

Breastfeeding Duration Is Associated With WIC Site-Level Breastfeeding Support Practices

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ABSTRACT

Objective: To describe *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC) site-level breastfeeding support practices and associations with breastfeeding outcomes.

Design: Secondary analysis of WIC Infant and Toddler Feeding Practices Study–2, including data from interviews with caregivers of infants and interviews and surveys with staff from 27 WIC state agencies and 80 study sites.

Participants: A total of 1,235 mothers of breastfed infants participating in the WIC Infant and Toddler Feeding Practices Study–2.

Main Outcome Measure: Any and fully breastfeeding 2, 6, and 12 months postpartum.

Analysis: Descriptive statistics described WIC site-level breastfeeding supports. Multilevel mixed modeling of breastfeeding at 2, 6, and 12 months, controlling for site- and participant-level characteristics.

Results: Five WIC site-level supports were significantly and independently associated with any and fully breastfeeding: access to breastfeeding peer counselors, access to International Board Certified Lactation Consultants, postnatal home visits, allowing any WIC staff member to provide breast pump education, and having a policy not to provide formula during the first 30 days postpartum. Likelihood of any and fully breastfeeding increased with each additional site-level support present (odds ratio = 1.09, 95% confidence interval, 1.06–1.12; and odds ratio = 1.26, 95% confidence interval, 1.21–1.31, respectively).

Conclusions and Implications: Positive associations between site-level supports and breastfeeding at 2, 6, and 12 months were observed. Additional research is needed to understand how site-level supports interrelate and whether specific combinations are more effective, and to identify variations in implementation of breastfeeding supports.

Key Words: WIC, breastfeeding, duration (*J Nutr Educ Behav.* 2020; 52:680–687.)

Accepted January 25, 2020. Published online March 11, 2020.

INTRODUCTION

Breastfeeding rates are rising in the US, yet for many infants, breastfeeding does not continue for the duration recommended by the American Academy of Pediatrics. Current guidelines recommend exclusive breastfeeding for the first 6 months, followed by the introduction of complementary foods around 6 months and continued

breastfeeding until at least 12 months of age.¹ According to the National Immunization Survey,² among US infants born in 2014, 82% started breastfeeding, 55% were breastfeeding at 6 months (25% exclusively), and 34% at 12 months.

Nearly half of all US infants participate in the *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC),³ a program

administered by the US Department of Agriculture (USDA), with services delivered through state and local agencies.⁴ Breastfeeding education and support are core services provided by WIC, along with the provision of supplemental foods, nutrition education, and referrals to health and social services. Federal regulations specify minimum WIC expenditures for breastfeeding promotion and support.⁵ Additionally, numerous policies and initiatives ensure breastfeeding support is provided throughout the prenatal period and first year postpartum. For example, since 2004, the US Congress has earmarked funding for breastfeeding peer counselors (BFPCs), and WIC agencies have implemented BFPC programs.⁶ Other breastfeeding support initiatives implemented by the USDA include the *Loving Support Makes Breastfeeding Work* campaign with extensive resources for training

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Conflict of Interest Disclosure: The authors have not stated any conflicts of interest.

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<https://doi.org/10.1016/j.jneb.2020.01.014>

WIC staff and educating participants (recently updated as *WIC Breastfeeding Support, Learn Together, Grow Together*)^{7,8} and enhanced food packages for breastfeeding mothers and infants.⁹

Although all WIC agencies promote and support breastfeeding, there is considerable variation in the staffing, resources, and practices across WIC sites. This diversity is described in the report of a USDA-sponsored WIC Breastfeeding Policy Inventory (BPI) conducted in 2013.¹⁰ The BPI was the first documentation of WIC breastfeeding policies and practices from a census of 90 state and 1,800 local agencies. Among the findings for local agencies, 69% had BFPCs and 38% had ≥ 1 staff member with the credential of International Board Certified Lactation Consultant (IBCLC). Other findings were that 58% trained all staff on breastfeeding, one-third met with breastfeeding mothers in the hospital or in their homes, and 88% had a private space for mothers to breastfeed in WIC sites. The BPI also assessed practices for recording breastfeeding data and identified variation in collection of outcome measures for initiation and duration. The BPI did not analyze the association between WIC breastfeeding policies and practices and outcomes, but it recommended this for future research. To date, research on this topic has largely focused on WIC's use of BFPCs, which has been shown to improve breastfeeding duration and exclusivity among participants.¹¹

In 2011, the USDA funded the WIC Infant and Toddler Feeding Practices Study-2 (WIC ITFPS-2). This longitudinal study explored feeding practices and health and nutrition outcomes among a national sample of children receiving WIC benefits at birth. Breastfeeding intention, initiation, exclusivity, and duration were among the many outcomes of interest in the WIC ITFPS-2. The study previously found that 83% of women initiated breastfeeding, 42% were breastfeeding at 3 months postpartum, and 18% at 12 months.¹² Although the WIC ITFPS-2 reported sizable increases in breastfeeding rates compared with the rates from 20 years ago, it also demonstrated that a gap

persists between WIC breastfeeding rates and American Academy of Pediatrics recommendations.

The WIC ITFPS-2 data present a unique opportunity to examine the relationship between individual site-level breastfeeding support practices and breastfeeding outcomes in a large national sample of infants participating in WIC. Although the BPI report described local agency-level breastfeeding practices, it neither examined site-level variations nor linked these practices to breastfeeding outcomes. This secondary analysis of WIC ITFPS-2 data was conducted to (1) describe breastfeeding support features of 80 WIC sites randomly selected to participate and (2) examine site-level predictors of duration of any breastfeeding and fully breastfeeding among infants served at these sites.

METHODS

Study Sample

The WIC ITFPS-2 study incorporated both a core longitudinal sample and a supplemental cross-sectional sample ($n = 3,777$). The WIC ITFPS-2 core sample of women and their infants were recruited when enrolling in WIC for the first time for that pregnancy prenatally or before their infant was 2.5 months old in 80 WIC sites across 27 states and territories during a 20-week recruitment period in 2013. Participant-level data were weighted to represent the national population of infants whose mothers enrolled in WIC for the first time for that pregnancy during the enrollment period (July to November, 2013). Sites included in the study had to enroll a minimum of 30 study-eligible participants per month and recruited mothers needed to be at least 16 years old and able to complete the interviews in either English or Spanish. A detailed description of the study's complex survey design and data collection methods is provided in the *WIC Infant and Toddler Feeding Practices Study 2: Infant Year Report*.¹² The WIC ITFPS-2 was approved by Westat Institutional Review Board and the Office of Management and Budget and by state and local Institutional Review Boards

as needed. The secondary analysis of WIC ITFPS-2 data presented here focuses on the subset of mothers and infants in the core longitudinal sample who enrolled prenatally, initiated breastfeeding, and completed bimonthly interviews through at least the age of 13 months ($n = 1,235$).

Procedures and Measures

Site level. Site-level characteristics related to staffing, policies, and practices that support breastfeeding were collected via 3 methods for the WIC ITFPS-2: (1) interviews with 27 WIC state agency representatives affiliated with study sites, (2) site visits to all 80 sites to collect data on facilities and staffing and conduct a 1-hour interview with a site supervisor or coordinator, and (3) surveys of staff ($n = 802$) working in each of the 80 sites during the period when participants were enrolled in the study.

State policy on the issuance of formula to breastfeeding infants in the first 30 days postpartum was captured during WIC state agency interviews and applied to all sites in the state. The presence of a BFPC program and information on site-level policies and practices, such as whether BFPCs or certified (IBCLC or other certification) lactation consultants (LCs) met with prenatal women during pregnancy, visited breastfeeding women in the hospital or at home after delivery, or facilitated support groups for breastfeeding mothers, were assessed through interviews with site staff. Additional data obtained through site visits and staff surveys at each of the 80 study sites included a count of BFPCs, staff with the IBCLC credential, and breastfeeding coordinators; identification of staff roles and practices in breastfeeding education and support; and the presence of a designated space for breastfeeding mothers (Table 1).

Participant level. Outcome variables of interest for this analysis were derived from interviews conducted over the first 13 months of the child's life and included any and fully breastfeeding at the age of 2 months (60 days), 6 months (180 days), and 12 months (365 days) as part of the

Table 1. WIC Site Characteristics (n = 80)

Variable	%
Staffing	
Site has a BFPC program ^a	80
Site has an IBCLC ^a	25
Site has a breastfeeding coordinator ^a	14
>75% of site staff provides breastfeeding education and support ^a	50
Breastfeeding policies and practices	
Issuance of 1 can of formula for breastfed infants during first 30 d permitted ^b	56
BFPCs or LCs ^a on-site	85
BFPCs or LCs visit breastfeeding mothers in hospital ^a	24
BFPCs or LCs visit breastfeeding mothers in home ^a	21
BFPCs or LCs provide breastfeeding support group ^a	20
Breastfeeding mothers who request formula are referred to a registered dietitian, IBCLC, or LC ^a	51
Any staff member can provide breast pump education ^a	43
BFPC contact new mothers ≥ 2.5 times during first 10 d (n = 64 sites with BFPC) ^c	56
Other site characteristics	
Site has separate space for breastfeeding mothers ^a	74
Participant to direct service staff ratio higher than the average across all sites ^a	45

BFPC indicates breastfeeding peer counselor; IBCLC, International Board Certified Lactation Consultant; LC, lactation consultant (with or without IBCLC credential); WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*.

^aFrom site interview and observation; ^bFrom state agency interview; ^cFrom staff survey.

WIC ITFPS-2. Binomial variables for any breastfeeding were derived for each period based on the number of days the mother reported the infant was fed any amount of breast milk exclusively or in combination with any other nutritional source. Fully breastfeeding was defined as receiving only breast milk up to 6 months, with no introduction of formula or complementary foods, and only breast milk and complementary foods from 6 to 12 months, with no introduction of formula.

Demographic information used for this analysis included mother's race/ethnicity, mother's education level, income, mother's age at infant's birth, parity, marital status, whether the father lived with the mother at the time of the child's birth, mother's previous WIC experience, previous breastfeeding experience, and the age of the infant when the mother went back to work. The Infant Feeding Intentions (IFI) scale, a 5-item, validated questionnaire was used to measure intention to breastfeed. Questions were scored on a Likert scale from 0 to 4 and then summed for a total IFI score ranging from 0 to 16, with higher values indicating stronger intention (Table 2).¹³

Data Analysis

Descriptive statistics were used to describe site-level variation in breastfeeding staffing, policies, practices, and other breastfeeding-related characteristics that may affect WIC's influence on breastfeeding duration. Weighted estimates are representative of WIC participants who met the WIC ITFPS-2 study enrollment criteria. For predictive analyses, site-level characteristics were assigned to study participants on the basis of the WIC site in which they enrolled.

Logistic regression was conducted using both overall participant-level weights and participant-level replicate weights to determine which demographic characteristics of the mothers were associated with breastfeeding outcomes. Mother living with the father of the baby, poverty level (>130% or <130% of the federal poverty guidelines), race, ethnicity, mother's age at birth of the infant, breastfeeding history, whether the mother went back to work before the infant was 12 weeks old, and IFI scale were all significantly related ($P < .05$) to the binomial breastfeeding outcomes and thus controlled for in all multilevel multivariate models. Marital status and parity were also shown

to be associated with breastfeeding outcomes but were excluded from subsequent models because marital status was highly correlated with the mother living with the child's father ($r = .76$; $P < .001$), and parity was correlated with breastfeeding history ($r = .55$; $P < .001$).

Mixed-effects logistic regression modeling was conducted with binary outcomes for any and fully breastfeeding at 2, 6, and 12 months, including site-level and participant-level characteristics as independent variables. Site-level weights and participant weights scaled to the site population (by dividing the participant weight by the average site weight) were included. To account for clustering within sites, site was treated as a random effect. Preliminary models grouped similar site characteristics (staffing-related, policy, and physical site features) together. Final models included all site-level characteristics that were consistently and strongly associated with the breastfeeding outcomes modeled together with demographic characteristics. Because many WIC sites had >1 significant site characteristic, a score was derived for each site as the total number of site characteristics that were related to

Table 2. Demographic Characteristics of WIC Participants—Weighted

Variable	Weighted % (Unweighted n = 1,235; Weighted n = 319,083)	SE of %
Mother or caregiver's highest education level		
High school or less	59.5	1.7
More than high school	40.5	1.7
Mother living with father of baby at child's birth		
Yes	59.0	1.7
No	41.1	1.7
Marital status of mother at child's birth		
Married	35.3	1.6
Not married	64.7	1.6
Poverty level using 2014 guidelines		
Below 100% federal poverty level	67.1	1.7
Above 100% federal poverty level	32.9	1.7
Prior WIC receipt		
Yes	53.5	1.7
No	46.5	1.7
Race and ethnicity of infant		
Non-Hispanic black	17.4	1.3
Non-Hispanic white	23.5	1.4
Non-Hispanic other	6.8	0.9
Hispanic	52.3	1.7
Age of mother or caregiver at child's birth, y		
16–19	12.1	1.2
20–25	38.2	1.7
≥26	49.7	1.7
Previous breastfeeding experience of mother, mo		
No history	47.5	1.7
≤3	21.8	1.4
>3	30.8	1.5
Birth order of infant		
First born	42.6	1.7
Second born	27.6	1.5
Third or subsequent	29.8	1.5
Did mother return to work before infant was 12 wk old?		
No	64.6	1.6
Yes	35.4	1.6
Infant Feeding Intentions scale (range, 0–16)	Mean	95% CI
	10.7	10.5–10.9

CI indicates confidence interval; SE, standard error; WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*.

breastfeeding outcomes. One site was not assigned a score because it did not have any study participants who met the inclusion criteria. Site score was modeled as both a continuous and categorical variable. Data analysis was conducted using SAS software (version 9.4, SAS Institute, Inc, Cary, NC, 2012) and IBM SPSS Statistics for Windows (version 25.0, IBM Corp, Armonk, NY, 2017).

RESULTS

Table 1 describes the breastfeeding supports available at study sites. All sites selected for the WIC ITFPS-2 had ≥1 breastfeeding supports available. Breastfeeding peer counselors were available in 80% of sites; however, there was a large range in the ratio of BFPCs to participants among sites that had these staff members

(0.01–1.24 BFPCs/1,000 WIC participants) (data not presented). In most sites, a BFPC or LC met with prenatal women (85.0%), and many had a designated space for breastfeeding mothers (74.4%). Approximately half of the sites were in states that permit the issuance of 1 can of powdered formula to breastfeeding infants during the first 30 days (56.3%). A policy to refer breastfeeding mothers to a registered dietitian, IBCLC, or LC if they requested formula was in place in half of the sites (51.3%). Much less common were sites with an IBCLC on-site, sites with BFPCs or LCs who visited breastfeeding mothers in the hospital or their home, and sites with breastfeeding support groups (led by a BFPC or LC).

Participant-level characteristics are displayed in Table 2. Nearly 41% of mothers who enrolled in WIC prenatally and initiated breastfeeding completed some education after high school. Half of mothers were aged ≥26 years, more than one-third were married (35.3%), and 59.0% were living with the father of their child at the time of the birth. More than two thirds (67.1%) had family incomes <100% of the federal poverty guidelines based on the 2014 standard. More than half of the mothers had previous breastfeeding experience, received WIC previously, and identified their infant as Hispanic. Intention to breastfeed, measured prenatally, was fairly high among this population of women who initiated breastfeeding, with a mean IFI score of 10.7 on a scale of 0–16, in which higher scores indicate stronger intention to breastfeed.

Among infants whose mothers initiated breastfeeding, 61.4% continued with any breastfeeding, and 34.7% continued to breastfeed fully until at least 2 months. Duration rates decreased with age, with only about one-third of infants still receiving any breast milk, one fifth still fully breastfeeding by age of 6 months, and one fourth still receiving any breast milk at the age of 12 months.

Results from multilevel multivariate models including demographic and site-level characteristics are shown in Table 3. Presence of a BFPC program had a significant and

Table 3. Association Between WIC Site Characteristics and Breastfeeding at Age 2, 6, and 12 Mo

Site Characteristic	Model 1: at 2 Mo		Model 2: at 6 Mo		Model 3: at 12 Mo	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Any Breastfeeding (yes vs no)						
Site has a BFPC program	1.26 (1.18–1.35)	<.001	0.89 (0.83–0.95)	<.001	0.63 (0.59–0.68)	<.001
Site has an IBCLC	0.90 (0.83–0.97)	.005	1.09 (1.01–1.18)	.02	1.45 (1.33–1.58)	<.001
Issuance of 1 can of formula for breastfed infants during first 30 d not permitted	1.23 (1.16–1.31)	<.001	1.39 (1.31–1.48)	<.001	1.01 (0.95–1.08)	.72
BFPC or lactation consultant visit breastfeeding mothers in home	1.05 (0.99–1.12)	.11	1.41 (1.32–1.51)	<.001	1.54 (1.43–1.66)	<.001
Any staff member can provide breast pump education	1.01 (0.95–1.07)	.71	1.11 (1.04–1.18)	<.001	0.85 (0.79–0.91)	<.001
	Model 4: at 2 Mo		Model 5: at 6 Mo		Model 6: at 12 Mo	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Fully breastfeeding (yes vs no)						
Site has a BFPC program	0.94 (0.86–1.02)	.12	0.77 (0.71–0.83)	<.001	0.76 (0.69–0.84)	<.001
Site has an IBCLC	1.37 (1.25–1.50)	<.001	1.68 (1.54–1.83)	<.001	2.18 (1.97–2.42)	<.001
Issuance of 1 can of formula for breastfed infants during first 30 d not permitted	1.12 (1.04–1.21)	.002	1.03 (0.96–1.11)	.42	1.07 (0.98–1.18)	.12
BFPC or lactation consultant visit breastfeeding mothers in home	1.52 (1.41–1.65)	<.001	2.13 (1.98–2.30)	<.001	2.00 (1.83–2.20)	<.001
Any staff member can provide breast pump education	1.35 (1.26–1.45)	<.001	1.37 (1.27–1.47)	<.001	1.24 (1.13–1.36)	<.001

BFPC indicates breastfeeding peer counselor; CI, confidence interval; IBCLC, International Board Certified Lactation Consultant; OR, odds ratio; WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*.

Notes: LCs were those with IBCLC or other certifications. Models controlled for mother living with the father of the baby, poverty level (>130% or <130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale. Models included all site-level characteristics modeled together.

positive association with any breastfeeding at 2 months ($P < .001$) but not at the age of 6 and 12 months. Presence of an IBCLC in the site was associated with decreased odds of any breastfeeding at 2 months ($P = .005$) but increased odds of any breastfeeding at 6 and 12 months of age ($P = .02$ and $< .001$, respectively) and fully breastfeeding at all ages ($P < .001$ for all). There was increased likelihood of fully breastfeeding at all ages and any breastfeeding at age 6 and 12 months both in sites that provided home visits and in sites that allowed any staff to provide breast pump education to mothers compared with sites where these practices were not present ($P < .001$ for all). Infants in sites with a state policy prohibiting the issuance of formula during the first 30 days to breastfeeding infants were more likely than infants at sites allowing the issuance of 1 can of powdered formula to be

breastfeeding (any) at 2 and 6 months of age ($P < .001$ for both) and fully breastfeeding at 2 months of age ($P = .002$).

Because most sites had multiple site-level characteristics present, multilevel multivariate models explored associations between breastfeeding outcomes and the number of site-level characteristics present, as shown in Table 4. The sum of 5 characteristics was used to assign each of the included 79 sites with a score: presence of BFPC program, access to an IBCLC, policy prohibiting the issuance of formula to breastfeeding infants in the first 30 days, provision of home visits, and allowing any staff to provide breast pump education. A majority of sites had only 1 ($n = 23$), 2 ($n = 30$), or 3 ($n = 22$) characteristics present. Presence of 4 or 5 characteristics was much less common ($n = 4$). There were no apparent differences between these and other sites except

for the number of breastfeeding supports they had in place. For each additional characteristic present, infants were 26% more likely to be fully breastfeeding at 2 months ($P < .001$) and 36% to 40% more likely to be fully breastfeeding at 6 and 12 months ($P < .001$ each). When examined as a dichotomous variable, infants in sites with 3–5 characteristics present were nearly 1.6 times as likely to be fully breastfeeding at 2 months and twice as likely to be fully breastfeeding at 6 and 12 months ($P < .001$ for all) compared with infants in sites with only 1 to 2 site-level characteristics present.

DISCUSSION

To date, most national studies of WIC breastfeeding supports have been descriptive,^{10,14} and studies examining associations between breastfeeding supports and outcomes

Table 4. Association Between Number of WIC Site-Level Characteristics Present and Breastfeeding Outcomes at Age 2, 6, and 12 Mo

Number of Site Characteristics Scale	At 2 Mo		At 6 Mo		At 12 Mo	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Any breastfeeding						
Total score, continuous	1.09 (1.06–1.12)	<.001	1.19 (1.16–1.23)	<.001	1.08 (1.04–1.11)	<.001
Total score, 3–5 vs 1–2 characteristics	1.05 (1.00–1.11)	.07	1.28 (1.21–1.36)	<.001	1.05 (0.98–1.12)	.17
Fully breastfeeding						
Total score, continuous	1.26 (1.21–1.31)	<.001	1.36 (1.31–1.42)	<.001	1.40 (1.34–1.47)	<.001
Total score, 3–5 vs 1–2 characteristics	1.59 (1.48–1.70)	<.001	2.09 (1.95–2.23)	<.001	2.11 (1.94–2.29)	<.001

CI indicates confidence level; OR, odds ratio; WIC, *Special Supplemental Nutrition Program for Women, Infants, and Children*. Notes: Models controlled for mother living with the father of the baby, poverty level (>130% or >130%), race, ethnicity, mother's age at the birth of the infant, breastfeeding history, whether the mother returned to work before the infant was 12 weeks old, and the intention to breastfeed scale. Number of site characteristics scale (0–5) is based on the number of characteristics present at each site: breastfeeding peer counselor program, policy does not permit formula issuance for breastfeeding infants in first 30 days, access to an IBCLC, provision of home visits, and allowing any staff member to provide breast pump education.

have largely focused on the presence of a BFPC program.^{15,16} In a recent report, it was noted that WIC agencies have the flexibility to operate their programs in a way that best meets the needs of their participants¹⁶; thus, variations in site operations certainly exist and may be associated with different breastfeeding outcomes for WIC participants. This analysis found that several practices intended to promote and support breastfeeding are available in WIC sites, supplementing findings from the BPI study. This analysis measured more than the prevalence of these practices; it also examined how the practices relate to breastfeeding outcomes, both replicating and extending existing research. There were BFPC programs present in a large percentage of study sites, and they were associated with increased odds of any and fully breastfeeding at 2 months. These results are consistent with several studies that examined associations with breastfeeding longevity.^{17–19}

Data collected from a sample of WIC local agencies during phase I of the *Loving Support Peer Counselor Program Study*¹⁴ indicated that more than half (at least 56%) of contacts between participants and BFPCs are not in person (44% by phone and 12% by mail). Some literature suggests it is important for peer counselor support to be ongoing and in person to improve breastfeeding

duration or that these types of support are more effective.²⁰ Together, these findings may help to explain why this analysis did not find a BFPC program to be positively associated with breastfeeding at 6 and 12 months. Resources for BFPC programs are limited and therefore focus on assisting women in the prenatal and early postnatal periods, whereas other types of WIC staff may be more involved, influential, or accessible to mothers later in the postpartum period. For example, this analysis found that 1 in 4 sites had a staff member with an IBCLC credential and that access to an IBCLC increases the odds of fully breastfeeding at all 3 times and any breastfeeding at 6 and 12 months. Access to an IBCLC may be important on its own or indicative of sites that offer more intense or comprehensive breastfeeding support. The negative association between presence of an IBCLC and any breastfeeding at 2 months may be related to when and how sites use their IBCLC resources.

Approximately 20% of WIC ITFPS-2 sites offer home visits by a BFPC or LC. Home visits provide an opportunity to identify potential breastfeeding problems such as incorrect positioning or latch of the infant and to encourage mothers and address concerns in a comfortable environment.²¹ Thus, it is unsurprising to find an association between home visits and continued breastfeeding. Similar results were

observed among women at sites with a policy that any staff member can provide breast pump education. It is possible that these practices are actually proxies for site characteristics that are difficult to measure, such as the quality, intensity, or comprehensiveness of breastfeeding support services. This theory is further supported by the finding that presence of multiple significant site-level characteristics is associated with increased odds of breastfeeding at each period.

This analysis also examined the association between policy for formula issuance to breastfeeding infants during the first 30 days and breastfeeding outcomes. Approximately 60% of states permit the issuance of 1 can of powdered formula to breastfeeding infants during the first 30 days¹⁰; at the time of data collection, more than half of the sites in the WIC ITFPS-2 were in states with this policy. Based on evidence from this analysis, allowing formula issuance during this period may reduce the likelihood that women who initiate breastfeeding will continue to 2 or 6 months, which is consistent with literature that suggests formula introduction during the first weeks after birth can lead to shorter durations of any and exclusive breastfeeding.²² However, it is unknown how this policy may affect women's decision to initiate breastfeeding because the sample excluded infants who were never breastfed.

This analysis was subject to several limitations. First, 12–21 months lapsed between when the site-level data were collected and when the 13-month participant interview was conducted. To the extent that some WIC site-level policies, practices, and staffing changed, or infants and their mothers relocated to a different site during this period, the results could misrepresent actual associations between site-level characteristics and breastfeeding outcomes.

Second, the analysis was only able to describe the breastfeeding support practices available in the site and was not able to link women with breastfeeding support services they actually received. Therefore, findings are limited to describing how site-level supports of breastfeeding are generally associated with breastfeeding outcomes among infants served at that site.

Third, the sample was restricted to include only women who enrolled in the WIC ITFPS-2 prenatally and who initiated breastfeeding. Women who enroll prenatally likely differ from those who enroll postpartum, and potentially in ways that influence breastfeeding duration. A prenatal subsample was selected because intention to breastfeed, a strong predictor of breastfeeding duration, was assessed only during the prenatal interview. Because only infants whose mothers initiated breastfeeding were included, the impact of site practices on breastfeeding initiation could not be explored.

Fourth, the data were collected for WIC ITFPS-2 more than 6 years before this analysis was conducted and may not represent current WIC site practices and policies.

Finally, although the WIC ITFPS-2 results are weighted to represent the national population of infants whose study-eligible mothers enrolled in WIC for the first time during the study enrollment period, the study sites are not nationally representative of all WIC sites. Because WIC ITFPS-2 sites were selected from among all WIC sites enrolling ≥ 30 study-eligible participants per month, results on the prevalence of breastfeeding support characteristics are representative of similarly sized sites.

IMPLICATIONS FOR RESEARCH AND PRACTICE

This analysis demonstrated positive associations between several site-level characteristics and breastfeeding outcomes and found that the more breastfeeding support practices present at a site, the better the breastfeeding outcomes. These results could be used to inform WIC site strategies for improving breastfeeding support (eg, strengthening BFPC support beyond the early postnatal weeks and having an IBCLC on the WIC breastfeeding support team). Although this analysis was unable to identify which infants received formula from WIC during the early weeks, results indicate that the likelihood of women *who initiate breastfeeding* continuing to breastfeed at 2 and 6 months may be decreased in sites where state agency policy allows 1 can of formula during the infant's first 30 days. Because this analysis included only those who initiated breastfeeding, additional research is needed to understand how formula issuance policies are implemented in sites and how they relate to both breastfeeding initiation and duration outcomes.

These findings suggest that more comprehensive or intense site-level support may yield more positive outcomes across the first year of life, but that not all types of support are influential at all points during that first year. Additional research is needed to understand how site characteristics interrelate and to identify variations in the implementation of breastfeeding support practices at the site level. Some site-level characteristics that may influence breastfeeding, such as the quality of services provided by a BFPC and the connection a WIC mother feels to site staff, were not examined in this analysis. Thus, more research is needed to understand the role and relative importance of these factors, which are notoriously difficult to measure.

ACKNOWLEDGMENTS

The authors would like to acknowledge Nancy Weinfield, PhD, Christine

Borger, Brenda Sun, Brady West, Kelley Scanlon, and Danielle Berman for their support and guidance. Data are drawn from the WIC Infant and Toddler Feeding Practices Study–2, a federal study conducted under the direction of the Office of Policy Support in the Food and Nutrition Service, USDA (AG-3198-B-11-0020).

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Food Pantries Integrating Eating Competence, Interest/Enjoyment in Physical Activity and Self-Efficacy for Pantry Participants

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INTRODUCTION

Those with low socioeconomic status who visit food pantries are also at increased risk for nutrition-related health issues, so food pantry participation represents an entry point for nutrition education.^{1,2} Messages need to be feasible and include sustainable suggestions sensitive to the needs of food pantry participants. The *Whole Body Approach (WBA)*, a health promotion, nondiet program for adults who are low income, was developed by the Northern Illinois Food Bank and Northern Illinois University to address this need.

The *WBA* targeted behavioral rather than weight outcomes. It aligned with Health at Every Size (HAES), a weight-neutral approach centered on respecting body, shape, and size diversity, promoting a holistic approach toward wellness, ending weight discrimination and stigma, and promoting eating and exercise based on individualized hunger, satiety, nutritional needs, and pleasure. The HAES paradigm targets health regardless of income level.³ The goal of the *WBA* program was to help clients develop a healthy relationship with food and fitness through a nondiet curriculum. This GEM focuses on the *WBA* curriculum created for a target audience that was low

socioeconomic status, used food pantries, and was largely Hispanic and white.

CURRICULUM DEVELOPMENT

The *WBA* was developed in close collaboration with Northern Illinois University. The foundation of the *WBA* curriculum is derived from the HAES curriculum and adapted to a low-income audience through field testing since 2015.⁴ The curriculum was used in tandem with the Social Cognitive Theory concept of self-efficacy⁵ and the Satter Eating Competence Model that emphasizes being positive, comfortable, and flexible with eating and realistic, along with being able to access enough enjoyable and nourishing food to eat.⁶ The Satter Eating Competence Model has been validated in low-income audiences.⁷ Behavior change involves not only gaining knowledge, skills, and resources but also developing self-efficacy as defined by the Social Cognitive Theory.⁸

The *WBA* used learner-centered discussions and hands-on activities, including experiential learning activities, to engage participants and direct behavioral objectives. The *WBA* targeted 3 main objectives: (1) improve

eating competence, (2) increase interest/enjoyment in physical activity, and (3) increase confidence related to consuming, accessing, and providing fruits and vegetables in the household. The behavioral objectives were chosen based on literature that suggested the nondiet paradigm, targeted behavioral outcomes rather than weight itself, and showed improvement in behavior change specific to the low-income audience.⁹

Participants were encouraged to take 1 step or goal at a time through discussions and experiential learning and were provided with workbook handouts. To reinforce increasing self-efficacy, pantry-fresh produce and a recipe were provided weekly, and a hands-on cooking demonstration was implemented in week 9 (Table). Reflections of the previous week's goals were discussed at the beginning of each session, and participants set new goals at the end of each session. The message that "small changes make big differences" was incorporated around the targeted outcomes.

The *WBA* included a lesson manual and a PowerPoint (Microsoft Office 365, Microsoft Corporation, Redmond, WA) slide show for the educator along with weekly "Helpful Hints" for implementation of the *WBA* sent through e-mail. Each week, educators followed a lesson plan that included the topic of the week (Table).

All materials were back-translated from Spanish to English by graduate research assistants fluent in Spanish. This *WBA* curriculum was reviewed by experts in HAES and field-tested several times before its use in this report. Furthermore, the *WBA* program was created using the best practices in nutrition

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Conflict of Interest Disclosure: The authors have not stated any conflicts of interest.

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J Nutr Educ Behav. 2020;52:195–198

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<https://doi.org/10.1016/j.jneb.2019.10.003>

Table. The *Whole Body Approach* 10-Week Program Schedule of Topics With Learner Objectives and Behavioral Outcomes Targeted

Weekly Session Topics	Learner Objectives	Outcomes Targeted ^a
1. Welcome to the program	Identify the overall goal of the program. Explain why they were invited to this program.	
2. Developing a healthy relationship with food	Explain the importance of group sharing and confidentiality. Name 3 key components of the HAES nondiet approach. State how the current HAES approach is different from dieting experiences in the past.	Eating attitude Internal regulation Contextual skills
3. Enjoyable movement	Build confidence in using a tool for hunger and fullness cues. Identify 2 motivators to personal movement. Name 2 intrinsic and 2 extrinsic motivators to exercise. Name 2 benefits of enjoyable movement.	Interest/Enjoyment in physical activity
4. Practicing mindfulness	Identify at least 2 personal triggers for emotional eating. List at least 2 healthy coping tools for negative emotions. Identify comfort level with honoring cravings. Practice mindful eating techniques.	Internal regulation Eating attitude
5. Problem solving	Identify a chain of events that supports a healthy and unhealthy relationship with food or fitness. Identify an action plan that supports a healthy relationship with food and/or fitness. Strengthen skills related to meal planning.	Contextual skills
6. Every Body is a good body	Define the thin-ideal. Identify the costs of pursuing this ideal. List ways to resist pressures to be thin. Develop new ways to talk about bodies in positive ways.	Eating attitude and interest/enjoyment for physical activity
7. Talk back to negative thoughts	Identify how negative thoughts affect behavior. Define body image. Reflect on their body image. Practice talking back to negative thoughts (related to food & eating) and the thin-ideal.	Eating attitude
8. You can manage stress	Reflect on their causes of stress. Identify signs of stress. Identify the relationship between stress and chronic disease. Practice managing stress.	Internal regulation Contextual skills eating attitude
9. Make social cues work for you and cooking demo with Chef Jen	Identify problem social cues. Identify helpful social cues. Identify ways of dealing with social cues. Practice using the “Intuitive Eater’s Holiday Bill of Rights.”	Food acceptance food regulation contextual skills Self-efficacy
10. Ways to stay motivated	Reflect on experiences with the <i>Whole Body Approach</i> to disease prevention. Identify goals achieved during the program. Identify future goals. State “small changes make big differences” 2 more times.	

HAES indicates Health at Every Size program.

^aSelf-efficacy was targeted weekly through access to fresh produce and a new recipe. Session 9, however, incorporated a cooking demonstration.

education for low-income audiences, which included trainings for the educators.¹⁰

IMPLEMENTATION AND RESULTS

This intervention measuring pre- and postoutcomes included participants

(n = 73) aged 27–89 years, mostly female 93% (n = 67), and 53% (n = 38) completed surveys in Spanish. Certified diabetes educators, registered dietitians, and nutrition and dietetic graduate research assistants who had been trained on the *WBA* program facilitated the 10 weekly, 90-minute education sessions to adult food pantry patrons. All materials were

available in Spanish and English. Translators were available when needed. Approval for this study was obtained through the Northern Illinois University Review Board. Recruitment sessions took place at each site, 2 weeks before the start of the class by program directors and nutrition and dietetic graduate research assistants. Recruiters encouraged attending 80%



Figure. The *Whole Body Approach* program in action with Chef Jen doing a cooking demonstration with class participants.

of the classes. Regular attendance was necessary to test the impact of the entire program because different topics each week addressed program objectives. These sessions were delivered in partnership with surrounding food pantries in the Northern Illinois region. Participants were able to choose fresh produce following each session. The cooking demonstration sessions used pantry produce and provided the recipe to participants.

Behavior change outcomes were evaluated pre- and posteducation with the Eating Competence Satter Inventory 2.0, which included subscales that measure eating attitude, contextual skills, food acceptance, and internal regulation,^{6,7,11} along with the interest/enjoyment subscale of the Motives for Physical Activities Measure – Revised,¹² and a self-efficacy survey on fruit and vegetable consumption, access, and ability of the individual to provide these items to their family.⁵ The pretests were given at the beginning of the first class session and the posttest was given at the end of class session 10.

Analyses were conducted using aggregate data from all locations via Statistical Analysis Systems (version 9.3, SAS Institute, Inc, Cary, NC, 2016) and Statistical Package for the Social Sciences (version 24.0, SPSS, Inc, Chicago, IL, 2016) Paired t tests were used to compare pre- and postintervention results of the variables of interest including: eating

competence with the components of eating attitudes, contextual skills, food acceptance, interest/enjoyment in physical activity, and self-efficacy related to consuming, accessing, and providing fruits and vegetables to their household. In addition, a Bonferroni adjustment to decrease type I error was done. All scores tested in the *WBA* survey increased from pre- to postintervention. Results revealed that behavioral outcomes significantly improved ($P < .05$) for eating competence ($P = .003$), eating attitudes ($P = .04$), contextual skills ($P = .001$), food acceptance ($P = .008$), interest/enjoyment in physical activity ($P = .003$), and self-efficacy ($P = .003$) after *WBA* program completion. After the Bonferroni adjustment was applied ($P < .007$), overall eating competence, contextual skills, self-efficacy, and interest/enjoyment in physical activity were statistically significant. Feedback from both participants and educators indicated that they would like to see the program continue. The program length did not appear to be a barrier to participation. Program instructors consistently recommended the need to increase the class time by 30 minutes in previous pilot tests to accommodate planning and class discussion. Educators have praised the training program on how the nondiet approach focuses on changing the way health care professionals convey messages about weight and health to the public.

DISCUSSION AND IMPLICATIONS

The *WBA* is an evidence-based, theoretically grounded, nondiet curriculum that targets eating competence, interest/enjoyment in physical activity, and self-efficacy related to consuming, accessing, and providing fruits and vegetables. This program is unique in that it removes weight as a primary outcome and focuses on behavioral change. The food pantry appeared to be an ideal setting for those participants who attend the pantry setting regularly to receive education and fresh produce. Food pantry education is feasible and appears to lead to improved outcomes in a nutritionally vulnerable population group.

NOTES

The study was reviewed and approved by the Northern Illinois University Institutional Review Board. This research was funded by the Northern Illinois Food Bank.

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