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## Effectiveness of Peer Counselor Support on Breastfeeding Outcomes in WIC-Enrolled Women

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### Abstract

**Objective:** To evaluate the effectiveness of different quantities and types of breastfeeding peer counselor (BFPC) support on breastfeeding (BF) outcomes in women enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program.

**Design:** Secondary data analysis using BFPC data from an upstate New York county WIC (April 1, 2009- March 30, 2011) merged with New York State Department of Health WIC surveillance data.

**Participants:** 2,149 WIC-enrolled mothers with live singleton births who accepted a BFPC referral and received different quantities and types of BFPC support (telephone; in-person; mailings).

**Main Outcome Measures:** Self-reported BF initiation and duration at 30 days.

**Analysis:** Multivariable logistic regression was used to estimate the odds of BF outcomes at 30 days associated with different levels of BFPC support.

**Results:** Mothers who accepted BFPC referrals and had at least one phone conversation, or in-person contact had a significant 35-164% increased odds of positive BF outcomes. Mailings did not significantly improve outcomes.

**Conclusions and Implications:** WIC programs may need to identify barriers to BF duration and implement interventions in communities with low BF rates. Future studies may benefit from

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#### CONFLICT OF INTEREST

The authors have not stated any conflicts of interest.

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evaluating the impact of combined in-person support and phone contacts during the prenatal and postpartum periods on BF outcomes.

### Keywords

breastfeeding initiation; breastfeeding duration; peer counselor; WIC

## INTRODUCTION

There is extensive scientific evidence to support the positive impact of breastfeeding (BF) on health outcomes of mothers and infants.<sup>1,2</sup> Despite the known benefits of BF, disparities persist in BF initiation and duration among low-income women. The National Immunization Survey of 2015 births<sup>2</sup> reports that 76.7% of mothers participating in the Special Supplemental Nutrition Program for Woman, Infants, and Children (WIC) initiated BF, well below the national rate (83.2%) and the rate among eligible non-WIC participants (83.3%). Similarly, rates of BF duration at 6 months were the lowest among WIC-enrolled mothers (44.5%) compared with the national rate (57.6%) and that of eligible non-WIC participants (65.8%). Although WIC program efforts have increased especially since 2009, with initiatives limiting the availability of formula and increasing food benefits for exclusive BF mothers, very little is known about whether BF disparities have decreased overtime. In a secondary analysis of national representative data, the authors also reported that WIC-enrolled mothers had a significantly lower prevalence of average ever-BF (63%) compared with WIC- noneligible participants (80%).<sup>3</sup> This suggests that WIC-enrolled mothers may face unique challenges initiating and maintaining BF. Generally, women who do not initiate BF or BF for a short duration tend to be black, single mothers, have more than one child, or have administrative or manual occupations.<sup>4</sup> Moreover, overweight/obese women are less likely to initiate BF. As noted in a systematic review anatomical/physiological, medical, psychological, and/or sociocultural factors may be possible reasons.<sup>5</sup> While there are a myriad of barriers and challenges that women from lower income households face ranging from individual beliefs and attitudes to inadequate interpersonal support to institutional practices.<sup>6,7</sup>

A number of evidence-based strategies to improve BF rates overall have been developed such as maternity care practices, educating mothers and professional support.<sup>8,9</sup> Few of these have been designed specifically for mothers from lower income households. WIC's Breastfeeding Peer Counselor program (BFPC) is one exception and the focus of this paper. In efforts to improve BF rates, WIC established the BF peer counselor model to improve BF rates among its participants.<sup>10</sup> Importantly, WIC BFPCs are women who successfully breastfed one or more children and are from the same population of women as the women they support. Their function is to encourage and support pregnant and BF women. BFPCs have been found to be as effective, if not more effective, than healthcare professionals in promoting BF among their peers.<sup>11-13</sup> Most BFPC programs provide both prenatal and postnatal support, while others offer postnatal support; BFPCs use telephone calls (and more recently texts) or visits in the home, hospital or clinic.

Although peer counseling has demonstrated efficacy in improving BF rates in populations at risk for early BF termination in observational studies<sup>11,14–20</sup> and in a recent meta-analysis of randomized controlled trials,<sup>21</sup> effectiveness studies of current programs are warranted. Further, the impact of specific WIC BFPC program components on BF initiation and duration as has been relatively understudied.<sup>22–25</sup> Therefore, the purpose of this study was to compare the initiation and duration of BF at 30 days among mothers enrolled in an upstate New York WIC program from April 1, 2009 to March 30, 2011, who accepted a BFPC referral, and received different quantities and types of BFPC support (telephone, in-person, and/or mailings).

## METHODS

### Upstate NY WIC Breastfeeding Peer Counselor (UNYWIC BFPC) Program

The UNYWIC BFPC program began with volunteers who provided support to WIC participants referred to BFPC services. In 2005, UNYWIC received funding from New York State WIC to establish a BFPC program that added a paid BFPC Coordinator and shifted the BFPCs from volunteers to paid employees. During the study period (i.e., April 1, 2009 to March 30, 2011), there were up to 8 BFPCs. Qualifications included having a high school diploma or GED, a history of successful BF for at least one year, and being a prior or current recipient of WIC services. The BFPCs completed the *Loving Support*<sup>10</sup> that was required by WIC. This training consisted of interactive modules in the following areas: (1) WIC BFPC program, (2) counseling and communication skills, (3) getting started with breastfeeding, and (4) talking with mothers about BF. Additionally, all BFPCs as part of their training, completed a USDA Food and Nutrition Service competency-based curriculum (i.e. Grow and Glow in WIC; <https://wicworks.fns.usda.gov/resources/grow-and-glow-wic>).

The UNYWIC BFPC program protocol included a referral for BFPC follow-up of all women who expressed any interest in BF. The initial prenatal contact was made by phone within two weeks of receiving a referral. Two additional prenatal contacts were made by the BFPCs. Home visits were also provided, if requested by the participant. The goals of prenatal support included building rapport, identifying barriers to BF, and providing education. The initial postpartum contact was made by the BFPC within five days of the infant's birth. BFPC contacts included telephone, in-person (WIC clinic or home), or mailings. There were no other BFPC options available.

### Data Sources

Infant, maternal, demographic, and BFPC information were obtained from three merged data sources: NYS Pediatric Nutrition Surveillance Systems (PedNSS), NYS Pregnancy Nutrition Surveillance Systems (PNSS), and the UNYWIC BFPC database. The NYS PedNSS and PNSS are public health surveillance systems that use data collected at the time of WIC certification or during routine WIC clinic visits to track maternal-infant health and nutrition indicators. The UNYWIC BFPC database was created by the research team to collect demographic data in addition to quantity and type of BFPC contact for all WIC-certified mothers and infants with referrals. The study protocol was approved by the University, county, and NYS Department of Health Institutional Review Boards.

## Sample

A total of 5,402 mother-infant dyads who were referred to the UNYWIC BFPC program and accepted BFPC services were identified. We excluded the following from our analysis: mothers with missing BF information (n=1,656); or maternal demographic information (n=1,243); those with multiple births (n=116) or who had been institutionalized (n=1); records with BFPC contact dates outside the date range for the index birth (n=185); or duplicate BFPC information (n=52). The final dataset contained 2,149 mother-infant dyads.

## Measurement

Outcome measures from PedNSS included self-reported BF initiation (yes/no) and BF duration lasting 30 days or longer (yes/no). Initiation was derived from responses to the following question “Are you currently breastfeeding?” If the answer was no, “Was [the child] ever breastfed or fed breast milk?” Duration was assessed through responses to the question, “How old was [the child] when he/she completely stopped being breastfed or fed breast milk?” Continuous responses to this question were used to create a dichotomous variable (yes/no) for BF status at 30 days. Answers to the questions were assessed and updated at each WIC visit until the mother reported that she was no longer providing her infant breast milk. Although exclusive BF (derived from the response to the question “How old was [the child] when they were first fed something other than breast milk?”) was recorded in the administrative dataset, it was not included in the secondary data analysis. Therefore, the researchers were unable to assess exclusive BF as a secondary outcome.

## Data Analysis

Descriptive statistics were used to report the study characteristics. Chi-square tests of independence were used to assess differences in group characteristics. Based on previously published literature directed acyclic graphs,<sup>26</sup> and change-in-estimate procedures,<sup>26</sup> the following covariates were evaluated as potential confounders: pre-pregnancy body mass index, gestational diabetes, hypertensive disorders of pregnancy, maternal age, maternal education, maternal race/ethnicity, postpartum smoking, parity, pregnancy interval, pregnancy weight gain, gestational age, and city (percent poverty ratio and residence in high-risk zip code). Covariates that did not change the estimated odds of BF initiation associated with different quantities and types of BFPC by >10% were not retained in the final regression models (gestational diabetes, hypertensive disorders of pregnancy, pre-pregnancy body mass index, pregnancy weight gain, and parity). The same covariates were included in each regression model. Multicollinearity was tested by the variance inflation factor (VIF range 1.2–1.7; no multicollinearity observed). Model fit was tested with the likelihood ratio test with  $P < 0.05$  indicating adequate fit.

Multivariable logistic regression was used to separately estimate the relative odds of BF initiation associated with different quantities and types of BFPC contact, adjusting for covariates. Manual model building was used to enter variables. All regression models were repeated to estimate the relative odds of BF duration at 30 days associated with different quantities and types of BFPC contact, adjusting for the same covariates. From each model, the unadjusted and adjusted odds ratio and 95% confidence intervals are reported. In order to retain the number of observations in the final model, a category for “not applicable” (NA)

was created for variables with 10 or more missing values (for NA, maternal education, n=982; pregnancy interval, n=105; and city (high-risk zip code and poverty ratio), n=297). We used SAS version 9.4 (©SAS Institute, Inc. Cary, NC, 2016) to construct all datasets, conduct descriptive analyses, and perform all other statistical analyses.

## RESULTS

Table 1 presents characteristics of WIC participants referred to BFPC by type of contact received. There were statistically significant differences in the distribution of maternal age across groups: A higher proportion of mothers who received mailings were 18 years old compared with the other types of BFPC ( $P=0.05$ ). Similarly, the mailings group had a greater proportion of mothers with less than high school education ( $P=0.03$ ).

The percentage of WIC-enrolled mothers who initiated BF was 78.5% (1,688/2,149). Among those initiating BF, 63.4% (1,071/1,688) were still BF at 30 days. There were significant differences between BF initiators and non-initiators for all types of BFPC contact ( $P<0.001$ ) except the mailings group ( $P=0.63$ ). Additionally, the distributions of age ( $P<0.001$ ), education ( $P<0.001$ ), race/ethnicity ( $P<0.001$ ), postpartum smoking ( $P<0.001$ ), pregnancy interval ( $P<0.001$ ), and city (percent poverty ratio and residence in high-risk zip code) ( $P<0.001$ ) were significantly different between BF initiators and non-initiators. Similar differences were also observed among initiators who were still breastfeeding at 30 days and those discontinuing BF at 30 days (Table 2).

Generally, mothers who received BFPC contact by phone had significantly increased relative odds of BF initiation, after adjusting for covariates, with the greatest odds among mothers who received >1 phone conversation (OR=3.08; 95% CI=2.14, 4.42). Compared with mothers who did not receive any personal contact, mothers who received 2 in-person contacts were more likely to initiate BF (OR=3.42; 95% CI = 2.56, 4.58) (Table 3). Similar associations were observed for BF duration, with mothers that generally received at least one BFPC contact by phone (OR=1.69; 95% CI=1.32, 2.17) or in-person (OR=1.37; 95% CI= 1.06, 1.78) having improved BF outcomes (Table 4). Receipt of mailings were not associated with improvements in BF outcomes. The likelihood ratio test indicated that the models with all seven predictors fit significantly better than the models with only the intercept ( $P<0.0001$ ).

## DISCUSSION

Findings in this study regarding the impact of BFPC contact on positive BF outcomes were consistent with other studies.<sup>27,28</sup> Previous studies have reported that WIC BFPC programs support the improvement of BF initiation<sup>24,25,27–29</sup> and duration<sup>22,25,29</sup> with in-person contact being the most effective. While phone conversations and in-person contacts were the most effective in improving BF in the present study, systematic reviews have reported that in-person support was more effective than phone or combined phone and in-person support.<sup>27,28</sup> The present study did not assess different combinations of program components to determine the most effective type of contact. However, in a recent secondary analysis, the authors reported 17%–83% decreased hazard of discontinuing any BF associated with any

combination of in-person and phone contact.<sup>22</sup> Mailings were found to be ineffective and were primarily received by young mothers with less than a high school education. This population may be more transient and perhaps face greater challenges with initiating or maintaining BF. Further, this suggests that a behavioral component that incorporates sociocultural influences may be beneficial in improving BF outcomes for mothers at risk for early termination. Additionally, mailings may not be an appropriate component of a WIC BFPC program and should be reevaluated as a primary initial contact option in future studies.

In contrast to previous findings,<sup>22,28</sup> this lower-intensity (<5 contacts) BFPC program generally provided improvements in BF outcomes. This finding should be interpreted with caution as the study sample was comprised of women who were referred to a BFPC program and accepted services. Therefore, factors such as prenatal intention to BF, social or community support, and confidence in ability to BF,<sup>25</sup> coupled with a WIC BFPC visit may have influenced a mother's decision to BF. Of the BF-initiators, 63.4% were still BF at 30 days. It is possible that in-person support and phone contacts may not be as effective in promoting duration in WIC-enrolled women.

Although a major strength of our study was evaluating the effectiveness of different types and quantities of BFPC support, there are several limitations that should be considered when making inferences. First, this secondary analysis relied on data collected by NYS Department of Health and UNYWIC. Thus, we were unable to obtain data on potential confounders such as BF history, previous peer counselor experience, number of children in household, marital status, and employment status. Moreover, data were missing for some variables such as maternal education, high risk zip code and poverty ratio, pregnancy interval, and BF at 30 days among initiators. We also had no information on mothers' self-reported difficulties in BF, BF plan/intention, number of live births, and the duration of BFPC contact. Therefore, these findings may in part be due to residual confounding.

Second, BF outcomes (initiation and duration at 30 days) were obtained through maternal self-report. It is possible that there is an over-reporting of BF; however, misclassification of outcomes is likely to be non-differential with respect to exposure groups. Therefore, the reported effect estimates are likely attenuated or biased towards the null. Further, given that exclusive BF at 30 days was not assessed as a secondary outcome, it is unknown which specific program components are the most effective in promoting exclusivity.

Third, there is the potential for self-selection bias in the different types and quantities of BFPC that these mothers receive. For example, some mothers with BF challenges may have had more BFPC contacts as compared with mothers without BF challenges. Furthermore, some first-time mothers due to lack of experience may have sought out or accepted more BFPC contact as compared with multiparous mothers. Therefore, the sample may not be representative of low-income mothers receiving WIC BFPC services.

Fourth, the evaluation of this BFPC model is limited to one urban-based program. Therefore, generalizability of findings to other settings maybe limited. However, the primary purpose of this study was to document the effectiveness of the different levels of BFPC support on BF

outcomes in mothers enrolled in WIC. As a result, the study findings could be relevant to women enrolled in WIC or programs like WIC that serve low-income women. Since this study invariably excludes mothers who are not eligible for WIC or meet WIC eligibility criteria, but do not participate in WIC, these study findings would not be generalizable to them.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

This study demonstrated the effectiveness of specific program components on the impact of BF outcomes in women who accepted BFPC referrals and received services. Findings from this study also highlight the importance that existing program components may not be as effective in promoting duration in a local population of WIC-enrolled women. Therefore, future WIC programs should identify barriers to BF duration from the mothers' perspective, implement interventions that incorporate behavioral and sociocultural influences in community areas with low initiation and duration rates, assess adherence to program-specific protocols, and evaluate the efficacy of combined in-person support and phone contact during the prenatal and postpartum periods on BF outcomes. Future work is needed to understand barriers to promoting BF duration during the critical window of the postpartum period.

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**Table 1.**

Sociodemographic Characteristics of WIC Participants Referred to Breastfeeding Peer Counseling Program, by Types of Contact Received (n=2,149)

	Any BFPC Contact n=2,149 n (%)	Voicemails n=794 n (%)	Phone Conversations n=944 n (%)	Mailings n=394 n (%)	In-person n=1,246 n (%)	P
<b>Maternal age</b>						0.05
18	398 (19)	128 (16)	158 (17)	88 (22)	214 (17)	
19–29	1,384 (64)	527 (66)	606 (64)	247 (63)	797 (64)	
30–39	354 (16)	132 (17)	172 (18)	56 (14)	226 (18)	
40–49	13 (.6)	7 (1)	8 (1)	3 (1)	9 (1)	
<b>Maternal education</b>						0.03
< High school	552 (33)	175 (28)	217 (30)	130 (41)	292 (30)	0.03
High school or GED	683(41)	267 (42)	292 (40)	122 (39)	407 (42)	
>High school	443(26)	187 (30)	224 (30)	64 (20)	272 (28)	
<b>Maternal race</b>						0.32
Non-Hispanic white	789 (37)	312 (39)	339 (36)	145 (37)	459 (36)	
Non-Hispanic black	1,025(48)	356 (45)	442 (47)	184 (47)	582 (47)	
Hispanic	253 (12)	98 (12)	126 (13)	45 (11)	157 (13)	
Other	82 (4)	28 (4)	37 (4)	20 (5)	48 (4)	
<b>Postpartum smoking</b>						0.26
Smoker	263 (12)	86 (11)	102 (11)	53 (13)	143 (11)	
Non-smoker	1,886 (88)	708 (89)	842 (89)	341 (87)	1,103 (89)	
<b>Pregnancy interval</b>						0.33
Primiparous	1,196 (57)	476 (61)	537 (58)	227 (58)	708 (58)	
Prior pregnancy <18 months	204 (9)	69 (9)	82 (9)	36 (9)	111 (9)	
Prior pregnancy 18 months	716 (34)	235 (30)	309 (33)	128 (33)	407 (33)	
<b>Gestational age</b>						0.76
<37 weeks (Preterm)	157 (7)	49 (6)	66 (7)	22 (6)	89 (7)	
37 weeks (Term)	1,992 (93)	745 (94)	878 (93)	372 (94)	1157 (93)	
<b>City (poverty ratio &amp; zip code)</b>						0.17
100%, not high-risk	286 (14)	114 (15)	137 (15)	51 (13)	176 (15)	
100%, high-risk	530 (25)	198 (26)	233 (25)	98 (25)	315 (25)	
>100%, high risk	806 (39)	271 (35)	329 (36)	150 (39)	431 (36)	
>100%, not high-risk	462 (22)	191 (25)	223 (24)	89 (23)	285 (24)	

**Table 2.**

Bivariate Analyses of the Association between Maternal Characteristics and BF initiation or BF Duration at 30 Days

	<b>BF initiators n=1,688</b>	<b>Non-BF initiators n=461</b>		<b>BF at 30 days n=1,071</b>	<b>No BF at 30 days n=589</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>P</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P</b>
<b>Type of BFPC contact</b>						
Vocemails			<0.001			0.03
0	1,028/1,355 (76)	327/1,355 (24)		627/1,008 (62)	381/1,008 (38)	
1	391/482 (81)	91/482 (19)		258/388 (66)	130/388 (33)	
>1	269/312 (86)	43/312 (14)		186/264 (70)	78/264 (30)	
Phone conversations			<0.001			<0.001
0	887/1,205 (74)	318/1,205 (26)		500/875 (57)	375/875 (43)	
1	449/553 (81)	104/553 (19)		303/439 (69)	136/439 (31)	
>1	352/391 (90)	39/391 (10)		268/346 (77)	78/346 (23)	
Mailings			0.63			0.08
0	1,375/1,755 (78)	380/1,755 (22)		883/1,348 (65)	465/1,348 (35)	
1–3	313/394 (79)	81/394 (21)		188/312 (60)	124/312 (40)	
In-person			<0.001			<0.001
0	654/903 (72)	249/903 (28)		355/645 (55)	290/645 (45)	
1	838/1,047 (80)	209/1,047 (20)		558/823 (68)	265/823 (32)	
2	196/199 (98)	3/199 (2)		158/192 (82)	34/192 (18)	
<b>Maternal age</b>						
18	377/604 (62)	227/604 (38)	<0.001	171/372 (46)	201 (54)	<0.001
19–29	1,747/2,681 (65)	934/2,681 (35)		1,022/1,723 (59)	701/1,723 (41)	
30–39	511/767 (67)	256/767 (33)		366/504 (73)	138/504 (27)	
40–49	34/45 (76)	11/45 (24)		25/34 (74)	9/34 (26)	
<b>Maternal education</b>						
< High school	605/1,062 (57)	457/1,062 (43)	<0.001	310/597 (52)	287/597 (48)	<0.001
High school or GED	832/1,288 (65)	456/1,288 (35)		470/821 (57)	351/821(43)	
>High school	607/765 (79)	158/765(21)		422/597 (71)	175/597(29)	
<b>Maternal race/ethnicity</b>						
Non-Hispanic white	1,039/1,672 (62)	633/1,672 (38)	<0.001	636/1,022 (62)	386/1,022 (38)	0.03
Non-Hispanic black	1,157/1,780 (65)	623/1,780 (35)		676/1,144 (59)	468/1,144 (41)	
Hispanic	322/447 (72)	125/447 (28)		178/321 (55)	143/321(45)	
Other	151/198 (76)	47/198 (24)		94/146 (64)	52/146 (36)	
<b>Postpartum smoking</b>						
Smoker	299/641 (47)	342/641 (53)	<0.001	145/299 (48)	154/299 (51)	<0.001
Non-smoker	2,370/3,456 (69)	1,086/3,456 (37)		1,439/2,334 (62)	895/2,334 (38)	
<b>Pregnancy interval</b>						
Primiparous	1,235/1,818 (68)	583/1,818 (32)	<0.001	693/1,212 (57)	519/1,212(43)	0.02
Prior pregnancy <18 months	359/584 (61)	225/584 (39)		212/355 (60)	143/355(40)	

	<b>BF initiators n=1,688</b>	<b>Non-BF initiators n=461</b>		<b>BF at 30 days n=1,071</b>	<b>No BF at 30 days n=589</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>P</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P</b>
Prior pregnancy 18 months	1,014/1,590 (64)	576/1,590 (36)		637/1,005 (63)	368/1,005 (37)	
<b>Gestational age</b>			0.50			0.88
<37 weeks	177/296 (60)	119/296 (40)		103/175 (59)	72/175 (41)	
37 weeks	2,492/3,801 (66)	1,309/3,801 (34)		1,481/2,458 (60)	977/2,458 (40)	
<b>City</b>			<0.001			<0.001
100%, not high-risk	353/535(66)	182/535 (34)		205/344 (60)	139/344 (40)	
100%, high-risk	556/921 (60)	365/921 (40)		320/550 (58)	230/550 (42)	
>100%, high-risk	952/1,460 (65)	508/1,460 (35)		544/944 (58)	400/944 (42)	
>100%, not high-risk	603/1,487 (41)	281/1,487(59)		401/594 (68)	193/594 (32)	

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**Table 3.**

Relative Odds of Breastfeeding Initiation Associated with Quantity and Type of Breastfeeding Peer Counselor Support among WIC Participants with Referrals (n=2,149)

Type of BFPC contact	BF initiators n=1,688	Non-BF initiators n=461	Unadjusted	Adjusted <sup>a</sup>	P
	n (%)	n (%)	OR (95% CI)	OR (95% CI)	
Voicemails					
0	1,028/1,355 (76)	327/1,355 (24)	1.00	1.00	0.0005
1	391/482 (81)	91/482 (19)	1.37 (1.05, 1.77)	1.35 (1.03, 1.77)	
>1	269/312 (86)	43/312 (14)	2.00 (1.41, 2.81)	1.90 (1.33, 2.71)	
Phone conversations					
0	887/1,205 (74)	318/1,205 (26)	1.00	1.00	<.0001
1	449/553 (81)	104/553 (19)	1.55 (1.21, 1.98)	1.52 (1.18, 1.97)	
>1	352/391 (90)	39/391 (10)	3.24 (2.27, 4.61)	3.08 (2.14, 4.42)	
Mailings					
0	1,375/1,755 (78)	380/1,755 (22)	1.00	1.00	0.6326
1–3	313/394 (79)	81/394 (21)	1.07 (0.82, 1.40)	1.18 (0.89, 1.56)	
In-person					
0	654/903 (72)	249/903 (28)	1.00	1.00	0.065
1	838/1,047 (80)	209/1,047 (20)	1.11 (0.86, 1.42)	1.13 (0.89, 1.44)	
2	196/199 (98)	3/199 (2)	3.33 (2.47, 4.49)	3.42 (2.56, 4.58)	

Note: no contact indicates that the participant did not receive that type of contact, but still received other peer counseling services

<sup>a</sup>maternal age, maternal education, maternal race/ethnicity, postpartum smoking, pregnancy interval, gestational age, and city (poverty ratio and high-risk zip code)

**Table 4.**

Relative Odds of Breastfeeding Duration at 30 days among Initiators Associated with Quantity and Type of Breastfeeding Peer Counselor Support among WIC Participants with Referrals (n=1,660)

Type of BFPC contact	BF at 30 days n=1,071	No BF at 30 days n=589	Unadjusted	Adjusted <sup>a</sup>	P
	n (%)	n (%)	OR (95% CI)	OR (95% CI)	
Voicemails					
0	627/1,008 (62)	381/1,008 (38)	1.00	1.00	0.073
1	258/388 (66)	130/388 (33)	1.21 (0.94, 1.54)	1.17 (0.91, 1.51)	
>1	186/264 (70)	78/264 (30)	1.45 (1.08, 1.94)	1.39 (1.03, 1.88)	
Phone conversations					
0	500/875 (57)	375/875 (43)	1.00	1.00	<.0001
1	303/439 (69)	136/439 (31)	1.67 (1.31, 2.13)	1.69 (1.32, 2.17)	
>1	268/346 (77)	78/346 (23)	2.58 (1.94, 3.42)	2.55 (1.91, 3.42)	
Mailings					
0	883/1,348 (65)	465/1,348 (35)	1.00	1.00	0.2174
1-3	188/312 (60)	124/312 (40)	0.80 (0.62, 1.03)	0.85 (0.65, 1.10)	
In-person					
0	355/645 (55)	290/645 (45)	1.00	1.00	<.0001
1	558/823 (68)	265/823 (32)	1.40 (1.09, 1.80)	1.37 (1.06, 1.78)	
2	158/192 (82)	34/192 (18)	2.55 (2.00, 3.26)	2.64 (2.05, 3.39)	

Note: no contact indicates that the participant did not receive that type of contact, but still received other peer counseling services

<sup>a</sup> maternal age, maternal education, maternal race/ethnicity, postpartum smoking, pregnancy interval, gestational age, and city (poverty ratio and high-risk zip code)