Western Journal of Nursing Research
201X, Vol XX(X) 1–19

DOI: 10.1177/0193945913514638
wjn.sagepub.com
SAGE

Infant Feeding Attitudes and Breastfeeding Intentions of Black College Students

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Abstract

Breastfeeding rates are lowest among Black women than women of other races. An understanding of infant feeding attitudes may help improve breastfeeding rates among Black women. The theory of planned behavior guided this study to explore infant feeding attitudes of Black college students and the contribution of attitudes to breastfeeding intentions after controlling for age, gender, income, and education level. A sample of 348 Black college students below 45 years old with no children and no history of pregnancies were recruited for this study. The Iowa Infant Feeding Attitude Scale and a Demographic Questionnaire were used to collect data. Participants agreed that breast milk is the ideal food for infants and 48% indicated high probability of breastfeeding intentions. Infant feeding attitudes also explained approximately 30% (Nagelkerke R^2) of the variance in breastfeeding intentions. Therefore, breastfeeding interventions targeting Black women should focus on improving breastfeeding attitudes.

Keywords

breastfeeding, theory of planned behavior, attitudes, breastfeeding intentions

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Early initiation of breastfeeding in the United States has steadily increased over the years to the highest rate of 76.5% in 2010. However, Black women (59.7%) continue to have the lowest breastfeeding rate compared with Asian (86.4%), Hispanic (80.6%), and White (77.7%) women (Centers for Disease Control and Prevention [CDC], 2013). This is a significant public health concern considering Black (odds ratio [OR] = 0.69; 95% confidence interval [CI] = [0.53, 0.90]), and low birth weight (OR = 0.97; 95% CI = [0.64, 1.47]) infants were found to have a lower risk of postneonatal death when breastfed than infants never breastfed (Chen & Rogan, 2004). Evidence also demonstrates an association between breastfeeding and a decreased risk of necrotizing enterocolitis which has a high case-fatality rate for preterm infants (Ip et al., 2007). The racial disparity in breastfeeding rates should be addressed as Black women have the highest incidence of preterm births and twice as many low birth weight infants compared with White women (Mathews & MacDorman, 2008).

Breastfeeding Influences

Consistent evidence shows United States breastfeeding rates were influenced by different maternal characteristics such as age, education, income, and race. Among all races, less educated and younger women were not as likely to breastfeed as college educated and older women (CDC, 2013; Chen & Rogan, 2004; Forste, Weiss, & Lippincott, 2001). Variations in breastfeeding rates across the sociodemographic characteristics occur among the races with differences noted between Black and White women. College educated Black women have been found to be less likely to breastfeed than college educated White women (Scanlon et al., 2010) demonstrating a persistent racial disparity in breastfeeding that is not explained by education.

Social and cultural norms have also been linked with breastfeeding behavior. Hannan, Li, Benton-Davis, and Grummer-Strawn (2005) analyzed data from the Healthstyles survey which included health-related beliefs of American men and women ≥18 years of age of different races, incomes, and regions and found social norms in the United States to include an agreement that breast milk is healthier, but formula feeding does not lead to increased illness. Breasts are also viewed as a sexual organ by the present-day society leading to perceptions that breastfeeding should not be displayed by the media. People in Southern and Midwestern regions demonstrated the least support of breastfeeding in public. This evidence reflects social and cultural norms about breastfeeding in the United States that hinder breastfeeding for all women. Among Black women in the United States, breastfeeding is viewed as culturally unacceptable and is avoided by many mothers and

grandmothers. This may be due to breastfeeding roots tied to slavery as well as poverty which has led to little value in breastfeeding and formula feeding as the method of choice among Black women (Ludington-Hoe, McDonald, & Satyshur, 2002). Many Black women grow up in a family culture or community without ever being exposed to another Black mother breastfeeding an infant. The lack of breastfeeding role models to share personal experiences with may contribute to the tradition of formula milk feeding (Pak-Gorstein, Haq, & Graham, 2009). Nonetheless, Black women have indicated culture had little effect on their breastfeeding decisions (Street & Lewallen, 2013).

Factors other than sociodemographic characteristics and culture may have a stronger influence on breastfeeding decisions. Black and White women have reported personal choice, encouragement from family and friends, and benefits of breastfeeding as the basis for breastfeeding decisions (Street & Lewallen, 2013). Partner support and positive breastfeeding attitudes were found to also have a significant association with breastfeeding intentions among urban first-time pregnant women. The strongest association was partner support indicating that family influences may be more important (Persad & Mensinger, 2008). While support from fathers has been reported as influential in breastfeeding decisions, research including father's attitudes toward breastfeeding is limited. Parental attitudes, including father's attitudes, are often reported by female partners (Alexander, Dowling, & Furman, 2010; Scott, Shaker, & Reid, 2004). Alexander et al. (2010) found women perceived little support for breastfeeding from fathers and friends. Paternal attitudes were reported by the mother as concentrated on the father with emphasis on beliefs that breastfeeding will make the infant spoiled and breastfeeding will not allow the father to be involved which presented barriers to breastfeeding.

Influences on breastfeeding decisions among Black women have been addressed in research. Fooladi (2001) explored views on breastfeeding of two generations of low-income Black women. Younger women with access to free formula were found to have lower rates of breastfeeding. Embarrassment about breastfeeding in public and fear of low breast milk supply was reported as a significant barrier to breastfeeding for both generations. However, low-income, urban, Black pregnant teens and adults with a mean age of 22 reported reasons for breastfeeding to be influenced by convenience and health benefits with few concerns about breastfeeding in public (Alexander et al., 2010). Another study examined the intentions to breastfeed among a sample of Black pregnant women in the military and found 95% to report intentions to breastfeed after delivery. Older age and positive perceptions of breastfeeding ability were significantly associated with breastfeeding intentions (Saunders-Goldson & Edwards, 2004). In addition, several qualitative

studies have found low-income and college educated Black women who breastfed to report being knowledgeable about the benefits of breastfeeding as well as having positive breastfeeding attitudes and experiences (Cricco-Lizza, 2004; McCarter-Spaulding, 2007; Robinson & VandeVusse, 2009).

Despite breastfeeding promotion, Black women have the lowest incidence of breastfeeding among other women. Limited research has addressed breastfeeding attitudes, intentions, and experiences in an exclusive sample of Black women which has focused primarily on low-income women with a high school education (Alexander et al., 2010; Cricco-Lizza, 2004; Fooladi, 2001). Small samples of college educated and middle-income Black women have been included in qualitative breastfeeding research (McCarter-Spaulding, 2007; Robinson & VandeVusse, 2009). Sociodemographic characteristics, cultural norms, knowledge of breastfeeding benefits, positive breastfeeding attitudes, and support from fathers contribute significantly to breastfeeding intentions and initiation. However, research has not directly assessed Black men's breastfeeding beliefs.

Decisions concerning breastfeeding are often made early in life before becoming pregnant (Saunders-Goldson & Edwards, 2004). Thus, research which examines attitudes prior to pregnancy is important. It is also essential to identify predictors of breastfeeding intentions to design effective breastfeeding interventions. More research is needed to get a better idea of which factors beyond sociodemographic characteristics have the greatest impact on breastfeeding intentions among Black women. This study will help fill the existing gap in knowledge by providing an understanding of Black college educated women's and men's attitudes and intentions toward breastfeeding.

The Theory of Planned Behavior (TPB) guides this study as the focus of the theory is on explaining human behavior. Behavior is a function of beliefs relevant to the behavior and is influenced by behavioral, normative, and control beliefs (Ajzen, 1991). Behavioral beliefs are the favorable or unfavorable attitudes toward the behavior that result from beliefs about the outcomes of the behavior. Normative beliefs are the expectations of others which result in perceived social pressure called subjective norms. Control beliefs are concerned with the presence of factors that may facilitate or impede performance of the behavior which gives rise to perceived behavioral control (Ajzen, 1991). Thus, the key variables of the TPB are attitudes, subjective norms, and perceived behavioral control which leads to formation of intention. Intention to perform a given behavior is a central factor to the TPB. The stronger the intention to perform the behavior, the more likely the behavior will occur. Each variable reveals a different aspect of the behavior which may serve as a point of focus in attempts to change the behavior (Ajzen, 1991). The TPB is also a useful model for studying breastfeeding behavior because it measures

variables open to change (Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005).

Several researchers have used the TPB as the framework to examine breastfeeding behavior and found TPB variables to be predictive of breastfeeding duration among women intending to breastfeed. Attitudes and subjective norms have been found to be significantly associated with breastfeeding initiation in a sample of 733 low-income women (Khoury et al., 2005). Breastfeeding attitudes have also been found to be a stronger predictor of feeding choice than sociodemographic variables and breastfeeding support (Persad & Mensinger, 2008; Scott et al., 2004).

Purpose

The purpose of this study were twofold: (a) to explore infant feeding attitudes and breastfeeding intentions of Black college students and (b) to examine the ability of infant feeding attitudes to predict breastfeeding intentions after controlling for age, gender, income, and education. Due to the low breastfeeding rates among young and college educated Black women, Black college students were the target population for this study. Breastfeeding decisions have been reported to be influenced by breastfeeding experiences and family support (Persad & Mensinger, 2008; Robinson & VandeVusse, 2009); therefore, women and men were included in this study.

Method

Design and Sample

A descriptive cross-sectional study was conducted using self-report questionnaires to explore infant feeding attitudes and breastfeeding intentions. A convenience sample of 348 participants was included in this study based on a power analysis table (Polit & Beck, 2004) using 0.05 level of significance, a medium effect size of 0.30, and 0.80 power. To explore variations in infant feeding attitudes by gender, 174 women and 174 men were recruited. The inclusion criteria were Black women and men attending college; <45 years of age; able to speak, read, and write English; with no children; and no history of pregnancies. Pregnant women and college students with children were excluded from this study, because prenatal classes that discuss breastfeeding issues are often attended during pregnancy and could impact their attitudes about breastfeeding. Institutional Review Board approval was received for this study from University of Memphis and Saint Louis University, and students were recruited over a 6-month period.

A pilot study was conducted with a sample size of 10 Black college students (5 women and 5 men) to test the feasibility of the study, recruitment strategies, and data collection instruments. Students from University of Memphis were recruited in the pilot study from a common location on campus using flyers. Each participant completed the questionnaires in less than 10 min. Once all questionnaires were completed, the principal investigator asked for any comments regarding recruitment strategies by flyers and email messages, readability, and organization of questionnaires. No significant issues were identified and data collection for the study began. The 10 pilot study students were the first participants in the study as no changes were made after the pilot.

Data Collection and Instrumentation

Students were recruited from the University of Memphis, Saint Louis University, and a large predominately Black church in Memphis by email invitation that explained the purpose and inclusion criteria. Email addresses for a sample of the Black student population were provided by the Office of Student Affairs at University of Memphis. All students enrolled at Saint Louis University as Black race were sent the email invitation by the Black Student Alliance. Students meeting the inclusion criteria were invited to participate online via a link to the questionnaires or in-person at one of the campus locations (University of Memphis) during data collection times. Church members were informed about the study and invited to participate by announcements in programs and recruitment emails distributed to registered members of church. Snowball sampling was also used as a recruitment method. Data were collected in person and online to reach a variety of students at times that were convenient for them. It is common to combine data collection methods in a single study to best capture the needed data. In-person data collection is the most convenient method for distributing questionnaires and yields the greatest number of completed questionnaires while data collection via an online method allows access to a broad group of people with a lower response rate of completed questionnaires (Polit & Beck, 2004). Recruitment and in-person data collection were conducted by the principal investigator. Participation was voluntary and no incentives were provided with consent implied by completion of the questionnaires. No names or identifying information was collected from participants to minimize risk for loss of anonymity. Emails were not linked to online questionnaires and all responses were anonymous.

The Iowa Infant Feeding Attitude Scale (IIFAS) was used to collect data regarding attitudes toward infant feeding methods and the Demographic

Questionnaire was used to collect data regarding sociodemographic variables. Qualtrics Survey Software was used for the online questionnaires and data were collected in the same format as the paper questionnaires. Online responses were set within the software to allow only one response per email address which restricted multiple submissions and recorded data in an anonymous manner.

IIFAS. Previous evidence indicates maternal attitudes are essential predictors of infant feeding method and duration of breastfeeding; therefore, the IIFAS was developed to measure attitudes toward infant feeding (De La Mora, Russell, Dungy, Losch, & Dusdieker, 1999). De La Mora et al. (1999) conducted independent studies to analyze the use of the IIFAS in assessing maternal attitudes toward infant feeding methods and predict the choice of feeding method as well as actual breastfeeding behavior. Evidence from all studies demonstrated the IIFAS to be reliable in assessing infant feeding attitudes and predictive of infant feeding as well as duration of breastfeeding with good internal consistency demonstrated in Study 1 by a Cronbach's alpha of .86 and .85 in Study 2 (De La Mora et al., 1999). Internal consistency in the third study was lower than the other studies (Cronbach's α of .68); however, mothers with positive attitudes were found to continue exclusive (breast milk only) and partial breastfeeding (breast milk and formula feeding) for a longer duration (De La Mora et al., 1999).

The IIFAS has a 5-point response scale with options ranging from *strongly disagree* (1) to *strongly agree* (5) and includes 17 items. Items favor breastfeeding (8 items) and formula feeding (9 items) with a total score ranging from 17 to 85. The items that favor formula feeding are reverse-scored before the total score is summed. A score close to 17 reflects positive formula feeding attitudes, while a high score close to 85 reflects positive attitudes favoring breastfeeding (De La Mora et al., 1999). No exact score has been established to define positive breastfeeding or formula feeding attitudes. However, a score of 51 has been used to indicate a neutral infant feeding attitude (Sittlington, Stewart-Knox, Wright, Bradbury, & Scott, 2007). The mean attitude score has been used for group comparison of infant feeding intentions and behavior. Statistically significant differences have been found among breastfeeding women (mean attitude scores ranging from 63 to 66) compared with women selecting formula feeding (mean attitude scores ranging from 49 to 56) indicating higher scores approaching 85 reflect more positive breastfeeding attitudes (De La Mora et al., 1999; Scott et al., 2004; Shaker, Scott, & Reid, 2004; Simmie, 2006; Sittlington et al., 2007). Women undecided about their infant feeding intentions had a mean attitude score of 55 (Sittlington et al., 2007).

Demographic Questionnaire. The Demographic Questionnaire was developed by the principal investigator and consisted of 16 questions to collect data regarding sociodemographic variables associated with breastfeeding. Women born outside the United States, of older age, with more years of formal education, and higher incomes are consistent variables associated with high breastfeeding rates (Persad & Mensinger, 2008). Mothers who have seen other mothers breastfeed were found to have more favorable breastfeeding attitudes (Sittlington et al., 2007); therefore, information was also gathered on whether participants were breastfed as an infant and had exposure to a breastfeeding mother.

Analysis

Completed questionnaires were double entered into Microsoft Access and reviewed for errors. The database was stored on a secure network requiring a password for access and data were analyzed using SPSS© Statistics 21. Data were screened for missing information, outliers, normality, and correlations. Confirmatory factor analysis and internal consistency reliability were estimated for the IIFAS using SAS© Analytics 9.2 Proc-Calis procedure. Descriptive statistics were used to characterize the demographic data, attitude scores, and breastfeeding intention. Independent-samples *t* tests and analysis of variance were used for analyzing differences in infant feeding attitudes among demographic variables. Chi-square test of independence and Kruskal–Wallis Test was used to examine associations among demographic variables and breastfeeding intentions. Sequential logistic regression was used to determine the relative contributions of infant feeding attitudes to explain intention to breastfeed future children (for women) or support breastfeeding mothers (for men) after controlling for age, gender, education, and income.

Results

Sample Characteristics

A total sample of 348 Black college students (174 women and 174 men) was recruited with 86 (24.7%) questionnaires completed online and 262 (75.3%) completed during in-person data collection. Table 1 describes the sociodemographic characteristics of female and male participants. The ages for the total sample ranged from 17 to 44 with a mean age of 22 (standard deviation [*SD*] = 5.38). The majority of the sample was born in the United States (95%), single (93%), enrolled full-time (86%), undergraduate students (85%), reported their permanent state of residence to be Tennessee (80%), and with

Table 1. Female and Male Characteristics.

Demographics	Female *N* (%)	Male *N* (%)
Age group		
17-19	54 (31.4)	42 (24.9)
20-29	100 (58.1)	111 (65.7)
30-39	18 (10.5)	7 (4.1)
40-44	0 (0.0)	9 (5.3)
Marital status		
Single	163 (94.2)	160 (92.0)
Married	9 (5.2)	10 (5.7)
Divorced	1 (0.6)	3 (1.7)
Widowed	0 (0.0)	1 (0.6)
Student status		
Full-time	151 (87.3)	148 (85.1)
Part-time	22 (12.7)	26 (14.9)
Level of education		
Freshman	35 (20.1)	38 (21.8)
Sophomore	43 (24.7)	33 (19.0)
Junior	33 (19.0)	41 (23.6)
Senior	36 (20.7)	38 (21.8)
Graduate	27 (15.5)	24 (13.8)
Work status		
Full-time	35 (20.1)	41 (23.6)
Part-time	89 (51.2)	69 (39.6)
Do not work	50 (28.7)	64 (36.8)
Yearly income (in US$)		
0-14,999	132 (76.3)	122 (70.5)
15,000-29,999	23 (13.2)	32 (18.5)
30,000-44,999	4 (2.3)	12 (6.9)
45,000-59,999	7 (4.1)	5 (2.9)
60,000+	7 (4.1)	2 (1.2)
Parental financial support		
Yes	108 (62.1)	90 (51.7)
No	66 (37.9)	84 (48.3)
Parents yearly income (in US$)		
0-14,999	16 (9.2)	14 (8.4)
15,000-29,999	22 (12.6)	18 (10.8)
30,000-44,999	21 (12.1)	27 (16.3)
45,000-59,999	27 (15.5)	17 (10.2)
60,000+	43 (25.9)	43 (25.9)
Do not know	45 (25.9)	47 (28.3)

an annual income of US$0 to US$14,999 (73%). The permanent state of residence for 92% of the sample was southern regions, while for 6% was midwestern regions, and for 2% western regions of the United States. Nearly half of the sample (45%) worked part-time and 57% reported receiving financial support from their parents with 25% of parents' yearly income reported as US$60,000+. When asked about breastfeeding experience as an infant, 17% did not know while 40% reported being breastfed as an infant. Eighty-three percent reported knowing someone who breastfed.

IIFAS

Univariate statistics showed a total of 25 missing responses across 10 items with < 5% missing among all items. Participant item mean substitution was used for imputation of missing data. Visual examination of boxplots for each item revealed 9 items with outliers. All cases were examined and found to have no errors in coding or data entry, and were appropriate subjects for the sample population. The outlier cases were identified as outliers due to the selected response of strongly agree or strongly disagree when the majority of participants selected neutral, agree, or disagree. This reflected the difference of opinions and the strong feelings of some participants regarding the stated belief about infant feeding methods. For all 9 items, no significant change in each item mean or *SD* was found when the cases were deleted. Therefore, all cases remained in the data set. Distribution of items for the IIFAS was fairly normal with 5 items negatively or positively skewed.

Confirmatory factor analysis with the total sample was performed to investigate construct validity of the IIFAS and determine if the theoretical structure was invariant among this sample of Black female and male college students. The number of parameters was constrained with the highest loading parameter on each factor scaled to one and the models were estimated using maximum likelihood estimation. The regression coefficients and *t* statistics were evaluated for significance of each parameter. Parameter estimates were determined with a table of *t* distributions, and a *t* statistic of >1.96 was needed for significance at the .05 level (Tabachnick & Fidell, 2007). Items favoring formula feeding loaded on the formula factor and items favoring breastfeeding loaded on the breastfeeding factor. Regression coefficients for Model 3 are displayed in Table 2, and Table 3 displays complete fit indices for all models. The chi-square difference test revealed no statistically significant difference in Models 3 and 4. The Cronbach's alpha coefficient was .67 for the total scale.

Total attitude scores ranged from 38 to 80 with a mean score of 57 (*SD* = 6.99). Distribution of attitude scores was approximately normal with slightly

Table 2. Iowa Infant Feeding Attitude Scale Confirmatory Factor Analysis Factor Loadings.

	Factor		
Items	Formula Feeding	Breastfeeding	*t* Statistic
Formula is as healthy	1.00		
Formula better if mom works	0.71		4.79
Breast milk benefits only while breastfed	0.55		4.06
Breast milk lacks iron	0.50		3.93
No breastfeeding in public	0.42		3.44
Formula feeding more convenient	0.39		3.34
Breastfed infants overfed	0.47		3.18
Fathers feel left out[a]	0.24		1.89
Mother who drinks[a]	0.16		1.50
Breast milk is ideal food		1.00	
Healthier infants		0.71	7.80
Easily digested		0.65	7.57
Mother-infant bonding		0.63	7.42
Great joys of motherhood		0.55	6.60
Breast milk less expensive		0.54	6.53
Breastfeeding more convenient		0.17	2.22
Formula fed infants overfed[b]		−0.003	−0.05

[a]Analysis by gender revealed significant high loadings for females but not males.
[b]Analysis by gender revealed low non-significant loadings for females and males and was removed for Model 4 analysis. All items determined relevant and remained in the overall model due to no statistically significant difference found between Models 3 and 4.

Table 3. Iowa Infant Feeding Attitude Scale Confirmatory Factor Analysis Fit Indices.

Model	χ^2	*df*	χ^2/df	GFI	AGFI	CFI	NFI	RMR	RMSEA
Model 1	337.52**	118	2.86	.90	.86	.70	.61	.07	.08
Model 2	199.47**	78	2.56	.94	.88	.83	.77	.06	.07
Model 3	207.16**	97	2.14	.93	.89	.85	.76	.06	.06
Model 4	194.87**	86	2.26	.93	.90	.84	.76	.06	.06

Note. GFI = goodness of fit index; AGFI = adjusted GFI; CFI = comparative fit index; NFI = normed fit index; RMR = root mean square residual; RMSEA = root mean square error of approximation.
**$p < .001$.

Table 4. Pearson and Spearman rho Correlation Coefficients.

Variables	Attitude Score	Breastfeeding Intention
Age	.184**	.165*
Gender	.236**	
Know someone who BF	.242**	.254**
Income	.119*	.143*
Education level	.214**	.248**
BF as infant		.189**
Attitude score		.480**

Note. BF = breastfed.
*$p < .05$. **$p < .001$.

positive skewness. In general, participants were knowledgeable about the benefits of breast milk. Fifty percent disagreed with the belief that nutritional benefits of breast milk only lasts as long as the infant is breastfed, and 56% agreed that breast milk is healthier for infants than formula. While 61% agreed breast milk is more easily digested than formula, 79% thought women who occasionally drink should not breastfeed their infant. Nearly half (47%) of the participants were knowledgeable about breast milk including iron; however, 47% were neutral on this belief.

Positive attitudes regarding formula feeding were revealed by 45% of participants who agreed formula feeding was more convenient than breastfeeding, and 42% who agreed that formula feeding is a better choice if the mother works outside the home. In addition, 46% agreed women should not breastfeed in public places. Although more participants thought formula feeding is more convenient, 70% agreed that breast milk is the ideal food for infants. Positive attitudes in favor of breastfeeding were supported by 77% of participants who agreed that breastfeeding increases mother–infant bonding and 41% agreed that women who formula feed miss one of the great joys of motherhood. The majority disagreed with the belief that infants who are breastfed are more likely overfed (55%), and fathers will feel left out if their infant is breastfed (60%). Ninety-one percent also agreed breast milk is less expensive.

Significant correlations were observed among infant feeding attitude scores and age, gender, income, education level (undergraduate or graduate student), and knew someone who breastfed their infant (Table 4). There was a significant difference in attitude scores among gender ($t = -4.52$, $p < .001$), knowing someone who breastfed their infant ($t = -4.65$, $p < .001$), age ($F = 5.287$, $p < .001$), and education level ($F = 7.289$, $p < .001$). A non-significant

difference was observed among income ($p = .09$). Female participants had higher attitude scores with a mean score of 58 ($SD = 6.81$) compared with male participants ($M = 55$, $SD = 6.80$). Participants who knew someone who breastfed their infant had higher attitude scores ($M = 58$, $SD = 6.83$) compared with no exposure to breastfeeding ($M = 53$, $SD = 6.60$). Higher attitude scores also occurred for participants 31 to 40 years of age ($M = 61$, $SD = 5.36$, 95% CI = [58.07, 64.12]) and with a graduate degree ($M = 61$, $SD = 6.65$, 95% CI = [59.54, 63.28]).

Breastfeeding Intentions

The majority of the sample (163) indicated a high probability (81%-100%) of intentions to breastfeed future children with 71 participants indicating a 61% to 80% chance. Only 14 (4%) of the participants indicated no chance to breastfeed future children. Visual examination of boxplots revealed no outliers. Data were approximately normal with slight negative skewness. A significant correlation was observed among breastfeeding intention and age, education level, income, being breastfed as an infant, knowing someone who breastfed their infant, and infant feeding attitude scores (Table 4). However, chi-square test for independence and Kruskal–Wallis Test revealed a significant association only between participants who were breastfed as an infant ($\chi^2 = 46.12$, $p < .001$), knew someone who breastfed their infant ($\chi^2 = 32.53$, $p < .001$), more than 30 years of age ($\chi^2 = 9.54$, $p < .05$), had a higher level of education ($\chi^2 = 23.18$, $p < .001$), and higher attitude scores ($\chi^2 = 79.96$, $p < .001$). A non-significant association was observed for income ($p = .08$).

Prediction of Breastfeeding Intentions

Sequential logistic regression was used to examine infant feeding attitudes ability to predict breastfeeding intentions after controlling for age, gender, income, and education. Breastfeeding intentions were grouped as highly likely (≥81% probability) and less likely (≤80% probability) to breastfeed future children. Preliminary analyses demonstrated no violation of the assumptions of normality, linearity, and homoscedasticity. Age and education level were highly correlated ($r = .81$); therefore, age was excluded from the model. Model 1 included gender, income, and education ($\chi^2 = 18.56$, $p < .01$) and explained approximately 7% (Nagelkerke R^2) of the variance in breastfeeding intention. Infant feeding attitude scores explained approximately 30% (Nagelkerke R^2) of the variance in breastfeeding intentions in Model 2 ($\chi^2 = 64.25$, $p < .001$). Model 1 correctly classified 61% of the cases and Model 2 correctly classified 69%. As shown in Table 5, only attitude score

Table 5. Sequential Logistic Regression: Predicting Highly Likely to Breastfeed Future Children.

	B	*SE*	Wald	*p*	Odds Ratio	95% CI	
						Lower	Upper
Attitude	0.165	0.024	46.87	.000	1.18	1.125	1.236
Education	1.01	0.387	6.39	.009	2.75	1.29	5.86
Gender	0.588	0.264	4.06	.04	0.588	0.351	0.985
Income	0.336	0.314	1.15	.284	1.40	0.756	2.591
Constant	−9.74	1.36	51.63	.000	0.000		

($p < .001$), education ($p < .05$), and gender ($p < .05$) make a unique statistically significant contribution with attitude score the strongest predictor reporting an OR of 1.18.

Discussion

In accordance with the TPB, favorable attitudes regarding breastfeeding indicated greater intentions to breastfeed future children. The regression model was able to distinguish between participants who were highly likely to breastfeed future children and those who were not. The odds of a participant being in the highly likely to breastfeed future children category is about 1 time higher with each one-point increase in infant feeding attitude score, all other factors being equal. In addition, this is the first known study to examine infant feeding attitudes and breastfeeding intentions in a sample of Black college students without children. Participants were knowledgeable about the benefits of breastfeeding and had more positive attitudes toward breastfeeding than formula feeding. Although participants agreed that formula feeding is more convenient, they believed breast milk is healthier for infants and is the ideal food. These findings are consistent with previous research with college students (Marrone, Vogeltanz-Holm, & Holm, 2008; Tarrant & Dodgson, 2007). Marrone et al. (2008) surveyed 161 predominately White undergraduate students in psychology courses at the University of North Dakota regarding breastfeeding and found knowledge of breastfeeding to be associated with positive breastfeeding attitudes. Tarrant and Dodgson (2007) surveyed 403 college students in Hong Kong and found a positive correlation between knowledge and attitudes; however, students believed formula feeding was more convenient and equally beneficial for the infant as breastfeeding. Variation in attitude scores also demonstrated a significant difference

by gender among the participants in the current study with more positive breastfeeding attitudes among women. This finding is different from that found in previous research in that women were observed to have no significant difference in breastfeeding knowledge and attitudes compared with men (Marrone et al., 2008; Tarrant & Dodgson, 2007).

Positive breastfeeding attitudes and a greater probability of breastfeeding intention were observed among participants who knew someone who has a higher level of education and breastfed their infant as well. This finding is consistent with previous research that has demonstrated exposure to breastfeeding to be associated with positive breastfeeding attitudes and intention to breastfeed future children (Marrone et al., 2008; Tarrant & Dodgson, 2007). Persad and Mensinger (2008) also found positive breastfeeding attitudes, perceived family approval, and a higher level of education to be associated with greater breastfeeding intentions among a sample of first-time mothers.

Limitations of this study include methodological concerns regarding the research design. While use of self-report allowed collection of direct information from participants regarding their beliefs and intentions of future behavior, use of a descriptive cross-sectional design and non-pregnant participants prohibit predictions regarding actual breastfeeding behavior. Use of in-person and online data collection permitted the principal investigator to reach a large number of students; however, anonymous data collection without participant tracking prohibited determination of duplicate participation. Risk of duplicate participation was curtailed by no incentives provided for participation and all data collected by the principal investigator. This non-experimental design limits the ability to infer a causal relationship among attitudes and breastfeeding intentions. In addition, the impact of area of study on infant feeding attitudes and breastfeeding intentions was not explored due to lack of knowledge of participant's majors.

A sample of convenience was recruited for this study which is subject to bias as students selected themselves to volunteer for the study in response to the recruitment flyer. Snowball sampling also occurred as students invited eligible friends to participate in person or online. This form of sampling is subject to bias as students may be inclined to invite others that share their same views (Polit & Beck, 2004). Furthermore, there is risk of socially desirable responding with the use of self-report questionnaires. This risk was minimized by instructing students to provide an honest view regarding each infant feeding belief as their responses were anonymous and could not be traced back to any student. The findings of this study are limited to the Black population without children who have some level of higher education beyond high school and cannot be generalized to other populations.

Although college students have positive attitudes toward breastfeeding, some believe formula feeding is more convenient and more acceptable in public. Therefore, breastfeeding campaigns and interventions directed to the Black population should include efforts to promote the practical advantages of breastfeeding and improve public acceptance of breastfeeding. Endorsement of breastfeeding as the most practical feeding method with emphasis on benefits, such as the convenience of feeding on demand without the need to prepare bottles or purchase formula may help breastfeeding to be viewed as the most suitable feeding method. Frerichs, Andsager, Campo, Aquilino, and Dyer (2006) analyzed how popular magazines frame content regarding infant feeding methods and found breastfeeding issues were covered more than formula feeding. Although content on breastfeeding portrayed breastfeeding to be beneficial and a better choice, the message that breastfeeding may be problematic was delivered by content on barriers to breastfeeding. Breastfeeding should be portrayed as the normal and natural infant feeding method. Content regarding infant feeding methods in magazines impacts what the public views as normal (Frerichs et al., 2006). Visual images of Black women breastfeeding such as in commercials, magazines, and billboards may change attitudes among Blacks and improve community support for breastfeeding women making it more acceptable to breastfeed in public.

The findings of this study concur with other studies (Saunders-Goldson & Edwards, 2004) that beliefs about infant feeding are possibly formed early in life, often before having children. Therefore, school health nurses should provide breastfeeding exposure by introducing breastfeeding education early in elective school parenting and health classes. Perinatal nurse educators and community health nurses should also educate women early during their pregnancy regarding breastfeeding and promote breastfeeding as the recommended feeding method. More education is needed for the general public concerning common misconceptions about breastfeeding regarding drinking alcohol and breast milk composition in an effort to improve attitudes regarding breastfeeding thereby increasing the probability of greater breastfeeding intentions. In addition, interventions should include men and other important people who support the breastfeeding mother. More positive attitudes regarding breastfeeding among men and non-breastfeeding women may provide breastfeeding mothers the help and support needed to continue breastfeeding for the recommended 6 months.

Future research should focus on factors that may impact breastfeeding rates among Black women. Research could include Black college graduates and those without a college degree to get a better understanding of the TPB variables (attitudes, subjective norms, intentions, and behavior) regarding infant feeding methods that can be generalized to a broader population. This

will allow investigation of the impact of education on infant feeding beliefs, intentions, and breastfeeding behavior. The inclusion of women and men with and without children in breastfeeding research will allow sample comparison by gender to explore differences among the TPB variables and predictions of breastfeeding decisions. More research measuring attitudes using the IIFAS with a large sample from the Black population is also needed. The Cronbach's alpha of the IIFAS in this study was .67, indicating this may not be a good instrument to use with a sample of young, Black, or participants without children. The IIFAS has been used primarily in samples of White mothers and pregnant women. Nonetheless, evidence from this study can help guide future research framed by the TPB to close the gap in knowledge regarding the low breastfeeding rates among Black women.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179-211.

Alexander, A., Dowling, D., & Furman, L. (2010). What do pregnant low-income women say about breastfeeding? *Breastfeeding Medicine*, *5*, 17-23. doi:10.1089/bfm.2009.0034

Centers for Disease Control and Prevention. (2013). *Breastfeeding among U.S. children born 2000-2009, CDC National Immunization Survey*. Retrieved from http://www.cdc.gov/breastfeeding/data/NIS_data/index.htm

Chen, A., & Rogan, W. J. (2004). Breastfeeding and the risk of postneonatal death in the United States. *Pediatrics*, *113*, e435-e439.

Cricco-Lizza, R. (2004). Infant-feeding beliefs and experiences of Black women enrolled in WIC in the New York metropolitan area. *Qualitative Health Research*, *14*, 1197-1210. doi:10.1177/1049732304268819

De La Mora, A., Russell, D., Dungy, C., Losch, M., & Dusdieker, L. (1999). The Iowa Infant Feeding Attitude Scale: Analysis of reliability and validity. *Journal of Applied Social Psychology*, *29*, 2362-2380.

Fooladi, M. M. (2001). A comparison of perspectives on breastfeeding between two generations of Black American women. *Journal of the American Academy of Nurse Practitioners*, *13*, 34-38.

Forste, R., Weiss, J., & Lippincott, E. (2001). The decision to breastfeeding in the United States: Does race matter? *Pediatrics*, *108*, 291-296.

Frerichs, L., Andsager, J. L., Campo, S., Aquilino, M., & Dyer, C. S. (2006). Framing breastfeeding and formula-feeding messages in popular U.S. magazines. *Women & Health*, *44*(1), 95-118. doi:10.1300/J013v44n01_06

Hannan, A., Li, R., Benton-Davis, S., & Grummer-Strawn, L. (2005). Regional variation in public opinion about breastfeeding in the United States. *Journal of Human Lactation*, *21*, 284-288.

Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., DeVine, D., . . . Lau, J. (2007). *Breastfeeding and maternal and infant health outcomes in developed countries* (Evidence Report/Technology Assessment No. 153, AHRQ Publication No. 07-E007). Rockville, MD: Agency for Healthcare Research and Quality.

Khoury, A., Moazzem, S., Jarjoura, C., Carothers, C., & Hinton, A. (2005). Breastfeeding initiation in low-income women: Role of attitudes, support, and perceived control. *Women's Health Issues*, *15*, 64-72. doi:10.1016/j.whi.2004.09.003

Ludington-Hoe, S. M., McDonald, P. E., & Satyshur, R. (2002). Breastfeeding in African-American women. *Journal of National Black Nurses Association*, *13*(1), 56-64.

Marrone, S., Vogeltanz-Holm, N., & Holm, J. (2008). Attitudes, knowledge, and intentions related to breastfeeding among university undergraduate women and men. *Journal of Human Lactation*, *24*, 186-192. doi:10.1177/0890334408316072

Mathews, T. J., & MacDorman, M. F. (2008). Infant mortality statistics from the 2005 period linked birth/infant death data set. *National Vital Statistics Reports*, *57*(2), 1-32.

McCarter-Spaulding, D. (2007). Black women's experience of breastfeeding: A focus group's perspective. *The Journal of Multicultural Nursing & Health*, *13*(1), 18-27.

Pak-Gorstein, S., Haq, A., & Graham, E. A. (2009). Cultural influences on infant feeding practices. *Pediatrics in Review*, *30*, e11-e21. doi:10.1542pir.30-3-e11

Persad, M., & Mensinger, J. (2008). Maternal breastfeeding attitudes: Association with breastfeeding intent and socio-demographics among urban primiparas. *Journal of Community Health*, *33*, 53-60. doi:10.1007/s10900-007-9068-2

Polit, D., & Beck, C. (2004). *Nursing research: Principles and methods* (7th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Robinson, K., & VandeVusse, L. (2009). Exploration of African-American women's infant feeding choices. *The Journal of the National Black Nurses Association*, *20*, 32-37.

Saunders-Goldson, M. S., & Edwards, Q. T. (2004). Factors associated with breastfeeding intentions of African-American women at military health care facilities. *Military Medicine*, *169*, 111-116.

Scanlon, K. S., Grummer-Strawn, L., Li, R., & Chen, J., Division of Nutrition, Physical Activity and Obesity, . . . CDC. (2010). Racial and ethnic differences in breastfeeding initiation and duration, by state—National Immunization Survey, United States, 2004-2008. *Morbidity and Mortality Weekly Report*, *59*, 327-334.

Scott, J. A., Shaker, I., & Reid, M. (2004). Parental attitudes toward breastfeeding: Their association with feeding outcome at hospital discharge. *Birth*, *31*, 125-131.

Shaker, I., Scott, J. A., & Reid, M. (2004). Infant feeding attitudes of expectant parents: Breastfeeding and formula feeding. *Journal of Advanced Nursing*, *45*, 260-268.

Simmie, E. (2006). Breastfeeding: Different ethnic background, different perceptions? *British Journal of Midwifery*, *14*(1), 20-26.

Sittlington, J., Stewart-Knox, B., Wright, M., Bradbury, I., & Scott, J. A. (2007). Infant-feeding attitudes of expectant mothers in Northern Ireland. *Health Education Research*, *22*, 561-570.

Street, D. J., & Lewallen, L. P. (2013). The influence of culture on breast-feeding decisions by African American and white women. *Journal of Perinatal & Neonatal Nursing*, *27*, 43-51. doi:10.1097/JPN.0b013e31827e57e7

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson Education.

Tarrant, M., & Dodgson, J. E. (2007). Knowledge, attitudes, exposure, and future intentions of Hong Kong University students toward infant feeding. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *36*, 243-254. doi:10.1111/J.1552-6909.2007.00144.x