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## Predictors of Breastfeeding in Overweight and Obese Women: Data From Active Mothers Postpartum (AMP)

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### Abstract

Excess maternal weight has been negatively associated with breastfeeding. We examined correlates of breastfeeding initiation and intensity in a racially diverse sample of overweight and obese women. This paper presents a secondary analysis of data from 450 women enrolled in a postpartum weight loss intervention (Active Mothers Postpartum [AMP]). Sociodemographic measures and body mass index (BMI), collected at 6 weeks postpartum, were examined for associations with breastfeeding initiation and lactation score (a measure combining duration and exclusivity of breastfeeding until 12 months postpartum). Data were collected September 2004–April 2007. In multivariable analyses, BMI was negatively associated with both initiation of breastfeeding (OR: .96; CI: .92–.99) and lactation score ( $\beta$   $-0.22$ ;  $P = 0.01$ ). Education and infant gestational age were additional correlates of initiation, while race, working full-time, smoking, parity, and gestational age were additional correlates of lactation score. Some racial differences in these correlates were noted, but were not statistically significant. Belief that breastfeeding could aid postpartum weight loss was initially high, but unrelated to breastfeeding initiation or intensity. Maintenance of this belief over time, however, was associated with *lower* lactation scores. BMI was negatively correlated with breastfeeding initiation and intensity. Among overweight and obese women, unrealistic expectations regarding the effect of breastfeeding on weight loss may negatively impact breastfeeding duration. In general, overweight and obese women may need additional encouragement to initiate breastfeeding and to continue breastfeeding during the infant's first year.

### Keywords

Breastfeeding; Overweight; Obesity; Postpartum; Initiation; Lactation

## Introduction

Breastfeeding is the preferred mode of infant feeding [1–3] and is associated with important health benefits for both mother and child [1–4]. The American Academy of Pediatrics [1] and the World Health Organization [2] recommend exclusive breastfeeding through 6 months postpartum and continued breastfeeding through at least the first year of life. Breastfeeding is a Healthy People 2010 priority [5], and the US Preventive Services Task Force recently recommended intervention before, around and after childbirth to encourage and support the practice [6].

Age, white race, and education have been positively associated with breastfeeding [7–11], while smoking [8,11,12], cesarean versus vaginal delivery [8,13], and preterm birth [11] have been negatively associated. Breastfeeding initiation and duration is also lower among overweight and obese women [14–16]. While there have been some inconsistent findings, most studies show that obese women breastfeed for shorter durations than normal weight women, even after adjustment for covariates [17].

The objective of this paper is to examine the effect of increasing body mass index on breastfeeding in a sample comprised exclusively of overweight and obese women. We further examine other correlates of breastfeeding within this sample, and whether there are differences in these correlates by race. Finally, we investigate whether beliefs about the effect of lactation on weight loss influence these overweight and obese women's breastfeeding behaviors.

## Subjects and Methods

### Participants

We conducted a secondary analysis of data collected from participants in Active Mothers Postpartum (AMP), a behavioral intervention to promote weight loss in overweight and obese postpartum women [18]. Results from the larger trial have been published elsewhere [19]. Participants ( $n = 450$ ) were recruited from September 2004 through April 2006 from the three largest obstetric clinics in Durham, North Carolina, and through posters in grocery stores, smaller obstetrics clinics, and libraries. English-speaking women  $\geq 18$  years of age and with a measured BMI  $\geq 25$  kg/m<sup>2</sup> at 6 weeks postpartum were eligible. In accordance with Duke Institutional Review Board approval, informed consent was obtained prior to any data collection.

### Measures

Four hundred fifty women completed the baseline assessments at 6 weeks postpartum. Sociodemographic information included: age, race, education, marital status, parity, and plans to work outside the home at 6 months postpartum. Health- and pregnancy-related data included smoking status, the Edinburgh Postnatal Depression Scale [20] (score of  $>12$  categorized as "postpartum depression" [21]), vaginal versus cesarean delivery, infant gestational age (weeks), self-reported prepregnancy weight and gestational weight gain, and current breastfeeding status (full breastfeeding, breastfeeding and formula feeding [mixed feeding], or formula feeding only).

Measured height and weight were obtained at 6 weeks postpartum using a Seca portable stadiometer and a Tanita BWB-800 scale, with participants in street clothing with shoes removed. Due to the high correlation (Pearson's  $r = 0.92$ ;  $P = <.0001$ ) between BMI derived from self-reported pre-pregnancy weight and BMI derived from weight measured at 6 weeks postpartum, and the greater reliability of the latter, we used the measured BMI at 6 weeks postpartum as the indicator of overall maternal weight status.

A total of 385 women completed the follow-up at 12 months postpartum. Women were again asked how they were currently feeding their baby, and formula feeding women were asked if they had *ever* breastfed. All women *currently* or *ever* breastfeeding completed a detailed recall of how the baby was fed during each month of life—full breastfeeding, mixed feeding, or formula feeding only. Full breastfeeding was defined as infant receiving only breast milk, not any formula or other milk. Introduction of juice, other fluids or solid foods was not recorded.

Figure 1 describes inclusion in the analysis samples. Initiation of breastfeeding was derived from the more detailed data available at 12 months, with all women *currently* or *ever* breastfeeding categorized as initiating breastfeeding. For those lost to follow-up ( $n = 65$ ), their response at 6 weeks postpartum was used to define initiation, with full ( $n = 14$ ) or mixed ( $n = 22$ ) breastfeeding categorized as initiating breastfeeding. No data on whether formula feeders at 6 weeks postpartum ( $n = 29$ ) had *ever* breastfed was available.

Amount of breastfeeding was summarized by a lactation score, a measure of breastfeeding “intensity” combining the duration and exclusivity of breastfeeding [22]. This score was derived from the detailed monthly feeding data collected at the 12 month follow-up. A value was assigned for each month—0 if formula fed, 1 if mixed, and 2 if fully breastfed. The resulting score has a possible range of 0–24, and more explanatory power than a simple measure of duration. Intensity was only addressed in those who initiated breastfeeding; i.e., respondents with a lactation score of 0 (never breastfed) were not included in the intensity analysis.

All women at baseline and 12 month follow-up were asked about their beliefs regarding lactation and weight loss: “on a scale from 1 to 7, where 1 is certain not to happen and 7 is certain to happen, to what extent do you think breastfeeding will help women lose weight?” Women who reported ever having breastfed at 12 month follow-up ( $n = 274$ ) also responded to a list of possible reasons for breastfeeding.

## Statistical Analyses

We examined initiation of breastfeeding for the total sample ( $n = 450$ ), and lactation score among those who initiated breastfeeding and completed the detailed breastfeeding recall at 12 months postpartum ( $n = 274$ ). Proportions initiating breastfeeding by relevant categories of each sociodemographic and health-related characteristic were calculated, and the chi-square test used to identify associations between these variables and breastfeeding initiation. For the purposes of presentation in these bivariate analyses, BMI was categorized as overweight (25.0–29.9), obesity class I (30.0–34.9), obesity class II (35.0–39.9), or obesity class III (40+) [23], and gestational weight gain was classified according to Institute of Medicine (IOM) recommendations for appropriate gestational weight gain according to prepregnancy BMI [24]. Mean lactation scores were calculated by relevant categories for each variable, and Student’s *t*-test and ANOVA used to test bivariate associations between these characteristics and lactation score.

Multivariable logistic and linear regression were used to assess the sociodemographic and health-related variables as predictors of breastfeeding initiation and lactation score. To control for any possible effect of intervention participation, trial arm was included as a control variable in the model for lactation score. Education was collected in categories and entered as dummy variables into the models. Age, parity, gestational age, gestational weight gain, and BMI were entered as continuous variables.

Racial differences were first examined in separate models for blacks and whites. Any variable with a *P*-value  $\leq .05$  in the stratified models was tested for statistical significance

by introducing an interaction term with race into the original combined model. Pearson's  $r$  was used to explore simple correlations between baseline weight loss outcome expectancies and the initiation and intensity of breastfeeding. Responses at 12 months and the change over time (i.e., response at 12 months minus response at 6 weeks) were calculated, and tested for correlation with lactation score.

For all analyses, a  $P$ -value  $\leq .05$  was used to indicate statistically significant associations. Analysis was performed using SAS 8.2 (Cary, NC).

## Results

Comparing women who completed the 12 month follow-up with those who did not, we found no statistically significant differences in age group, race, work outside the home, parity, BMI category, or intervention arm. Women who were unmarried, were smokers, and had less education were somewhat less likely to have completed the follow-up, though these differences were not significant after controlling for the other sociodemographic covariates (data not shown).

Baseline characteristics of the sample are presented in Table 1. The mean BMI was 33 ( $\pm 6.4$ ) and a high proportion of the women were black. Most had a college or graduate degree, were married, and planned to return to work full-time. There were few smokers, and the proportion having cesarean delivery was high.

Sixty-nine percent of participants initiated breastfeeding. Among those who breastfed, the mean duration of breastfeeding was 7.2 months ( $\pm 4.0$ ), and the mean lactation score was 12.4 ( $\pm 7.8$ ). Figure 2 details the proportions fully breastfeeding or mixed feeding in each of the 12 months postpartum (among those who completed the 12 month follow-up,  $n = 385$ ).

Bivariate relationships are presented in Table 2. Women who were older, more educated, married, and non-smokers were more likely to breastfeed and have higher lactation scores. Black women were less likely to initiate breastfeeding and had lower lactation scores than women of other races. Women with preterm births and fewer children were less likely to initiate breastfeeding, and women working full-time had lower lactation scores.

Body mass index was negatively correlated with both initiation of breastfeeding and lactation score. Figure 3 presents breastfeeding by weight category at initiation and at 6 and 12 months postpartum.

In multivariable models (Table 3), education, gestational age and BMI remained significant predictors of breastfeeding initiation. For every unit increase in BMI, the relative odds of initiating breastfeeding were reduced by 4% (OR: .96; CI: .92–.99). Among those who initiated breastfeeding, black race, working full-time, parity, smoking, gestational age and BMI all had significant effects on lactation score. Each unit increase in BMI reduced the lactation score by 0.22 ( $P = 0.01$ ).

The separate analyses for blacks and whites suggested tendencies toward racial differences—for example, increasing education had a significant positive effect on lactation score for black women, although this was not found in the overall sample or in the stratified model for whites. In models including interaction terms between race and these covariates, however, none of the interaction terms were significant at the .05 level (data not shown).

Among ever breastfeeders at 12 months ( $n = 274$ ), the third most commonly endorsed reason for breastfeeding was that it would help the mother lose weight ( $n = 202$ ). Other common reasons for breastfeeding were to benefit the health of the baby ( $n = 268$ ), to bond with the

baby ( $n = 234$ ), to reduce feeding costs ( $n = 190$ ), and convenience ( $n = 178$ ). As for whether breastfeeding would help with weight loss, 37% of women at baseline answered “7” (“certain to happen”) and 80% answered 5 or higher. However, this variable was not significantly correlated with either breastfeeding initiation or lactation score (data not shown).

Belief that breastfeeding would enhance weight loss decreased from 6 weeks to 12 months postpartum, at which time 27% responded “7” and 69% responded 5 or higher. This measure at 12 months was negatively correlated with lactation score (Pearson’s  $r = -0.13$ ,  $P = .04$ ), as was the change in beliefs over time (Pearson’s  $r = -0.16$ ;  $P = 0.009$ ). There were no significant correlations between change in beliefs and BMI or weight change from baseline to follow-up, although heavier women were less likely to lose weight in this period (data not shown).

## Discussion

Within this sample of overweight and obese women, BMI was negatively associated with breastfeeding initiation and intensity. In multivariable analysis, for every 5 units increase in BMI (e.g., every increase in BMI category—overweight to obese class I, class I to class II, etc.) the odds of initiating breastfeeding were reduced by ~20%, and the lactation score was reduced by about 1.1. A drop of this size in lactation score represents more than a month of breastfeeding lost, or more than a month of mixed feeding instead of full breastfeeding.

Bivariate relationships between initiation and duration of breastfeeding and age, race, education, marital status, fulltime work, parity, smoking, and infant gestational age mirrored those in the general population [7–11]. Associations between initiation and several demographic predictors were mitigated after adjusting for education, as has been found elsewhere [25,26]. Also consistent with previous studies [25,27,28], gestational age remained positively associated with both outcomes and full-time work remained negatively associated with intensity after adjustment for covariates. Smokers were only half as likely as non-smokers to initiate breastfeeding in the multivariable model; that this effect was not statistically significant is likely due to the small number of smokers in the sample ( $n = 26$ ). The effect of smoking on intensity, however, was large enough to be statistically significant, even among the small number of breastfeeders who smoked [28]. Neither postpartum depression nor cesarean delivery were associated with breastfeeding.

### Racial Differences in Predictors of Breastfeeding

There were no statistically significant racial differences in the predictors of breastfeeding. However, low educational attainment may be more of a barrier to breastfeeding intensity for blacks than for whites. Though the interaction effect of race with education on lactation score was sizable, it did not achieve statistical significance ( $\beta 3.60$ ,  $P = 0.09$  for college;  $\beta 2.94$ ,  $P = 0.24$  for postgraduate). Thus, although breastfeeding predictors did not differ statistically by race, overweight and obese African-American women with the lowest levels of education may be at particularly high risk for early breastfeeding cessation.

Our findings can be compared to those of Kugyelka et al. [29] and Liu et al. [30] who found no effect of BMI on initiation or duration of breastfeeding in stratified analyses including only black women. In our similar stratified analyses, we found no effect of BMI on initiation among black women but did find an effect on intensity ( $\beta -0.26$ ;  $P = 0.02$ , adjusted for covariates). This effect was not significantly different from that among whites, however, when tested using an interaction term for race\*BMI in the model including the entire sample ( $\beta -0.09$ ;  $P = 0.58$ ).

## Breastfeeding and Weight Loss for Overweight Women

Breastfeeding can promote postpartum weight loss, particularly when continued for at least 6 months [31,32]. The women in our sample were familiar with this idea, but beliefs related to breastfeeding and weight loss at baseline were not associated with breastfeeding initiation or intensity. Interestingly, expectations regarding weight loss decreased overall from baseline to follow-up, while both higher expectations at 12 months and increasing expectations over time were associated with lower lactation scores. It may be that women with more experience breastfeeding (e.g., higher lactation scores) reduced their expectations of weight loss to realistic levels, but it may also be that women with persistent, unrealistically high expectations for postpartum weight loss gave up on lactation earlier. Future research should explore this possibility in greater detail.

## Limitations of the Study

The question “have you ever breastfed your baby” was not asked among formula feeders at baseline. Some women ( $n = 29$ ) may have initiated breastfeeding but stopped by 6 weeks postpartum, making the crude initiation rate conservative. This may also have impacted the intensity analysis; however, both breastfeeders and formula feeders were lost to follow-up, and we found no systematic differences between those who completed follow-up and those who did not. The breastfeeding measure we used did not account for supplementation with juice or water. However, the lactation score summarizes breastfeeding intensity without utilizing such information, and is appropriate to the present analysis, since the outcome of interest is duration and exclusivity of breastfeeding *behavior*, and not volume of lactation. Also, the breastfeeding measures are based on recall at 12 month follow-up—however, recall methods are standard practice for national surveillance [33] and breastfeeding recall has been shown to be valid up to 3 years postpartum [34].

The proportion of women who initiated breastfeeding was slightly larger than has been reported in other samples of overweight and obese women. Women in this study participated in a 9-month behavioral intervention trial, although it is not clear how this might make them different in their breastfeeding behavior from those who did not enroll. Although research participants tend to be more educated than the general population, our participants were racially and sociodemographically diverse. Further, it should be noted that women enrolling in a weight loss trial may be more interested in losing weight, and therefore more sensitive to a perceived lack of weight loss over time. If so, they may be more likely than other women to stop breastfeeding if they experience little postpartum weight loss. This possibility should be considered when interpreting the association between beliefs about lactation and weight loss and the duration of breastfeeding in this group.

The measure of overall body weight status used for these analyses was the more reliable, measured BMI, which was collected 6 weeks postpartum, rather than the self-reported prepregnancy weight. These measures were highly correlated in our sample, however, and since weight tends to be under-reported generally [35] and particularly by overweight persons [36–38], a measured weight is preferred when available. Further, we tested the multivariable models using prepregnancy BMI as the indicator of weight status and achieved similar results. This may limit comparison to other studies, however, as many do not have a measured weight available to use as the indicator of weight status.

## Implications for Clinical Practice

Overweight women may have problems initiating breastfeeding due to large breasts, which can make positioning and latching on more difficult [39], and are more likely to experience delayed lactogenesis (milk “coming in”) [40–42]. Obese women are also more likely to experience delivery complications that are independently associated with delayed



lactogenesis, including prolonged labor and cesarean delivery [13,43,44]. Further, obesity is an independent predictor of diminished prolactin response, which can impact the establishment of successful lactation and lead to diminished lactation performance in the short term [45]. Accordingly, obese women are more likely to discontinue breastfeeding within only a few weeks of delivery [16,46].

Providers often do not realize that these women are less likely to breastfeed successfully nor do they counsel overweight women differently because of their weight [47]. Recent evidence has shown that interventions to encourage and support breastfeeding can positively affect breastfeeding uptake and duration [6,48,49], and resources are available to inform practitioners about the special needs and concerns of overweight and obese women [50–52]. Our study also shows, as with the general population [53,54], that overweight and obese mothers who are black or have a high school or less than high school education are at particularly high risk of early breastfeeding cessation.

Finally, overweight and obese breastfeeding women expecting to lose weight postpartum may be frustrated if this weight loss is not realized, and this may impact their commitment to sustained breastfeeding. In these cases, a likely barrier to weight reduction is excess caloric intake, which itself promotes weight retention but also offsets the energy deficit produced by lactation [55,56]. These women need continued counseling to manage their expectations around the effect of breastfeeding on weight loss, and can be advised to reduce their overall caloric intake to promote moderate and sustainable weight reduction: reducing energy intake by 500 kilocalories per day in overweight, fully breastfeeding women has been shown to produce an average weight loss of 0.5 kg per week without affecting lactation or infant growth [56]. Moreover, the potential negative impact of beliefs about breastfeeding and weight loss requires further study, as it may represent a previously unrecognized, modifiable risk factor for reduced breastfeeding among overweight and obese women. The most commonly cited reason for breastfeeding in this group was the health of baby, and emphasizing this point is likely the best way to encourage breastfeeding among overweight women.

## Conclusion

BMI was negatively correlated with both initiation and intensity of breastfeeding in this sample of overweight and obese women. These women did not appear to have additional unique risk factors for reduced breastfeeding, although overweight mothers who are black and less educated may be an especially high-risk group. Overweight and obese women may become discouraged if they don't experience weight loss during breastfeeding, and should be counseled to manage their weight loss expectations and to moderate their overall caloric intake to support postpartum weight loss. In general, overweight and obese women may need additional encouragement to consider breastfeeding and to continue breastfeeding during the infant's first year.

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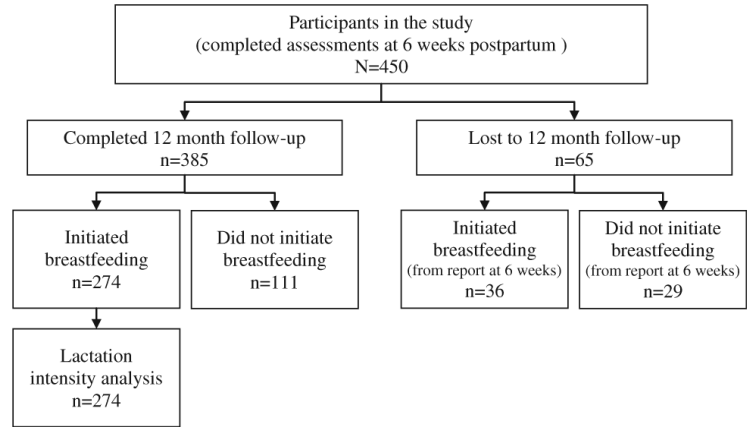
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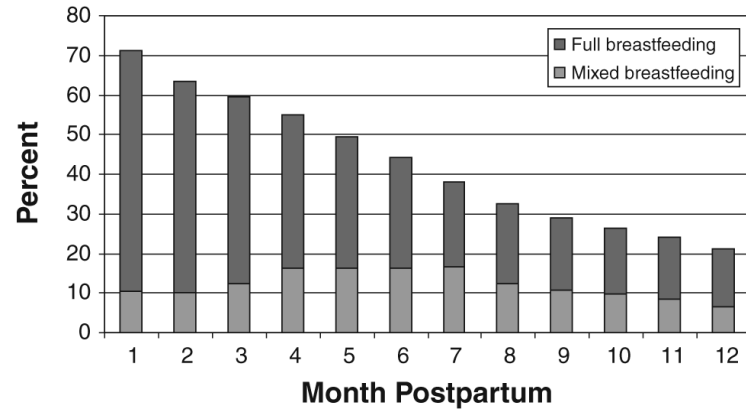


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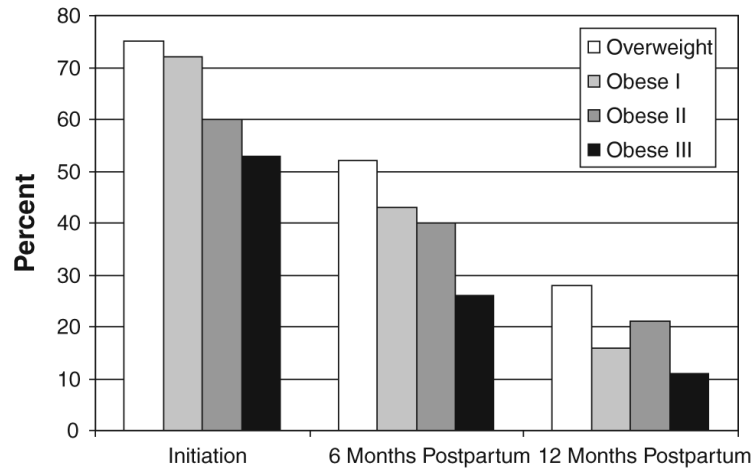
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**Fig. 1.**  
Inclusion in the analysis samples



**Fig. 2.** Breastfeeding in the first year postpartum. Percent fully breastfeeding or combining with formula (mixed feeding) by month among those completing the 12-month survey ( $n = 385$ )



**Fig. 3.** Breastfeeding by BMI group. Initiation of breastfeeding ( $n = 450$ ), and percent continuing to breastfeed at 6 and 12 months among those completing the 12-month survey ( $n = 385$ )

Table 1

## Sample characteristics

Variable	Total (n = 450) % (n)
Age (mean [SD])	30.9 (5.6)
18–24	14.2 (64)
25–34	55.8 (251)
35+	30.0 (135)
Race	
White/other	54.9 (247)
Black	45.1 (203)
Education	
High school graduate or less	45.1 (203)
College degree	33.3 (150)
Postgraduate degree	21.6 (97)
Marital status	
Single	31.3 (141)
Married	68.7 (309)
Plan to work outside home (at 6 mo pp)	
Not work outside the home	19.2 (86)
Parttime	18.0 (81)
Fulltime	62.8 (282)
Parity	
1	41.1 (185)
2	36.0 (162)
3+	22.9 (103)
Current smoking	
Yes	5.8 (26)
Postpartum depression	
Yes	8.7 (39)
Delivery type	
Vaginal	61.9 (274)
Cesarean section	38.2 (169)
Gestational age (weeks; mean [SD])	38.4 (2.1)
Preterm birth (<37 weeks)	11.6 (52)
Gestational weight gain (kg; mean [SD])[24]	14.9 (8.7)
Under IOM recommendations	19.6 (88)
Within IOM recommendations	20.8 (93)
Above IOM recommendations	59.6 (267)
Body mass index (kg/m <sup>2</sup> ; mean [SD]) [23]	33.0 (6.4)
25–29.9 (overweight)	40.0 (180)
30–34.9 (obese class I)	31.3 (141)
35–39.9 (obese class II)	15.6 (70)



Variable	Total (n = 450) % (n)
40+ (obese class III)	13.1 (59)
Initiation of breastfeeding	
Never breastfed	31.1 (140)
Breastfed	68.9 (310)
Duration of breastfeeding (months [1–12]; mean [SD]) <sup>a</sup>	7.2 (4.0)
Lactation score (intensity [1–24]; mean [SD]) <sup>a</sup>	12.4 (7.8)

<sup>a</sup> Among breastfeeders only; measured at 12 month follow-up

**Table 2**  
Bivariate relationships between predictor variables and breastfeeding initiation and lactation score

Variable	Initiation of breastfeeding (n = 450)		Lactation score* (n = 274)	
	%	P-value**	Mean (SD)	P-value**
Age				
18-24	45.3	<0.0001	8.2 (6.5)	0.02
25-34	74.5		13.0 (7.8)	
35+	69.6		12.3 (8.0)	
Race				
White/other	76.5	0.0001	14.0 (7.9)	<0.0001
Black	59.6		9.8 (6.9)	
Education				
High school graduate or less	59.1	<0.0001	10.5 (7.9)	0.003
College degree	70.0		12.7 (7.7)	
Postgraduate degree	87.6		14.5 (7.5)	
Marital status				
Single	53.2	<0.0001	9.1 (6.3)	0.0001
Married	76.1		13.4 (8.0)	
Plan to work outside home (at 6 mo pp)				
Not work outside the home	76.7	0.14	16.1 (7.9)	<0.0001
Parttime	71.6		13.5 (8.7)	
Fulltime	66.0		10.8 (7.0)	
Parity				
1	68.1	0.03	11.3 (7.9)	0.16
2	63.6		12.8 (7.9)	
3+	78.6		13.6 (7.6)	
Current smoking				
No	70.5	0.003	12.6 (7.8)	0.007
Yes	42.3		5.6 (5.3)	
Postpartum depression				
No	69.6	0.30	12.4 (7.8)	0.66

Variable	Initiation of breastfeeding ( <i>n</i> = 450)		Lactation score* ( <i>n</i> = 274)	
	%	<i>P</i> -value**	Mean (SD)	<i>P</i> -value**
Yes	61.5		11.6 (8.4)	
Delivery type				
Vaginal	70.8	0.21	12.6 (7.9)	0.48
Cesarean section	65.1		11.9 (7.7)	
Preterm birth (<37 weeks)				
No	71.3	<b>0.005</b>	12.6 (7.8)	0.12
Yes	51.9		9.6 (8.4)	
Gestational weight gain [24]				
Under IOM recommendations	65.9	0.56	11.8 (7.5)	0.52
Within IOM recommendations	73.1		13.4 (8.0)	
Above IOM recommendations	68.5		12.2 (7.9)	
Body mass index (kg/m <sup>2</sup> ) [23]				
25–29.9 (overweight)	75.0	<b>0.003</b>	14.0 (7.9)	<b>0.004</b>
30–34.9 (obese class I)	72.3		10.9 (7.6)	
35–39.9 (obese class II)	60.0		13.1 (7.9)	
40+ (obese class III)	52.5		9.1 (6.8)	

Significant *P*-values in bold

\* Range = 1–24

\*\* Chi-square test for differences in proportions; ANOVA and *t*-tests for differences in means

**Table 3**  
 Multivariable analysis: predictors of breastfeeding initiation (logistic regression) and lactation score (linear regression)

Variable	Initiation of Breastfeeding ( <i>n</i> = 450)		Lactation score ( <i>n</i> = 274)	
	Adjusted odds ratio	Confidence interval	Effect size	<i>P</i> -value
Age (years)	1.01	(0.96, 1.06)	0.02	0.83
Race <sup>a</sup>				
Black	0.81	(0.46, 1.42)	-3.13	<b>0.006</b>
Education <sup>b</sup>				
College degree	1.27	(0.72, 2.23)	1.20	0.31
Postgraduate degree	2.77	<b>(1.26, 6.08)</b>	2.11	0.12
Marital status <sup>c</sup>				
Married	1.38	(0.78, 2.45)	-1.01	0.44
Plan to work outside home (at 6 mo pp) <sup>d</sup>				
Parttime	0.69	(0.31, 1.54)	-1.49	0.30
Fulltime	0.60	(0.33, 1.21)	-4.26	<b>0.0005</b>
Parity	1.30	(0.94, 1.81)	1.85	<b>0.006</b>
Current smoking <sup>e</sup>				
Yes	0.45	(0.18, 1.14)	-7.06	<b>0.008</b>
Postpartum depression <sup>g</sup>				
Yes	0.77	(0.36, 1.67)	-1.44	0.42
Delivery type <sup>f</sup>				
Cesarean section	0.78	(0.48, 1.25)	-0.69	0.47
Gestational age (weeks)	1.12	<b>(1.01, 1.25)</b>	0.65	<b>0.002</b>
Gestational weight gain (kg)	1.01	(0.97, 1.02)	-0.0004	0.99
Body mass index (kg/m <sup>2</sup> )	0.96	<b>(0.92, 0.99)</b>	-0.22	<b>0.01</b>
Intervention arm			0.14	0.87
Intercept ( <i>R</i> -square)			16.7	(0.24)

Significant *P*-values in bold

<sup>a</sup>Reference categories: all other races;

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<sup>b</sup> high school graduate or less;

<sup>c</sup> single;

<sup>d</sup> do not plan to work outside the home;

<sup>e</sup> nonsmoker;

<sup>f</sup> vaginal delivery;

<sup>g</sup> not depressed