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The Association between Birth Method and Successfulness of Exclusive
Breastfeeding at the Time of Hospital Discharge at Wellstar Kennestone
Hospital from March, 2011 through March, 2013

Sarah Tintle

B.A., Modern Language & Culture: Spanish

KENNESAW STATE UNIVERSITY

A Thesis Submitted to the Graduate Faculty of Georgia State University in Partial Fulfillment of the
Requirements for the Degree

MASTER OF PUBLIC HEALTH

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APPROVAL PAGE

The Association between Birth Method and Successfulness of Exclusive Breastfeeding at the Time of Hospital Discharge at Wellstar Kennestone Hospital from March, 2011 through March, 2013

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ABSTRACT

BACKGROUND: Breastfeeding is important to children's health and development in early years. It may also have implications for health in later life as it has been associated with some chronic non-communicable diseases including hypertension, obesity, diabetes, hypercholesterolemia, and cardiovascular diseases. The prevalence of exclusive breastfeeding in the United States is estimated to be approximately 44% for a 3-month period and 24% for a 6-month period (CDC, 2008). There are many factors that influence whether or not a mother will be successful in exclusive breastfeeding, and one factor that has been identified with the success of this is delivery method.

OBJECTIVE: The purpose of this study was to determine whether or not infant delivery method is associated with exclusive breastfeeding. Additionally, other environmental and personal factors examined included: intent, infant-to-breast within two hours of birth, as well as maternal race, parity, and age.

METHODOLOGY: Data were obtained from the Wellstar Kennestone Hospital Lactation Department through an agreement. The information was extracted from the patients' medical charts between March, 2011 and March, 2013 by nurses in the lactation department. Descriptive statistical tests and univariate and multivariate logistic regression analyses were conducted to examine associations between delivery method and exclusive breastfeeding with analytic consideration given to significant environmental and personal maternal characteristics.

RESULTS: There was a statistically significant association between delivery method and exclusive breastfeeding (OR= .510, 95% CI= .375-.695) after adjusting for intent, whether or not baby was put to the breast within two hours of birth, maternal race, parity, and maternal age. Mothers who delivered via cesarean section were .510 times as likely to be exclusively breastfeeding at the time of hospital discharge when compared to mothers who delivered vaginally.

CONCLUSION: The results of this study indicate that there is a significant association between delivery method and exclusive breastfeeding, in that vaginally delivered babies were more likely to be exclusively breastfeeding compared to babies delivered via cesarean section. This result is consistent with other research, and it further supports recommendations for healthcare professionals to promote breastfeeding for the first six months of life. As aligned with the Baby-Friendly Hospital Initiative and WHO goals, exclusive breastfeeding should be thoroughly encouraged in addition to promoting natural (vaginal) birth options whenever possible. Further research regarding post-partum factors for both types of delivery that can lead to higher rates of exclusive breastfeeding is warranted.

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CHAPTER 1

INTRODUCTION

1a. Background

Healthy People 2020 includes four objectives for the promotion of breastfeeding including: an increase in the rate of breastfeeding, a reduction in formula use within the first two days of life, an increase in employer lactation support, and an increase in birthing centers that have supportive care for breastfeeding mothers. Trends in breastfeeding rates have shown a recent increase with regard to some level of breastfeeding initiation in data from 2008 (Centers for Disease Control and Prevention, 2008). The short and long-term benefits that can be derived from breastfeeding are undeniable including: economic, immunologic, and may also be implicated in reduction of non-communicable diseases (World Health Organization WHO, Centers for Disease Control and Prevention CDC, American Academy of Pediatrics AAP, Uniformed Services University of the Health Services USU).

There are many factors that may have an impact on the successfulness of a mother's intention to breastfeed including both environmental factors like hospital support as well as physical elements like health status of mother post-partum. Delivery method is just one example of how the mother's health may vary depending on the trauma to the body. There are, however, many different support resources out there for mothers who intend and try to breastfeed. Many

hospitals have lactation departments with lactation consultants to educate mothers and assist them with the actual process. The number of International Board Certified Lactation Consultants (IBCLCs) has been on the rise for the past few years. From 2006-2013, the rate of IBCLCs in hospitals has risen from 2.1 to 3.5 per 1,000 live births (CDC). According to the CDC, breastfeeding success is directly related to professional support by way of the IBCLC. There are also community organizations that exist to promote breastfeeding education and support like La Leche League.

1b. Purpose of Study and Hypothesis

The purpose of this study is to assess whether birthing method is associated with the success of exclusive breastfeeding at the time the mother/baby couple is discharged from the hospital. This study posits that mothers who have undergone a cesarean section will be associated with less success with regard to exclusive breastfeeding. There are various factors that influence this hypothesis. The null hypothesis for this study is that there is no association between delivery method and success with exclusive breastfeeding.

CHAPTER 2

LITERATURE REVIEW

2a. Importance of Breastfeeding/ Predictors for Breastfeeding

Breastfeeding and its benefits carry large implications for the health of both developed and undeveloped countries. Ranging from specific diseases to overall childhood development, breastfeeding has shown a preventative association with various outcomes both immunologically and anti-inflammatorily (Uniformed Services University of the Health Services). La Leche League reports that breastfeeding can be specifically “protective against many illnesses, including painful ear infections, upper and lower respiratory ailments, allergies, intestinal disorders, colds, viruses, staph, strep and e coli infections, diabetes, juvenile rheumatoid arthritis, many childhood cancers, meningitis, pneumonia, urinary tract infections, salmonella, Sudden Infant Death Syndrome (SIDS) as well as lifetime protection from Crohn’s Disease, ulcerative colitis, some lymphomas, insulin dependent diabetes, and for girls, breast and ovarian cancer” (La Leche League, 2016). Breast milk can also help the infant’s immune system mature more quickly than that of a formula-fed baby while also assisting in a quicker recovery from illness. This long list of diseases can also expand into overall cardiovascular disease including coronary heart disease and stroke according to a study by Rich-Edwards, et. al.(2004). Another benefit of human milk is that it varies nutritionally and may be associated with lower Body Mass Index and

possibly other diseases associated with increased obesity due to the metabolic state of the infant's needs (Maseglia, et. al, 2014)). In addition to the physical health benefits of breastfeeding, The Centers for Disease Control and Prevention (CDC) also report that breastfeeding may also impact the intelligence and socialization of the baby.

Breastfeeding is increasing nationally according to a 2013 Breast Feeding Report Card from CDC, which reported a 6% increase in breastfeeding over the last decade (CDC). Unfortunately, this report does not identify exclusive breastfeeding. Exclusive breastfeeding is defined as ONLY breast milk, no solids, no water, and no other liquids such as formula or cow's milk. It also announces that while 77% may seem high, the amount of mothers still breastfeeding at the WHO and American Pediatric Association recommendation of six months drops drastically by almost half. Reports from the WHO show that the average rate of exclusive breastfeeding in the European Region is a mere 13%. So while breastfeeding overall may be increasing, many mothers are still not achieving optimal outcomes by not doing so exclusively and for at least the first six months. In addition to the traditionally identified benefits (immunologic and economic) of exclusive breastfeeding, CDC has also identified mental and physical health benefits for the mother. Lastly, the CDC estimates that a substantial amount could be saved from medical costs if rates of exclusive breastfeeding increased (Columbia Broadcasting System, 2013).

There are many different factors that may affect a mother's decision to breastfeed or not, but according to Bandura's Social Cognitive Theory, the construct of *Reciprocal Determinism* posits that there is a triangular relationship between an individual, the environment, and ultimately his/her behavior (Bandura, 1978). The environment and characteristics of a mother influence her intended and actual behaviors in terms of interacting with her child. Her intent in

turn may also affect the environment, such as the hospital or home, in which she exists. This intent may subsequently be associated with the adoption of exclusive breastfeeding. This can be examined by looking at aspects like birthing methods, hospital practices, physician attitudes, as well as other situational elements including maternal education and professional/career setting.

The immediate postpartum mother-infant interaction is extremely important to the outcome of successful breastfeeding. The birthing process can be extremely stressful on both mother and infant, and there are certain stress hormones that released. In a study performed with animals and research performed by Zetterstrom, the stress level of the infant is raised if separated from the mother after birth (1999). Another measure of the importance of immediate interaction is the cry behavior of the infant (Zetterstrom, 1999). Infants who are clothed and separated from the mother may cry for extended periods of time, while an infant that is placed skin-to-skin with the mother hardly cries (Zetterstrom, 1999). Skin-to-skin contact is extremely essential to successful breastfeeding (Zetterstrom, 1999). The infant immediately begins to move toward the nipple that has a more attractive odor as odor perception is developed in utero (Zetterstrom, 1999).

The American Academy of Pediatrics (AAP) recognizes the benefits of exclusive breastfeeding and has organized various programs to educate pediatricians as well as support them in encouraging their patients to do so (Breastfeeding Initiatives AAP, 2005). Although pediatricians are educated about breastfeeding while in medical school or during their residency, many pediatricians have expressed a desire to learn more about the management of breastfeeding (Feldman-Winter, Schanler, O'Connor, Lawrence, 2008). Pediatricians are also more likely to aid patients with breastfeeding if they have had personal experience with exclusive breastfeeding (either themselves or their spouse). In a study performed to analyze the attitudes of pediatricians

about breastfeeding by Feldman-Winter, et. al, (2008) found that doctors were more likely to recommend against breastfeeding for many minor issues. They were also under the influence that the benefits of exclusive breastfeeding did not outweigh the difficulties. This may be due to the lack of knowledge of management or barriers, as previously stated. Another downfall of using the pediatrician to educate is the fact that the first-time postnatal office visit may not occur until after the fourth day postpartum (National Library of Medicine, 2016). At this point, pediatricians may be more likely to recommend formula if the baby has had severe weight loss or breastfeeding complications (Feldman-Winter, Schanler, O'Connor, & Lawrence, 2008).

Traditionally, research has identified that key factors to success in exclusive breastfeeding are linked to educational attainment and higher socioeconomic status (Zetterstrom, 1999). In many developing countries, however, the maternal lifestyle and work atmosphere may create a barrier to the success of breastfeeding. The campaign, therefore, in many countries is to pressure the employers to allow either a longer maternity leave or to create a better nursing situation for the mothers (Zetterstrom, 1999).

In addition to educational and socioeconomic factors that influence breastfeeding, maternal intent has also been shown to influence breastfeeding (Di Girolamo, Thompson, Martorell, Fein, & Grummer-Strawn, 2005). A study found that the majority of women (50-90%) decide on a feeding method prior to becoming pregnant or very early on in the pregnancy. It is also evident that women who waiver or are not sure of method are more likely to stop breastfeeding shortly after delivery. (DiGirolamo, Thompson, Martorell, Fein, & Grummer-Strawn, 2005). Another study by O'Campo et. al., found that an earlier decision to breastfeed increases the odds of initiation and longer duration (Dennis, 2001). There have been other studies that also state that intention is directly associated with the actual duration of

breastfeeding (Wiemann et al., 1998). Although with the promotion of breastfeeding has come more acceptance of this, many women still feel that it is frowned upon, and thus choose to supplement or bottle feed while in public. Another perceived barrier to making the decision to exclusively breastfeed is the woman's employment status. A woman who works outside of the home may believe that the process is going to be extremely difficult. The longer maternity leaves in some European countries may contribute to the longer period of exclusive breastfeeding. Some mothers may choose to make their decision based on former births and their previous breastfeeding experience. They may have lacked support with prior attempts, and thus the intent is to not exclusively breastfeed perceiving the difficulty of it.

2b. Cesarean Section

The Baby Friendly Hospital Initiative was launched in 1991 by the World Health Organization and UNICEF in order to ensure that maternity hospitals and birthing centers are supportive of the breastfeeding effort (WHO). The initiative involves 10 Steps to Successful Breastfeeding ranging from healthcare provider training to not giving the infant a pacifier. The fourth step on the list involves the rapid initiation of infant-mother contact. It urges that the baby be put skin-to-skin on the mother's chest within thirty minutes after birth. Noncompliance with Step 4 of the 10 Steps is associated with preemptive cessation of breastfeeding according to a study by Murray and Fisher (Rowe-Murray & Fisher, 2002). This same study goes even farther by suggesting that suggests that the basic care factors involved with caring for a mother and newborn can directly affect the success and duration of breastfeeding (Rowe-Murray & Fisher, 2002). Although it is internationally recognized that many developed countries use cesarean delivery quite commonly (Rowe-Murray & Fisher, 2002), studies prior to the Murray/Fisher study have generally not investigated the affect of the cesarean delivery with the immediate

postpartum period and the health care atmosphere with regard to early initiation of breastfeeding. Rowe-Murray and Fisher (2002) found that women who had a c/section typically did not get to put the baby to the breast nearly as quickly as those mothers who delivered vaginally (Rowe-Murray & Fisher, 2002). In a similar study performed in Turkey by Cakmuk and Kuguoglu (2006), researchers determined that there was a significant difference for birth method and initiation of breastfeeding after birth with a higher proportion of mothers who experienced vaginal birth initiating breastfeeding. .

Another possible barrier to successful breastfeeding after a woman has a cesarean section is maternal emotional health. Some have identified increased depression or depressive symptoms that some after obstetric intervention and/or cesarean section. Some of these symptoms may include feelings of inadequacy, issues with self-esteem and body image. (Rowlands & Redshaw, 2012). According to the Birth Trauma Association, some women struggle with the immediate bond and the breastfeeding relation based on the trauma they have gone through physically in birthing (BTA). Another study that investigated mode of birth with relation to women's psychological and physical wellbeing postpartum found a significant association with cesarean and depression, but not a significant relationship between cesarean and difficulty breastfeeding (Rowlands, & Redshaw, 2012).

2c. Maternal Age

There are various factors that may prevent or hinder a young mother from breastfeeding. These are not limited to, but may include, family support, lack of knowledge about the practice, and lack of knowledge about the benefits of the breast milk. According to a study from Li et al. (2003) using data from the 2002 National Immunization Survey, they found that breastfeeding rates were higher with older mothers although it may be difficult to distinguish the role of

education and socioeconomic conditions. The same study found that mothers with higher levels of education and higher economic status were also more likely to breastfeed for a longer duration than mothers with less education (Li et. al, 2003). This study also found that women and infants who received WIC were less likely to initiate breastfeeding, and they were also more likely to stop breastfeeding sooner than mothers who did not receive WIC assistance (Li et. al, 2003). Studies published by the American Academy of Pediatrics have shown that the age of the mother may play a role in whether or not she exclusively breastfeeds. Based on the study by Jones et al., maternal age does have a positive association with breastfeeding. Young mothers (less than or equal to 20 years of age) were almost 50% less likely to breastfeed when compared with mothers 30+ years (Jones et. al., 2011).

2d. Race

This same study also found that babies born to black mothers were also approximately 50% less likely to breastfeed than babies born to white mothers. This study examined other factors such as birth weight, maternal education level, smoking status and familial status. These items were not examined in the present study due to lack of data (Jones, Kogan, Singh, Dee, & Grummer-Strawn, 2011).

According to data from the 2012 USDA WIC report, when standardized for the U.S. population, blacks and other races are almost twice as likely to receive WIC than whites. As previously acknowledged, women who participated in WIC are less likely to breastfeed than mothers who do not receive WIC. A possible explanation for this could be that WIC provides free formula for the infants. This in combination with other barriers could explain the low rate of breastfeeding with WIC mothers.

2e. Parity

Study has shown that parity can play a role both positively and negatively in a mother's choice and a mother's success with her breastfeeding intent. Mothers who have previously breastfed are going to hold a certain level of experience with breastfeeding. This may have been a positive experience, but just the same, a mother who has not had a good experience may not intend to breastfeed. Their preconceptions and former experience may play a role in whether they think they will have the same situation. A study by Kruse et al. shows that the initiation of breastfeeding diminishes with each birth a mother experiences based on birth certificate data (2005). As previously mentioned, a mother's experience with breastfeeding can play a huge role in whether a mother intends to breastfeed or not. Mothers who did not choose to breastfeed were associated with unsuccessful attempts with prior children. This same study also found that mothers who did not breastfeed their first child were less likely to initiate breastfeeding with subsequent children (Kruse et. al., 2005). This may be due to lack of support or assistance in subsequent deliveries. If a mother did not succeed previously, she may need extra support in order to feel adequate and accomplished. She has failed once, and she needs to know that does not mean she cannot be successful.

Another study, however, from Hammer et al., shows that increased parity can lead to higher levels of success with breastfeeding. This leads to the possibility of variation due to experience as well as enhanced time management and support (Hammer et. al., 1999). In addition to lack of support for mothers with more than one child, time management may also become an issue for mothers who have children at home. Along with the second or third child come more demands on a mother. A mother must be able to pull away in order to breastfeed the infant. There is a significant time and dedication requirement while breastfeeding

CHAPTER 3

METHODOLOGY

3a. Data Source

The data for this thesis was provided by the Wellstar Kennestone Hospital Lactation Department. As part of the work to transform into a Baby-Friendly certified hospital, lactation consultants pulled various pieces of medical information from patient charts and compiled a spreadsheet. The hospital began the attempt to become a Baby-Friendly certified hospital approximately four years ago in the spring of 2012. The hospital is hoping to gain this certification by September, 2016. Participants who delivered at Kennestone Hospital between March, 2011 and March, 2013 were selected randomly. The data provided includes details regarding maternal age, gestational age, parity, ethnicity, and type of delivery. No identifying information was provided. Data was entered into the patient charts by nurses, physicians, technicians, as well as lactation consultants. Data was provided in an excel spreadsheet for analysis, and the data was approved by the Georgia State University Institutional Review Board in 2013 for the purpose of this research.

3b. Inclusion and Exclusion Criteria

The sample for this thesis consisted of 1161 mothers who delivered in the examined time period. Based on the definition of full-term, patients were excluded from the data collection if

they delivered at or prior to 37 weeks gestation as they did not meet the criteria of being full term. Cases for analyses were excluded if the infant was transferred to the Neonatal Intensive Care Unit at birth. Additionally, mothers or infants with contraindications for breastfeeding including, but not limited to HIV or maternal drug abuse were also excluded.

3c. Studied Variables

The following variables were used in the analysis.

Exclusive Breastfeeding: The data collected describes whether or not the mother was able to exclusively breastfeed while in the hospital. Nurses were required to document all feeding information throughout the infants' time in the hospital. Exclusive breastfeeding was defined by the absence of any formula feeding prior to leaving the hospital.

Mother's Intention: All mothers are asked upon arrival to the hospital whether or not they intend to breastfeed, bottle-feed, or use both methods.

Delivery Method: The type of delivery was included in the data as vaginal birth or cesarean. There was not sufficient information to determine whether or not the C-section was planned or spontaneous (emergency).

Maternal Age: The mothers' ages were categorized into the following strata and then coded accordingly: less than or equal to 22 (1), 23-29 (2), 30-39 (3), greater than or equal to 40 (4).

To the Breast within 2 Hours: This measure was also collected in order to examine whether or not the delay in skin-to-skin and maternal-infant contact has an association with the success of breastfeeding. In this data, however, it was only documented whether the baby made it to skin-to-skin within two hours.

Parity: This describes the number of pregnancies that the mother has delivered (live or stillbirth >20 weeks). This does not include gravidity, or the number of total pregnancies.

3d. Data Analysis

Statistical Package for the Social Sciences (SPSS) 22.0 was used for all data analysis. Descriptive statistics were used to look for trends among the variables. Univariate logistic regression was performed and crude odds ratios were generated to determine the relative measure of effect. Multivariate logistic regression with all independent variables was performed to control for covariates including maternal age, parity, intent, to the breast within two hours. The dependent variable was exclusive breastfeeding while the main exposure variable was delivery method. $P < .05$ and 95% CI were used to determine statistical significance.

CHAPTER 4

RESULTS

4a. Descriptive Statistics

As shown in Table 1, the total sample size for this study was 1161. Nearly two-thirds of the sample were white (n=719, 62%), while blacks and other categories were nearly equally represented (206 (18%); 225 (19%), respectively). Among the study sample, 782 (67%) delivered vaginally, while 379 (33%) delivered via cesarean section. Forty percent (467) of these mothers were delivering infants from their initial pregnancy and 9.7% (112) reported the most current delivery as their fourth pregnancy or greater. When asked, 719 (61.9%) of mothers intended to exclusively breastfeed while only 15.6% (181) did not intend to initiate breastfeeding. Of the 1161 babies born, the majority (57%, 662) were put to the breast within two hours of the delivery. The majority of mothers (82.4%, 957) were between the ages of 23 and 39, while only 3.9% (45) and 13.7% (159) were 40 or older and 22 or younger respectively.

Upon discharge from the hospital, 39% (453) were classified as exclusively breastfeeding at the time of hospital discharge. Among this group, 73% (331) delivered their babies vaginally compared with the 26.7% (122) who delivered via cesarean section. Of the 453, almost 90% (406) of those mothers had the intention to exclusively breastfeed. Among newborns born to mothers indicating their intent to exclusively breastfeed, 73.3% (332) were put to the breast within two hours of birth. White mothers were 78.6% (356) of the exclusive breast feeders,

11.9% (54) were black, and 8.6% (39) were other including American Indian and Asian/Pacific Islander. Exclusive breastfeeding was associated with mothers pregnant a first or second time- 42.2% (191) and 33.3% (151), respectively. Exclusive breastfeeding declined among women reporting third pregnancies (n=81, 17.9%), followed by mothers pregnant four times or greater (n=29, 6.4%). Mothers between the ages of 23-39 were most likely 88.5% (401) to adopt exclusive breastfeeding.

Table 1. Summary of Breastfeeding by Birth and Maternal Characteristics

Variable	Number (%)	Number Exclusively Breastfeeding (%)
Delivery Method		
Vaginal	782 (67.4)	331 (73)
Cesarean Section	379 (32.6)	122 (26.7)
Missing	5	
Intent		
Bottle	181 (15.6)	17 (.03)
Breast	719 (61.9)	406 (89.6)
Both Breast & Bottle	245 (21.1)	29 (.06)
Undecided	13 (1.1)	1
Missing	5	
To Breast within 2 Hours		
Yes	662 (57.0)	332 (73.3)
No	495 (42.5)	121 (26.7)
Missing	5	
Race of Mother		
Black	206 (17.7)	54 (11.9)
White	719 (61.9)	356 (78.6)
Other	225 (19.4)	39 (8.6)
Missing	11	
Parity		
1	467 (40.2)	191 (42.2)
2	393 (33.9)	151 (33.3)
3	187 (16.1)	81 (17.9)
4+	112 (9.7)	29 (6.4)
Missing	2	0
Maternal Age		
≤ 22	159 (13.7)	42 (9.3)
23-29	441 (38.0)	182 (40.2)
30-39	516 (44.4)	219 (48.3)
≥ 40	45 (3.9)	10 (2.2)

4b. Univariate and Multivariate Analysis

Univariate logistic regression was performed using the data set to examine the impact of each variable on exclusive breastfeeding. As seen in Table 2, mothers who delivered their babies via cesarean section were approximately 34% less likely to exclusively breastfeed than mothers who delivered vaginally (OR= .640, 95% CI= .494-.828 p= .001). Mothers who did not intend to breastfeed were 91% less likely to exclusively breastfeed than mothers who did intend to exclusively breastfeed (OR= .092, 95% CI= .066-.129 p= .000). Infants who were not put to the breast within two hours of delivery were .32 times as likely to exclusively breastfeed than infants who were put to the breast within two hours of birth (OR= .321, 95% CI= .249-.415 p= .000). White mothers were approximately 63% more likely than Black mothers (OR= .365, 95% CI= .259-.515 p= .000). Mothers in the Other races were .214 times as likely to breastfeed as White mothers (OR= .214, 95% CI= .147-.311 p= .000). Second-time mothers were approximately 11% less likely to exclusively breastfeed when compared with first-time mothers (OR= .885, 95% CI= .672-1.165 p= .385). Third-time mothers were 1.084 times as likely to breastfeed than the first-time mothers (OR= 1.084, 95% CI= .769-1.529 p= .644). Fourth-time mothers were approximately 50% less likely to breastfeed than first-time mothers (OR= .496, 95% CI= .312-.787 p= .003). Mothers younger than 23 were .51 times as likely to exclusively breastfeed than mothers between 23-39 years old (OR= .51, 95% CI= .342-.763 p= .001). Mothers between the ages of 30 and 39 were 1.048 times as likely to exclusively breastfeed than mothers between 23-29 (OR= 1.048, 95% CI= .810-1.357 p= .720). Mothers forty years of age and older were .403 times as likely to breastfeed as mothers between 23-39 (OR= .403, 70% CI= .195-.836 p= .015). P-values were significant at <0.05 for delivery method, intent, race, and to the breast within two

hours in addition to fourth-time mothers and mothers over 40 years of age. They were not statistically significant for age and parity in the other categories.

Table 2. Univariate Associations of Breastfeeding with Birth and Maternal Characteristics

Variable	OR	95% CI
Delivery Method (VAG is referent)	.640	.494-.828
Intent (Intent to breastfeed is referent)	.092	.066-.129
To Breast within 2 Hours (YES is referent)	.321	.249-.415
Race of Mother (WHITE is referent)		
Black	.365	.259-.515
Other	.214	.147-.311
Parity (1 is referent group)		
2	.885	.672-1.165
3	1.084	.769-1.529
4+	.496	.312-.787
Maternal Age (23-29 is referent group)		
≤ 22	.511	.342-.763
30-39	1.048	.810-1.357
≥ 40	.403	.195-.836

Multivariate logistic regression analysis was performed using the data set. The purpose of the multivariate analysis was to assess the impact a variable has on exclusive breastfeeding outcome when adjusting for all the other variables (delivery method, intent, to the breast within 2 hours, maternal race, parity, and maternal age). As seen in Table 3, mothers who delivered their babies via cesarean section were approximately 49% less likely to exclusively breastfeed than mothers who delivered vaginally (OR= .510, 95% CI= .375-.695, p= .000). Mothers who did not intend

to breastfeed were 88% less likely to exclusively breastfeed than mothers who did intend to exclusively breastfeed (OR= .119, 95% CI= .083-.171 p=.000). Infants who were not put to the breast within two hours of delivery were .444 times as likely to exclusively breastfeed than infants who were put to the breast within two hours of birth (OR= .444, 95% CI= .330-.598 p=.000). White mothers were approximately 53% more likely to exclusively breastfeed than Black mothers (OR= .467, 95% CI= .314-.694 p= .000). Other mothers were approximately 68% less likely to breastfeed than white mothers (OR= .317, 95% CI= .207-.484 p= .000). Second-time mothers were approximately 1.151 times as likely to exclusively breastfeed as first-time mothers (OR= 1.152, 95% CI= .825-1.605 p= .409). Third-time mothers were approximately 1.40 times as likely to exclusively breastfeed as second-time mothers (OR= 1.406, 95% CI= .915-2.160 p= .120). Fourth-time mothers were approximately .763 times as likely to exclusively breastfeed as second-time mothers (OR= .763, 95% CI= .423-1.376 p= .369). Mothers under the age of 23 were .849 times as likely to exclusively breastfeed than mothers between 23-29 (OR= .849, 95% CI= .523-1.379 p= .509). Mothers between the age of 30 and 39 were 1.14 times as likely to exclusively breastfeed than mothers between 23-29 (OR= 1.14, 95% CI= .834-1.557 p= .411). Mothers over the age of 40 were .403 times as likely to exclusively breastfeed than mothers between 23-29 (OR= .403, 95% CI= .172-.947, p= .037). P-values were significant at <0.05 for delivery method, intent, race, and to the breast within two hours in mothers over 40 years of age. They were not statistically significant for parity nor age in the other categories.

Table 3. Multivariate Associations of Breastfeeding with Birth and Maternal Characteristics

Variable	OR	95% CI
Delivery Method (VAG is referent)	.510	.375-.695
Intent (Intent to breastfeed is referent)	.119	.083-.171
To Breast within 2 Hours (Yes is referent)	.444	.330-.598
Race of Mother (WHITE is referent)		
Black	.467	.314-.694
Other	.317	.207-.484
Parity (1 is referent)		
2	1.151	.825-1.605
3	1.406	.915-2.160
4+	.763	.423-1.376
Maternal Age (23-29 is referent)		
≤ 22	.849	.523-1.379
30-39	1.140	.834-1.557
≥ 40	.403	.172-.947

CHAPTER 5

DISCUSSION

The purpose of this study was to examine the association of delivery method and exclusive breastfeeding at hospital discharge. Delivery method was associated with increased odds of exclusive breastfeeding at hospital discharge. While controlling for delivery method, other variables such as intent, whether or not the baby was to the breast within two hours of delivery, maternal race, parity, and maternal age were included in the analysis. It was expected that delivery method would be significantly associated with increased odds of exclusive breastfeeding. All variables examined were associated with the adoption of exclusive breastfeeding, with the exception of parity. This exception is possibly explained by the factors that vary with number of children including but not limited to, lack of support for mothers who have previously given birth, lack of confidence for mothers who have been unsuccessful previously, and time management skills. Mothers who have had children prior to the birth in this study may not receive the same amount of support from nursing staff, physicians, and the lactation department due to allocation of resources. First-time mothers may be the higher priority when comparing a mother who is known to have breastfed before. Similarly, a mother who attempted to breastfeed previously unsuccessfully may not have the confidence to attempt it again. Mothers who have more than one child are also more liable to lack the time and energy

that breastfeeding requires.

5a. Strengths

A major strength of this study is the fact that the data utilized clinical chart data. Healthcare providers and clinical team members were responsible for collecting data necessary for hospital certification endeavors. Hence, the potential for recall bias is limited.

5b. Limitations

One limitation of this study is the fact that delivery method was only measured as vaginal or cesarean section. In order to better understand impacts of delivery method, it would be useful to account for births that required additional assistance, such as vacuum or forceps-assisted births. In addition to assisted births, classifications of cesarean section deliveries as planned or emergency would also be valuable for this study.

Another limitation of this study is the point in time at which exclusive breastfeeding was observed. It was noted in the patient's chart at the time of hospital discharge. Therefore, feeding preferences/methods may have changed once the mother and infant were released.

Another limitation lies in the fact that the healthcare professionals who reported the data have the possibility of reporting erroneous information via various channels of communication. Additionally, they may be aware that the hospital is working toward an initiative, which introduces the threat of potential bias.

5c. Implications

The results of this study align with the suggestions from the WHO that the infant should be put to the breast within one hour of birth. In addition to this, it should be suggested that cesarean section not be an elective surgery if the outcome will make breastfeeding more difficult. The only trend that maintained similarity throughout was that mothers with 4+ children were less

likely to adopt exclusive breastfeeding. With regard to parity, the nursing staff, physicians, and lactation departments may need to take a different approach and expand tailored support and assistance to mothers of other children while in the hospital, so the opportunity to exclusively feed a newborn can be maximized.

5d. Future Study

Suggestions for future studies would include examining additional maternal and environmental factors that may influence breastfeeding decisions. These may include elements like employment status, nature of employment and employer, and influence of social norms. Certain employers and even vendors are much more apt to support breastfeeding through various methods. Certain companies allow and even fight for more community social awareness and support for the breastfeeding community. Further research that addresses different patterns with regard to parity is essential as well. This could include an analysis of intent among solely mothers experiencing their first pregnancy and predictors of exclusive breastfeeding.

5e. Conclusion

The results of this study indicate that delivery by cesarean section decreases the odds of exclusive breastfeeding at the time of hospital discharge. While the decision to exclusively breastfeed appears to be influenced by maternal and environmental factors, additional research is warranted. In depth investigation into barriers, norms, and incentives for breastfeeding would benefit further intervention development and inform more supportive breastfeeding policy, institutional/environmental structure, and system-level changes.

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