

Utah State University

DigitalCommons@USU

All Graduate Plan B and other Reports

Graduate Studies

5-2012

Determining the Effect of One-On-One Education in Addition to Written Material on Breastfeeding Initiation Rates in the Hospital Setting

Carly Elizabeth Grace

Follow this and additional works at: <https://digitalcommons.usu.edu/gradreports>



Part of the [Nutrition Commons](#)

Recommended Citation

Grace, Carly Elizabeth, "Determining the Effect of One-On-One Education in Addition to Written Material on Breastfeeding Initiation Rates in the Hospital Setting" (2012). *All Graduate Plan B and other Reports*. 119. <https://digitalcommons.usu.edu/gradreports/119>

This Report is brought to you for free and open access by the Graduate Studies at DigitalCommons@USU. It has been accepted for inclusion in All Graduate Plan B and other Reports by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.



DETERMINING THE EFFECT OF ONE-ON-ONE EDUCATION IN ADDITION TO
WRITTEN MATERIAL ON BREASTFEEDING INITIATION RATES IN THE HOSPITAL
SETTING

By

Carly Grace, R.D., L.D., C.B.E.

A plan B report in partial fulfillment of the requirements for the degree

of

MASTER OF DIETETICS ADMINISTRATION

in

Nutrition, Dietetics and Food Sciences

Approved:

Janette Smith Kudin, MS, RD, CD
Major Professor

Martha Archuleta, PhD, RD
Committee Member

Marlene Israelsen, MS, RD, CD
Committee Member

UTAH STATE UNIVERSITY
Logan, Utah
2012

Copyright © Carly Grace 2012
All rights reserved

ABSTRACT

Determining the Effect of One-on-One Education in Addition to Written Material on
Breastfeeding Initiation Rates in the Hospital Setting

by

Carly E. Grace, R.D., L.D., C.B.E.

Utah State University, 2012

Major Professor: Janette Kudin, M.S., R.D., C.D.
Department: Masters of Dietetic Administration

The objective of this research was to determine the breastfeeding initiation rate among healthy, term infants at a select hospital, the effect of one-on-one breastfeeding education, in addition to written material on breastfeeding initiation rates in the hospital setting, and if other factors from available data are associated with differences in breastfeeding initiation. This was a quasi-experimental convenience sample study with subjects assigned to a control group (written education) or intervention group (written and one-on-one education). The setting was the obstetrics unit at Siloam Springs Memorial Hospital (Benton County, Arkansas).

Subjects were women delivering infants without complication between March and August 2011. 120 charts were reviewed (60 control and 60 experimental). The experimental group n=60 participants were mothers who received one-on-one instruction about breastfeeding

topics from a certified breastfeeding educator in addition to a written education booklet. The education was completed within 24 hours either before or after delivery in the patient's hospital room. The control group mothers n=60 received a written education booklet only.

Each infant's logged intake data was recorded from reviewed medical records for ever breastfed, formula fed or both. Other infant and maternal criteria collected in the chart review included demographics, insurance status, smoking status, obstetric physician, as well as infant birth order, birth type, and weight.

Logistical regression analysis was used to determine the effect of certain maternal factors on breastfeeding initiation. Statistical significance was determined at a p-value of <0.05. Chi squared tests were used to further verify the significance of these variables. Descriptive statistics were performed on the demographic data for means.

61.7% of infants initiated breastfeeding in the hospital. This study revealed 5 main factors that influenced breastfeeding initiation at the significant level: maternal intention to breast feed, maternal education level, maternal smoking, infant birth order, and in-hospital one-on-one breastfeeding education.

One-on-one breastfeeding education along with written education is a promising intervention for increasing breastfeeding initiation in the hospital setting. Partial implementation of the BFHI was successful increasing breastfeeding rates by introducing step 5- showing mothers how to breastfeed and maintain lactation.

(60 pages)

Key Words: Breastfeeding, initiation, education, intervention, maternal

CONTENTS

ABSTRACT	iii
LIST OF TABLES AND FIGURES.....	vii
LIST OF ACRONYMS	viii
CHAPTER I.....	1
Introduction.....	1
Statement of the Problem	1
Purpose, Objectives, Research Question	6
Review of Literature	7
Importance of Breastfeeding	7
Health Benefits of Breastfeeding.....	7
Breastfeeding Initiation and Duration.....	8
Cost Effectiveness of Breastfeeding	9
Current Breastfeeding Rates.....	10
The Breastfeeding Hospital Initiative.....	11
Barriers to Breastfeeding.....	14
Importance of Education on Increasing Breastfeeding Rates.....	14
Timing.....	14
Education Type	16
Current Research on Breastfeeding	19
Further research needs for Breastfeeding Intervention.....	20
Summary	20
Reference List	22
CHAPTER II.....	29
Introduction.....	29
Methods.....	31
Population and Sample	32
Data Collection	33
Data Analysis.....	33

Results and Discussion	34
Results	34
Characteristics of Sample	34
Logistical Regression Analysis.....	37
Discussion.....	38
Conclusion	41
Reference List.....	44
 CHAPTER III	 47
Observations from the Project	47
Interactive and Personalized Breastfeeding Health Promotion Interventions are Required to Support Breastfeeding Education.	48
Positive Messages were More Aptly Received Through Face-to-Face Discussion of the Material	48
Women Should Receive Face-to-Face Prenatal Education	49
Breastfeeding Promotion Must Take Into Consideration Previous Infant Feeding Experiences.....	50
Notes on Study Design and Areas of Future Research.....	50
Registered Dietitians and Lactation Professionals in this Specialty.....	53
Overall Conclusions.....	55
Reference List	56
 APPENDIX.....	 59
Baby Friendly Hospital Initiative 10 Steps to Successful Breastfeeding	

LIST OF TABLES AND FIGURES

Chapter I

Table

1	Tri County Population and Income Comparison.....	3
2	Tri County Ethnicity Comparison.....	3
3	Tri County Ethnicity Comparison.....	4

Chapter II

Figure

1	National Trends in Breastfeeding Rates.....	30
---	---	----

Table

1	Characteristics of Intervention and Control Groups.....	35
2	Factors Influencing Breastfeeding Initiation Rates.....	37
3	Main Effects of Physician Choice by Maternal Age Group.....	38

LIST OF ACRONYMS

AAFP	American Academy of Family Physicians
AAP	American Academy of Pediatrics
BFHI	Breastfeeding Hospital Initiative
CDC	Center for Disease Control
OB	Obstetric
PRAMS	Pregnancy Risk Assessment Monitoring System
RD	Registered Dietitian
SSMH	Siloam Springs Memorial Hospital
UNICEF	The United Nations Children's Fund

CHAPTER I

Introduction

Statement of the Problem

Breastfeeding is a primary element in child health and survival. Human milk is species-specific, and all substitute feeding preparations measure far from it, making human milk uniquely ideal for infant feeding.¹⁻⁵ The advantages of breastfeeding include health, nutritional, immunologic, developmental, psychological, social, economic, and environmental benefits.⁵⁻⁸ Exclusive breastfeeding is the normal standard against which all alternative feeding methods must be measured with regard to growth, health, development, and all other short- and long-term outcomes.²

The national goals for breastfeeding are largely set by physician research societies, specifically in the realm of duration recommendations. The American Academy of Pediatrics (AAP), along with the American Academy of Family Physicians (AAFP), recommends exclusive breastfeeding for approximately six months of life, which should continue with the addition of complementary foods throughout the second half of the first year.^{2,5,9} The Healthy People 2010 goals include breastfeeding rates that coincide with the AAFP and AAP recommendations for duration and exclusivity.¹⁰

Despite the benefits of breastfeeding, the United States, even with annual rate improvements, continues to fall short of national breastfeeding goals.¹⁰ Throughout the 1970's and early 1980's, the percentage of mothers who began breastfeeding in the hospital increased steadily from 25 to 61.9 percent but then gradually declined to 51.5 percent by 1990.¹¹ The latest

reported data from 2008 fell just short of the 75% Healthy People 2010 breastfeeding initiation goal with 74.6% initiating breastfeeding. Nevertheless, only 14.8% breastfed exclusively through 6 months, falling well behind the 50% goal of Healthy People 2010.¹⁰

Because of challenge to increase breastfeeding rates,^{12,13} the Baby Friendly Hospital Initiative (BFHI) was conceived in 1991 by the World Health Organization and the United Nations Children's Fund.^{12,13} A hospital or birthing center can receive Baby-Friendly designation if they are compliant with the Ten Steps to Successful Breastfeeding (see Appendix A).¹² The percentage of infants breastfeeding has been shown to improve after hospitals initiate the BFHI practices.^{4,14-16} Despite this, US hospitals have been slow to adopt these policies and practices outlined in the BFHI.¹⁷ As of November 17, 2011 there were only 121 BFHI hospitals in the United States.¹⁸

Siloam Springs Memorial Hospital (SSMH) is a 73 bed hospital located in the western area of Benton County, Arkansas which has adopted a only a few of the 10 BFHI steps such as encouraging breastfeeding on demand and practicing a rooming in option. While breastfeeding initiation rates are not known, based on experience, the obstetrics (OB) director and administration estimate it to be well below the national average for initiation.

There are several demographic factors in this hospital community which are known to correlate to low breastfeeding rates. Specifically, SSMH serves a tri-county area with a high poverty rate,¹⁹ which is correlated with low breastfeeding rates.²⁰ As seen in the Table 1, for the tri-county population that the hospital serves, the median household income is \$37,232 (28% less than the national average). Also, the percent of individuals below poverty level for the area is 5.7% higher than the national average.

Table 1. Tri County Population and Income Comparison¹⁹

	Population (2010)	Estimate Median Household Income (2009)	Individuals Below Poverty Level (2009)
Benton County, Arkansas	221,339	\$49,226.00	13.1%
Adair County, Oklahoma	22,683	\$28,105.00	25.5%
Delaware County, Oklahoma	41,487	\$34,365.00	18.9%
Tri-County Average	95,170	\$37,232.00	19.2%
National Average	307,006,550	\$51,425.00	13.5%

The population of the tri-county is also mildly diverse. As seen in Table 2, the population for the three counties is primarily white (non-Hispanic) (70.5%), with American Indian or Alaskan Native and Hispanic persons averaging close to 10% each. This is important because breastfeeding rates in the US vary by race. Non-Hispanic blacks typically have a lower prevalence of breastfeeding initiation than non-Hispanic whites.²¹ Also, Hispanics generally have lower prevalence of breastfeeding than non-Hispanic whites in western states and higher in eastern states.^{21,22}

Table 2. Tri County Ethnicity Comparison¹⁹

	White persons (a)	Black persons (a)	American Indian and Alaska Native persons (a)	Asian persons (a)	Native Hawaiian and Other Pacific Islander (a)	Persons reporting two or more races	Persons of Hispanic or Latino origin (b)	White persons not Hispanic
Benton County, AR	82.60%	1.30%	1.70%	2.90%	0.30%	2.70%	15.50%	76.60%
Adair County, OK	72.20%	7.40%	8.60%	1.70%	0.10%	5.90%	8.90%	68.70%
Delaware County, OK	67.00%	0.20%	22.40%	1.30%	Z	8.00%	3.00%	65.90%
Tri-County Average	73.93%	2.97%	10.90%	1.97%	0.20%	5.53%	9.13%	70.40%
National Average	72.40%	12.60%	0.90%	4.80%	0.20%	2.90%	16.30%	63.70%

Data from 2010

(a) Includes persons reporting only one race. (b) Hispanics may be of any race, so also are included in applicable race categories. (Z) Value greater than zero but less than half unit of measure

Education has also been found to have an impact on breastfeeding initiation. Education has been shown to be positively correlated with breastfeeding initiation and duration.^{6,7,20} As seen in Table 3. below, 80.43% of the tri-county residents are estimated to have a high school degree or higher and 16.9% are estimated to hold a bachelor’s degree or higher. These percentages are 4.17% and 10.6% lower than the national averages, respectively. Because the town of Siloam Springs is home to John Brown University, the county estimates for educational level may be slightly higher than what is likely representative of the hospital’s Labor and Delivery population.

Table 3. Tri County Ethnicity Comparison¹⁹

	High school graduates, percent of persons age 25+, 2005-2009	Bachelor's degree or higher, pct of persons age 25+, 2005-2009
Benton County, Arkansas	83.20%	24.90%
Adair County, Oklahoma	75.40%	10.50%
Delaware County, Oklahoma	82.70%	15.30%
Tri-County Average	80.43%	16.90%
National Average	84.60%	27.50%

While SSMH has recognized the challenging population and implemented some of the BFHI principles, it has failed to include perhaps one of the most significant: providing one-on-one education to nursing mothers on breastfeeding. The hospital staff does provide a booklet “A New Beginning—Your Personal Guide to Postpartum Care”²³ to patients but does not verbally teach any of the information. The booklet covers a comprehensive list of postpartum topics, with 18 of the 48 pages focused on breastfeeding concerns including: benefits, supply and demand,

latching, burping, challenges to breastfeeding and breastmilk storage. Since written education is already being provided, it is speculated that the addition of one-on-one teaching of these topics would further increase this intervention's effectiveness in increasing breastfeeding rates.

Research indicates that the implementation of comprehensive breastfeeding education to mothers will improve hospital breastfeeding initiation rates.¹⁴⁻¹⁶ The percentage of infants breastfeeding has been shown to improve after hospitals fully initiate the BFHI practices.¹⁴⁻¹⁶

Full implementation of the BFHI has been shown to have an impact on hospitals' breastfeeding initiation and duration.^{12,14-16} However, it is still unclear if *full* implementation is necessary for initiation or duration improvement. Full implementation may not be feasible for small hospitals such as Siloam Springs Memorial Hospital. It is unknown what effect adopting only some of the BFHI principles would have on hospital breastfeeding initiation rates in the US. It is also unknown which of the 10 steps^{12,24} are more effective in increasing breastfeeding initiation and duration. Although this hospital does maintain some of the BFHI principles, it does not include all of them. Arguably one of the most significant and simple to implement steps of the BFHI is step 5 (show mothers how to breastfeed and how to maintain lactation even if separated from their infant).^{12,24} Further research should be conducted to determine if partial implementation of the BFHI can be influential and if the specific initiation of step 5¹² would have an effect on breastfeeding initiation rates.

Purpose, Objectives, Research Question

Purpose

The purpose of this study is to determine the effect on breastfeeding initiation rates of adding one of the Ten Steps of BFHI¹² to the current protocol at Siloam Springs Memorial Hospital. One-on-one education will be incorporated into the current protocol to meet the goal of BFHI step 5 – “Show mothers how to breastfeed and how to maintain lactation even if separated from their infant.”

Objectives

1. Collect baseline data to determine the breastfeeding initiation rate among healthy full-term infants at Siloam Spring Memorial Hospital.
2. Determine the effect of one-on-one breastfeeding education, in addition to written material on breastfeeding initiation rates, in the hospital setting.
3. Determine if other factors from available data are associated with breastfeeding initiation.

Research Question

Can one-on-one breastfeeding education with a breastfeeding educator in the private hospital setting increase hospital initiation rates?

Review of Literature

Importance of Breastfeeding

Health Benefits of Breastfeeding

Breastfeeding has been shown to provide numerous health benefits for infants including a reduced risk of severe respiratory tract infections, decreased rates of diarrhea, and fewer middle ear infections compared to formula-fed infants.^{2,5-7} The health effects of breastfeeding persist beyond the period of breastfeeding. Children who are not breastfed are at increased risk of obesity,⁶ type 1 and 2 diabetes,^{6,8} Sudden Infant Death Syndrome²⁵ and childhood leukemia.⁶ Research supports the importance of six months of exclusive breastfeeding (when compared with four months) as protective against respiratory tract and gastrointestinal tract infections and pneumonia.^{6,26-28}

There are also many documented *maternal* benefits of breastfeeding, including possible protection in the longer term against type 2 diabetes, breast cancer, ovarian cancer, osteoporosis and postpartum depression.^{6,29-31} The noted benefits also include decreased postpartum bleeding and more rapid uterine involution, attributable to increased concentrations of oxytocin.³² A commonly reported benefit for mothers who breastfeed their infants is early return to postpartum weight,³³ however according to a recent meta analysis by Ip et al.,⁶ the effect of breastfeeding in mothers on return-to-pre-pregnancy weight was negligible, and the effect of breastfeeding on postpartum weight loss was unclear.

Breastfeeding Initiation and Duration

During breastfeeding, antibodies pass to the infant.³⁴⁻³⁷ This is one of the most important features of colostrum,³⁵ mothers' first milk, which is highly concentrated with antibodies. Because of this, early breastfeeding initiation is important to take advantage of the most concentration of antibodies in colostrum. Colostrum and mature breast milk also contain several anti-infective factors such as bile salt stimulated lipase (which protects against amoebic infections),^{36,37} lactoferrin (which binds iron and inhibits the growth of intestinal bacteria)^{36,37} and immunoglobulin A, (which protects against microorganisms).³⁸

In the half hour after birth, the baby's suckling reflex is strongest, and the baby is more alert, so it is the ideal time to start breastfeeding.³⁹ Breastfeeding also releases hormones that contract the uterus to reduce post-partum bleeding.³² Early breast-feeding is associated with fewer nighttime feeding problems.⁴⁰

The debate over the optimal duration of exclusive breastfeeding has had a long history. The American Academy of Pediatrics, along with the American College of Obstetricians and Gynecologists, American Academy of Family Physicians, World Health Organization, United Nations Children's Fund, and many other health organizations recommend exclusive breastfeeding of infants for approximately 6 months of life and to continue breastfeeding with appropriate complementary foods for at least one year.^{2,5,9,11,12,41} The recommendation rests largely on Kramer and Kakuma's systematic review⁴² of infant and maternal health effects of exclusive breast feeding for six months versus three to four months. The review included 16 eligible studies, seven of which were from developing countries. The study's conclusions included evidence for the efficacy of six months' exclusive breast feeding (notably reduced infection rate).

Subsequent studies have supported Kramer's findings.^{2,6,26,28} Questionnaire based data from the National Health and Nutrition Examination Survey III cohort showed that US infants who were exclusively breast fed for more than six months had lower risk of pneumonia and recurrent otitis media than those breast fed for four to six months.²⁸

Cost Effectiveness of Breastfeeding

In addition to health advantages for infants and mothers, economic, family and environmental benefits have been described. Studies have shown healthcare dollar savings for infants who are exclusively breastfed.⁴³ A 2001 study revealed that \$3.6 billion could be saved if breastfeeding rates were increased to levels of the Healthy People objectives.⁴⁴ Included in the study were 3 diseases: otitis media, gastroenteritis and necrotizing enterocolitis, as well as total direct and indirect costs and cost of premature death.

Using methods similar to those in the 2001 study, Bartick and Reinhold⁴⁵ computed current costs and compared them to the projected costs if 80% and 90% of US families could comply with the recommendation to exclusively breastfeed for 6 months. Excluding type 2 diabetes (because of insufficient data), they conducted a cost analysis for all pediatric diseases for which the Agency for Healthcare Research and Quality reported risk ratios that favored breastfeeding: necrotizing enterocolitis, otitis media, gastroenteritis, hospitalization for lower respiratory tract infections, atopic dermatitis, sudden infant death syndrome, childhood asthma, childhood leukemia, type 1 diabetes mellitus and childhood obesity.

The study found that that if 90% of US families could comply with medical recommendations to breastfeed exclusively for 6 months, the United States would save \$13 billion per year and prevent an excess 911 deaths, nearly all of which would be in infants (\$10.5

billion and 741 deaths at 80% compliance), concluding that investment in strategies to promote longer breastfeeding duration and exclusivity may be cost-effective.

Research has also suggested potential decreased costs for public health programs like the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC);⁴⁶ decreased parental employee absenteeism and associated loss of family income; more time for attention to siblings and other family matters as a result of decreased infant illness; decreased environmental burden for disposal of formula cans and bottles; and decreased energy demands for production and transport of artificial feeding products.⁴⁷⁻⁴⁹

Current Breastfeeding Rates

Because of these numerous benefits, in effort to increase the prevalence of breastfeeding, the US Department of Health and Human Services has included breastfeeding goals and focus areas as part of the “Healthy People” 10 year goals since the prevention plan’s origin in year 2000. The following goals were established for breastfeeding by the year 2020: an 81.9% rate of initiation, a 60.6% rate of breastfeeding for 6 months, and a 34.1% rate of breastfeeding for 12 months.⁵⁰ In addition, the Healthy People 2020 goals call for an increase in the proportion of women who exclusively breastfeed to 46.2% exclusively breastfed at 3 months and 25.5% exclusively breastfeeding at 12 months.⁵⁰ The Centers for Disease Control and Prevention (CDC) has also called for research to identify successful programs and policies to support exclusive breastfeeding, especially among groups with the lowest rates.⁵¹ Currently only 39 percent of all infants 0–5 months of age in the developing world are exclusively breastfed, and less than 60 per cent of 6- to 9-month-olds continue to be breastfed while also receiving solid, semi-solid or soft foods.⁴¹

Rates of infants ever breastfeeding in the US have increased from 52% in the 1990's to 74% or greater today according to the most recent CDC report card,^{10,11} although rates continue to fall below national goals.⁵¹ Regrettably, breastfeeding duration rates continue to decline rapidly in the first year, with fewer than 44.3% of mothers breastfeeding at 6 months postpartum and 23.8% breastfeeding at 12 months.¹⁰ Furthermore, the U.S. CDC reported that only 35% of infants were exclusively breastfeeding at 3 months and only 14.8% exclusively breastfeeding at 6 months.¹⁰ Thus, most women stop breastfeeding before the 6 to 12 month recommendation of the American Academy of Pediatrics and American Academy of Family Physicians.⁹

The breastfeeding rates for the state of Arkansas are lower than the national average and have trended below National Health goals.⁵¹ The CDC reports for the state of Arkansas from 2008 63.9% ever breastfed, 34% breastfeeding at 6 months, 16% breastfeeding at 12 months, 29.9% exclusively breastfeeding at 3 months and 13.7% exclusively breastfeeding at 6 months.¹⁰

The Siloam Springs Memorial Hospital rates are unknown at this time but are expected to be lower than the national breastfeeding goals. The predicted breastfeeding rates are low due to several factors, including high poverty level and low education level in the area served.

The Breastfeeding Hospital Initiative

Successful long term breastfeeding starts with successful, early breastfeeding initiation. Breastfeeding education has been shown to positively influence successful breastfeeding initiation.^{6,7,12} Professional educational intervention in the early postpartum period has been shown to promote positive breastfeeding behaviors.^{7,52}

Early breastfeeding initiation is linked to long term success. Researchers have reported a positive effect on duration when breastfeeding is initiated immediately after birth.^{53,54} According

to the “Ten Steps to Successful Breastfeeding,”¹² maternity services staff should assist mothers to initiate breastfeeding within a half hour of birth.

Perhaps one reason for the increase in breastfeeding initiation over the past 20 years has been largely influenced by the focus on the Breastfeeding Hospital Initiative, conceived in 1991 by the World Health Organization and the United Nations Children’s Fund.^{12,13} A hospital or birthing center can receive Baby-Friendly designation if they are compliant with the Ten Steps to Successful Breastfeeding.¹² The percentage of infants breastfeeding has been shown to improve after hospitals initiate the BFHI practices.^{4,14-16}

Numerous studies have been conducted looking at the impact of the BFHI practices on breastfeeding initiation and duration. The BFHI is consistently shown to have impact at the individual hospital level.^{4,14-16} One of the best exhibitions of this fact are the Promotion of Breastfeeding Intervention Trial studies, which demonstrated that the Ten Step program increases breastfeeding and that this increase is associated with a variety of positive health outcomes.⁴

In a study in Boston conducted in the 1990’s, implementation of the BFHI guidelines was used as an intervention to increase breastfeeding and exclusive breastfeeding. The effect of implementation of the BFHI steps on breastfeeding continuation before, during and after the initiation of the Baby-Friendly Policies was evaluated.¹⁴ At the beginning of the study, prior to the initiation of the BFHI policies, lactation support was minimal and only limited breastfeeding education was available for patients and none of the ten steps were followed consistently. By the midpoint of the research (the middle sample) the Baby-Friendly Task Force had been formed and a lactation consultant had been hired. By the end of the selected time frame, nearly all ten steps were fully implemented except steps 4 and 6. Implementation of the BFHI program was found

to be an effective intervention to increase breastfeeding and exclusive breastfeeding and the likelihood of breastfeeding continuation was concluded to be improved when mothers gave birth in a Baby-Friendly hospital.¹⁴

There are few studies that show the impact of the BFHI at the population level. A Switzerland study⁵⁵ performed in 2003 on the impact of the BFHI at the population level confirmed that the BFHI is associated with improved outcomes but also that it is the practices of the BFHI, rather than just the label of a Baby-Friendly Hospital, that are associated with positive outcomes. Although this study primarily focused on breastfeeding duration, it was shown that BFHI hospitals had a more positive impact on breastfeeding rates. The study found differences in breastfeeding duration between designated baby-friendly health facilities with a higher BFHI compliance and those with lower compliance. The study suggests that the fact that breastfeeding rates improved even in the non BFHI hospitals may be directly influenced by the BFHI, by raising public awareness in the community. It is unknown what affect adopting only some of the BFHI principles would have on hospital breastfeeding initiation rates in the US.

While implementation of the BFHI has been shown to have an impact on hospitals' breastfeeding initiation and duration¹⁴⁻¹⁶ it is still unclear if *full* implementation is necessary for initiation or duration improvement. Full implementation may not be feasible for small hospitals such as Siloam Springs Memorial Hospital. It is unknown what effect adopting only some of the BFHI principles would have on hospital breastfeeding initiation rates in the US. It is also unknown which, if any of the 10 steps are more effective in increasing breastfeeding initiation and duration.

Barriers to Breastfeeding

Despite the well-established benefits, low-income mother infant pairs, who are at the highest risk for poor health, tend to have the lowest breastfeeding rates in the US.^{2,51} Young maternal age, being unmarried, lower maternal income, low education status and African-American ethnicity have also been shown to be risk factors for an American mother choosing not to breastfeed.^{20,21,56} Researchers have also found that mothers who smoked initiated breastfeeding less often and weaned earlier than nonsmoking mothers.⁵⁷⁻⁵⁹

Researchers have identified other barriers to breastfeeding, many using focus groups. These barriers include insufficient information and low self-confidence specific to breastfeeding,⁶⁰⁻⁶³ lack of support from family, partners, and health care providers,^{60,62,64,65} problems with breastfeeding in the postpartum period and lack of access to lactation assistance.^{65,66} Studies show that most women wean early due to perceived difficulties with breastfeeding rather than maternal choice.^{67,68}

Importance of Education on Increasing Breastfeeding Rates

Education is arguably the best avenue in which to increase breastfeeding rates worldwide. Countless studies have examined correlates to breastfeeding and not breastfeeding.

Timing

There is some limited research investigating breastfeeding education interventions in relation to breastfeeding initiation and duration.⁶⁹⁻⁷² Studies performed have investigated antenatal education,⁷³⁻⁷⁵ while others have focused on postnatal-in hospital education,^{60,76} or

postnatal-in hospital education coupled with post discharge hospital visits.⁷⁷ Other studies have focused on both antenatal along with postnatal interventions.^{75,78} Despite the wealth of information, there is substantial variation between the studies tied with a lack of detail which makes it difficult to make comparisons to results.

In Sikorski's 2003 review⁷⁰ of 20 randomized or quasi-randomized controlled trials, the effect size in studies of interventions containing an antenatal element to breastfeeding support and that measured in studies where only postnatal support was offered were similar although only the latter received statistical significance.

In Hannula et al.'s systematic review,⁷¹ search of CINAHL, Medline and Cochrane Central Register databases were conducted for data collection. The search was limited to articles published in Finnish, Swedish and English between the year 2000-2006, focusing on breastfeeding and breastfeeding support interventions. Two reviewers independently analyzed 36 articles in the final analysis. These researchers found that interventions expanding from pregnancy to the intrapartum period and throughout the postnatal period were more effective than interventions concentrating on a shorter period.

A 12 month longitudinal study by Pannu et al.⁷⁵ was conducted in two public Australian hospitals to determine the effect of mothers receiving health promotional material and education antenatally and/ or postnatally on breastfeeding outcomes. Data were collected on a sample of 587 mothers. The results showed that mothers who received an individual consultation or were involved in a discussion on breastfeeding antenatally with hospital staff were approximately 55% less likely to cease fully breastfeeding before 6 months, and 50% less likely to cease fully breastfeeding before 12 months postnatally. In the postnatal period, mothers who received instruction on positioning and attachment of the infant to the breast while in the hospital were

approximately 30% less likely to cease fully breastfeeding before 6 months. The study concluded a positive association between receiving individualized breastfeeding information in both the antenatal and postnatal period, and breastfeeding outcomes. This study, however, found no relationship between any type of health promotion activities and breastfeeding initiation. A large limitation of this study is that the individual discussion or consultation on breastfeeding in the early postnatal period was not defined with regard to the content or health professional involved, and there was no assessment on the quality of the health promotion materials, and the variety of types provided.

Education Type

Studies have focused on many types of interventions, including use of peer counselors, group education classes, pamphlets and handouts, video instruction, one-on-one instruction and demonstration or a combination of interventions.^{73-75,79}

Previous research has demonstrated a lack of effect on initiating breastfeeding with the provision of breastfeeding literature and non-interactive methods of health education.^{69,71,72,79,80}

This would imply that more personalized and interactive antenatal breastfeeding health promotion interventions are required to support breastfeeding initiation. Studies have shown that women value being *shown* how to feed their infants, rather than being *told* how to feed their infants.^{81,82}

A systematic review of 13 controlled trials of nearly 3,600 women in 7 countries was conducted in 2001 to evaluate the effect of enhanced breastfeeding support interventions on breastfeeding duration.⁸³ The analysis of studies with interventions that were primarily face-to-face intervention confirmed a positive impact on breastfeeding duration. Also of note is that no

impact was found between prenatal professional support vs. postnatal professional support in this meta-analysis.

Hannula et al.⁷¹ found that intervention packages using various methods of education and support from well-trained professionals were more effective than interventions concentrating on a single method. They concluded that during the antenatal period, the effective interventions were interactive, involving mothers in conversation. The Baby Friendly Hospital Initiative (BFHI) as well as practical hands off -teaching, when combined with support and encouragement, were effective approaches. Effective methods in the postnatal period were home visits, telephone support and breastfeeding centers combined with peer support.

The authors noted that effectiveness of the various methods in the interventions are difficult to calculate because most interventions were a combination of many methods used. It is hard to say which component is the effective one. For example, written material was never the only intervention. Some interventions had only a slightly positive effect, while a combination of interventions usually resulted in better success. They concluded that the best way then to develop a useful intervention is to use various methods of breastfeeding support simultaneously and in continuum.

In a 2003 meta-analysis⁷² by Guise et al., studies from 1966-2001 were examined to review whether primary care based interventions improve initiation and duration of breastfeeding. Of note is that educational programs had the greatest effect of any single intervention on both initiation and short-term duration, while written materials did not significantly increase breastfeeding. Also, in Sikorski et al.'s 2003 systematic review of randomized and quasi randomized trials,⁷⁰ the provision of face-to-face professional support

postnatally showed a statistically significant benefit on any breastfeeding but had a greater effect on the continuation of exclusive breastfeeding.

Some studies have examined peer counseling as a breastfeeding intervention in the postpartum term. Chapman, Damio, Young and Perez-Escamilla⁷⁶ found that postpartum peer counseling improves breastfeeding rates at 1 and 3 months postpartum. Shaw and Kaczorowski⁸⁴ found that women assigned to the peer counseling group were more likely to initiate breastfeeding and to be breastfeeding at 6 weeks postpartum than women not provided with peer counseling. Although Peer Counselor support has proven to be beneficial, it is often time intensive and requires multiple visits, and thus is not always a feasible intervention method in the hospital setting.

Professional individualized postnatal support was found to have a beneficial effect on both duration and exclusivity in a Cochrane review of 34 randomized or quasi-randomized controlled trials from 14 countries.⁷⁷ This review looked at whether providing support for breastfeeding mothers from either professionals, trained lay people, or both would help mothers to continue to breastfeed. It included almost 30,000 women and was composed of randomized or quasi-randomized controlled trials comparing extra support for breastfeeding mothers with usual maternity care. Both professional and lay support were effective, and together they were also effective in areas where initiation and continuation of breastfeeding was not high.

The study concluded that further trials are needed to assess the effectiveness of both lay and professional support in different settings, particularly those with low rates of breastfeeding initiation, and for women who wish to breastfeed for longer than three months. The authors noted that future trials should consider timing and delivery of support interventions and that research is needed to identify the aspects of support that are the most effective.

Current Research on Breastfeeding

One issue in breastfeeding that has recently been studied more closely is the quality of care received by breastfeeding mothers and babies during their hospital stay. While substantial research has been published defining evidence based lactation and breastfeeding care,^{2,12} there is a broad gap between available evidence and the quality of care currently being provided. Despite numerous patient acuity tools and patient classification systems currently in use in many areas of health care, only recently have acuity tools existed related to lactation or breastfeeding. Recent research⁸⁵ has proposed acuity definitions relating to increasing maternal-infant lactation acuity to risk of poor breastfeeding outcomes—that is, premature weaning. Thus, as the lactation acuity level increases for a mother baby couplet, the risk of premature weaning also increases. Matching lactation acuity with appropriate resources can result in better utilization of staff, more timely patient-focused care, and an increase in exclusive breastfeeding at discharge,⁸⁵ one of the Joint Commission's new voluntary perinatal core measures.⁸⁶

Fathers roles in infant-feeding decisions is another recent research focus.^{87,88} The majority of research on external influences shows that the infant's father has the greatest impact on shaping feeding intentions^{7,89-91} Bar-Yam and Darby found a strong association between fathers' positive attitudes toward breastfeeding and mothers' intentions to breastfeed in their review of literature addressing fathers and breastfeeding.⁹² Arora et al.⁸⁹ found that a mother's perception of a father's attitude toward breastfeeding was the most significant factor for her to initiate bottle feeding. In Avery's focus grouped based study,⁸⁷ men who encouraged breastfeeding cited the infant's health as a key benefit. Many reported learning about breastfeeding through their partner's health care providers. Understanding the role of fathers in

early-infant feeding decisions could be critical to supporting new families and increasing breastfeeding initiation and duration.

Further Research Needs for Breastfeeding Intervention

For hospitals just beginning the BFHI initiative small steps are necessary and should be tested for significance in order to achieve a balance of effectiveness and feasibility for facilities just starting out. For small hospitals with limited staff resources, prenatal breastfeeding classes and post discharge follow up are not always feasible. No previous studies have purposed to investigate the effect of mere one-on-one breastfeeding education during the hospital stay on breastfeeding initiation rates in the private hospital setting.

Summary

In summary, there is strong evidence to suggest that breastfeeding has a positive health benefit for both women and infants. Many women initiate breastfeeding today, although national breastfeeding initiation goals have not been met.¹⁰ The percentage of infants initiating breastfeeding and exclusively breastfeeding has been shown to improve after hospitals fully initiate the BFHI practices.^{4,14-16} One of the key BFHI practices includes providing breastfeeding education to mothers.²⁴

While implementation of the BFHI has been shown to have an impact on hospitals' breastfeeding initiation and duration,^{4,14-16} it has been unclear if *full* implementation is necessary for initiation or duration improvement. Arguably one of the most significant and simple to

implement steps of the BFHI is step 5 (show mothers how to breastfeed and how to maintain lactation even if separated from their infant).^{12,24} Further research should be conducted to determine if partial implementation of the BFHI can be influential, and if the specific initiation of step 5 would have an effect on breastfeeding initiation rates at Siloam Springs Memorial Hospital.

Reference List

1. Hambraeus L, Forsum E, Lonnerdal B. Nutritional aspects of breastmilk and cow's milk formulas. In: Hambraeus L, Hanson L, MacFarlane H, eds. Symposium on Food and Immunology. Stockholm, Sweden: Almqvist and Wiksell; 1975. p.116-124. Symposia of the Swedish Nutrition Foundation XIII.
2. Gartner LM, Morton J, Lawrence RA, et al., for the American Academy of Pediatrics Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2005;115(2):496-506.
3. World Health Organization. *Global strategy for Infant and Young Child Feeding. The Optimal Duration of Exclusive Breastfeeding*. WHO, Geneva, Switzerland. 2001.
4. Kramer MS, Chalmers B, Hodnett ED, et al. Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. 2001. *JAMA*. 2001;285(4):413-20.
5. American Academy of Pediatrics Breastfeeding Position Paper 2008. <http://www.aafp.org/online/en/home/policy/policies/b/breastfeedingpositionpaper.html>. Accessed February 8, 2011.
6. Ip S, Chung M, Raman G, et al. Breastfeeding and maternal and infant health outcomes in developed countries. Evidence Report/Technology Assessment No. 153. AHRQ Pub. No. 07-E007. Rockville, Md.: Agency for Healthcare Research and Quality, 2007.
7. Dennis CL. Breastfeeding initiation and duration: a 1990-2000 Literature Review. *J Obstet Gynecol Neonatal Nurs*. 2002;31:12-32.
8. Alves JG, Figueiroa JN, Meneses J, Alves GV. Breastfeeding Protects Against Type 1 Diabetes Mellitus: A Case-Sibling Study. *Breastfeed Med*. 2011;7(1):25-8.
9. American Academy of Family Physicians. Family Physicians Supporting Breastfeeding: Position paper. 2008. www.aafp.org/online/home/policy/policies/b/breastfeedingpositionpaper.html. Accessed Feb 11, 2011.
10. Centers for Disease Control and Prevention Web Site. Breastfeeding Practices—results from the National Immunization Survey. <http://www.cdc.gov/breastfeeding/data/reportcard2.htm>. Accessed November 19, 2010.
11. The Surgeon General's Call to Action to Support Breastfeeding 2011. Page 7. <http://www.surgeongeneral.gov/topics/breastfeeding/calltoactiontosupportbreastfeeding.pdf>. Accessed November 14, 2011.
12. World Health Organization. *Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services*. Geneva, Switzerland: World Health Organization; 1989.

13. World Health Organization. *The Baby Friendly Hospital Initiative*. Geneva, Switzerland: World Health Organization; 2009.
14. Philipp BL, Merewood A, Miller LW, et al. Baby-Friendly Hospital Initiative improves breastfeeding initiation rates in a US hospital setting. *J Pediatr*. 2001;108:677-681.
15. Merewood A, Philipp BL, Chawla N, Cimo S. The Baby-Friendly Hospital Initiative Increases Breastfeeding Rates in a US Neonatal Intensive Care Unit. *J Hum Lact*. 2003; 19:166-171.
16. Philipp BL, Malone KL, Cimo S, et al. Sustained breastfeeding rates at a US baby-friendly hospital. *Pediatrics*. 2003;112:e234-e236.
17. Philipp BL, Merewood A. The baby-friendly way: The best breastfeeding start. *Pediatr Clin North Am*. 2004;51:761-783.
18. Baby-Friendly USA, Inc. Web Site. Baby Friendly Hospitals and Birth Centers. <http://www.babyfriendlyusa.org/eng/03.html> . Accessed November 17, 2011.
19. US Census Bureau Fact Finder <http://quickfacts.census.gov>. Accessed July 1, 2011.
20. Li R, Darling N, Maurice E, Barker L, Grummer-Strawn L. Breastfeeding rates in the United States by characteristics of the child, mother, or family: the 2002 National Immunization Survey. *Pediatrics*. 2005;115(1)e31-e37.
21. Li R, Grummer-Strawn L. Racial and ethnic disparities on breastfeeding among United States infants: Third National Health and Nutrition Examination Survey, 1988-1994. *Birth*. 2002;29:251-257.
22. CDC Pediatric Nutrition surveillance http://www.cdc.gov/pednss/pednss_tables/pdf/national_table9.pdf. Accessed September 26, 2011.
23. Moran DE, Kallman GB. *A New Beginning; Your Personal Guide to Postpartum Care*. Arlington, TX: Customized Communications, Incorporated; 2000.
24. Baby-Friendly USA, Inc. Web Site. The 10 Steps to Successful Breastfeeding. <http://www.babyfriendlyusa.org/eng/10steps.html>. Accessed June 6, 2011.
25. Hauck FR, Thompson JM, Tanabe KO, Moon RY, Vennemann MM. Breastfeeding and Reduced Risk of Sudden Infant Death Syndrome: A Meta-analysis. *Pediatrics*. 2011;128(1):103-110.
26. Boccolini CS, Carvalho ML, Oliveira MI, Boccolini PM. Breastfeeding can prevent hospitalization for pneumonia among children under 1 year old. *Pediatrics*. 2011;127(5): 399-404.
27. Kramer MS, Guo T, Platt RW, et al. Infant growth and health outcomes associated with 3 compared with 6 mo of exclusive breastfeeding. *Am J Clin Nutr*. 2003;78(2):291-295.
28. Chantry, CJ, Howard, CR, Auinger, P. Full breastfeeding duration and associated decrease in respiratory tract infection in U.S. children. *Pediatrics*. 2006;117(2): 425-432.

29. Labbok MH. Effects of breastfeeding on the mother. *Pediatr Clin North Amer*. 2001;48(1):143-158.
30. Siskind V, Green A, Bain C, Purdie D. Breastfeeding, menopause, and epithelial ovarian cancer. *Epidemiology*. 1997;8(2):188-191.
31. Newcomb P, Storer B, Longnecker M, et al. Lactation and a reduced risk of premenopausal breast cancer. *New Eng J Med*. 1994;330:81-87.
32. Chua S, Arulkumaran S, Lim I, Selamat N, Ratnam SS. Influence of breastfeeding and nipple stimulation on postpartum uterine activity. *Br J Obstet Gynaecol*. 1994;101:804-805.
33. Dewey KG, Heinig MJ, Nommsen LA. Maternal weight-loss patterns during prolonged lactation. *Am J Clin Nutr*. 1993;58(2):162-6.
34. Slade HB, Schwartz, SA. Mucosal immunity: the immunology of breast milk. *J. of Allergy and Clin Immunol*. 1987;80(3):348-356.
35. Saint L, Smith, M, Hartmann PE. The yield and nutrient content of colostrum and milk of women from giving birth to 1 month post-partum. *British Journal of Nutrition*. 1984;52: 87-95.
36. Kunz C, Rodriguez-Palmero M, Koletzko B, Jensen R . Nutritional and biochemical properties of human milk, Part I: General aspects, proteins, and carbohydrates. *Clin Perinatol*. 1999;26(2);307–33.
37. Rodriguez-Palmero M, Koletzko B, Kunz C, Jensen R. Nutritional and biochemical properties of human milk: II. lipids, micronutrients, and bioactive factors. *Clin Perinatol*. 1999;26(2);335–59.
38. Glass RI, Svennerholm AM, Stoll BJ, et al. Protection against cholera in breast-fed children by antibodies in breast milk. *N. Engl. J. Med*. 1983;308(23):1389–92.
39. Widström AM, Wahlberg V, Matthiesen AS, et al. Short-term effects of early suckling and touch of the nipple on maternal behaviour. *Early Hum. Dev*. 1990;21(3):153-63.
40. Renfrew MJ, Lang S, Woolridge MW. Early versus delayed initiation of breastfeeding. *Cochrane Database Syst Rev*. 2000;(2).
41. UNICEF The United Nations Children’s Fund web site. Overview of breastfeeding patterns. http://www.childinfo.org/breastfeeding_overview.html. Accessed November 17, 2011.
42. Kramer MS, Kakuma R. Optimal duration of exclusive breastfeeding. *Cochrane Database Syst Rev*. 2002;(1):CD003517.
43. Heinig M, Host defense benefits of breastfeeding for the infant: Effect of breastfeeding duration and exclusivity. *Pediatr Clin N Am*. 2001;48:105-123.

44. Weimer J. *The Economic Benefits of Breastfeeding: A Review and Analysis*. Washington, DC: Food and Rural Economics Division Economic Research Service, US Department of Agriculture Report No. 13. 2001. <http://www.ers.usda.gov/publications/fanrr13/fanrr13.pdf>. Accessed June 13, 2011.
45. Bartick M, Reinhold A. The Burden of Suboptimal Breastfeeding in the United States: A Pediatric Cost Analysis. *Pediatrics*. 2010;125:1048-56.
46. Tuttle CR, Dewey KG. Potential cost savings for Medi-Cal, AFDC, food stamps, and WIC programs associated with increasing breast-feeding among low-income Hmong women in California. *J Am Diet Assoc*. 1996;96:885-90.
47. Cohen R, Mrtek MB, Mrtek RG. Comparison of maternal absenteeism and infant illness rates among breast-feeding and formula-feeding women in two corporations. *Am J Health Promot*. 1995;10:148-153.
48. Jarosz LA. Breast-feeding versus formula: cost comparison. *Hawaii Med J*. 1993;52:14-18.
49. Levine RE, Huffman SL, Center to Prevent Childhood Malnutrition. *The Economic Value of Breastfeeding, the National, Public Sector, Hospital and Household Levels: A Review of the Literature*. Washington, DC: Social Sector Analysis Project, Agency for International Development;1990.
50. Healthy People.gov website. Healthy People 2020 Objectives for Maternal, Infant and Child Health. <http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=26> Accessed June 16, 2011.
51. US Department of Health and Human Services. *Healthy People 2010 Midcourse Review—Maternal, Infant and Child Health—Focus Area 16*. Washington DC: Government Printing Office 2007.
52. Susin L, Giugliani E, Kummer S, Maciel M, Simon C, da Silveira L. Does parental breastfeeding knowledge increase breastfeeding rates? *Birth*. 1999;26:149-156.
53. Buxton K, Gielen A, Faden R, Brown C, Paige D, Chwalow A. Women intending to breastfeed: Predictors of early infant feeding experiences. *American Journal of Preventive Medicine*. 1991;7:101-106.
54. Chapman D, Perez-Escamilla R. Does delayed perception of the onset of lactation shorten breastfeeding duration? *Journal of Human Lactation*. 1999;15:107-111.
55. Merten S, Dratva J, Ackermann-Liebrich U. Do baby-friendly hospitals influence breastfeeding duration on a national level? *Pediatrics*. 2005;116e:702-708.
56. Kurinij N, Shiono PH, Rhoads GG. Breast-feeding incidence and duration in black and white women. *Pediatrics*. 1988;81:365-371.

57. Weiser TM, Lin M, Garikapaty V, Feyerharm RW, Bensyl DM, Zhu BP. Association of maternal smoking status with breastfeeding practices: Missouri, 2005. *Pediatrics*. 2009;124(6):1603-10.
58. Edwards N, Sims-Jones N, Breithaupt K. Smoking in pregnancy and postpartum: Relationship to mothers' choices concerning infant nutrition. *Canadian J. of Nurs. Res.* 1998;30:83-98.
59. Sayers G, Thornton L, Corcoran R, Burke M. Influences on breast feeding initiation and duration. *Irish Journal of Medical Science*. 1995;164:281-284.
60. de Oliveira LD, Giugliani ERJ, do Espirito Santo LC, et al. Effect of intervention to improve breastfeeding technique on the frequency of exclusive breastfeeding and lactation-related problems. *J Hum Lact*. 2006;22:315-321.
61. Dunn S, Davies B, McCleary L, Edwards N, Gaboury I. The relationship between vulnerability factors and breastfeeding outcome. *J Obst Gynecol Neonatal Nurs*. 2006;35:87-97.
62. Ingram J, Johnson D, Greenwood R. Breastfeeding in Bristol: Teaching good positioning, and support from fathers and families. *Midwifery*. 2002;18:87-101.
63. Blyth R, Creedy DK, Dennis C, Moyle W, Pratt J, DeVries SM. Effect of maternal confidence on breastfeeding duration: an application of breastfeeding self-efficacy theory. *Birth*. 2002;29:278-284.
64. Taveras EM, Capra AM, Braveman PA, Jensvold NG, Escobar GJ, Lieu TA. Clinician support and psychosocial risk factors associated with breastfeeding discontinuation. *Pediatrics*. 2003;112:108-115.
65. DiGirolamo AM, Grummer-Strawn LM, Fein S. Maternity care practices: implications for breastfeeding. *Birth*. 2001;28:94-100.
66. Havener J. The Effects of Spatial Location on Breastfeeding Intentions in a Low-Income Population. [doctoral dissertation]. State University of New York at Binghamton; 2002.
67. Barber CM, Abernathy T, Steinmetz B, Charlebois J. Using a breastfeeding prevalence survey to identify a population for targeted programs. *C J Public Health*. 1997;88:242-245.
68. Bick D, MacArthur C, Lancashire R. What influences the uptake and early cessation of breast feeding? *Midwifery*. 1998;14:242-247.
69. Fairbank L, O'Meara S, Renfrew MJ, Wooldridge M, Sowden AJ, Lister-Sharp D. A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding. *Health Technol Assess*. 2000;4:1-71.
70. Sikorski, J, Renfrew, MJ, Pindoria S, Wade A. Support for breastfeeding mothers: a systematic review. *Paediatr Perinat Epidemiol*. 2003;17(4):407-17.

71. Hannula L, Kaunonen M, Tarkka MT. A systematic review of professional support interventions for breastfeeding. *J Clin Nurs*. 2007;17:1132-43.
72. Guise JM, Palda V, Westphff C, Chan BKS, Helfand M, Lieu TA. The effectiveness of primary care-based interventions to promote breastfeeding: systematic evidence review and meta-analysis for the US Preventative Services Task Force. *Ann Fam Med*. 2003;1:70-8.
73. Duffy EP, Percival P, Kershaw E. Positive Effects of an antenatal group teaching session on postnatal nipple pain, nipple trauma and breast feeding rates. *Midwifery*. 1997;12:189-96.
74. Rosen IM, Krueger MV, Carney LM, Graham JA. Prenatal breastfeeding education and breastfeeding outcomes. *Matern Child Nurs*. 2008;33:315-319.
75. Pannu PK, Giglia RC, Binns CW, Scott JA, Oddy WH. The effectiveness of health promotion materials and activities on breastfeeding outcomes. *Acta Paediatr*. 2011;100(4):534-37.
76. Chapman D, Damio G, Young S, Perez-Escamilla R. Effectiveness of breastfeeding peer counseling in low income, predominately Latina population: A randomized controlled trial. *Archives of Pediatric and Adolescent Medicine*. 2004;158:897-902.
77. Britton C, McCormick FM, Renfrew MJ, Wade A, King SE. Support for breastfeeding mothers. Cochrane Database of Systematic Reviews 2007;1. Art. No: CD001141. DOI: 10.1002/14651858.CD001141.pub3.
78. Bonuck KA, Trombley M, Freeman K, McKee D. Randomized, Controlled Trial of a Prenatal and Postnatal Lactation Consultant Intervention on Duration and Intensity of Breastfeeding up to 12 Months. *Pediatrics*. 2005;116(6):1413-26.
79. Dyson L, McCormick F, Renfrew MJ. Interventions for promoting the initiation of breastfeeding (review). Cochrane Database of Systematic Reviews. 2005;(2)1-23. Art. No.: CD001688. DOI: 10.1002/14651858.CD001688.pub2.
80. de Oliveira ML, Camacho LA, Tedstone AE. Extending breastfeeding duration through primary care: a systematic review of prenatal and postnatal interventions. *J Hum Lact*. 2001;17:326-43.
81. Memmott M, Bonuck K. Mother's reactions to a skills-based breastfeeding promotion intervention. *Matern Child Nutr J*. 2006;2:40-50.
82. Hoddinott P, Pill R. A qualitative study of women's views about how health professionals communicate about infant feeding. *Health Expect*. 2000;2:224-233.
83. Sikorski J, Renfrew MJ. Support for breastfeeding mothers. In J. Neilson C. Crowther E. Hodnett G. Hofmeyr (Eds.), *Pregnancy and childbirth module of the Cochrane Database of Systematic Reviews*. Available in The Cochrane Library [database on disk and CDROM]. The Cochrane Collaboration, 2001. Issue 1. Oxford, UK: Update Software (updated quarterly).

84. Shaw E, Kaczorowski J. The effect of peer counseling program on breastfeeding initiation and longevity in a low-income rural population. *J Hum Lact.* 1999;15:19-25.
85. Mannel, R. Defining Lactation Acuity to Improve Patient Safety and Outcomes. *J Hum Lact.* 2011;27:163.
86. Joint Commission. Specifications Manual for Joint Commission national quality measures. <http://manual.jointcomission.org/releases/TJC2010B/MIF0170.html>. Published September 2010. Accessed July 6, 2011.
87. Avery AB, Magnus JH. Expectant Fathers' and Mothers' Perceptions of Breastfeeding and Formula Feeding: A Focus Group Study in Three US cities. *J Hum Lact.* 2011;27(2): 147-154.
88. Rempel, LA, Rempel JK. The Breastfeeding Team: The Role of Involved Fathers in the breastfeeding Family. *J Hum Lact.* 2011;27:115.
89. Arora S, McJunkin C, Wehrer J, Kuhn P. Major factors influencing breastfeeding rates: mother's perception of father's attitude and milk supply. *Pediatrics.* 2000;106:E67.
90. Bentley M, Gavin L, Black MM, Teti L. Infant feeding practices of low-income, African-American, adolescent mothers: an ecological, multigenerational perspective. *Soc Sci Med.* 1999;49:1085-1100.
91. Bentley ME, Dee DL, Jensen JL. Breastfeeding among low-income, African-American women: power, beliefs and decision making. *J Nutr.* 2003;133:305S-309S.
92. Bar-Yam NB, Darby L. Fathers and breastfeeding: a review of the literature. *J Hum Lact.* 1997;13:45-50.

CHAPTER II

Introduction

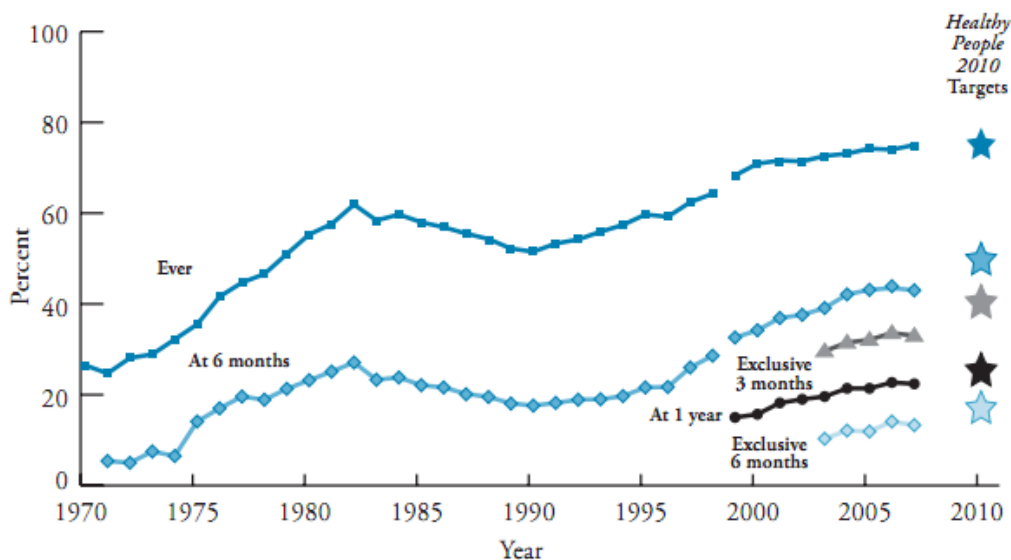
Breastfeeding is a primary element in child health and survival. Human milk is species-specific, and all substitute feeding preparations measure far from it, making human milk uniquely ideal for infant feeding.¹⁻⁵ The advantages of breastfeeding include health, nutritional, immunologic, developmental, psychological, social, economic and environmental benefits.⁵⁻⁸ Despite the benefits of breastfeeding, the United States, even with annual rate improvements, continues to fall short of national breastfeeding goals.

The national goals for breastfeeding are largely set by United States Department of Health and Human Services, following the recommendations of physician research societies, specifically in the realm of duration recommendations. The American Academy of Pediatrics along with the American Academy of Family Physicians recommends exclusive breastfeeding for approximately six months of life, which should continue with the addition of complementary foods throughout the second half of the first year.^{2,5,9} Exclusive breastfeeding is the normal standard against which all alternative feeding methods must be measured with regard to growth, health, development and all other short- and long-term outcomes.² Successful long term breastfeeding starts with successful, early breastfeeding initiation.

As seen in figure 1, throughout the 1970's and early 1980's, the percentage of mothers who began breastfeeding in the hospital setting increased from 25% steadily to 61.9 percent, but then gradually declined to 51.5 percent by 1990.¹⁰ The latest reported data from 2008 fell just

short of the 75% Healthy people 2010 breastfeeding initiation goal with 74.6% initiating breastfeeding.¹¹ Nevertheless, only 14.8% breastfed exclusively through 6 months, falling well behind the 50% goal of Healthy People 2010.

Figure 1. National Trends in Breastfeeding Rates¹⁰ US Breastfeeding rates from 1970-2010



Because of the Center for Disease Control's challenge to increase breastfeeding rates, the Baby Friendly Hospital Initiative (BFHI) was conceived in 1991 by the World Health Organization and the United Nations Children's Fund (UNICEF).^{12,13} A hospital or birthing center can receive Baby-Friendly designation if they are compliant with the Ten Steps to Successful Breastfeeding¹² (see Appendix A). The percentage of infants initiating breastfeeding and exclusively breastfeeding has been shown to improve after hospitals fully initiate the BFHI practices.^{4,14-16}

However, full implementation may not be feasible for small hospitals such as the one in this study. It is unknown if partial adoption of these policies can produce improved

breastfeeding initiation rates. It is also unknown which of the 10 steps are more effective in increasing breastfeeding initiation and duration. SSMH does maintain some of the BFHI principles, such as encouraging breastfeeding on demand and partial rooming in. The facility also provides an education booklet to inform mothers how to breastfeed and maintain lactation. However, healthcare providers at the hospital have found from patient rounding that patients are unaware of the booklets or do not read them. Research has previously demonstrated a lack of effect on initiating breastfeeding with the provision of breastfeeding literature and non-interactive methods of health education.¹⁷⁻²¹

The advantages of breastfeeding to both mother and child are well documented.⁶⁻⁹ Despite the success of the BFHI and improving breastfeeding rates, the US is still not meeting its goals.¹¹ This may be due to the challenge of implementing all 10 steps of the BFHI. The research presented here examines if partial implementation of the BFHI can be influential, and if the specific addition of step 5 would have an effect on breastfeeding initiation rates in the private hospital setting. Other matters of interest are the impact of other criteria on breastfeeding initiation rates, such as maternal demographics and characteristics.

Methods

All methods used in this study received prior approval from Siloam Springs Memorial Hospital Institutional Review Board and Utah State University Institutional Review Board.

Population and Sample

Siloam Springs Memorial Hospital (SSMH) is a 73 bed hospital located in the western area of Benton County, Arkansas which has adopted a only a few of the 10 steps to BFHI such as encouraging breastfeeding on demand, however, the BFHI has not been fully implemented.

OB Nursing staff were trained in an in-service prior to start of the study to inform them of the study and to encourage them to pay attention to proper documentation and charting. All mothers who delivered at the hospital during the study time frame of March-August 2011 received the booklet “A New Beginning—Your Personal Guide to Postpartum Care”²² as part of their normal hospital care. The booklet covers a comprehensive list of postpartum topics, with 18 of the 48 pages focused on breastfeeding concerns including: benefits, supply and demand, latching, burping, and challenges to breastfeeding and breastmilk storage.

The total sample size for this study was 120 participants. The experimental group (n=60) was a convenience sample of mothers in which the mother received one-on-one instruction about the topics in the booklet from a certified breastfeeding educator in addition to the written booklet. The education was completed immediately before or within 24 hours after delivery in the patient’s hospital room.

The control group (n=60), whose mothers received written education only, was selected after the intervention group’s data collection. The random number generator in Microsoft Excel was used to sort through a numbered, computer generated list of all 300 subjects who delivered during the study time frame and met qualification criteria and who had not received the intervention education. The breastfeeding educator selected the subjects using a random numbers function of Excel, under the supervision of the hospital Health Information Manager.

To meet the inclusion criteria, subjects were those with singleton pregnancies, no obstetrical complications and who delivered normal, healthy infants with no congenital abnormalities. Participants were excluded if their infants were born before 37 weeks of gestation (prematurity) or were of low infant birth weight (<2500g). Subjects excluded from the study also included those with Human Immuno-deficiency virus, Hepatitis C, substance abuse, and those who elected infant adoption.

Data Collection

Data collection for both experimental group and control group via medical chart review. The information was recorded in a Microsoft Excel spreadsheet in such a manner as to not identify participants directly or indirectly through identifiers and was completed under the supervision of the hospital's Health Information Manager.

The infants' logged intake data from the medical records was recorded for ever breastfed, ever formula fed or both. Other infant and maternal criteria was collected in the chart review included maternal age, marital status, working status, education level, race, insurance status (as a proxy for economic status), smoking status, obstetric physician, as well as infant birth order, type and weight.

Data Analysis

Logistical Regression analysis was used to determine the effect of certain maternal factors on breastfeeding initiation, specifically, maternal age, insurance type, infant birth order, maternal prenatal care, language, employment status, smoking status, education level, marital status, race, infant weight, gestational age at delivery, provision of one-on-one breastfeeding

education and maternal plans to breast feed. Statistical significance was determined at a p-value of <0.05 . For each variable, the null hypotheses was assumed. Chi squared tests were used to further verify the significance of these variables. Descriptive statistics were performed on the demographic data for means.

Results and Discussion

Results

Characteristics of Sample

A total of 120 mothers were included (60 control and 60 experimental) in the study. Characteristics of the women in the study sample are shown in table 1. These results are not indicative of the entire OB patient population because only healthy births were included in each sample. The age range of all the participants was 17-45 years with the majority (64%) falling between 20-30 years old. Income status was not available; however insurance type was used as a proxy for income. The principle insurance type was Medicaid at 61 percent of the women in the study sample. Sixteen percent of the mothers reported smoking. Only 13% of mothers between both groups attended prenatal classes, however 94% received prenatal care. The majority of the sample (56%) was unemployed. Twenty eight percent of mothers had less than a high school education, while 37% had an education of high school or equivalent. Fifty five percent of participants were married, sixty five percent of participants were Caucasian and the majority of

Table 1. Characteristics of Intervention and Control Groups

	Control	Intervention	Total
Maternal age (years)			
<20	13.3%	18.3%	15.8%
20-30	68.3%	60.0%	64.2%
>30	18.3%	21.7%	20.0%
Mother's insurance type			
Medicaid	68.3%	53.3%	60.8%
Uninsured	8.3%	10.0%	9.2%
Insured	23.3%	36.7%	30.0%
Maternal smoking			
Yes	16.7%	15.0%	15.8%
No	83.3%	85.0%	84.2%
Mother attended prenatal classes			
Yes	15.0%	10.0%	12.5%
No	85.0%	90.0%	87.5%
Mother ever received prenatal care			
Yes	88.3%	100.0%	94.2%
No	11.7%	0.0%	5.8%
Mother's primary language			
English	85.0%	86.7%	85.8%
Spanish	15.0%	13.3%	14.2%
Mother's working status			
Employed	26.7%	51.7%	39.2%
Student	6.7%	3.3%	5.0%
Unemployed	66.7%	45.0%	55.8%
Mother's education level			
Less than highschool	38.3%	18.3%	28.3%
High school or equivalent	31.7%	41.7%	36.7%
Beyond highschool	30.0%	40.0%	35.0%
Mother's marital status			
Married	50.0%	60.0%	55.0%
Single	48.3%	40.0%	44.2%
Widowed	1.7%	0.0%	0.8%
Divorced	0.0%	0.0%	0.0%
Mother's primary race			
Caucasian	63.3%	66.7%	65.0%
Hispanic/ Latino	16.7%	15.0%	15.8%
Native American	11.7%	13.3%	12.5%
Other	0.0%	1.7%	6.7%
Infant birth order			
Mean	2.55	1.91	2.23
Range	1-9	1-7	1-9
Infant weight (g)			
Mean	3354	3430	3392
Range	2500-4480	2510-4690	2500-4690
Infant gestational age (weeks)			
Mean	39.25	39.28	39.27
Range	37-42	37-42	37-42
Intention to breastfeed upon admission			
Yes	73.3%	75.0%	74.2%
No	26.7%	25.0%	25.8%
Infant ever breastfed in hospital			
Yes	46.7%	76.7%	61.7%
No	53.3%	23.3%	38.3%
Infant exclusively breastfed in hospital			
Yes	31.7%	45.0%	38.3%
No	68.3%	55.0%	61.7%

the remaining participants were either Hispanic/Latino (16%) or Native American (12%). Infant birth orders ranged from 1-9, with a mean of 2.23.

In terms of breastfeeding practices, seventy four percent of women had intentions to breastfeed upon admission to the hospital, while only 62% of participants actually did initiate breastfeeding in the hospital and only 38% exclusively breastfed in the hospital.

The one-on-one education provided to the experimental group improved breastfeeding rates with 46.7% initiating breastfeeding in the control group and 77% of those in the intervention group.

Logistical Regression Analysis

In this sample, the overall effect of mother's age was not effective at the significant level. An interaction between maternal age and OB physician was noted in the sample data, which may have affected these results (See tables 2&3). There is an indication that older mothers who chose OB physician 1 were slightly more likely to breastfeed (71%) as compared to those who chose OB 2 (67%). Younger mothers in this sample under the care of OB physician 2 were much more likely to breastfeed (80%) than those under the care of OB physician 1 (20%).

Infant birth type did not significantly impact breastfeeding rates. Several factors were shown to significantly impact breastfeeding initiation rates. Maternal working status was significant for negatively impacting breastfeeding rates with a p-value of .036. Infant birth order was found to significantly impact breastfeeding rates at $p < .05$, meaning breastfeeding rates

improved with higher infant birth order. Maternal smoking was found to be significant at $p < .05$ and was negatively associated with breastfeeding. Maternal education level was found to significantly increase breastfeeding with a p-value of $< .05$, and was found to dramatically

Table 2. Factors Influencing Breastfeeding Initiation Rates

	Coefficient	Exponential of Estimated Coefficients	z value	p value	Odds ratio
Maternal Age Total					
MAge2 vs MAge1	4.7092	2.9949	1.572	0.115851	1.109652E+02
Mage 3 vs MAge 1	2.5434	3.4233	0.743	0.457507	1.272222E+01
Obstetric Physician	4.3497	1.8595	2.339	0.19325	7.745615E+01
Infant Birth Order	0.8463	0.3249	2.605	0.009186	2.331036E+00
Infant Birth Type	-0.8853	0.8924	-0.992	0.321194	4.125947E-01
Maternal Working Status	-1.3533	0.6463	-2.094	0.036251	2.583782E-01
Maternal Education Level					
Maternal Education Level (highschool or equivalent)	2.1098	0.8806	2.396	0.016582	8.246392E+00
Maternal Education Level (some college)	2.5836	0.9396	2.75	0.005965	1.324445E+01
Maternal Smoking	-2.0565	0.998	-2.061	0.039339	1.279029E-01
Plans to Ever Breastfeed	5.5718	1.2151	4.585	4.53E-06	2.628965E+02
Receiving Breastfeeding Education	3.0539	0.8531	3.58	0.000344	2.119804E+01
Maternal age:OB physician Interaction					
MAge 2 vs MAge1	-4.6856	2.0511	-2.284	0.022346	9.23E-03
MAge 3 vs MAge1	-4.1635	2.2272	-1.869	6.16E-02	1.555265E-02

increase with mothers who had some college vs. mothers with only a high school diploma or equivalent. Mothers reported intention upon admission to breastfeed was strongly found to positively impact breastfeeding, with a p-value of $< .001$. The overall effect of mothers receiving one-on-one education counseling in addition to written material is statistically significant with a p-value of $< .001$.

Table 3. Main Effects of Physician Choice by Maternal Age Group

Maternal Age (years)	OB	# of Women	Ever Breastfed (%)
<20			
	OB 1	10	20%
	OB 2	10	80%
20-30			
	OB 1	44	64%
	OB 2	33	61%
>30			
	OB 1	14	71%
	OB 2	9	67%

Maternal working status was used as a proxy for maternal income. This factor, along with maternal language, marital status, delivery anesthesia, prenatal care and race fell out of the model due to non-effect.

Discussion

The assumption of this study was that one-on-one breastfeeding education, in addition to written breastfeeding education would significantly improve the proportion of women initiating breastfeeding in the hospital setting.

It was hypothesized that implementing step 5 of the BFHI, showing mothers how to breastfeed and how to maintain lactation, would encourage them to attempt breastfeeding. Results from our study show that participating in individualized consultation, or information sharing, from a breastfeeding educator in the private hospital setting was significantly associated with breastfeeding initiation, holding all other predictor variables at a fixed value. In mothers who received written education only, breastfeeding initiation rates were 46.7%. The addition of

one-on-one education resulted in a 76.7% breastfeeding initiation rate for the intervention group (a 64% increase).

The literature supports these findings in two ways. First, previous research has demonstrated a lack of effect on initiating breastfeeding with the provision of breastfeeding literature and non-interactive methods of health education.¹⁷⁻²¹ This would indicate that more interactive and personalized breastfeeding health promotion interventions are required to support breastfeeding education. Second, in a systematic review of randomized or quasi-randomized controlled trials by Sikorski et al.,²³ the provision of face-to-face professional support postnatally showed a statistically significant benefit on any breastfeeding but had a greater effect on the continuation of exclusive breastfeeding.

Women have also been shown to be more likely to breastfeed if they have a positive maternal attitude toward breastfeeding²⁴ and believe it to be healthier, easy, convenient and conducive to freedom.²⁵ The booklet used in both the control and intervention groups highlighted these breastfeeding pros. This might indicate that the positive messages were more aptly received through face-to-face discussion of the material, which is a subject for further research.

Not surprisingly, maternal plans to breastfeed were a strong factor in breastfeeding initiation in the hospital, which is also found previously.²⁶ Holding all other predictor variables constant, the odds of breastfeeding initiation rate for mothers who planned to ever breastfeed is about 253 times the estimated odds for those who did not plan to ever breast feed. In a recent study, data from the US Centers for Disease Control and Prevention's Pregnancy Risk Assessment Monitoring System (PRAMS) for three states, Ohio, Michigan and Arkansas, during

2000-2003 were analyzed. Prenatal intention to breast-feed was a powerful predictor of short-term breast-feeding outcomes in women delivering both at term and prematurely.²⁷

Another characteristic that showed significance in this research was infant birth order, which was positively correlated with breastfeeding initiation. Studies show that U.S. mothers are likely to choose the same feeding method for each of their children, independent of the number of children they have.²⁸⁻³⁰ If a woman breastfeeds her first child, she is likely to also breastfeed her subsequent children, regardless of how many children she has. Conversely, if a woman does not breastfeed her first child, she is less likely to breastfeed in the future. Thus, efforts to promote breastfeeding that target first-time mothers are likely to have the greatest impact. However, there are also smaller but significant numbers of women who switch from breastfeeding to formula feeding, and vice versa, with subsequent children.³⁰ Thus, breastfeeding promotion must take into consideration previous infant feeding decisions and experiences.

As in previous US studies,^{31,32} maternal education level was found to be a significant influencing factor on breastfeeding initiation. Li et al. found that compared with children whose mothers had only a high school education, those whose mothers had graduated from college had were 21%, 22%, and 9% more likely initiating breastfeeding.³¹

As mentioned previously, smoking had a mild negative influence on breastfeeding initiation rates. This is not surprising, as researchers have found that mothers who smoked initiated breastfeeding less often and weaned earlier than nonsmoking mothers.³³⁻³⁵

In this sample, the overall effect of mother's age was not effective at the significant level. This does not correspond with previous research^{31,36} where older women have been shown to initiate breastfeeding more often. An interaction between maternal age and OB physician was

noted in the sample data, which may explain the unusual results. For this reason, maternal age and OB physician pairs were also analyzed, which revealed some significance. There is an indication that older mothers who chose OB physician 1 were slightly more likely to breastfeed (71%) as compared to those who chose OB 2 (67%). Younger mothers in this sample under the care of OB physician 2 were much more likely to breastfeed (80%) than those under the care of OB physician 1 (20%).

The percentage of infants ever breastfed in the state of Arkansas in 2008 were 63.9%.³⁷ The breastfeeding stated in this statistic was not necessarily initiated in the hospital. The percentage of infants who initiated breastfeeding in this entire sample was 61.7%. This sample is not entirely representative of all births at the hospital because only healthy births were examined. We would expect the breastfeeding initiation rate to be even lower if births with complications or pre-term infants were included.

Conclusion

There is strong evidence to suggest that breastfeeding has a positive health benefit for both women and infants. Many women initiate breastfeeding today, although national breastfeeding initiation goals have not been met. Arkansas has shown even lower rates of breastfeeding initiation compared with other states. Numerous mothers wean early because of perceived difficulties with breastfeeding and lack of support rather than maternal choice. The percentage of infants initiating breastfeeding and exclusively breastfeeding has been shown to

improve after hospitals fully initiate the BFHI practices.^{4,14-16} One of the key BFHI practices includes providing breastfeeding education to mothers.³⁸

While implementation of the BFHI has been shown to have an impact on hospitals' breastfeeding initiation and duration,^{12,14-16} it has been unclear if *full* implementation is necessary for initiation or duration improvement. This study purposed to learn what effect adopting only some of the BFHI principles would have on hospital breastfeeding initiation rates in the private US hospital setting. Specifically, this study aimed to examine if the addition of one-on-one breastfeeding education (step 5 of the BFHI) would significantly impact breastfeeding rates in a private hospital setting. The study further aimed to examine which other factors significantly influence breastfeeding initiation.

This study revealed 5 main factors that influenced breastfeeding initiation: maternal intention to breast feed, maternal education level, maternal smoking, infant birth order and in-hospital one-on-one breastfeeding education, which included showing mothers how to breastfeed and maintain lactation.

Because the education intervention showed significant results, we conclude that a promising intervention for increasing breastfeeding initiation in the hospital setting is one-on-one breastfeeding education along with written education. This would imply that more personalized and interactive breastfeeding health promotion interventions are required to support breastfeeding initiation. We further conclude that partial implementation of the BFHI was successful in increasing breastfeeding rates by introducing step 5- showing mothers how to breastfeed and maintain lactation. Further research should be conducted to verify this finding and also determine other steps that might be successful if used alone.

Also, because intention to breastfeed had such a significant impact on actual initiation rates, we deduce that prenatal education in the same one-on-one format may further influence initiation rates. This is a necessary topic for further research. Further research should also be conducted to examine if these same factors are influential on breastfeeding duration rates.

Reference List

1. Hambraeus L, Forsum E, Lonnerdal B. Nutritional aspects of breastmilk and cow's milk formulas. In: Hambraeus L, Hanson L, MacFarlane H, eds. Symposium on Food and Immunology. Stockholm, Sweden: Almqvist and Wiksell; 1975. p.116-124. Symposia of the Swedish Nutrition Foundation XIII.
2. Gartner LM, Morton J, Lawrence RA, et al., for the American Academy of Pediatrics Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2005;115(2):496-506.
3. World Health Organization. *Global strategy for Infant and Young Child Feeding. The Optimal Duration of Exclusive Breastfeeding*. WHO, Geneva, Switzerland. 2001.
4. Kramer MS, Chalmers B, Hodnett ED, et al. Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. 2001. *JAMA*. 2001;285(4):413-20.
5. American Academy of Pediatrics Breastfeeding Position Paper 2008. <http://www.aafp.org/online/en/home/policy/policies/b/breastfeedingpositionpaper.html>. Accessed February 8, 2011.
6. Ip S, Chung M, Raman G, et al. 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, 2007.
7. Dennis CL. Breastfeeding initiation and duration: a 1990-2000 Literature Review. *J Obstet Gynecol Neonatal Nurs*. 2002;31:12-32.
8. Alves JG, Figueiroa JN, Meneses J, Alves GV. Breastfeeding Protects Against Type 1 Diabetes Mellitus: A Case-Sibling Study. *Breastfeed Med*. 2011;7(1):25-8.
9. American Academy of Family Physicians. Family Physicians Supporting Breastfeeding: Position paper. 2008. www.aafp.org/online/home/policy/policies/b/breastfeedingpositionpaper.html. Accessed Feb 11, 2011.
10. The Surgeon General's Call to Action to Support Breastfeeding 2011. Page 7. <http://www.surgeongeneral.gov/topics/breastfeeding/calltoactiontosupportbreastfeeding.pdf>. Accessed November 14, 2011.
11. Centers for Disease Control and Prevention Web Site. Breastfeeding Practices—results from the National Immunization Survey. <http://www.cdc.gov/breastfeeding/data/reportcard2.htm>. Accessed November 19, 2010.
12. World Health Organization. *Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services*. Geneva, Switzerland: World Health Organization; 1989.

13. World Health Organization. *The Baby Friendly Hospital Initiative*. Geneva, Switzerland: World Health Organization; 2009.
14. Philipp BL, Merewood A, Miller LW, et al. Baby-Friendly Hospital Initiative improves breastfeeding initiation rates in a US hospital setting. *J Pediatr*. 2001;108:677-681.
15. Merewood A, Philipp BL, Chawla N, Cimo S. The Baby-Friendly Hospital Initiative Increases Breastfeeding Rates in a US Neonatal Intensive Care Unit. *J Hum Lact*. 2003; 19:166-171.
16. Philipp BL, Malone KL, Cimo S, et al. Sustained breastfeeding rates at a US baby-friendly hospital. *Pediatrics*. 2003;112:e234-e236.
17. Fairbank L, O'Meara S, Renfrew MJ, Wooldridge M, Sowden AJ, Lister-Sharp D. A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding. *Health Technol Assess*. 2000;4:1-71.
18. Hannula L, Kaunonen M, Tarkka MT. A systematic review of professional support interventions for breastfeeding. *J Clin Nurs*. 2007;17:1132-43.
19. Guise J-M, Palda V, Westphff C, Chan BKS, Helfand M, Lieu TA. The effectiveness of primary care-based interventions to promote breastfeeding: systematic evidence review and meta-analysis for the US Preventative Services Task Force. *Ann Fam Med*. 2003;1: 70-8.
20. Dyson L, McCormick F, Renfrew MJ. Interventions for promoting the initiation of breastfeeding (review). *Cochrane Database of Systematic Reviews*. 2005;(2)1-23. Art. No.: CD001688. DOI: 10.1002/14651858.CD001688.pub2.
21. de Oliveira ML, Camacho LA, Tedstone AE. Extending breastfeeding duration through primary care: a systematic review of prenatal and postnatal interventions. *J Hum Lact*. 2001;17:326-43.
22. Moran DE, Kallman GB. *A New Beginning; Your Personal Guide to Postpartum Care*. Arlington, TX: Customized Communications, Incorporated; 2000.
23. Sikorski, J, Renfrew, MJ, Pindoria S, Wade A. Support for breastfeeding mothers: a systematic review. *Paediatr Perinat Epidemiol*. 2003;17(4):407-17.
24. Tarkka M, Paunonen M, Laippala P. Factors related to successful breast feeding by first-time mothers when the child is 3 months old. *Journal of Adv. Nurs*. [serial online]. January 1999;29(1):113-118. Available from: Academic Search Premier, Ipswich, MA. Accessed February 7, 2011.
25. Libbus M, Kolostov L. Perceptions of breast-feeding and infant feeding choice in a group of low income mid-Missouri women. *Journal of Human Lactation*. 1994;10:17-23.
26. Losch M, Dungy C, Russell D, Dusdieker L. Impact of attitudes on maternal decision regarding infant feeding. *Journal of Pediatrics*. 1995;126:507-514.

27. Colaizy TT, Saftlas AF, Morriss FH. Maternal intention to breast-feed and breast-feeding outcomes in term and preterm infants: Pregnancy Risk Assessment Monitoring System (PRAMS), 2000-2003. *Public Health Nutr.* 2012;15(4):702-10. Epub 2011 Sep 22.
28. DaVanzo J, Starbird E, Leibowitz A. Do women's breastfeeding experiences with their first-borns affect whether they breastfed their subsequent children? *SocBiol.* 1990;37:223-232.
29. Kieffer EC, Novotny R, Welch KB, et al. Health practitioners should consider parity when counseling mothers on decisions about infant feeding methods. *J Am Diet Assoc.* 1997;97:1313-1316.
30. Taylor J, Geller L, Risica, P. M., et al. Birth order and breastfeeding initiation: Results of a national survey. *Breastfeeding Medicine.* 2008;3:20-27.
31. Li R, Darling N, Maurice E, Barker L, Grummer-Strawn L. Breastfeeding rates in the United States by characteristics of the child, mother, or family: the 2002 National Immunization Survey. *Pediatrics.* 2005;115(1)e31-e37.
32. Kurinij N, Shiono PH, Rhoads GG. Breast-feeding incidence and duration in black and white women. *Pediatrics.* 1988;81:365-371.
33. Weiser TM, Lin M, Garikapaty V, Feyerharm RW, Bensyl DM, Zhu BP. Association of maternal smoking status with breastfeeding practices: Missouri, 2005. *Pediatrics.* 2009;124(6):1603-10.
34. Edwards N, Sims-Jones N, Breithaupt K. Smoking in pregnancy and postpartum: Relationship to mothers' choices concerning infant nutrition. *Canadian J. of Nurs. Res.* 1998;30:83-98.
35. Sayers G, Thornton L, Corcoran R, Burke M. Influences on breast feeding initiation and duration. *Irish Journal of Medical Science.* 1995;164:281-284.
36. Barnes J, Stein A, Smith T, Pollock JI, Extreme attitudes to body shape, social and psychological factors and a reluctance to breast feed. ALSPAC Study Team. Avon Longitudinal Study of Pregnancy and Childhood. *J R Soc Med.* 1997;90(10):551-9.
37. US Department of Health and Human Services. *Healthy People 2010 Midcourse Review—Maternal, Infant and Child Health—Focus Area 16.* Washington DC: Government Printing Office 2007.
38. Baby-Friendly USA, Inc. Web Site. The 10 Steps to Successful Breastfeeding. <http://www.babyfriendlyusa.org/eng/10steps.html>. Accessed June 6, 2011.

CHAPTER III

Observations from the Project

This project met its three research objectives:

1. Collect baseline data to determine the breastfeeding initiation rate among healthy, term infants at Siloam Spring Memorial Hospital.
2. Determine the effect of one-on-one breastfeeding education, in addition to written material on breastfeeding initiation rates in the hospital setting.
3. Determine if other factors from available data are associated with breastfeeding initiation.

In this study it was hypothesized that implementing step 5 of the BFHI, showing mothers how to breastfeed and how to maintain lactation, would encourage them to attempt breastfeeding. Results from our study show that participating in individualized consultation, or information sharing, from a breastfeeding educator in the private hospital setting was significantly associated with breastfeeding initiation. Total breastfeeding rates for this healthy infant population were 61.7%. In mothers who received written education only, breastfeeding initiation rates were 46.7%. The addition of one-on-one education resulted in a 76.7% breastfeeding initiation rate for the intervention group (a 64% increase). The following is a discussion of the implications this study may have on program development for RD educators.

Interactive and Personalized Breastfeeding Health Promotion Interventions are Required to Support Breastfeeding

The literature supports the findings of this study in two ways. First, previous research has demonstrated a lack of effect on initiating breastfeeding with the provision of breastfeeding literature and non-interactive methods of health education.¹⁻⁵ This would indicate that more interactive and personalized prenatal breastfeeding health promotion interventions are required to support breastfeeding education. Second, the provision of face-to-face professional support in the hospital setting showed a statistically significant benefit on any breastfeeding but had a greater effect on the continuation of exclusive breastfeeding.⁶

Positive Messages are More Aptly Received Through Face-to-Face Discussion of the Material

Interestingly, maternal plans to breastfeed were a strong factor in breastfeeding initiation in the hospital, which is also found previously.⁷ Recently, prenatal intention to breast-feed is a powerful predictor of short-term breast-feeding outcomes in women delivering both at term and prematurely.⁸ Women are also more likely to breastfeed if they have a positive maternal attitude toward breastfeeding⁹ and believe it to be healthier, easy, convenient, and conducive to freedom.¹⁰ The booklet used in both the control and intervention groups highlighted these breastfeeding pros. This might indicate that the positive messages were more aptly received through face-to-face discussion of the material, which is a subject for further research. Examples of positive messages that educators could focus on are:

- Benefits of breastfeeding

- Breastfeeding as the normal feeding option
- Ways families can support breastfeeding

Women Should Receive Face-to-Face Prenatal Education

Most women (94.2%) received prenatal care, although it was not found to be correlated with breastfeeding. It is possible that the addition of one-on-one breastfeeding education at prenatal visits would further increase breastfeeding rates in this population. Most women in this study did not attend prenatal classes (12.5%) and this factor was not significantly influential on breastfeeding initiation in this study. Perhaps if women received face-to-face education in prenatal classes they would be even more likely to initiate breastfeeding. In this population, more effort may need on recruitment for such classes due to low participation in this particular study.

Registered Dietitians often meet face-to-face with prenatal women for gestational diabetes education. This is an excellent opportunity for RD's to positively impact mothers' plans to breastfeed. Registered Dietitians in this setting already have the mothers' attention and are already discussing what's best for mother and infant health. Regardless of lactation background, RD's can take the opportunity during appointments to encourage mothers to breastfeed, explain the benefits and refer as necessary to breastfeeding support services.

Breastfeeding Promotion Must Take Into Consideration previous infant feeding experiences

Another characteristic that showed significance in our research was infant birth order, which was positively correlated with breastfeeding initiation. Infant birth order is often a confounding factor considered in breastfeeding studies.¹¹ Research shows that U.S. mothers are likely to choose the same feeding method for each of their children, independent of the number of children they have.¹²⁻¹⁴ If a woman breastfeeds her first child, she is likely to also breastfeed her subsequent children, regardless of how many children she has. Conversely, if a woman does not breastfeed her first child, she is less likely to breastfeed in the future. Thus, efforts to promote breastfeeding that target first-time mothers are likely to have the greatest impact. However, there are also smaller but significant numbers of women who switch from breastfeeding to bottle feeding, and vice versa,¹⁴ with subsequent children. Thus, breastfeeding promotion must take into consideration previous infant feeding experiences, if any.

Notes on Study Design and Areas of Future Research

The principle investigator in this study was a Registered Dietitian (RD), with the Certified Breastfeeding Educator (CBE) credential who was employed to provide face-to-face breastfeeding education for mothers. She was the only lactation educator employed by the hospital and the baseline breastfeeding rates were unknown during the time of the study. This project was designed to study the efficacy of this professional on the hospital breastfeeding rates, but did not estimate an actual population breastfeeding rate for the hospital because only healthy births were examined. The percentage of infants ever breastfed in the state of Arkansas in 2008

were 63.9%. The breastfeeding stated in this statistic was not necessarily initiated in the hospital. The percentage of infants who initiated breastfeeding in this entire sample was 61.7%. We would expect the breastfeeding initiation rate to be even lower if births with complications or pre-term infants were included.

Only healthy, normal births were included in this study as to rule out any confounding factors that are known to be associated with low breastfeeding rates. These mothers and infants should not be neglected in regard to education interventions, but a more concise study examining one potential confounding factor at a time may be warranted.

Due to the design of the study, it is unknown if breastfeeding was initiated after hospital discharge, but this is unlikely because researchers^{15,16} have reported a positive effect on duration when breastfeeding is initiated immediately after birth.

The researchers considered using additional patient surveys administered upon 6 week physician follow up to examine breastfeeding duration. Instead, the researchers chose to examine initiation only as this was a pilot study with time constraints. A follow up study would be insightful to the hospital to examine if one-on-one breastfeeding initiation influenced duration rates. Studies show that one-on-one education impacts duration,^{6,17,18} so we would expect positive results.

In this study, 97.5 of mothers (n=117) were educated after delivery but 2.5% (n=3) were educated while laboring, yet prior to delivery. This is unlikely to have influenced the study outcome, as both scenarios were within the hospital stay. In the future, it might be beneficial for the entire sample to be educated during the exact same period.

Fifteen percent of the sample listed Spanish as their primary language. Mothers who spoke Spanish were educated using a booklet in the Spanish language but instructed in English because there was limited interpretation available and the intervention may not have remained consistent if Spanish interpretation had been provided. Future researchers may consider using an interpreter or studying individual language speaking mothers at a time.

In our study, only mothers were targeted for the intervention. Paternal involvement was not noted or examined nor was the fathers' presence during the bedside. The majority of research on external influences shows that the infant's father has the greatest impact on shaping feeding intentions.¹⁹⁻²² Bar-Yam and Darby found a strong association between fathers' positive attitudes toward breastfeeding and mothers' intentions to breastfeed in their review of literature addressing fathers and breastfeeding.²³ Arora et al.¹⁹ found that a mother's perception of a father's attitude toward breastfeeding was the most significant factor for her to initiate bottle feeding. In Avery's focus grouped based study,²⁴ men who encouraged breastfeeding cited the infant's health as a key benefit. Many reported learning about breastfeeding through their partner's health care providers. Perhaps fathers participating in face-to-face education like that in this study would produce further increased breastfeeding initiation rates.

The researchers also considered including Step 3 of the BFHI "Inform all pregnant women about the benefits and management of breastfeeding" in the study. This step, however was not formally studied, because most of the participants were not technically pregnant at the actual time of education, but immediately post-partum. However, the education book along with verbal education did cover the topics of the benefits and management. In this hospital's case, accessing providing the education prior to delivery was not feasible at the time of this study. This addition of the partial step of step 3 the BFHI, although unconventionally administered,

could have impacted the initiation rates as well and is therefore a factor in the significant increase. Future research might examine other BFHI steps or clusters of BFHI steps on the impact of initiation and duration of breastfeeding. Also, the initiation of a prenatal face-to-face education intervention might yield even higher breastfeeding rates.

All women in the experimental group were offered breastfeeding *assistance* by the breastfeeding educator, as this is a normal job duty of the breastfeeding educator and is interpreted as part of step 5- showing mothers how to breastfeed and how to maintain lactation. This factor was not specifically documented or examined for significance, but would be a possible research target for future study, as physical assistance is not something that can be offered prenatally. For future research, nursing could be included in providing education and/or hands-on breastfeeding assistance.

Registered Dietitians and Lactation Professionals in this Specialty

Registered Dietitians with competency in breastfeeding education can also aid in management of breastfeeding as it falls under their scope of practice. As experts in food and nutrition throughout the life cycle, it is the responsibility of registered dietitians to promote and support breastfeeding for its short-term and long-term health benefits for both mothers and infants. ADA emphasizes the essential role of RD's in promoting and supporting breastfeeding by providing up-to-date, practical information to pregnant and postpartum women, involving family and friends in breastfeeding education and counseling, advocating for the removal of institutional barriers to breastfeeding, collaborating with community organizations and others

who promote and support breastfeeding, and advocating for policies that position breastfeeding as the norm for infant feeding.

The American Dietetic Association's position²⁵ on promoting and supporting breastfeeding states that RD's have an important role in conducting empirical research on breastfeeding-related topics and that research is especially needed on the effectiveness of breastfeeding promotion campaigns.

Factors such as hospital practices, knowledge, beliefs and attitudes of mothers and their families and access to breastfeeding support can influence initiation, duration and exclusivity of breastfeeding. As this study has shown, a simple addition of one-on-one education in contrast with merely providing written education is much more effective in increasing breastfeeding initiation rates. Professionals who wish to increase breastfeeding initiation might focus on the following:

- Target first time mothers
- Focus on face-to-face interventions
- Expand the project to see if these factors continue to influence breastfeeding beyond hospital discharge- i.e. duration.
- Examine exclusivity of breastfeeding in the hospital; i.e. how individual BFHI steps affect if an infant is only breast fed in the hospital
- Consider prenatal class education to influence intention to breastfeed and thus influence breastfeeding rates

Overall Conclusions

In this project, we met our objective to examine if the addition of one BFHI step, specifically, one-on-one breastfeeding education in addition to written education, would result in an increase in breastfeeding initiation rates in the private hospital setting. We also succeeded in gathering baseline breastfeeding rates on healthy births in the hospital, which we hypothesized would be less than the state and national average. The results of the data analysis confirmed our hypothesis that breastfeeding rates would be significantly impacted by the addition of one-on-one education. Our data also confirmed that in this sample, even with half of subjects receiving one-on-one education, and corresponding increased breastfeeding rates, the total sample's breastfeeding rates fell below state and national averages. We found several factors that positively affected initiation rates such as infant birth order, maternal smoking, and maternal intention to breast feed. Thus, partial implementation of the BFHI was found to produce increased breastfeeding rates. Further research should be conducted in the prenatal and postnatal time period and should examine which BFHI steps, and to which degree are most helpful in producing positive results.

Reference List

1. Fairbank L, O'Meara S, Renfrew MJ, Wooldridge M, Sowden AJ, Lister-Sharp D. A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding. *Health Technol Assess.* 2000;4:1-71.
2. Dyson L, McCormick F, Renfrew MJ. Interventions for promoting the initiation of breastfeeding (review). *Cochrane Database of Systematic Reviews.* 2005;(2)1-23. Art. No.: CD001688. DOI: 10.1002/14651858.CD001688.pub2.
3. Hannula L, Kaunonen M, Tarkka MT. A systematic review of professional support interventions for breastfeeding. *J Clin Nurs.* 2007;17:1132-43.
4. Guise J-M, Palda V, Westphff C, Chan BKS, Helfand M, Lieu TA. The effectiveness of primary care-based interventions to promote breastfeeding: systematic evidence review and meta-analysis for the US Preventative Services Task Force. *Ann Fam Med.* 2003;1:70-8.
5. de Oliveira ML, Camacho LA, Tedstone AE. Extending breastfeeding duration through primary care: a systematic review of prenatal and postnatal interventions. *J Hum Lact.* 2001;17:326-43.
6. Sikorski, J, Renfrew, MJ, Pindoria S, Wade A. Support for breastfeeding mothers: a systematic review. *Paediatr Perinat Epidemiol.* 2003;17(4):407-17.
7. Losch M, Dungy C, Russell D, Dusdieker L. Impact of attitudes on maternal decision regarding infant feeding. *Journal of Pediatrics.* 1995;126:507-514.
8. Colaizy TT, Saftlas AF, Morriss FH. Maternal intention to breast-feed and breast-feeding outcomes in term and preterm infants: Pregnancy Risk Assessment Monitoring System (PRAMS), 2000-2003. *Public Health Nutr.* 2012;15(4):702-10. Epub 2011 Sep 22.
9. Tarkka M, Paunonen M, Laippala P. Factors related to successful breast feeding by first-time mothers when the child is 3 months old. *Journal of Adv. Nurs.* [serial online]. January 1999;29(1):113-118. Available from: Academic Search Premier, Ipswich, MA. Accessed February 7, 2011.
10. Libbus M, Kolostov L. Perceptions of breast-feeding and infant feeding choice in a group of low income mid-Missouri women. *Journal of Human Lactation.* 1994;10:17-23.
11. Ip S, Chung M, Raman G, et al. 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, 2007.

12. DaVanzo J, Starbird E, Leibowitz A. Do women's breastfeeding experiences with their first-borns affect whether they breastfed their subsequent children? *Soc Biol.* 1990;37:223-232.
13. Kieffer EC, Novotny R, Welch KB, et al. Health practitioners should consider parity when counseling mothers on decisions about infant feeding methods. *J Am Diet Assoc.* 1997;97:1313-1316.
14. Taylor J, Geller L, Risica, P. M., et al. Birth order and breastfeeding initiation: Results of a national survey. *Breastfeeding Medicine.* 2008;3:20-27.
15. Buxton K, Gielen A, Faden R, Brown C, Paige D, Chwalow A. Women intending to breastfeed: Predictors of early infant feeding experiences. *American Journal of Preventive Medicine.* 1991;7:101-106.
16. Chapman, D, Perez-Escamilla R. Does delayed perception of the onset of lactation shorten breastfeeding duration? *Journal of Human Lactation.* 1999;15:107-111.
17. Sikorski, J., Renfrew, M. J. Support for breastfeeding mothers. In J. Neilson, C. Crowther, E. Hodnett, & G. Hofmeyr (Eds.), *Pregnancy and childbirth module of the Cochrane Database of Systematic Reviews.* Available in The Cochrane Library [database on disk and CDROM]. The Cochrane Collaboration, 2001. Issue 1. Oxford, UK: Update Software (updated quarterly).
18. Pannu PK, Giglia RC, Binns CW, Scott JA, Oddy WH. The effectiveness of health promotion materials and activities on breastfeeding outcomes. *Acta Paediatr.* 2011;100(4):534-37.
19. Arora S, McJunkin C, Wehrer J, Kuhn P. Major factors influencing breastfeeding rates: mother's perception of father's attitude and milk supply. *Pediatrics.* 2000;106:E67.
20. Bentley M, Gavin L, Black MM, Teti L. Infant feeding practices of low-income, African-American, adolescent mothers: an ecological, multigenerational perspective. *Soc Sci Med.* 1999;49:1085-1100.
21. Bentley ME, Dee DL, Jensen JL. Breastfeeding among low-income, African-American women: power, beliefs and decision making. *J Nutr.* 2003;133:305S-309S.
22. Dennis CL. Breastfeeding initiation and duration: a 1990-2000 Literature Review. *J Obstet Gynecol Neonatal Nurs.* 2002;31:12-32.
23. Bar-Yam NB, Darby L. Fathers and breastfeeding: a review of the literature. *J Hum Lact.* 1997;13:45-50.
24. Avery AB, Magnus JH. Expectant Fathers' and Mothers' Perceptions of Breastfeeding and Formula Feeding: A Focus Group Study in Three US cities. *J Hum Lact.* 2011;27(2): 147-154.

25. James DC, Dobson B; American Dietetic Association. Position of the American Dietetic Association: Promoting and supporting breastfeeding. *J Am Diet Assoc.* 2005;105(5):810-8.

APPENDIX

APPENDIX

Baby Friendly Hospital Initiative 10 Steps to Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in - that is, allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.