

HOW NUTRITION EDUCATION DURING BREASTFEEDING AFFECTS NEW
MOTHER'S KNOWLEDGE AND MILK PRODUCTION WHILE THE
INFANT IS IN THE NEONATAL INTENSIVE CARE UNIT (NICU)

by

Maren Anderson and Nina Maloney

Submitted in Partial Fulfillment of the
Requirements for Departmental Honors in
the Department of Nutritional Sciences
Texas Christian University
Fort Worth, Texas

May 3, 2013

HOW NUTRITION EDUCATION DURING BREASTFEEDING AFFECTS NEW
MOTHER'S KNOWLEDGE AND MILK PRODUCTION WHILE THE
INFANT IS IN THE NEONATAL INTENSIVE CARE UNIT (NICU)

Project Approved:

Dr. Mary Anne Gorman, Ph.D., R.D., L.D., FADA
Department of Nutritional Sciences
(Supervising Professor)

Dr. Anne VanBeber, Ph.D., R.D., L.D., CFCS
Department of Nutritional Sciences

Dr. Lyn Dart, Ph.D., R.D., L.D.
Department of Nutritional Sciences

TABLE OF CONTENTS

INTRODUCTION	1
REVIEW OF LITERATURE	2
Nutrition Education.....	2
Importance of Breastfeeding.....	3
Breastfeeding Continuation	3
METHODS	3
RESULTS	5
TABLES	6
CONCLUSIONS	9
Suggestions for Further Research.....	9
DOCUMENTATION USED DURING RESEARCH	10
Participant Consent Form	10
Pre-Education Questionnaire	14
Pre-Education Food Recall	16
Post-Education Questionnaire.....	17
Post-Education Food Recall.....	19
Exit Evaluation.....	20
Educational Handout 1	21
Educational Handout 2.....	22
Thank-You Letter.....	23
REFERENCES	24
ABSTRACT	26

ACKNOWLEDGEMENTS

The students of this research project would like to acknowledge the help and support given to them by Dr. Mary Anne Gorman, Honors professor in the Department of Nutritional Sciences. Without her tireless aide and multiple revisions, this project would not be here today. The students would also like to thank Dr. Lyn Dart of the Nutritional Sciences department for introducing this project and for helping coordinate with the dietitians at Baylor All Saints Hospital in Fort Worth, Texas, where the research was completed.

The students would like to thank Mrs. Cindy Floyd, NICU dietitian, for her leadership and coordination of this experiment's details, such as recruiting patients and completing charting information. Mrs. Ashley Mullins must also be acknowledged, as she was a key player in the creation of this research project.

INTRODUCTION

The How Nutrition Education During Breastfeeding Affects New Mother's Knowledge and Milk Production While the Infant is in the Neonatal Intensive Care Unit (NICU) project was created in 2011 with the purpose of promoting the use of the Registered Dietitian within the NICU setting to increase the abilities of new moms to breastfeed. The Academy of Nutrition and Dietetics recommends that infants are exclusively breastfed for the first six months of life. The key objective of this research project is to increase the number of breastfeeding mothers, and to increase the amount of time that mothers breastfeed. This is an incredibly important subject, as breastfeeding has numerous positive health influences on the mother of the baby, as well as the baby itself.¹ For example, breast milk contains immunoglobulins that will protect the newborn against common illnesses and infections.² Although breastfeeding is the most nutritionally complete source of food for babies through age six months, only 13.6% of babies are exclusively breastfed until that age.³

There have been multiple studies that have shown a correlation between nutrition education for mothers of low birth weight and normal birth weight infants and an increase in weight, height, and length of continued breastfeeding, as well as a decrease in respiratory illness, when compared with infants of mothers who did not receive nutrition education. Two studies in particular that showed these correlations are from the European Journal of Clinical Nutrition and the Journal of Human Lactation.^{4 5}

Although mothers are provided lactation support within the hospital, once they leave, help is often expensive or not within reach of most mothers. If mothers receive extra support, both in the hospital and within their community, they are able to breastfeed

more often and for a longer period of time.⁶ By promoting not only breastfeeding itself as a positive practice, but also the role that ancillary services can have in promoting breastfeeding, this research project will highlight the importance of registered dietitians in the NICU setting.

Research Objectives

The research objectives of this study are as follows: determine the efficacy of nutritional education provided by Registered Dietitian's in the NICU, to determine nutrition knowledge of breastfeeding and lactation of mothers with low-birth weight babies, and to determine if breast milk produced by mothers with babies in the NICU changes based on nutrition knowledge and support from a Registered Dietitian.

LITERATURE REVIEW

Nutrition Education

There have been multiple studies that have shown a correlation between nutrition education for mothers of low birth weight and normal birth weight infants and an increase in weight, height, and length of continued breastfeeding, as well as a decrease in respiratory illness, when compared with infants of mothers who did not receive nutrition education. Two studies in particular that showed these correlations are from the European Journal of Clinical Nutrition and the Journal of Human Lactation^{4, 5}.

Importance of Breastfeeding

. The key objective of this research project is to increase the number of breastfeeding mothers, and to increase the amount of time that mothers breastfeed. This is an incredibly important subject, as breastfeeding has numerous positive health influences on the mother of the baby, as well as the baby itself.¹ For example, breast milk contains immunoglobulins that will protect the newborn against common illnesses and infections². Although breastfeeding is the most nutritionally complete source of food for babies through age six months, only 13.6% of babies are exclusively breastfed until that age³.

Breastfeeding Continuation

Although mothers are provided lactation support within the hospital, once they leave, help is often expensive or not within reach of most mothers. If mothers receive extra support, both in the hospital and within their community, they are able to breastfeed more often and for a longer period of time⁶. By promoting not only breastfeeding itself as a positive practice, but also the role that ancillary services can have in promoting breastfeeding, this research project will highlight the importance of registered dietitians in the NICU setting.

METHODS

Participants will be chosen for the Experimental group based on criteria set out by the NICU dietitian, which includes birthing a baby that weighed equal to or less than 1500 grams at birth and intending on breastfeeding said baby. These participants will be contacted by Mrs. Floyd, NICU dietitian, and if interested, will fill out the consent document to be included in the study. The consent document should take about five

minutes to complete. Participants who have signed the consent document will receive an initial assessment by the researchers, Maren Anderson and Nina Maloney. The participants will be asked to fill out a 24 hr food record of foods that they normally consume at home, and then will complete a pre-test with questions about breastfeeding and lactogenic foods. Combined, these documents will take about fifteen minutes of time to complete. Once they have completed both the pre-test and the food recall, participants will receive one session of nutrition education from Mrs. Floyd after an average of four weeks of hospitalization. She will provide them with literature that answers questions about breastfeeding and lactogenic foods. She will answer any questions that they might have. This education will take about fifteen minutes. When the participant's newborn is ready to leave the hospital, the participant will have a follow-up completed by the researchers. The participant will be asked to complete a 24 hr food record of food eaten at home, and complete a post-test that has the same content as the pre-test. These documents will take about fifteen minutes of time to complete. The amount of milk in milliliters produced by the mother will be recorded by Nursing staff throughout the experiment.

Experimental participants who meet the criteria for the control group will be chosen from a database of information obtained by NICU nurses on a day to day basis that includes: birth weight, daily weight, amount of breastmilk pumped per day, amount of breastmilk consumed by the newborn per day, and the amount of other formula consumed per day until the newborn leaves the NICU. This group will not be asked to fill out any paperwork or complete any tests.

RESULTS

A total of 5 mothers were included in the Control Group and 3 mothers were in the Experimental Group. The average amount of milk produced by mothers in the Experimental Group prior to nutrition education was 593.67 mL/week, and the average amount produced after nutrition education was 1356 mL/week. Subjects in the Experimental Group had pre-nutrition education knowledge average scores of 70.00% and post-nutrition education knowledge average scores of 76.67%. The increase in nutrition knowledge following nutrition education was 6.67% in the Experimental Group. Analysis of 24-hour dietary recall calculations revealed no significant difference in kcals consumed prior to and following nutrition education sessions in the Experimental Group. The amount of milk produced by mothers in both the Experimental and Control Groups increased throughout the study; however, mothers in the Control Group exhibited only a slight increase in volume of breast milk produced while their child was in the NICU. All of the mothers in the Experimental Group (100%) continued breastfeeding while their child was in the NICU, but 40% of the Control Group participants quit breastfeeding at some point during their child's stay in the NICU.

TABLES

Table 1

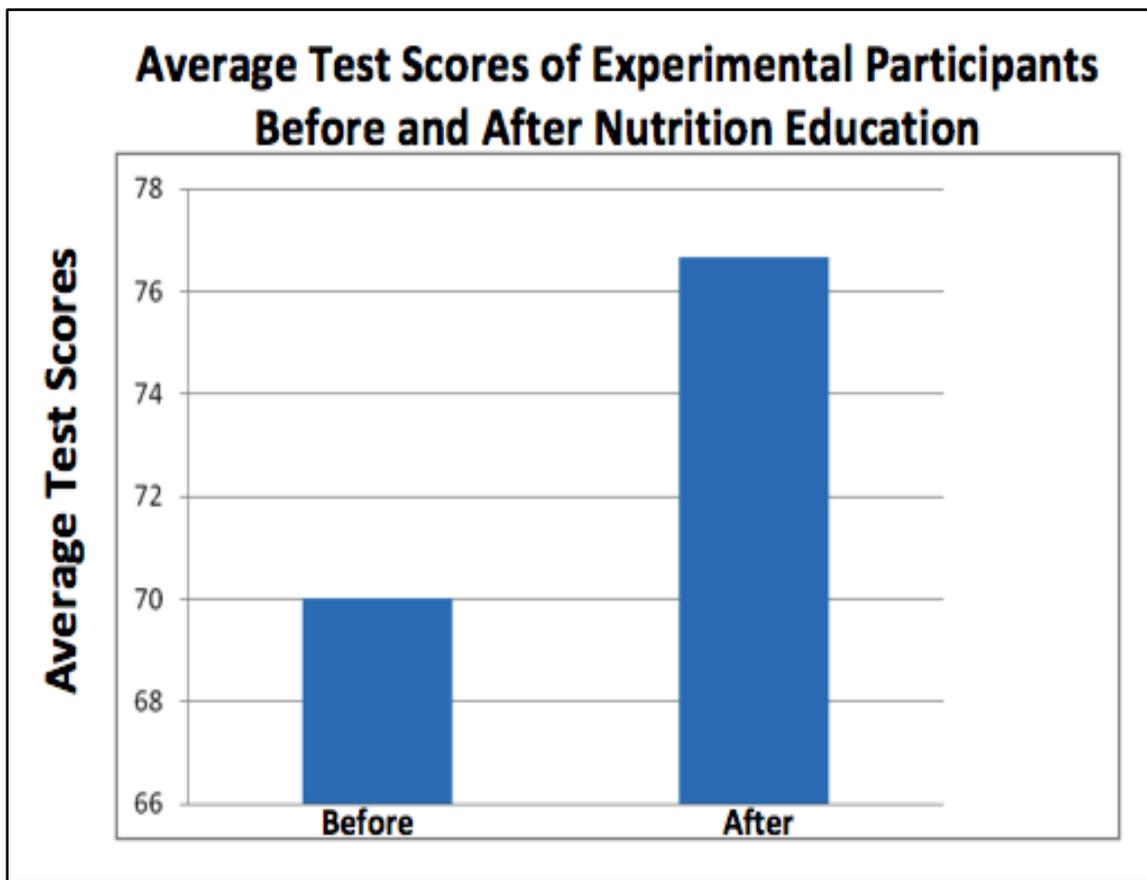


Table 2

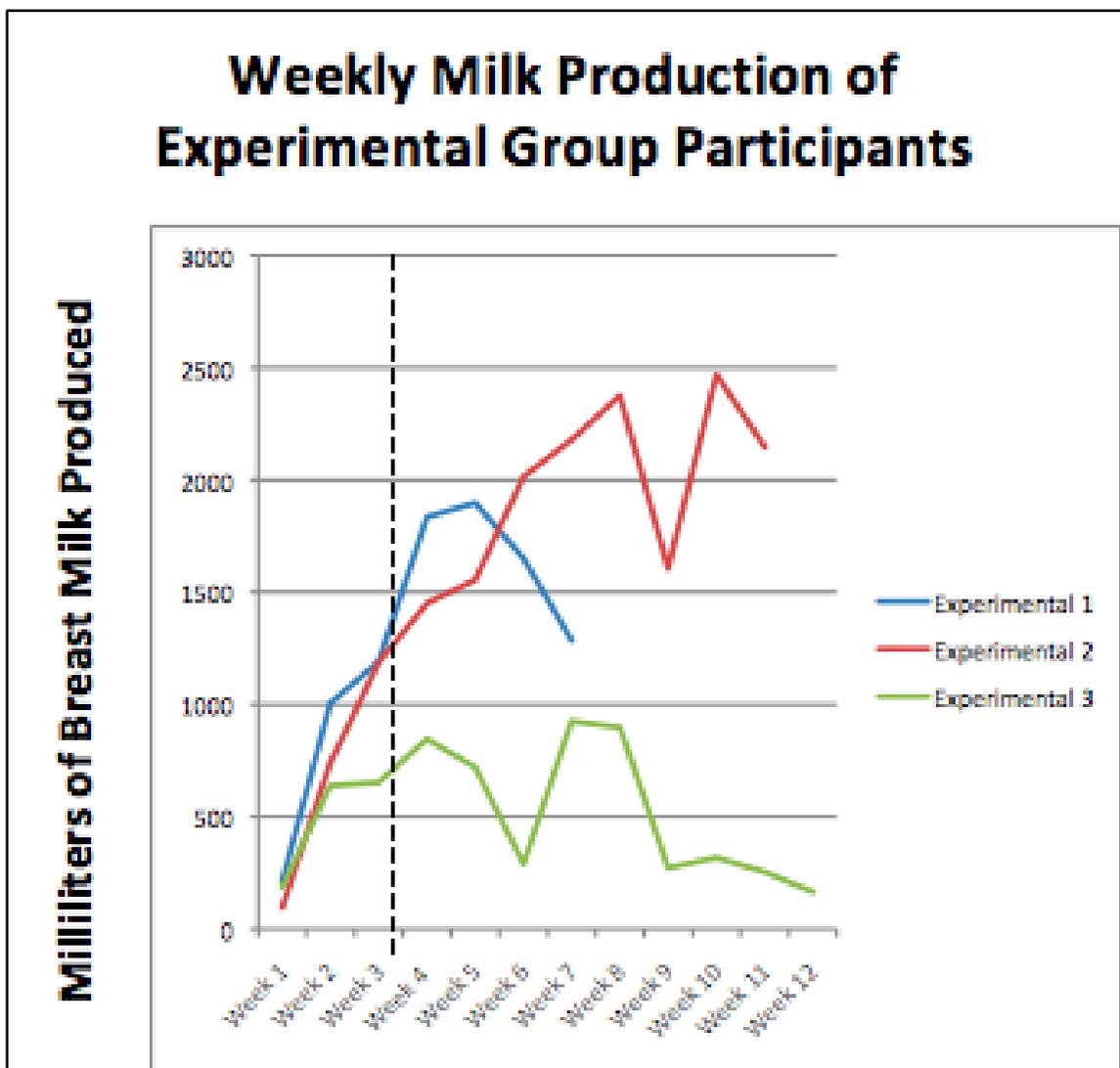
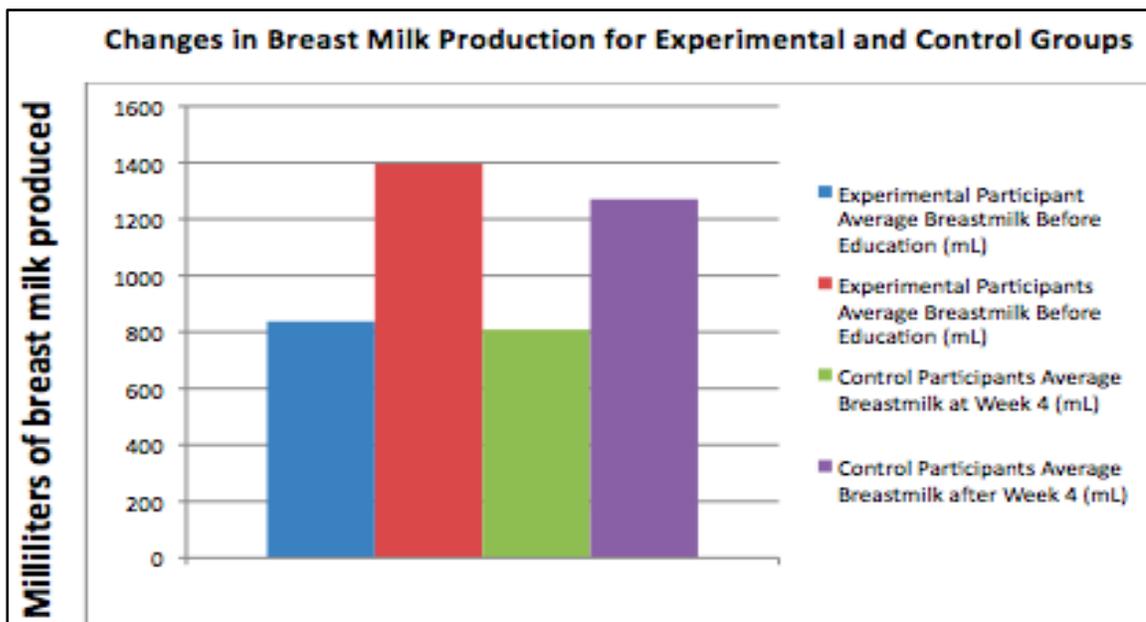


Table 3



CONCLUSIONS

The importance of breastfeeding is acknowledged and endorsed by medical and dietetics professionals, especially with low-birth weight or premature infants in the NICU setting. Nutrition education from a registered dietitian should be designed specifically for mothers of infants in the NICU and should include the importance of breastfeeding, lactogenic foods, and a balanced diet. This type of nutrition education is effective in improving nutrition knowledge, volume of breast milk produced, and prolongation of breastfeeding.

Suggestions for Future Research

In the future, this study would best be performed over a longer period of time than the one and half years that the students had to complete the research. This would be helpful in recruiting and retaining more participants, as the NICU is a very stressful environment for both mother and baby, and adding another burden is not something that any research would want to do to this vulnerable population. By focusing on smaller samples during an extended period of time, researchers might also gain more qualitative data about what the participants enjoyed and disliked concerning the nutrition education and the research design as a whole.

DOCUMENTATION USED DURING RESEARCH

Participant Consent Form



**Department of Nutritional Sciences
Research Review Board**

**Texas Christian University
Fort Worth, Texas**

CONSENT TO PARTICIPATE IN RESEARCH

Title of Research: How Nutrition Education Affects Breastfeeding Mothers

Funding Agency / Sponsor: Baylor All Saints Hospital, Fort Worth, TX

Study Investigators: Nina Maloney and Maren Anderson

What is the purpose of the research? The purpose of this research is to determine the effect of nutrition education regarding breastfeeding and lactogenic foods on breastfeeding practices, milk volume, and nutrition knowledge of mothers of babies less than 1500 g in the NICU setting.

How many people will participate? Ten mothers will participate in the study; 5 control and 5 experimental. The experimental group will consist of 5 first-time mothers who are willing to participate and currently have babies in the NICU. The 5 control participants will come from data collected at Baylor All Saints Hospital.

What is my involvement for participating in this study? Your involvement for participating in this study is (1) completing a questionnaire/24 hour food record prior to receiving nutrition education; (2) receiving nutrition education from a registered and licensed dietitian; (3) completing a post-nutrition education questionnaire/24 hour food record; and (4) completing an evaluation of your nutrition education experience and thoughts on the nutrition education. Nursing staff at Baylor All Saints will be collecting data on how much breastmilk you produce.

How long am I expected to be in this study for and how much of my time is required? You are expected to be in this study for the length of time that your baby remains in the hospital. The questionnaire/food record should take 5 minutes to complete. Nutrition education will take 15 minutes, and the post nutrition education questionnaire/food record will take 5 minutes.

What are the risks of participating in this study and how will they be minimized?

There are no serious risks of participating in this study, however, you will be expected to reveal potentially sensitive information regarding what you eat for a 24 hour period and the volume of breast milk produced.

What are the benefits of participating in this study? The benefits of participating in this study are to receive free nutrition education about breastfeeding and to increase the body of knowledge concerning the importance of nutrition education.

Will I be compensated for participating in this study? There will be no compensation for participating in this study.

What is an alternative procedure(s) that I can choose instead of participating in this study? You may choose not to participate in this study, or you may choose to withdraw from the study once it has begun.

How will my confidentiality be protected? All patient confidentially will be protected by not using any patient names, date of birth, or hospital identifiers on any documents. Patients will be identified by the date that they were admitted to the hospital.

Is my participation voluntary? Yes, your participation is voluntary.

Can I stop taking part in this research? Yes, you may stop taking part in this research.

What are the procedures for withdrawal? The procedures to withdraw from the study are to inform the investigators of your intent to withdraw.

Will I be given a copy of the consent document to keep? Yes, you will be given a copy of the consent document.

Who should I contact if I have questions regarding the study?

For questions regarding this study, please contact:

Maren Anderson (405) 488-8539 or Nina Maloney (817) 909-1590

Cindy Floyd, RD, LD (940) 452-1064, or Dr. Mary Anne Gorman (817) 257-6319

Who should I contact if I have questions regarding my rights as a study participant?

Dr. Lyn Dart, Chair, Department of Nutritional Sciences Research Review Board

Telephone 817-257-6321

Dr. David Cross, Chair, TCU Institutional Review Board,

Telephone 817 257-6416.

Your signature below indicates that you have read the information provided above, you have received answers to all of your questions and have been told who to call if you have any more questions, you have freely decided to participate in this research, and you understand that you are not giving up any of your legal rights.

Participant Name (please print):

Participant's Signature: _____

Date: _____

Investigator's Signature: _____

Revised July 2012

Pre-Test Questionnaire**Texas Christian University****Pre-Nutrition Education Questionnaire**

This questionnaire is to be filled out by the study participant before receiving nutrition education. Please answer all questions as thoroughly as possible. Thank you for your time!

1. For how many months is it recommended that mothers breastfeed exclusively (no additional food is given to the baby)?

- a. 8 months
- b. 1 year
- c. 2 months
- d. 6 months

2. Which statement is true about breastfeeding?

- a. Babies who are breastfed talk sooner than non-breast fed babies
- b. Breast milk is identical from mother to mother
- c. Breastfeeding promotes strong bonding between mother and baby
- d. Breastfeeding causes less bleeding for the baby after birth

3. True or False: Beans are considered to be a lean protein source that is important in a healthy diet for breastfeeding mothers.

- a. True
- b. False

4. All of these are health benefits for mothers who breastfeed except:

- a. Decreased risk of developing ovarian cancer
- b. Decreased risk of developing breast cancer
- c. Decreased risk of developing anemia
- d. Decreased risk of developing diabetes

5. All of these are examples of foods to eat to increase your milk supply except:

- a. Cinnamon
- b. Garlic
- c. Sweet Potatoes
- d. Oats

6. True or False: Breastfed babies have higher IQs than non breastfed babies.

- a. True
- b. False

7. Which of the follow food items is a good food for increasing milk supply?

- a. Onions
- b. Potatoes
- c. Lentils
- d. Artichokes

8. When breastfeeding, it is important to consume a diet high in:

- a. Fluids
- b. Vitamins and Minerals
- c. Fat
- d. Milk

9. True or False: Breastfeeding can cause decreased bleeding for the mother after birth.

- a. True
- b. False

10. All of these are true about the benefits of breastfeeding for the mother except:

- a. Better immune system function
- b. Uterus returns to normal size faster
- c. More weight loss
- d. Faster return to pre-pregnancy weight

Pre-Education Food Recall

Texas Christian University

24 Hour Food Record

This 24 hr food record to be filled out by the study participant before they receive nutritional education. Please complete as thoroughly as possible. Thank you for your time!

List foods and beverages consumed as well as estimated amount of food consumed

Example:

1 cup Cheerios with ½ cup 2% milk, one medium banana

Morning Meal:

Afternoon Meal:

Evening Meal:

Snacks:

Fluids Consumed:

1-2 cups 3-4 cups 5-6 cups 6-7 cups 8-9 cups 10 or more

Post-Education Questionnaire

Texas Christian University

Post-Nutrition Education Questionnaire

This questionnaire is to be filled out by the study participant after receiving nutrition education. Please answer all questions as thoroughly as possible. Thank you for your time!

1. For how many months is it recommended that mothers breastfeed exclusively (no additional food is given to the baby)?

- a. 8 months
- b. 1 year
- c. 2 months
- d. 6 months

2. Which statement is true about breastfeeding?

- a. Babies who are breastfed talk sooner than non-breast fed babies
- b. Breast milk is identical from mother to mother
- c. Breastfeeding promotes strong bonding between mother and baby
- d. Breastfeeding causes less bleeding for the baby after birth

3. True or False: Beans are considered to be a lean protein source that is important in a healthy diet for breastfeeding mothers.

- a. True
- b. False

4. All of these are health benefits for mothers who breastfeed except:

- a. Decreased risk of developing ovarian cancer
- b. Decreased risk of developing breast cancer
- c. Decreased risk of developing anemia
- d. Decreased risk of developing diabetes

5. All of these are examples of foods to eat to increase your milk supply except:

- a. Cinnamon
- b. Garlic
- c. Sweet Potatoes
- d. Oats

6. True or False: Breastfed babies have higher IQs than non breastfed babies.

a. True

b. False

7. Which of the follow food items is a good food for increasing milk supply?

a. Onions

c. Lentils

b. Potatoes

d. Artichokes

8. When breastfeeding, it is important to consume a diet high in:

a. Fluids

c. Fat

b. Vitamins and Minerals

d. Milk

9. True or False: Breastfeeding can cause decreased bleeding for the mother after birth.

a. True

b. False

10. All of these are true about the benefits of breastfeeding for the mother except:

a. Better immune system function

c. More weight loss

b. Uterus returns to normal size faster

d. Faster return to pre-pregnancy weight

Post-Education Food Recall
Texas Christian University
24 Hour Food Record

This 24 hr food record to be filled out by the study participant after they receive nutritional education. Please complete as thoroughly as possible. Thank you for your time!

List foods and beverages consumed as well as estimated amount of food consumed

Example:

1 cup Cheerios with ½ cup 2% milk, one medium banana

Morning Meal:

Afternoon Meal:

Evening Meal:

Snacks:

Fluids Consumed:

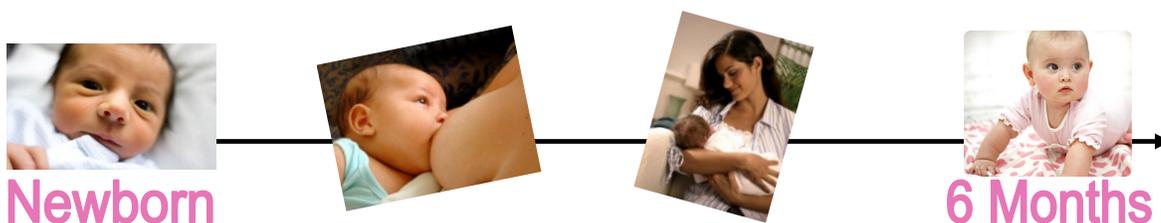
1-2 cups 3-4 cups 5-6 cups 6-7 cups 8-9 cups 10 or more

Exit Evaluation

1. How successful did you feel after the completion of the education?
2. Were the recipes easy to prepare?
3. Were the lactogenic foods easy to find?
4. Did you find the education helpful?
5. Would you recommend breastfeeding education to other people?
6. Would you take part in breastfeeding education again?

Educational Handout 1

Feeding Your Newborn Baby



Newborn

6 Months

The U.S. Surgeon General recommends that babies be fed exclusively breast milk for the first six months of life. There are many benefits of breastfeeding for baby and for mother.

Benefits for Baby

- Strong bonding with mother during breastfeeding
- Best source of nutrients to help baby grow
- Better immune system and ability to fight off disease
- Higher IQ and intelligence later in life
- Less risk of baby developing high blood pressure, diabetes, and heart disease later in life
- Less risk of Sudden Infant Death Syndrome (SIDS)



Benefits for Mom

- Strong bonding with baby during breastfeeding
- More weight loss and faster return to weight before pregnancy
- Uterus returns to normal size faster
- Less bleeding after birth
- Can be a method of birth control
- Less risk of developing breast and ovarian cancer
- Less risk of developing diabetes

Educational Handout 2

What Foods Are Best While Breastfeeding my Baby?

While breastfeeding your baby, it is important to consume a diet that is high in foods that are full of vitamins and minerals. This includes whole grains, fresh fruits and vegetables, and lean protein foods, such as chicken, fish, nuts, and beans.



If you have a small milk supply, or are worried that you will not be able to produce enough milk, you can try eating some of these foods and spices to increase your milk supply!



- Oats
- Barley
- Sweet Potatoes
- Lentils
- Dark green, leafy vegetables

- Fennel Seed
- Brewer's Yeast
- Garlic

For more information, please visit: www.mobimotherhood.org or speak with your Dietitian

Thank-you Letter

March 1, 2013

Dear _____,

I am writing to you to thank you for your participation in the research project completed in the NICU at Baylor All Saints. As one of the participants in this research, you were an integral part in its completion. This study was designed by two TCU students to prove the efficacy of breastfeeding education by a Registered Dietitian in the setting of the Neonatal Intensive Care Unit. Participants were asked to complete a pre-education test and 24 hour food recall prior to receiving breastfeeding education, as well as these same documents after the education session was complete.

The results of the study have been concluded as _____.

Thank you again for your invaluable participation in the research study.

Sincerely,

Maren Anderson, TCU Student

Nina Maloney, TCU Student

Cindy Floyd, RD LD, NICU Dietitian

REFERENCES

References:

1. Drivdal, A., & Pereira, G. (2011). *Facts for life: Why is breastfeeding important?* Retrieved 09/28, 2012, from http://www.unicef.org/mozambique/media_9256.html
2. U.S. Department of Health and Human Services. (2012). *Breast feeding*. Retrieved 09/28, 2012, from <http://www.nlm.nih.gov/medlineplus/breastfeeding.html>
3. Centers for Disease Control and Prevention. (2010). *Breastfeeding*. Retrieved 09/28, 2012, from <http://www.cdc.gov/breastfeeding/faq/index.htm>
4. Eckhart, D. EdH CNPN, Reifsnider, E. PhD, WHNP. Prenatal Breastfeeding Education: Its Effect on Breastfeeding Among WIC Participants. *Journal of Human Lactation*. 1997; 121-125.
5. Thakur SK, Roy SK, Paul K, Khanam M, Khatun W, Sarker D. Effect of nutrition education on exclusive breastfeeding for nutritional outcome of low birth weight babies. *European Journal of Clinical Nutrition*. 2012; 376-81.
6. Renfrew MJ, McCormick FM, Wade A, Quinn B, Dowswell T. (2012). Support for breastfeeding mothers. *Cochrane Database of Systematic Reviews 2012*, 1(5)

Other resources:

7. Carney, G. (2008). Complementary nutrition during lactation. *AND Pediatric Nutrition*, 32(1), 1-2-5.
8. Chong, H. L., & Gould, J. B. (2009). Factors influencing breast milk versus formula feeding at discharge for very low birth weight infants in california. *The Journal of Pediatrics*, 65(5), 657-658-662.
9. McKechnie, A. (2009). Maternal variables influencing duration of breastfeeding among low-income mothers. *ICAN*, 1(3), 126-127-132.
10. Nice, F. J. (2011). Common herbs and foods used as galactogogues.3(3), 129-130, 131, 132.

11. Pineda, R. (2011). Direct breast-feeding in the neonatal intensive care unit: Is it important? *Journal of Perinatology*, 31, 540-541-545

ABSTRACT

The importance of breastfeeding is widely known throughout the medical community, yet less than fifteen percent of babies are exclusively breastfed until the recommended age of six months. The present study determined the effect of nutritional counseling, including the importance of breastfeeding, lactogenic foods, and a balanced diet, on nutrition knowledge and milk production in breastfeeding mothers of babies in the NICU. Factors assessed included both pre- and post-nutrition knowledge regarding breastfeeding and other nutrition information, a 24-hour diet recall, and the amount of milk produced by the mother during the child's stay in the NICU. Participants were chosen randomly from mothers of babies who weighed 1500 grams or less at birth. A total of 5 mothers were included in the Control Group and 3 mothers were in the Experimental Group. This type of breastfeeding nutrition education can be effective in improving nutrition knowledge, volume of breast milk produced, and the continuation/prolongation of breastfeeding when delivered to breastfeeding mothers of babies in the NICU.