the nipple or bottle from their mouth, pushing away a bottle, or falling asleep (Hetherington 2020). As solid foods are introduced, children may reach or point to food when they are hungry and similarly push food away, play with food, or avert their gaze in disinterest to show that they are full. Responding to hunger and fullness cues and allowing children to regulate their energy intake are important components for infant feeding best practice in child care settings (NE Go NAP SACC 2017; Ward et al. 2014).

Child care is an important intervention setting. More than half of infants in the United States are in non-parental care for part or most of the day, and 62% of women with infants are employed (ZERO TO THREE 2017). Providers are in a position to intentionally support parents' goals through practice and education, however, few parents view their provider as a partner and resource when it comes to breastfeeding and infant feeding (Lundquist et al. 2019).

Lack of knowledge about breastfeeding and infant feeding recommendations is the primary barrier for implementation of best practices (Calloway et al. 2017; Clark et al. 2008; Dev et al. 2017). One multi-state intervention found that providers are willing to implement best practices when equipped with education, ongoing training and technical assistance, peer learning opportunities, and an emphasis on center-level policies regarding breastfeeding and infant feeding (Calloway et al. 2017). The Nutrition and Physical Activity Self-Assessment for Childcare (Go NAP SACC) program is designed to equip child care providers with knowledge, skills, and resources to support responsive feeding practices and breastfeeding continuation for working parents and families (Ammerman et al. 2007; Benjamin Neelon et al. 2014; Ward et al. 2014).

The Go NAP SACC program is an established, sustainable approach for improving child care providers' use of best practices to improve nutrition and physical activity environments. Existing literature has documented improvements in a variety of domains, including nutrition and screen time (Dev et al. 2018), outdoor play environment (Dinkel et al. 2018), and family style dining (Blaine et al. 2015). The program has shown sustained improvements in environment and practices across multiple sites at a 12-month follow-up (Smith et al. 2017).

The original Baby NAP SACC program was developed to address the unique physical activity and nutrition needs of infants (Benjamin Neelon et al. 2014). In its current version, the Go NAP SACC program targets breastfeeding and infant feeding practices in five general domains: (1) Environment, (2) Practice, (3) Professional Development, (4) Food, and (5) Policy (Ward et al. 2014). These domains encourage providers to create a breastfeeding friendly environment, actively support parents who want to continue breastfeeding, participate in professional development, provide foods that

are nutritious, use a responsive approach to infant feeding, and create a breastfeeding and infant feeding policy for their child care setting.

In Nebraska, Go NAP SACC has been provided to Family Child Care Homes (FCCH) and centers since 2010. Nebraska Go NAP SACC has historically been delivered by a variety of partnering organizations including the Child and Adult Care Food Program (CACFP) Sponsored Organizations, Nebraska Extension, Nebraska Team Nutrition, Nebraska Department of Health and Human Services, local health departments, health care systems, and nonprofit agencies. Seventy-one percent ($n = 1786$) of the child care providers in Nebraska operate FCCHs (Nebraska Department of Health and Human Services 2019). This evaluation examines outcomes regarding best practices for breastfeeding and infant feeding which have not been previously explored. The purpose is to identify whether the Nebraska Go NAP SACC program results in positive changes in breastfeeding and infant feeding environments, practices, and policies in Nebraska FCCHs. Potential variation in practices based on geographic location (rural vs. urban) were also examined. We expected urban FCCHs to perform better on most practices due to the existing factors of increased access to resources and higher prevalence of breastfeeding in urban areas.

Methods

This pre-post evaluation examined changes in breastfeeding and infant feeding environments and practices in 201 FCCHs recruited through partner organizations. The sample represents FCCHs from diverse counties in Nebraska who provide care to children from birth-to-five years-old. Providers completed the program between August 2014 and March 2018. As a program evaluation, this investigation was exempt from Institutional Review Board review and participants were not required to provide informed consent. These results are part of a larger, state-wide evaluation of the Nebraska Go NAP SACC program. The larger survey comprised five sections (Breastfeeding and Infant Feeding, Child Nutrition, Infant & Child Physical Activity, Outdoor Play and Learning, and Screen Time), with 113 total items (Ward et al. 2014). To

address our purpose, the 22 item Breastfeeding and Infant Feeding section was evaluated. All analyses were based on outcome measures of the Go NAP SACC self-assessment tool (Ammerman et al. 2007; NE Go NAP SACC 2017).

Recruitment

There are 1,786 FCCHs in Nebraska and FCCH providers in all 93 Nebraska counties were eligible to participate in Go NAP SACC. Providers were recruited through emails and newsletters from regional education service units, training organizations, the Nebraska Go NAP SACC online training calendar, the Nebraska Department of Education's Early Childhood Professional Record System, and word of mouth. Due to the variety of methods of recruitment, we were unable to track the number of providers who were approached or who were reached by recruitment materials. Recruitment began approximately 3 months before the initial training. Interested providers contacted trainers directly. Three-hundred and eighty-four providers completed a pre-assessment. Eighty-nine of these providers did not complete a post-assessment, resulting in 295 providers who completed the full intervention process. Ninety-four providers were excluded from this specific analysis because they did not provide care to infants.

Figure 1 highlights the steps in the participation process. First, providers completed the online pre-assessment hosted through a secure online server (Qualtrics) (NE Go NAP SACC 2017). Completing the pre-assessment was a requirement for receiving intervention training. Next, providers took part in a training. The 6-h, in-person training was developed by Go NAP SACC. The training focused on topics related to child and adult obesity, including child nutrition, physical activity, personal health and wellness, working with families, and breastfeeding and infant feeding. The assessments and training content are standardized, but providers may complete the 6-h training in one or multiple days. After the training, providers met with a trainer individually to discuss the pre-assessment, identify areas for improvement, and set goals. Technical assistance was provided by trainers during the following 3–4 months via phone, email, or in-person. Upon completion of goals, providers were asked to complete the post-assessment. After completion of the

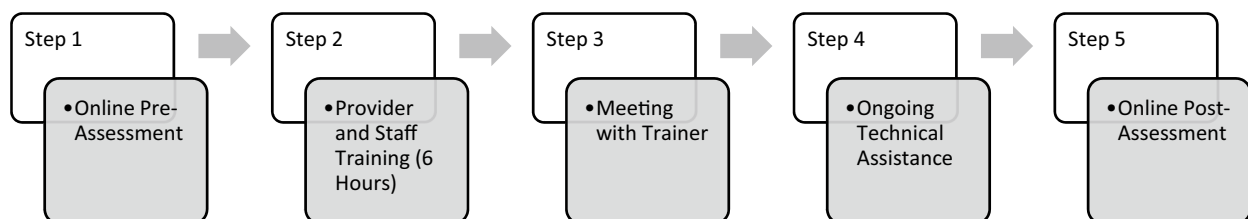


Fig. 1 Provider participation process

post-assessment, providers received a training certificate for 6 in-service hours and nutrition and physical activity-related teaching tools.

Measures

Providers completed the Go NAP SACC self-assessment which rates the FCCH on the extent to which they are meeting best practice recommendations for breastfeeding and infant feeding policies and practices. Items were ranked on a 4-point Likert scale, from “minimally engaging” to “fully engaging” in Go NAP SACC best practice recommendations (see Fig. 2).

Results

All analyses were conducted with SPSS Version 25. Sample data ($N = 201$) was assessed for normality using the Kolmogorov–Smirnov test and visual inspection of histograms, normal Q–Q plots, and box plots. These tests showed that the scores of breastfeeding and infant feeding practices of FCCHs were normally distributed ($p < 0.05$). Descriptive statistics were calculated from the Go NAP SACC baseline self-assessments for the breastfeeding and infant feeding environments, practices, and policies (see Table 1). The average time between pre-test and post-test was 5.28 months ($SD = 4.37$), with a range from one to 25 months.

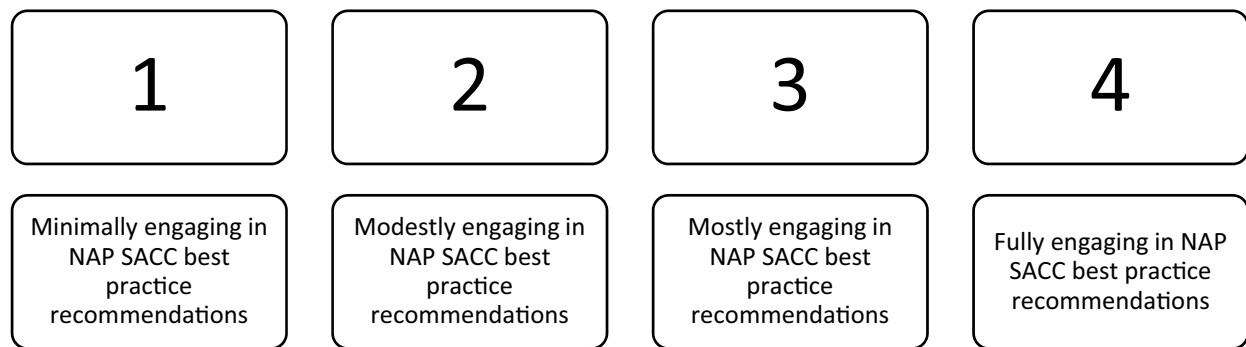


Fig. 2 Go NAPP SACC rating response categories

Table 1 Characteristics of FCCHs

Total children enrolled	n/2254	
Ages of children enrolled in program	n	% of total enrolled
0–23 months	581	22.75
24–35 months	484	18.95
3–5 years	748	29.29
School age children	522	20.44
Other	219	8.57
Characteristics of program	n	% of FCCHs
CACFP participation	176	87.56
Type of care offered		
Full day care offered	84	41.8
Full day and half day care offered	114	56.7
Other	2	1.5
Residence/location		
Urban classification	69	34.33
Rural classification	132	65.67

$N = 201$ (total number of FCCHs included in this analysis)

Results

Paired sample t-tests were conducted to examine the extent to which Go NAP SACC scores differed significantly from pre-test to post-test. The FCCH in our sample met all 22 standards for the Breastfeeding and Infant Feeding items at the time of pre-test (a score of 2 or higher). FCCH providers exceeded the standards (a score of 3 or higher) in (a) breastfeeding environment (e.g., space for mothers to breastfeed) and (b) infant foods (e.g., choosing iron-rich products for infant meals) at pre-test. There were significant changes at $p < 0.05$ in all 22 items from pre-test to post-test, and at $p < 0.001$ in 18 of 22 items (see Table 2). At post-test, all FCCH programs exceeded standards for all Breastfeeding and Infant Feeding items (a score of 3 or higher).

A repeated measures analysis of covariance (ANCOVA) determined whether or not the intervention's effect was different for FCCHs in rural and urban settings. This analysis examines whether the post-test means, adjusted for pre-test means, differ between the two groups. Rural–urban designation was based on county population, using the three categories of metropolitan (population greater than 50,000), micropolitan (population greater than 10,000), and rural (population smaller than 10,000) (Lin and Qu 2016). Consistent with previous literature, micropolitan and rural counties were combined to compare the rural–urban difference (Dinkel et al. 2018). CACFP participation increases the likelihood of best practices for nutrition and physical activity among providers, so CACFP participation was defined as the categorical control variable in the multivariate analysis. Additionally, length of time between pre-test and post-test was included as a covariate. CACFP was not significantly related to changes in using best practices. No significant differences were found on 18 out of 22 items in the evaluation, indicating the intervention worked equally well for FCCH in both rural and urban settings, regardless of CACFP participation and time between pre- and post-test (see Table 3).

Discussion

This evaluation explored whether the Nebraska Go NAP SACC program supports positive changes in breastfeeding and infant feeding environments, practices, and policies in FCCHs in the state of Nebraska. Utilizing scores from pre- and post-test measures, we found that FCCHs were meeting recommendations at pre-test, and exceeding recommendations at post-test. This finding is consistent with previous literature documenting the improvement of nutrition and physical activity domains in child care settings after implementing the Go NAP SACC program (Battista et al. 2014; Benjamin Neelon et al. 2014; Blaine et al. 2015; Dev et al. 2018; Dinkel et al. 2018). The Go

NAP SACC assessment is consistent with state licensing standards, so we would expect that FCCHs have the capacity to meet best practice regarding nutrition and physical activity at baseline. Additional information, resources, and technical assistance can support improvement in meeting and adhering to best practices more frequently and consistently. For example, in the domain of Breastfeeding Environment, the percentage of providers who were able to guarantee that “a quiet and comfortable space for mothers to breastfeed or express breast milk is always available” increased from 55.2 to 81.6%.

Recent literature highlights the importance of the child care providers in supporting breastfeeding continuation through best practices and intentional engagement with families (e.g., providing educational resources, discussing infant feeding preferences) (Lundquist et al. 2019). The Go NAP SACC assessment includes seven items that involve direct family engagement, including developing an infant feeding plan with the family and parent education about infant feeding and nutrition (see Table 2, underlined items). In this evaluation, significant improvement was observed in these items. Response frequencies indicate family engagement was the area in which providers experienced the most growth. At pre-test, more providers indicated minimally or modestly engaging in these best practices. At post-test, most providers had improved to modestly or fully engaging in these best practices. For example, when providers were asked about offering information to families at pre-test, 16.9% indicated that they “rarely or never” offered information, and 24.4% of providers shared this information multiple times with families. At post-test, only 2.5% of providers indicated “rarely or never” offering information, whereas 51.2% of providers shared this information multiple times.

In addition to identifying changes in best practices, we were interested in the differences in post-test scores between rural and urban FCCHs. We hypothesized that rural FCCHs would show improvement after engaging in the Go NAP SACC program. However, we also expected that differences in improvement would be observed between rural and urban settings. Significant differences between rural and urban scores were observed in four out of 22 items (see Table 3). Of these items, rural settings performed better on half, and urban settings performed better on the other half. Given these findings, it can be concluded that the intervention supported improvement for both settings. This finding is contrary to one study documenting additional challenges for rural child care settings in meeting recommendations for nutrition and physical activity (Foster et al. 2015), and provides evidence that rural child care centers have the capacity to exceed recommendations for best practice when provided information and resource rich interventions (Battista et al. 2014).

Table 2 Breastfeeding and infant feeding items at pre-test and post-test

	Pre	Post	<i>p</i> value
<i>Breastfeeding environment</i>			
A quiet and comfortable space for mothers to breastfeed or express breast milk is always available	3.38	3.82	< .001
(1) Not applicable	46 (22.9)	11 (5.5)	
(2) Rarely or never	19 (9.5)	6 (3.0)	
(3) Sometimes	14 (7.0)	8 (4.0)	
(4) Often	11 (5.5)	12 (6.0)	
(5) Always	111 (55.2)	164 (81.6)	
Three features (privacy, an electric outlet, and comfortable seating) are available to mothers in the space for breastfeeding or expressing breast milk	3.64	3.93	< .001
(1) Not applicable	43 (21.4)	14 (7.0)	
(2) None	7 (3.5)	0 (0.0)	
(3) 1 feature	4 (2.0)	2 (1.0)	
(4) 2 features	32 (15.9)	19 (9.5)	
(5) 3 features	115 (57.2)	166 (82.6)	
Enough refrigerator and/or freezer space is available to allow all breastfeeding mothers to store expressed breast milk	3.88	3.97	.024
(1) Not Applicable	13 (6.5)	10 (5.0)	
(2) Rarely or never	4 (2.0)	0 (0.0)	
(3) Sometimes	3 (1.5)	1 (0.5)	
(4) Often	5 (2.5)	4 (2.0)	
(5) Always	176 (87.6)	186 (92.5)	
<i>Breastfeeding support practices</i>			
<u>I promote breastfeeding and support mothers who provide breast milk for their infants by using 4–5 strategies</u>	3.07	3.59	< .001
(1) Not applicable	19 (9.5)	7 (3.5)	
(2) None	12 (6.0)	1 (0.5)	
(3) 1 strategy	31 (15.4)	12 (6.0)	
(4) 2–3 strategies	71 (35.3)	60 (29.9)	
(5) 4–5 strategies	68 (33.8)	121 (60.2)	
<i>Breastfeeding education and professional development</i>			
I complete professional development on promoting and supporting breastfeeding 2 times per year or more, including at least 1 in-person or online training, when available	2.12	3.09	< .001
(1) Not applicable	24 (11.9)	7 (3.5)	
(2) Never	59 (29.4)	6 (3.0)	
(3) Less than 1 time per year	51 (25.4)	35 (17.4)	
(4) 1 time per year	55 (27.4)	100 (49.8)	
(5) 2 times per year or more	12 (6.0)	53 (26.4)	
I have covered 4–5 topics as part of this professional development	3.21	3.79	< .001
(1) Not applicable	22 (10.9)	5 (2.5)	
(2) None	21 (10.4)	2 (1.0)	
(3) 1–2 topics	8 (4.0)	2 (1.0)	
(4) 3–4 topics	66 (32.8)	36 (17.9)	
(5) 5–6 topics	84 (41.8)	156 (77.6)	
<u>I offer expectant families, and families with infants, information on breastfeeding when families ask, at 1 set time during the year, and I tell prospective families about my policies and practices</u>	2.19	3.19	< .001
(1) Not applicable	13 (6.5)	9 (4.5)	
(2) Rarely or never	56 (27.9)	11 (5.5)	
(3) Only when families ask	80 (39.8)	51 (25.4)	
(4) When families ask and at 1 set time during the year	10 (5.0)	26 (12.9)	
(5) All of the above, and we tell prospective families about our breastfeeding policies and practices	42 (20.9)	104 (51.7)	
<i>Breastfeeding policy</i>			
My program's written policy on promoting and supporting breastfeeding includes 3–4 topics	2.11	3.31	< .001
(1) Not Applicable	11 (5.5)	11 (5.5)	
(2) No written policy or policy does not include these topics	99 (49.3)	34 (16.9)	
(3) 1 topic	13 (6.5)	0 (0.0)	
(4) 2–3 topics	44 (21.9)	34 (16.9)	
(5) 4–5 topics	34 (16.9)	122 (60.7)	

Table 2 (continued)

	Pre	Post	<i>p</i> value
<i>Infant foods</i>			
When I purchase cereal or formula for infants, I always choose iron-rich products	3.84	3.92	.008
(1) Not applicable	10 (5.0)	12 (6.0)	
(2) Rarely or never	1 (0.5)	0 (0.0)	
(3) Sometimes	5 (2.5)	3 (1.5)	
(4) Often	19 (9.5)	9 (4.5)	
(5) Always	166 (82.6)	177 (88.1)	
When I purchase or prepare mashed or pureed meats or vegetables for infants, these foods rarely or never contain added salt	3.71	3.88	< .001
(1) Not applicable	11 (5.5)	11 (5.5)	
(2) Always	1 (0.5)	1 (0.5)	
(3) Often	4 (2.0)	0 (0.0)	
(4) Sometimes	46 (22.9)	19 (9.5)	
(5) Rarely or never	139 (69.2)	170 (84.6)	
I rarely or never purchase baby food desserts for infants that contain added sugar	3.80	3.90	.012
(1) Not applicable	23 (11.4)	14 (7.0)	
(2) Always	0 (0.0)	1 (0.5)	
(3) Often	5 (2.5)	1 (0.5)	
(4) Sometimes	27 (13.4)	13 (6.5)	
(5) Rarely or never	146 (72.6)	172 (85.6)	
<i>Infant feeding practices</i>			
<u>With permission from families, the flexibility of timing of infant feedings in my program is fully flexible to infants showing they are hungry.</u>	3.43	3.74	< .001
(1) Not applicable	1 (0.5)	6 (3.0)	
(2) Feedings are only at fixed, scheduled times	1 (0.5)	0 (0.0)	
(3) Feedings are somewhat flexible to infants showing they are hungry, but feedings are mostly at fixed times	25 (12.4)	7 (3.5)	
(4) Feedings are mostly flexible to infants showing they are hungry, but feedings are sometimes at fixed times	62 (30.8)	37 (18.4)	
(5) Feedings are fully flexible to infants showing they are hungry	112 (55.7)	151 (75.1)	
I end infant feedings based only on infants showing they are full	3.47	3.66	< .001
(1) Not Applicable	3 (1.5)	7 (3.5)	
(2) Only the amount of breast milk, formula, or food left	1 (0.5)	0 (0.0)	
(3) Mostly the amount of food left, but partly on infants showing they are full	9 (4.5)	8 (4.0)	
(4) Mostly on infants showing they are full, but partly on the amount of food left	85 (42.3)	50 (24.9)	
(5) Only on infants showing they are full	103 (51.2)	136 (67.7)	
When feeding infants, I always use responsive feeding techniques	3.76	3.91	< .001
(1) Not applicable	2 (1.0)	8 (4.0)	
(2) Rarely or never	1 (0.5)	0 (0.0)	
(3) Sometimes	6 (3.0)	1 (0.5)	
(4) Often	33 (16.4)	17 (8.5)	
(5) Always	159 (79.1)	175 (87.1)	
During meal times, I praise and give hands-on help to guide older infants as they learn to feed themselves	3.73	3.85	.002
(1) Not applicable	0 (0.0)	7 (3.5)	
(2) Rarely or never	0 (0.0)	0 (0.0)	
(3) Sometimes	6 (3.0)	0 (0.0)	
(4) Often	43 (21.4)	29 (14.4)	
(5) Always	152 (75.6)	165 (82.1)	
<u>I inform families about what, when, and how much their infants eat each day through both a written and verbal report each day.</u>	2.80	3.10	< .001
(1) Not applicable	2 (1.0)	10 (5.0)	
(2) I do not inform families of daily infant feeding	7 (3.5)	3 (1.5)	
(3) A written report or a verbal report	80 (39.8)	54 (26.9)	
(4) Some days through both a written and verbal report, but usually one or the other	60 (29.9)	54 (26.9)	
(5) Both a written and verbal report each day	52 (25.9)	80 (39.8)	
<u>The written infant feeding plan that families complete for my program includes 4 topics</u>	3.21	3.59	< .001
(1) Not applicable	8 (4.0)	13 (6.5)	
(2) None	15 (7.5)	3 (1.5)	
(3) 1 topic	17 (8.5)	3 (1.5)	

Table 2 (continued)

	Pre	Post	<i>p</i> value
(4) 2–3 topics	80 (39.8)	61 (30.3)	
(5) 4 topics	81 (40.3)	121 (60.2)	
<i>Infant feeding education and professional development</i>			
I complete professional development on infant feeding and nutrition 2 times per year or more, including 1 in-person or online training, when available	2.49	3.15	< .001
(1) Not applicable	6 (3.0)	5 (2.5)	
(2) Never	30 (14.9)	0 (0.0)	
(3) Less than 1 time per year	60 (29.9)	23 (11.4)	
(4) 1 time per year	88 (43.8)	122 (60.7)	
(5) 2 times per year or more	17 (8.5)	51 (25.4)	
I have covered 4–5 topics as part of this professional development	3.46	3.82	< .001
(1) Not applicable	10 (5.0)	5 (2.5)	
(2) None	12 (6.0)	0 (0.0)	
(3) 1–2 topics	9 (4.5)	3 (1.5)	
(4) 3–4 topics	55 (27.4)	30 (14.9)	
(5) 5 topics	115 (57.2)	163 (81.1)	
<u>I offer families information on infant feeding and nutrition when families ask, at 1 set time during the year, and at other times as infants reach developmental milestones</u>	2.45	3.27	< .001
(1) Not applicable	5 (2.5)	9 (4.5)	
(2) Rarely or never	34 (16.9)	5 (2.5)	
(3) Only when families ask	93 (46.3)	44 (21.9)	
(4) When families ask and at 1 set time during the year	20 (10.0)	40 (19.9)	
(5) When families ask, at 1 set time during the year, and at other times as infants reach developmental milestones	49 (24.4)	103 (51.2)	
<u>The information I offer families on infant feeding and nutrition covers 4–5 topics</u>	3.08	3.65	< .001
(1) Not applicable	10 (5.0)	11 (5.5)	
(2) None	23 (11.4)	4 (2.0)	
(3) 1 topic	19 (9.5)	5 (2.5)	
(4) 2–3 topics	73 (36.3)	46 (22.9)	
(5) 4–5 topics	76 (37.8)	135 (67.2)	
<i>Infant feeding policy</i>			
My program's written policy on infant feeding and nutrition covers 4–5 topics	2.65	3.43	< .001
(1) Not applicable	6 (3.0)	11 (5.5)	
(2) No written policy or policy does not include these topics	57 (28.4)	20 (10.0)	
(3) 1 topic	14 (7.0)	2 (1.0)	
(4) 2–3 topics	71 (35.3)	51 (25.4)	
(5) 4–5 topics	53 (26.4)	117 (58.2)	

N=201 (total number of FCCHs included in this analysis). Scores were reported on a 4-point Likert scale, with 1 being the least recommended breastfeeding/infant feeding practice and 4 being the best breastfeeding/infant feeding practice. The actual answer options differed depending on question. "Not Applicable" responses were coded as "missing" and these values were not included in paired-sample t-tests. Family engagement items are underlined

Limitations and Future Directions

One limitation of this inquiry is that a measure of FCCH size or designation was not collected during participation in Go NAP SACC and thus could not be accounted for in analysis. Future research should examine whether any significant differences are associated with the size of the FCCH as well as the staff-to-child ratio.

The Go NAPP SACC program as implemented in Nebraska did not provide for a comparison or control group. The recommendations in Go NAP SACC are consistent

with the state's licensing standards and quality rating and improvement system, so all FCCHs should be meeting recommendations for best practice at pre-test. This evaluation is limited because the post-assessment results cannot be compared to FCCHs that receive no intervention training. Additionally, a wide range of time to completion was observed between participants from pre-test to post-test. We attempted to control for variability in outcomes due to time engaged with the intervention by controlling for time in our analysis.

Intervention research within child care settings can pose challenges for meaningful evaluation. High rates of turnover

Table 3 Differences in breastfeeding and infant feeding best practice in Rural and Urban FCCHs between pre- and post-test

	Time	Pre	Post	F	p
<i>Breastfeeding environment</i>					
A quiet and comfortable space for mothers to breastfeed or express breast milk is always available	Rural	3.43	3.81	4.028*	.05
	Urban	3.02	3.71		
Three features (privacy, an electric outlet, and comfortable seating) are available to mothers in the space for breastfeeding or expressing breast milk	Rural	3.63	3.90	1.197	.23
	Urban	3.49	3.86		
Enough refrigerator and/or freezer space is available to allow all breastfeeding mothers to store expressed breast milk	Rural	3.88	3.96	.398	.53
	Urban	3.87	3.94		
<i>Breastfeeding support practices</i>					
I promote breastfeeding and support mothers who provide breast milk for their infants by using 4–5 strategies	Rural	2.98	3.47	3.958*	.05
	Urban	3.14	3.69		
<i>Breastfeeding education and professional development</i>					
I complete professional development on promoting and supporting breastfeeding 2 times per year or more, including at least 1 in-person or online training	Rural	2.17	3.04	.092	.76
	Urban	2.02	3.13		
I have covered 4–5 topics as part of this professional development	Rural	3.22	3.77	.242	.62
	Urban	3.10	3.80		
I offer expectant families, and families with infants, information on breastfeeding when families ask, at 1 set time during the year, and I tell prospective families about my policies and practices	Rural	2.26	3.06	.464	.50
	Urban	2.13	3.36		
<i>Breastfeeding policy</i>					
My program's written policy on promoting and supporting breastfeeding includes the following number of topics	Rural	2.07	3.18	.891	.35
	Urban	2.12	3.39		
<i>Infant foods</i>					
When I purchase cereal or formula for infants, I always choose iron-rich products	Rural	3.84	3.90	.173	.68
	Urban	3.81	3.97		
When I purchase or prepare mashed or pureed meats or vegetables for infants, these foods rarely or never contain added salt	Rural	3.71	3.88	.302	.58
	Urban	3.75	3.89		
I rarely or never purchase baby food desserts for infants that contain added sugar	Rural	3.83	3.90	.353	.55
	Urban	3.77	3.90		
<i>Infant feeding practices</i>					
With permission from families, the flexibility of timing of infant feedings in my program is fully flexible to infants showing they are hungry	Rural	3.53	3.76	4.810*	.03
	Urban	3.27	3.71		
I end infant feedings based only on infants showing they are full	Rural	3.56	3.65	1.189	.28
	Urban	3.34	3.71		
When feeding infants, I always use responsive feeding techniques	Rural	3.79	3.90	.509	.48
	Urban	3.73	3.88		
During meal times, I praise and give handson help to guide older infants as they learn to feed themselves	Rural	3.73	3.89	2.289	.13
	Urban	3.68	3.79		
I inform families about what, when, and how much their infants eat each day through both a written and verbal report each day	Rural	2.78	2.97	4.923*	.03
	Urban	2.91	3.32		
The written infant feeding plan that families complete for my program includes 4 topics	Rural	3.31	3.55	2.066	.15
	Urban	3.02	3.58		
<i>Infant feeding education and professional development</i>					
I complete professional development on infant feeding and nutrition 2 times per year or more, including 1 in-person or online training	Rural	2.53	3.11	.004	.95

Table 3 (continued)

	Time	Pre	Post	F	p
	Urban	2.43	3.21		
I have covered 4–5 topics as part of this professional development	Rural	3.55	3.80	1.916	.17
	Urban	3.29	3.85		
I offer families information on infant feeding and nutrition when families ask, at 1 set time during the year, and at other times as infants reach developmental milestones	Rural	2.40	3.20	3.447	.07
	Urban	2.63	3.32		
The information I offer families on infant feeding and nutrition covers 4–5 topics	Rural	3.07	3.61	.005	.95
	Urban	3.00	3.62		
<i>Infant feeding policy</i>					
My program's written policy on infant feeding and nutrition covers 4–5 topics	Rural	2.73	3.40	1.871	.17
	Urban	2.40	3.34		

N=201 (total number of FCCHs included in this analysis)

All items controlled for CACFP Participation and length of time between pre- and post-test

* $p \leq .05$

and lack of consistency can lead to gaps in data collection, especially at post-test (Benjamin Neelon et al. 2016; Mattingly and Andresen 2016). Although the Nebraska Go NAP SACC program relies on relationships with trainers for ongoing technical assistance, the assessments are completed without assistance from a trainer. One limitation of this approach was a high number of providers responding with “Not Applicable” during completion of the pre-assessment if they did not understand how an item applied to their setting. For others, this choice was appropriate if they were not serving a breast or bottle-fed infant at the time of assessment. The web-version of the assessments did not contain skip-logic during this period of evaluation, which sometimes led to providers answering questions that were not applicable based on their response to previous questions. Finally, as with all self-report surveys, this evaluation does have the limitation of a possible self-response or social desirability bias.

Conclusion

Researchers engaged in child care evaluation research should consider providing assistance at all levels of evaluation, give special attention to timing of program interventions and assessments, and maintain flexibility to adapt to the needs of each setting. The findings of this evaluation indicate that interventions should focus on providing basic and practical education and training about breastfeeding and infant feeding for providers to support breastfeeding continuation for parents and self-regulation in eating behaviors for infants. Child care providers are experts in their field, and as such, should take a proactive role in engaging with parents by

initiating communication about infant feeding preferences, developing and sharing their infant feeding policies, and providing educational resources.

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References

- Ammerman, A. S., Ward, D. S., Benjamin, S. E., Ball, S. C., Sommers, J. K., Molloy, M., & Dodds, J. M. (2007). An intervention to promote healthy weight: Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) theory and design. *Preventing Chronic Disease, 4*(3), A67.
- Ballard, O., & Morrow, A. L. (2013). Human milk composition: Nutrients and bioactive factors. *The Pediatric Clinics of North America, 60*(1), 49–74. <https://doi.org/10.1016/j.pcl.2012.10.002>.
- Batan, M., Li, R., & Scanlon, K. (2013). Association of child care providers breastfeeding support with breastfeeding duration at 6 months. *Maternal and Child Health Journal, 17*(4), 708–713. <https://doi.org/10.1007/s10995-012-1050-7>.
- Battista, R. A., Oakley, H., Weddell, M. S., Mudd, L. M., Greene, J. B., & West, S. T. (2014). Improving the physical activity and nutrition environment through self-assessment (NAP SACC) in rural area child care centers in North Carolina. *Preventive*

- Medicine*, 67, S10–S16. <https://doi.org/10.1016/j.yjmed.2014.01.022>.
- Benjamin Neelon, S. E., Østbye, T., Hales, D., Vaughn, A., & Ward, D. S. (2016). Preventing childhood obesity in early care and education settings: lessons from two intervention studies. *Child Care, Health and Development*, 42(3), 351–358. <https://doi.org/10.1111/cch.12329>.
- Benjamin Neelon, S., Taveras, E., Østbye, T., & Gillman, M. (2014). Preventing obesity in infants and toddlers in child care: Results from a pilot randomized controlled trial. *Maternal and Child Health Journal*, 18(5), 1246–1257. <https://doi.org/10.1007/s10995-013-1359-x>.
- Blaine, R. E., Davison, K. K., Hesketh, K., Taveras, E. M., Gillman, M. W., & Benjamin Neelon, S. E. (2015). Child care provider adherence to infant and toddler feeding recommendations: Findings from the Baby Nutrition and Physical Activity Self-Assessment for Child Care (Baby NAP SACC) Study. *Childhood Obesity*, 11(3), 34–313. <https://doi.org/10.1089/chi.2014.0099>.
- Brand, E., Kothari, C., & Stark, M. A. (2011). Factors related to breastfeeding discontinuation between hospital discharge and 2 weeks postpartum. *The Journal of Perinatal Education*, 20(1), 36–44. <https://doi.org/10.1891/1058-1243.20.1.36>.
- Calloway, E., Stern, K., Schober, D., & Yaroch, A. (2017). Creating supportive breastfeeding policies in early childhood education programs: A qualitative study from a multi-site intervention. *Maternal and Child Health Journal*, 21(4), 809–817. <https://doi.org/10.1007/s10995-016-2174-y>.
- Centers for Disease Control and Prevention. (2017). *Rates of any and exclusive breastfeeding by sociodemographics among children born in 2017*. Atlanta, GA: Centers for Disease Control. Retrieved August 12, 2020, from https://www.cdc.gov/breastfeeding/data/nis_data/rates-any-exclusive-bf-socio-dem-2017.html.
- Centers for Disease Control and Prevention, (CDC). (2018). *Breastfeeding Report card: United States, 2018*. Atlanta, GA: Centers for Disease Control and Prevention. Retrieved May 1, 2019, from <https://www.cdc.gov/breastfeeding/data/reportcard.html>.
- Clark, A., Anderson, J., Adams, E., & Baker, S. (2008). Assessing the knowledge, attitudes, behaviors and training needs related to infant feeding, specifically breastfeeding, of child care providers. *Maternal and Child Health Journal*, 12(1), 128–135. <https://doi.org/10.1007/s10995-007-0221-4>.
- Dev, D. A., Speirs, K. E., Williams, N. A., Ramsay, S., McBride, B. A., & Hatton-Bowers, H. (2017). Providers perspectives on self-regulation impact their use of responsive feeding practices in child care. *Appetite*, 118, 66–74. <https://doi.org/10.1016/j.appet.2017.07.022>.
- Dev, D. A., Williams, N., Iruka, I., Garcia, A. S., Guo, Y., Patwardhan, I., et al. (2018). Improving the nutrition and screen time environment through self-assessment in family childcare homes in Nebraska. *Public Health Nutrition*, 21(13), 2351–2359. <https://doi.org/10.1017/s1368980018001416>.
- Dinkel, D., Dev, D., Guo, Y., Hulse, E., Rida, Z., Sedani, A., & Coyle, B. (2018). Improving the physical activity and outdoor play environment of family child care homes in Nebraska through Go Nutrition and Physical Activity Self-Assessment for Child Care. *Journal of Physical Activity & Health*, 15(10), 730–736. <https://doi.org/10.1123/jpah.2017-0411>.
- Foster, J. S., Contreras, D., Gold, A., Keim, A., Oscarson, R., Peters, P., et al. (2015). Evaluation of nutrition and physical activity policies and practices in child care centers within rural communities. *Childhood Obesity*, 11(5), 56–512. <https://doi.org/10.1089/chi.2015.0030>.
- Hetherington, M. M. (2020). Infant appetite: From cries to cues and responsive feeding. In H. L. Meiselman (Ed.), *Handbook of eating and drinking: Interdisciplinary perspectives* (pp. 373–389). Berlin: Springer.
- Lin, G., & Qu, M. (2016). *Smart use of state public health data for health disparity assessment*. Boca Raton: CRC Press, Taylor and Francis.
- Lucas, A., McMahon, P. M., Asling, M. B., Knobloch, A., Kosh, E., & Sims, K. (2013). Assessing child care providers' knowledge and attitudes regarding support of breastfeeding in a region with low breastfeeding prevalence. *Journal of Human Lactation*, 29(4), 556–563. <https://doi.org/10.1177/0890334413497259>.
- Lundquist, A., McBride, B. A., Donovan, S. M., & Kieffer, A. (2019). An exploratory look at the role of childcare providers as a support and resource for breastfeeding mothers. *Breastfeeding Medicine*, 14(5), 313–319. <https://doi.org/10.1089/bfm.2018.0091>.
- Mattingly, J. A., & Andresen, P. A. (2016). NAP SACC: Implementation of an obesity prevention intervention in an American Indian Head Start program. *Journal of Community Health Nursing*, 33(3), 145–153. <https://doi.org/10.1080/07370016.2016.1191871>.
- NE Go NAP SACC. (2017). Nutrition and physical activity self-assessment. <https://negonapsacc.unl.edu>.
- Nebraska Department of Health and Human Services. (2019). *Early childhood totals of type and capacity*. Retrieved May 1, 2019, from <http://dhhs.ne.gov/licensure/Documents/statewidedata>.
- Shloim, N., Vereijken, C. M. J. L., Blundell, P., & Hetherington, M. M. (2017). Looking for cues—Infant communication of hunger and satiety during milk feeding. *Appetite*, 108, 74–82. <https://doi.org/10.1016/j.appet.2016.09.020>.
- Smith, T. M., Blaser, C., Geno-Rasmussen, C., Shuell, J., Plumlee, C., Gargano, T., & Yaroch, A. L. (2017). Improving nutrition and physical activity policies and practices in early care and education in three states, 2014–2016. *Preventing Chronic Disease*, 14, E73. <https://doi.org/10.5888/pcd14.160513>.
- Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., et al. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, 387(10017), 475–490. [https://doi.org/10.1016/S0140-6736\(15\)01024-7](https://doi.org/10.1016/S0140-6736(15)01024-7).
- Ward, D., Morris, E., McWilliams, C., Vaughn, A., Erinosh, T., Mazzuca, S., Hanson, P., Ammerman, A., Neelon, S., Sommers, J. & Ball, S. (2014). *Go NAPSACC: Nutrition and physical activity self-assessment for child care* (2nd Ed.). Chapel Hill: Center for Health Promotion and Disease Prevention and Department of Nutrition, University of North Carolina at Chapel Hill. Retrieved May 1, 2020, from <https://gonapsacc.org/self-assessment-materials>.
- ZERO TO THREE. (2017). *Investments in quality child care secure the future: Infant-toddler child care fact sheet*. Retrieved May 1, 2020, from <https://www.zerotothree.org/resources/2012-infant-toddler-child-care-fact-sheet>.

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