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Exposure to Baby-Friendly Hospital Practices and Breastfeeding Outcomes of WIC Participants in Maryland

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Abstract

Background: The Baby-Friendly Hospital Initiative is an effective intervention to support maternal practices around breastfeeding. However, adherence of hospitals to the Baby-Friendly 10 Steps, as determined from the perspective of women participating in the United States Special Supplemental Nutrition Program for Women, Infants, and Children, has not been assessed.
Research Aims: (1) To compare maternal perceptions about maternity practices in Baby-Friendly Hospitals and non-Baby-Friendly Hospitals; (2) to evaluate the associations between degree of exposure to the Baby-Friendly 10 Steps and breastfeeding practices through the first 6 months; and (3) to evaluate whether the receipt of specific Steps was associated with breastfeeding practices through 6 months.
Methods: This study was a cross-sectional 2 group comparison, using prospective data collected through a self-report telephone survey and retrospective data gathered from participants' records. Women (N = 182) participating in four Maryland Special Supplemental Nutrition Program for Women, Infants and Children agencies were recruited. One hundred and eight (59%) participants delivered at designated Baby-Friendly Hospitals; 74 (41%) delivered in non-Baby-Friendly designated hospitals. Logistic regression models were utilized to determine the influence of perceived Step adherence on exclusive breastfeeding.
Results: Reported adherence to 10-Steps policies ranged from 10%–85% (lowest for Step 9, highest for Step 10) and only Step 9 (give no pacifiers or artificial nipples to breastfeeding infants) differed according to Baby-Friendly Hospital status. Greater exposure to the 10 Steps was positively associated with exclusive breastfeeding during hospitalization. The lack of perceived adherence to Step 6 (no food or drink other than human milk), Step 9, and the International Code of Marketing of Breast-milk Substitutes (no formula, bottles, or artificial nipples) significantly decreased the likelihood of exclusive breastfeeding through 6 months.
Conclusion: Maternal perception of Baby-Friendly Step adherence was associated with exclusive breastfeeding.

Keywords

Baby-Friendly Hospital Initiative, breastfeeding, breastfeeding practices, infants and children, supplemental nutrition program for women

Background

Breastfeeding is a recommended health practice that confers benefits to maternal and child health and these benefits are stronger when there is exclusive breastfeeding within the first 6 months of life (American Academy of Pediatrics [AAP], 2012; World Health Organization [WHO], 1998). Maternity practices that provide technical assistance and build self-efficacy are key to establishing breastfeeding practices (Rollins et al., 2016). The Baby-Friendly Hospital Initiative (BFHI), implemented by the WHO and the United Nations Children's Fund (UNICEF) in 1991 (WHO, 1998), details evidence-based practices (Baby-Friendly USA, 2016) that hospitals and their staff can adopt to promote initiation

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and maintenance of breastfeeding. Hospitals that are certified by Baby-Friendly USA (BFUSA) to be compliant with the Ten Steps (10 Steps) to Successful Breastfeeding (Baby-Friendly USA, 2016) and continue to uphold the standards receive designation as Baby-Friendly Hospitals (BFH). Exposure to the Steps has been associated with increased initiation and duration of breastfeeding (Munn et al., 2016), however, implementation of the 10 Steps and related practices may be variable, even among hospitals designated as Baby-Friendly (Nobari et al., 2017; Patterson et al., 2019).

In October 2012, the Maryland State Department of Health launched the Maryland Hospital Breastfeeding Policy Recommendations (MD DHMH, 2012), which included best practices in mother–baby care, and encouraged all birthing hospitals to adopt evidence-based practices to promote breastfeeding. In 2016, four Maryland hospitals were newly designated as Baby-Friendly. These hospitals, in southern, central, and northeastern Maryland, each serve as the primary birthing hospital for a specific Maryland county, which is served by one local agency for the federal Special Supplemental Program for Women, Infant and Children (WIC). Three nearby counties are served by a single local WIC agency whose participants primarily deliver in a hospital not designated Baby-Friendly (non-BFH). This study was designed to characterize the experiences of WIC participants delivering in the newly designated BFH, and, for comparison, participants delivering in the adjacent non-BFH. The aims of this study were to (1) compare maternal perceptions about maternity practices in designated Baby-Friendly Hospitals and non-Baby-Friendly designated hospitals; (2) evaluate the associations between degree of exposure to the Baby-Friendly 10 Steps and breastfeeding practices through the first 6 months after birth; and (3) evaluate whether the receipt of specific Steps was associated with breastfeeding practices during the first 6 months.

Key Messages

- Adherence of hospitals to Baby-Friendly Hospital Initiative practices, as determined from the perspective of women participating in the United States sponsored Special Supplemental Nutrition Program for Women, Infants, and Children has not been assessed.
- Adherence to Baby-Friendly Hospital policies ranged from 10%–85% (lowest for Step 9, highest for Step 10) and only Step 9 differed according to Baby-Friendly Hospital status.
- For every one-unit increase in adherence to Steps 1–10, there was a 43% increased odds of exclusive breastfeeding during hospitalization ($p < .001$).
- We have provided information about maternal perception of "Baby-Friendly" Step adherence, and provide guidance for the prioritization of practices (Step 6, Step 9, and the International Code for the Marketing of Breast-Milk Substitutes) that are most likely to promote breastfeeding practices.

Methods

Design

This study was a cross-sectional 2 group comparison, using prospective data collected through a self-report telephone survey and retrospective data gathered from WIC records. This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) and the Maryland Department of Health via expedited review.

Setting

The WIC Program provides supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, infants, and children up to 5 years of age, found to be at nutrition risk, through federal grants delivered to states and administered through local agencies (U.S. Department of Agriculture [USDA], 2020). The coverage of eligible pregnant or postpartum women participating in WIC in the state of Maryland was 86.6% in 2016 (USDA, 2016). In 2017 the prevalence of exclusive breastfeeding at 6 months in Maryland was 29.4%, which was higher than the national average (25.6%) and the prevalence among WIC participants (19.0%; CDC, 2019). The hospitals included in this study were located in southern, central, and northeastern Maryland and were all community hospitals with 74–267 beds.

Sample

Postpartum women were recruited through the WIC clinics. Posters and interest forms in English and Spanish were placed in the clinics, and those interested in learning about the study provided their contact information, including phone number, best

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times to call, and their preference for English or Spanish. They were contacted by phone to explain the study procedures and were screened for eligibility with the following inclusion criteria: Mother ≥ 18 years of age; English or Spanish speaker; delivery at one of the selected hospitals; no maternal medical conditions (e.g., HIV/tuberculosis, breast cancer, on chemotherapy, recreational drug use, recent blood transfusion); delivery of a healthy term infant (≥ 37 weeks' gestation), who had been admitted < 3 nights in a neonatal intensive care unit and was not prescribed a special formula.

Overall, 413 women submitted interest forms. Of these, 84 (20%) were unreachable (three or more phone-call attempts), 53 (13%) declined to participate, and 94 (23%) were found to be ineligible (i.e., ineligible delivery hospital [$n = 54$; 57%], mother < 18 years of age [$n = 5$; 5%], preterm delivery [$n = 10$; 11%], infant in the NICU > 3 days [$n = 11$; 12%], or other [$n = 14$; 15%]). We had sought to interview 200 women; however, 182 (44%) women were eligible and completed the phone survey. Of this sample, 108 (59%) delivered at a BFH and 74 (41%) delivered at a non-BFH. No power analysis was performed to interpret the adequacy of the final sample size.

Measurement

Data collected were a combination of existing WIC records and an author-created survey administered via telephone in English ($n = 162$; 89%) or Spanish ($n = 20$; 11%). The survey included questions that have been used previously to evaluate BFH practices (Shulman et al., 2018) and others created by the study team, which included researchers, WIC providers, and maternal/neonatal nursing and lactation support providers familiar with the implementation and expectations of the 10 Steps (Baby-Friendly USA, 2016). The survey was crafted in English, translated into Spanish by a native speaker, and then reviewed by others who were native speakers or with non-native fluency in Spanish. Both English and Spanish versions were reviewed by the two IRB.

Demographic Data. During the survey, participants were asked about their recent pregnancy experience (including intention to breastfeed), hospital experience (delivery, post-delivery) and experience after leaving the hospital. Information also was abstracted from the WIC Management Information System (MIS) when the infant reached 6 months of age, including maternal socio-demographic information, participation in government assistance programs (Medical Assistance, Temporary Cash Assistance, Supplemental Nutrition Assistance Program), pre-pregnancy weight and height, birth outcome (birth weight, gestational age), and infant feeding practices (exclusive breastfeeding at WIC certification, at 3 months and at 6 months).

Participant Exposure. We assessed participant experiences with each of the 10 Steps and a component of the International Code of Marketing Breast-milk Substitutes (IC; see Supplemental Table S1) for predetermined criteria and responses). Maternal perception guided the adherence measures, including Steps that were policy based and those that directly influence the experience of participants (Steps 4–10; Nickel et al., 2013). Adherence to the IC was determined based on receipt of formula, other human-milk substitutes, bottles or nipples upon hospital discharge, and did not specify if the materials were marketed by a manufacturer of human milk substitutes (Grummer-Strawn et al., 2017).

From the responses, we calculated three scores: (1) the BFH Score, the sum of the number of the 10 Steps reported by the mother; (2) the Hospital Score, the sum of five Steps that directly involved the participant and feeding in the hospital (Steps 4, 5, 7, 8, and 9); (3) the Home Score, which also included the three Steps to support breastfeeding after discharge (sum of Steps 4–10). For questions related to Steps 4, 5, and 7, responses could indicate a medical exclusion that would preclude receiving a Step; for example, in response to Step 4 (help mothers initiate breastfeeding within 1 hr of birth), participants who indicated their infant needed medical attention right after birth were considered to have a medical exclusion ($n = 23$; 13%).

Exclusive Breastfeeding. Exclusive breastfeeding at hospital discharge was obtained through maternal report during the survey and identified if participants reported that their infant was only fed human milk in the hospital and that their infant was never fed sugar water, water, formula, or any liquid other than human milk (Noel-Weiss et al., 2012). For analyses, feeding status in the hospital was categorized as exclusive breastfeeding, mixed feeding, or exclusive formula feeding. At the time of infant WIC certification, at 3 months, and at 6 months of age, exclusive breastfeeding was abstracted from the WIC MIS and determined via maternal report of no liquids other than human milk and no solids fed to the infant at the time point.

Data Collection

This study was conducted between March 2018 and September 2019. All participants provided verbal informed consent during the screener call prior to the start of data collection. Trained research staff conducted the one-time 20-min phone survey in English or Spanish according to participant preference. The interviews in Spanish were completed by a native Spanish speaker or a non-native speaker with 3 years of experience conducting interviews in Spanish regarding reproductive health. The median (interquartile range (IQR)) time postpartum for the interview was 2.6 (1.5–4.6) months. The median (IQR) age of the infant at WIC certification was 10 (6–18) days.

Upon completion of the phone survey, participants were sent a $20 pre-paid gift card. Participants were assigned an ID number, and their survey responses were kept separate from their name and contact information to ensure confidentiality. All data were kept secure on password-protected computers.

Data Analysis

Demographic characteristics of mothers and infants were described using means and standard deviations, and categorical variables were tabulated. Differences in maternal and infant characteristics by BFH status were evaluated utilizing chi-square tests for categorical variables and by *t*-tests for continuous variables.

Aim 1 was examined by determining maternal perception of overall adherence to the 10-Steps across all participants interviewed. Differences in maternal characteristics and reported adherence to the 10 Steps by BFH status (yes/no) and intention to breastfeed were evaluated utilizing chi-square tests to determine significant differences ($p < .05$).

Aim 2 was analyzed by assessing the associations of the BFH, Hospital and Home Scores on the outcome of exclusive breastfeeding (0 "No," 1 "Yes") determined via logistic regression models controlling for confounding variables. For ease of interpretation, the BFH Score and Hospital Score were centered at the mean to associate exposure to more Steps (+ 1 standard deviation) compared to the average experience of participants. We evaluated the scores in the total sample and considering subgroups of participants who were eligible, and those with one or multiple medical exclusions.

Aim 3 was investigated by evaluating associations of individual Step exposure (0 "Received Step," 1 "Did not receive Step") with breastfeeding practices. Maternal age (years), maternal race/ethnicity (Non-Hispanic White, Hispanic, Other [including Non-Hispanic Black]), maternal intention to breastfeed (yes/no [including no, maybe, and don't know responses]) and infant age at that time point (WIC certification visit - days at visit) were considered necessary for adjustment. Other variables explored as confounding factors were BFH (yes, no), maternal eligibility (either medically excluded, or eligible participants), maternal education (less than High School, greater than High School), primiparity (first child, second, or more), delivery type (vaginal or cesarean), and infant time spent in the hospital (days). Final models were selected based on lowest Akaike Information Criterion (AIC) value, estimating goodness of fit. Stata Version 14 was used for all analyses.

Results

Characteristics of the Sample

The average age of the participants interviewed was 26.5 years (SD = 5.2 years), about half had just delivered their first child and 76% (n = 138) stated an intention to breastfeed (Table 1). Participants who delivered at non-BFH were more likely to identify as Hispanic ($p < .01$), to prefer to be interviewed in Spanish ($p < .01$), and to have lower educational attainment ($p = .03$) than participants who delivered at a BFH. They were, however, less likely to be enrolled in Medical Assistance ($p = .01$). There were no differences in infant characteristics by BFH status.

Aim 1: Maternity Practices in BFH Versus non-BFH

There were no differences in participant report of hospital adherence to each of the 10 Steps by BFH status (see Supplemental Table S2), except for Step 9 (give no pacifiers or artificial nipples to breastfeeding infants), which was more frequently reported by participants who delivered in a BFH (15.7%; $n = 17$ vs. 2.7%; $n = 2$, $p = .01$). In contrast, there were marked differences in reported adherence by maternal intention to breastfeed (Table 2). Participants who intended to breastfeed were also more likely to report hospital adherence to Steps 2, 4, 5, 6, 8, and 10 than participants who did not intend to breastfeed. Participants who intended to breastfeed were less likely to receive discharge materials or instructions for human milk substitutes compared with participants who did not intend to breastfeed ($p = .02$).

We further evaluated exposure associated with maternal characteristics only amongst those who intended to breastfeed. Differences in reported adherence to specific Steps were observed by age, race, language preference, educational attainment, and parity, but not body mass index (BMI). Younger participants (< 25 years) were more likely to receive Step 5 (help initiate and maintain lactation) than older participants (≥ 25 years) ($p = .01$). Participants who identified as Non-Hispanic Black were least likely to report adherence to Step 7 (practice rooming in; $p = .01$) and participants who identified as Hispanic were least likely to report adherence to Step 9 (no pacifiers or artificial nipples; $p = .04$) compared to other race and ethnic groups. Participants who preferred to be interviewed in Spanish were less likely to report adherence to Step 3 (inform on the benefits of breastfeeding [$p = .03$], Step 6 [no food or drink other than human milk; $p = .03$], Step 7 [practice rooming in; $p < .01$] and the IC [no formula, bottles or artificial nipples; $p = .04$]) than participants who preferred to be interviewed in English. Participants with lower educational attainment were less likely to report adherence to Step 6 (no food or drink other than human milk; $p < .001$) compared to participants who graduated high school. Lastly, participants delivering their first child were less likely to report adherence to Step 7 (practice rooming in; $p = .03$) than participants delivering their second child or more.

The BFH Score is shown separately for participants with medical exclusions versus those without a medical exclusion (i.e., eligible for the Step; Table 3). The BFH score was roughly one point higher in eligible participants compared to those with a medical exclusion, and this was also true for both participant-centered scores. Differences in BFH Score ($p = .04$) and Home Score ($p = .02$) by BFH status were observed among participants with medical exclusions but not among individuals eligible for those Steps. There were differences in BFH Score, Hospital Score, and Home Score by intention to breastfeed among eligible participants and among those with medical exclusions. Overall, participants who intended to breastfeed received more Steps than participants who did not intend to breastfeed. Amongst those who intended to breastfeed, there were no differences in BFH

Table 1. Characteristics of Mother-Infant Dyads Stratified by Baby-Friendly Hospital Status (*N* = 182)

		Hospital Status			
	Total Sample *n (%)*	BFH *n* = 108 (59%) *n (%)*	Non-BFH *n* = 74 (41%) *n (%)*	X^2	*p*
Age				4.50	0.11
18-24.9	83 (45.6)	47 (43.5)	36 (48.7)		
25-34.9	83 (45.6)	48 (44.4)	35 (47.3)		
35+	16 (8.8)	13 (12.0)	3 (4.0)		
Race/Ethnicity				14.05	<0.01
Non-Hispanic White	75 (41.2)	41 (38.0)	34 (45.9)		
Non-Hispanic Black	54 (29.7)	41 (38.0)	13 (17.6)		
Hispanic	43 (23.6)	18 (16.7)	25 (33.8)		
Other	10 (5.5)	8 (7.4)	2 (2.7)		
Language of interview				18.31	<0.001
English	162 (89.0)	105 (97.2)	57 (77.0)		
Spanish	20 (11.0)	3 (2.8)	17 (23.0)		
Education				6.75	0.03
Less than High School	16 (8.8)	9 (8.3)	7 (9.5)		
High school graduate/GED	74 (40.7)	36 (33.3)	38 (51.3)		
Some college or graduate degree	92 (50.5)	63 (58.3)	29 (39.2)		
Enrolled in Medical Assistance	137 (75.3)	89 (82.4)	48 (64.9)	7.26	0.01
Enrolled in Temporary Cash Assistance	3 (1.6)	0 (0.0)	3 (4.1)	4.45	0.04
Enrolled in SNAP	43 (23.6)	23 (21.3)	20 (27.0)	0.80	0.37
Smoking Status					
Yes	21 (11.5)	16 (14.8)	5 (6.8)	2.79	0.10
No	161 (88.5)	92 (85.2)	69 (93.2)		
Breastfeeding History					
First child:				0.45	0.50
First time breastfeeding	88 (48.4)	50 (46.3)	38 (51.4)	4.43	0.22
Second or more:					
Yes, experience was successful	51 (28.0)	30 (27.8)	21 (28.4)		
Yes, experience was not successful	17 (9.3)	14 (13.0)	3 (4.0)		
Did not breastfeed before	21 (11.5)	12 (11.1)	9 (12.2)		
Other (exclusively pumped)	5 (2.8)	2 (1.9)	3 (4.0)		
Breastfeeding Intent				3.53	0.32
I knew I wanted to	138 (75.8)	87 (80.6)	51 (68.9)		
I thought I might	22 (12.2)	10 (9.3)	12 (16.2)		
I knew I would not	11 (6.0)	6 (5.6)	5 (6.8)		
I did not know what I would do	11 (6.0)	5 (4.6)	6 (8.1)		
Infant Female Sex	95 (52.2)	59 (54.6)	36 (48.6)	0.63	0.43
Days Spent in the Hospital					
≤ 2 days	108 (59.3)	58 (53.7)	50 (67.6)	3.50	0.06
> 2 days	74 (40.7)	50 (46.3)	24 (32.4)		
Delivery Type				4.46	0.22
Cesarean (planned)	19 (10.4)	12 (11.1)	7 (9.4)		
Cesarean (unplanned)	36 (19.8)	25 (23.1)	11 (14.9)		
Vaginal (spontaneous)	61 (33.5)	30 (27.8)	31 (41.9)		
Vaginal (induced)	66 (36.3)	41 (38.0)	25 (33.8)		

Note. SNAP = Supplemental Nutrition Assistance Program; BFH = Baby Friendly Hospital; Non-BFH = Non-Baby Friendly Hospital; Other = Asian, Native Hawaiian/Pacific Islander or Multiracial.

Table 2. Adherence to Baby Friendly 10 Steps Stratified by Intention to Breastfeed (*N* = 182).

Step	*Total Sample* *n (%)*	Intention to BF: Yes n = 138 (76%) *n (%)*	Intention to BF: No n = 44 (24%) *n (%)*	X^2	*p*
Step 1: Have a written breastfeeding policy that is routinely communicated to all health care staff.					
Met Step	77 (42.3)	58 (42.0)	19 (43.2)	0.02	0.89
Step Not Met	105 (57.7)	80 (58.0)	25 (56.8)		
Step 2: Train all health care staff in skills necessary to implement this policy.					
Met Step	150 (82.4)	124 (89.9)	26 (59.1)	21.79	<.001
Step Not Met	32 (17.6)	14 (10.1)	18 (40.9)		
Step 3: Inform all pregnant women about the benefits and management of breastfeeding.					
Met Step (Verbal & Written)	120 (65.9)	91 (65.9)	29 (65.9)	0.69	0.88
Met Partial (Verbal)	47 (25.8)	35 (25.4)	12 (27.3)		
Met Partial (Written)	2 (1.1)	2 (1.4)	0 (0.0)		
Step Not Met	13 (7.2)	10 (7.3)	3 (6.8)	3 (6.8)	
Step 4:Help mothers initiate breastfeeding within 1 hr of birth. [a]					
Met Step	89 (48.9)	74 (53.6)	15 (34.1)	13.52	<.01
Step Not Met	70 (38.5)	43 (31.2)	27 (61.4)		
NA-Medical Exclusion	23 (12.6)	21 (15.2)	2 (4.5)		
Step 5: Help mothers initiate breastfeeding and how to maintain lactation, even if they are separated from their infants.					
Met Step	100 (55.0)	87 (63.1)	13 (29.5)	15.29	<.001
Step Not Met	80 (44.0)	50 (36.2)	30 (68.2)		
NA-Medical Exclusion	2 (1.0)	1 (0.7)	1 (2.3)		
Step 6: Give infants no food or drink other than human milk, unless medically indicated.					
Met Step	67 (36.8)	62 (44.9)	5 (11.4)	16.16	<.001
Step Not Met	115 (63.2)	76 (55.1)	39 (88.6)		
Step 7: Practice rooming in – allow mothers and infants to remain together 24 hr a day.					
Met Step	69 (37.9)	53 (38.4)	16 (36.4)	0.20	0.90
Step Not Met	64 (35.2)	49 (35.5)	15 (34.1)		
NA-Medical Exclusion	49 (26.9)	36 (26.1)	13 (29.5)		
Step 8: Encourage breastfeeding on demand.					
Met Step	105 (57.7)	86 (62.3)	19 (43.2)	5.01	0.03
Step Not Met	77 (42.3)	52 (37.7)	25 (56.8)		
Step 9: Give no pacifiers or artificial nipples to breastfeeding infants.					
Met Step	19 (10.4)	16 (11.6)	3 (6.8)	0.81	0.37
Step Not Met	163 (89.6)	122 (88.4)	41 (93.2)		
Step 10: Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.					
Met Step	154 (84.6)	129 (93.5)	25 (56.8)	34.44	<.001
Step Not Met	28 (15.4)	9 (6.5)	19 (43.2)		
The IC: Did not receive formula, breast-milk substitutes bottles or nipples upon hospital discharge.					
Met IC	55 (30.2)	48 (34.8)	7 (15.9)	5.64	0.02
IC Not Met	127 (69.8)	90 (65.2)	37 (84.1)		

Note. IC = International Code of Marketing Breast-milk Substitutes
[a]Includes skin-to-skin contact and other activities that promote breastfeeding initiation

Score, Hospital Score, or Home Score by age, race, language preference, educational attainment, primiparity, or maternal BMI category.

Breastfeeding practices differed by BFH status (Figure 1). Infants delivered at a BFH were more likely to be exclusively breastfed in the hospital ($p = .03$), at WIC certification

Table 3. Total 10-Step Scores Stratified by Baby-Friendly Hospital Status and by Intention to Breastfeed (*N* = 182).

		Hospital Status				Intention to Breastfeed			
	Total	BFH *n* = 108 (59.3%)	Non-BFH *n* = 74 (40.7%)			Yes *n* = 138 (75.8%)	No *n* = 44 (24.2%)		
10 Step Score	*M (SD)*	*M (SD)*	*M (SD)*	*t*	*p*	*M (SD)*	*M (SD)*	*t*	*p*
BFH Score									
Eligible Patients	5.80 (2.64)	6.00 (2.57)	5.55 (2.74)	0.93	0.35	6.15 (2.60)	4.73 (2.52)	2.61	0.01
Medical Exclusion	4.67 (2.55)	5.15 (2.39)	3.76 (2.66)	2.07	0.04	5.26 (2.28)	2.71 (2.52)	3.57	<0.001
Hospital Score									
Eligible Patients	2.44 (1.34)	2.63 (1.45)	2.19 (1.29)	1.83	0.07	2.63 (1.32)	1.87 (1.22)	2.78	0.01
Medical Exclusion	1.43 (1.12)	1.60 (1.19)	1.10 (0.94)	1.70	0.09	1.64 (1.07)	0.71 (0.99)	2.88	0.01
Home Score									
Eligible Patients	3.74 (1.73)	3.93 (1.81)	3.49 (1.60)	1.38	0.17	4.08 (1.59)	2.70 (1.74)	4.01	<0.01
Medical Exclusion	2.48 (1.50)	2.80 (1.47)	1.86 (1.39)	2.42	0.02	2.89 (1.32)	1.07 (1.21)	4.61	<0.001

Note. BFH = Baby Friendly Hospital. Non-BFH = Non-Baby Friendly Hospital. Sample size for eligible patients = 121; medical exclusion = 61. BFH score calculated as the sum of adherence to Steps 1–10. Hospital Score calculated as the sum of adherence to Step 4, Step 5, Step 7, Step 8, and Step 9. Home Score calculated as the sum of adherence to Steps 4–10.

($p < .01$) and at 3 months ($p = .01$), but not at 6 months ($p = .06$). Participants who intended to breastfeed were more likely to exclusively breastfeed in the hospital ($p < .001$), at WIC certification ($p < .001$), at 3 months ($p = .01$), and 6 months ($p < .01$) than those who did not intend to breastfeed (or were unsure/didn't know).

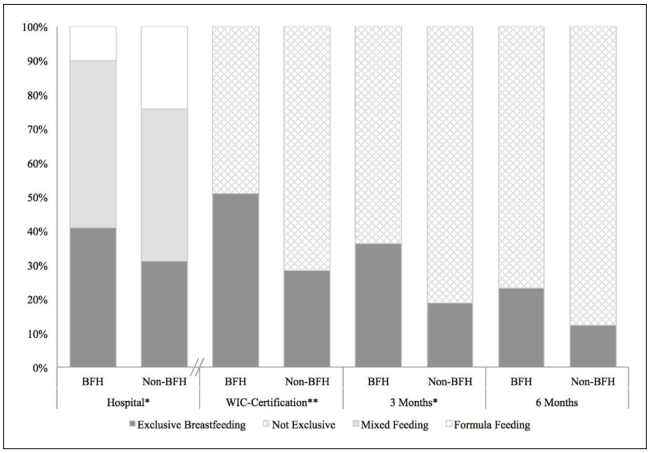

Figure 1. Unadjusted Prevalence of Exclusive Breastfeeding by Baby-Friendly Hospital Status From Hospital Discharge Through 6 Months.[a,b] [a]Infant feeding in the hospital (exclusive breastfeeding, mixed feeding, exclusive formula feeding) was obtained through maternal report during the interview. [b]Infant feeding a WIC-Certification, 3 Months, and 6 Month (exclusive breastfeeding, not exclusive) was abstracted from the WIC Management Information System (MIS) and determined via maternal report. *$p < .05$, ** $p < .01$.

Aim 2: Degree of Exposure to 10 Steps and Breastfeeding Practices

Multivariate associations between the exposure scores, 10-Step receipt, and exclusive breastfeeding at various time points are summarized in Table 4. Each individual cell represents the results of a separate logistic regression model, adjusted for covariates and confounding factors: maternal age, maternal race/ethnicity, intention to breastfeed, maternal educational attainment, as well as infant's age at that time point. For exclusive breastfeeding in the hospital, the models were also adjusted for medical eligibility, and, at 3 months, the models were also adjusted for primiparity.

Higher reported adherence scores were associated positively with the odds of exclusive breastfeeding. Participants who experienced 8 of the 10 Steps in the BFH Score were 43% more likely to exclusively breastfeed in the hospital ($p < .001$) and 16% more likely at WIC certification ($p = .03$) than participants who experienced only 5 of the 10 Steps. Participants who experienced 3 of the 5 Steps in the Hospital Score were 59% more likely to exclusively breastfeed in the hospital ($p < .01$) than participants who only experienced 2 of the 5 Steps. Participants who experienced 5 of the 7 Steps in the Home Score were 30% more likely to report exclusive breastfeeding at WIC certification ($p = .01$) than participants who only experienced 3 of the 7 Steps.

Aim 3: Receipt of Specific Steps and Breastfeeding Practices

Lack of Step receipt also affected the odds of exclusive breastfeeding at various time points. Participants who were not helped with breastfeeding within 1 hr of birth (Step 4) were 57% less likely to exclusively breastfeed in the hospital compared with participants who were helped ($p = .02$). Participants who

Table 4. Associations Between BFH-Score and BFH-Step Delivery and Exclusive Breastfeeding (*N* = 182).

	In the Hospital[a] *OR (%CI)*	WIC Certification *OR (%CI)*	3 Months[b] *OR (%CI)*	6 Months *OR (%CI)*
BFH Score	1.43 (1.21 – 1.69)	1.16 (1.01– 1.33)	1.09 (0.95 – 1.26)	0.97 (0.83 – 1.13)
Hospital Score	1.59 (1.18 – 2.14)	–	–	–
Home Score	–	1.30 (1.05 – 1.60)	1.22 (0.97 – 1.52)	1.08 (0.85 – 1.37)
Individual Steps				
Lack of Step 4	0.43 (0.20 – 0.89)	0.57 (0.29 – 1.13)	0.69 (0.34 – 1.40)	1.09 (0.49 – 2.41)
Lack of Step 5	0.60 (0.28 – 1.29)	1.07 (0.52 – 2.19)	0.99 (0.47 – 2.08)	1.60 (0.70 – 3.63)
Lack of Step 6	–	0.31 (0.15 – 0.65)	0.37 (0.17 – 0.80)	0.38 (0.16 – 0.90)
Lack of Step 7	0.89 (0.39 – 2.05)	1.06 (0.51 – 2.23)	1.06 (0.49 – 2.29)	0.78 (0.33 – 1.82)
Lack of Step 8	0.40 (0.19 – 0.86)	0.66 (0.32 – 1.33)	0.75 (0.36 – 1.56)	1.25 (0.55 – 2.81)
Lack of Step 9	0.13 (0.03 – 0.52)	0.12 (0.03 – 0.51)	0.27 (0.09 – 0.81)	0.33 (0.11 – 0.97)
Lack of Step 10	–	0.60 (0.19 – 1.96)	0.83 (0.23 – 3.05)	0.97 (0.23 – 4.10)
Lack of IC	0.13 (0.06 – 0.30)	0.29 (0.14 – 0.61)	0.39 (0.19 – 0.82)	0.26 (0.12 – 0.60)

Note. Logistic regression models were used to estimate the effect of BFH, Hospital and Home Scores, or lack of Step delivery with the outcome of exclusive breastfeeding at various time points. All models controlled for intention to breastfeed (yes, no), maternal age (years), maternal race/ethnicity (non-Hispanic white, Hispanic, other), maternal education (less than or greater than high school) and infant age at that time point (WIC-Certification - days at visit). BFH Score calculated as the sum of adherence to Steps 1–10. Hospital Score was the sum of adherence to Step 4, Step 5, Step 7, Step 8, and Step 9. Home Score was the sum of adherence to Steps 4–10. IC = International Code of Marketing Breast-Milk Substitutes; lack of IC = Did not receive formula, human-milk substitutes bottles, or nipples upon hospital discharge.

[a]This model also controlled for maternal eligibility (yes, no) based on lowest AIC.

[b]This model also controlled for primiparity (first child, second or more) based on lowest AIC.

indicated that their infant was given food or drink other than human milk (Step 6) in the hospital were 62%–69% less likely to report exclusive breastfeeding at WIC certification ($p < .01$), at 3 months ($p = .01$), and at 6 months of age ($p = .03$). Participants who were not encouraged to breastfeed on demand (Step 8) were 60% less likely to exclusively breastfeed in the hospital compared with participants who were encouraged ($p = .02$). Participants who indicated that their infants were given pacifiers or artificial nipples (Step 9) were 67%–88% less likely to exclusively breastfeed in the hospital ($p = .02$), at WIC certification ($p = .01$), at 3 months ($p = .02$), and at 6 months ($p < .05$). Participants who received discharge materials or instructions for human milk substitutes (lack of the IC being followed) were 61%–87% less likely to report exclusive breastfeeding in the hospital ($p < .001$), at WIC certification ($p < .01$), when infant was 3 months ($p = .01$) and 6 months of age ($p < .01$). When stratified by feeding in the hospital, amongst participants who were mixed feeding in the hospital, the receipt of discharge materials supporting human milk substitutes was associated with 89%–92% less likelihood of exclusive breastfeeding at 3 months ($p < .01$) and 6 months ($p < .01$).

Discussion

WIC participating women in Maryland reported variable exposure to the 10 Steps as part of their maternity experience, and only exposure to Step 9 differed by BFH status. There were small differences in the demographic characteristics of participants by BFH status, but there were no differences in breastfeeding history or breastfeeding intention. Medical exclusions, which preclude a Step, were generally low. When utilizing scores to characterize exposure—the BFH, Hospital and Home Scores—there were suggestive differences in reported hospital adherence in favor of BFH sites. However, considering the range of potential scores, reported adherence was moderate even for participants with no medical exclusions. Perfect scores for any of the three measures were reported by only 2%–3% of the sample with no difference by BFH status.

Strong differences in reporting of exposure to the 10 Steps were identified by maternal intention to breastfeed. This was partially expected, as participants who intend to feed their infant formula would not receive Step 5 (help mothers initiate breastfeeding), Step 6 (no food or drink other than human milk), Step 8 (encourage breastfeeding on demand), Step 9 (give no pacifiers or artificial nipples to breastfeeding infants), or Step 10 (foster the establishment of breastfeeding support groups). However, practices that should occur independent of feeding type, including skin-to-skin (as a component of Step 4) and rooming in (Step 7), were reported less frequently by participants without a clear intention to breastfeed. Among participants who reported, "I didn't know what to do" or "I thought I might" breastfeed ($n = 33$), only 81% reported skin-to-skin and 39% practiced rooming in. As most of the participants classified as not intending to breastfeed said they might breastfeed or did not know what they would do, reduced Step exposure reflects an important gap in service provision.

A common goal of the BFHI, BFH designation, and the Maryland Policy Recommendations of 2012 is the provision of organized, skilled, and consistent services to support breastfeeding practices for all women (Maryland Department of Health and Mental Hygiene, 2012). Consistent delivery of care practices that support breastfeeding is needed to address barriers, including lack of knowledge, social support, and other factors that lead to breastfeeding disparities by race/ethnicity, education, and income (Anstey et al., 2017; U.S. Department of Health and Human Services [DHHS], 2011). We could find no studies evaluating differential exposure to the 10 Steps by prenatal breastfeeding intention, even though it is a well-established factor leading to breastfeeding initiation and longer duration (DiGirolamo et al., 2005; Nelson et al., 2018). Researchers, however, have reported that younger mothers received fewer Steps (Sipsma et al., 2017), as did participants who were overweight or obese (Kair & Colaizy, 2016; Kair et al., 2019), and, recently, researchers conducting a qualitative study reported that non-Hispanic white participants received more Steps than Hispanic or non-Hispanic Black women delivering in one of two academic medical centers (Sipsma et al., 2019). Our findings suggest that the consistency of Step exposure varies by age, race/ethnicity, language, education, and parity, but not BMI. More research is needed in this area, with identification of paths to address what could be viewed as bias in service provision.

Despite minor differences in reported exposure, participants who delivered at BFH sites were more likely to report exclusive breastfeeding in the hospital, at WIC certification, and at 3 months. Participants who intended to breastfeed were more likely to exclusively breastfeed their infant through 6 months, findings similar to those reported for WIC participants in California (Nobari et al., 2017). The likelihood of exclusive breastfeeding at 3 months or at 6 months was influenced by exposure to Step 6, Step 9, and the IC. Lack of adherence to Step 6 (give infants no food or drink other than human milk, unless medically indicated) has consistently been associated with lower prevalence of exclusive breastfeeding (Tarrant et al., 2016) and shorter breastfeeding duration (McCoy & Heggie, 2020). It should be noted that adherence to the IC is not part of *Maryland's Hospital Breastfeeding Policy Recommendations*, and, despite support from the American Academy of Pediatrics for the IC, there is no corresponding legislative support in the United States (WHO, 2020).

We have captured the hospital experience of WIC participating mothers to determine perceived adherence to Baby-Friendly practices regardless of BFH status. As the coverage of WIC participation is high in the state of Maryland (86.6%), findings may be generalizable among low-income women (USDA, 2016). Interviews were conducted in both English and Spanish to allow for the representation of Spanish-speaking participants (11% of the sample preferred Spanish). Additionally, information about breastfeeding was established at multiple time points to determine the lasting influence of BFH practices.

Limitations

We report the hospital experiences of WIC participants, and have no data on other women, particularly those with higher incomes and speakers of languages other than English or Spanish. Although the survey was crafted by health professionals experienced in discussing maternity and breastfeeding experiences with women, and effort was made to evaluate equivalency of the questionnaire in two languages and to have the Spanish language interview conducted by a native-Spanish speaker, the potential for multiple forms of comprehension bias cannot be ignored. Results are based on recall of maternity care practices 1–4 months postpartum; therefore, the study may be subject to recall bias and only 44% of those who filled out an interest form agreed to be interviewed, which may have introduced selection bias. Multiple comparisons were made between the 10 Steps, BF scores, and outcomes of exclusive breastfeeding that may have introduced a false positive or Type 1 error. The sample size per group was limiting for detecting differences in maternity practices by BFH, especially given the Maryland Policy Recommendations, which support maternity practices in all birthing facilities.

Conclusion

Despite variability in Step adherence as reported by low-income mothers, Baby-Friendly practices were shown to promote breastfeeding initiation and duration in infants regardless of maternal intention to breastfeed. Hospitals should seek BFH designation and improve adherence to practices (Step 6, Step 9, and the IC) to promote breastfeeding practices. Additional studies with much larger sample sizes are needed to further assess differences in maternity practices associated with BFH, to evaluate bias in Step exposure among select groups of women, and to understand their influence on breastfeeding practices.

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was an unpaid consultant on the project. LEC is faculty, Program in Human Nutrition, and was principal investigator of the project. SG and MCA are faculty, Department of Population, Family, and Reproductive Health, The Johns Hopkins Bloomberg School of Public Health and were investigators on the project. SG and MCA are also staff at the Johns Hopkins' WIC Program, Baltimore, MD, which operates through contracts with the State of Maryland. The authors of this manuscript do not have any commercial or financial involvements that represent a conflict of interest.

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Supplemental Material

Supplemental material for this article is available online.

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