

**An Internal Evaluation of the  
Lactation Education Course at  
California State University, Northridge**

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**Prepared for**

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**May 2014**

## **Abstract**

The USDA-NIFA Breastfeeding Education Grant at CSUN focuses on increasing the professional competencies of Hispanic graduate nutrition science students in the area of lactation education. The present objective is to assess current students (Spring 2014) in the Lactation Education course offered by the Health Sciences Department at California State University, Northridge. Participants in the evaluation took self-report questionnaires and a lactation competency assessment at the end of the course.

Students in the breastfeeding course had significantly greater knowledge of breastfeeding practices than students in the program evaluation control group. In addition, students in the breastfeeding class had much more positive attitudes about breastfeeding, and they reported that the course helped change their attitudes about breastfeeding in a positive way. Although these results seem promising and the study provided descriptive data that could be used to guide future research, no meaningful generalizations can be made from these data due to limitations in the methodological design of the study. Suggestions for improving the methodological design are discussed.

## **I. Introduction**

The USDA-NIFA Breastfeeding Education Grant focuses on increasing the professional competencies of Hispanic graduate nutrition science students in the area of lactation education by June 30, 2016. There are about twenty-five participants in this program; they are currently taking the Lactation Education course (HSCI-496LA) that is being offered through the grant. The program has two key activities: (a) developing and offering the nutrition science graduate students a course in lactation education, and (b) developing and offering a lactation education practicum experience for Hispanic graduate nutrition science students.

The center for this program is located on the California State University, Northridge campus. The center is familiar with the core issue underlying this program, i.e., despite tremendous health benefits linked with breastfeeding, many women do not breast-feed their babies. The center reports that breastfeeding rates are particularly low among low-income women. Further, a serious challenge in educating and supporting breastfeeding mothers is the lack of healthcare professionals who are trained in the core competencies of lactation. These issues motivated the grant; the Lactation Education Course and Lactation Education Practicum were developed to address these problems.

The program currently lacks data on the status and results. They need to evaluate their graduate students on how knowledgeable they are on the lactation competencies. They want to evaluate the extent to which the graduate students who are taking the lactation education course comprehend the “United States Breastfeeding Committee Core Competencies in Breastfeeding Care and Services for All Health Care Professionals.” They want the questions asked to be knowledgeable, skill-related questions. The Lactation Education Course is to be evaluated, not the Practicum. The course is open to all students. The center wants the graduate students in this course, which is open to all students, to be evaluated, since they will be potential future lactation educators or consultants.

The center wants the graduate students who are taking the Lactation Education Course to follow-up later with the lactation practicum. The center wants to see that the Lactation Education Course is actually educating the graduate students on the lactation competencies, and that the students feel ready to go out and educate others on these competencies. The stakeholders for this grant are (a) the graduate students who are being educated to become lactation consultants, (b)

the healthcare professionals who will be working with these future lactation educators, and (c) the pregnant women who will need help with breastfeeding

## **II. Statement of the Problem**

Positive outcomes have been associated with breast-feeding, particularly in infant health and health and attachment. Therefore, there is a movement toward increasing breastfeeding, particularly in populations where there is a low percentage of mothers who breast-feed. To increase breastfeeding among identified populations, a course at California State University, Northridge (HSCI 496LA: Lactation Education), supported by a grant from the United States Department of Agriculture (USDA), will be designed to train future lactation specialists in breast feeding education for low income Latinas. A tool will be developed to assess the effectiveness of the class in imparting knowledge, skills, and attitudes (as developed by the United States Breastfeeding Committee - USBC) as a result of attending a breastfeeding class, as well as assessing student satisfaction with the course. The purpose of this study will be to determine the reliability of the evaluation instrument.

## **III. Literature Review**

There is a stark difference between human milk and artificial formula milk. Human milk “is species-specific, and all substitute feeding preparations differ markedly from it, making human milk uniquely superior for infant feeding” (Gartner, 2005). As detailed by Gartner (2005), in 1997 the American Academy of Pediatrics published the policy statement “Breastfeeding and the use of Human Milk,” and since then scientists and researchers have focused on finding the core benefits of breastfeeding and how it helps society as a whole. The policy statement held studies in pre-term and term infants, to find the experience of breast-fed infants in comparison to formula-fed infants. In third-world countries there is sufficient evidence that breast-fed infants have a decrease in the incidence and/or severity of a range of infectious diseases. Also, in the United States, a staggering 21 percent of infants who were breast-fed were less likely to suffer from mortality.

Infants who are breast-fed have been associated with “slightly enhanced performance on tests of cognitive development” (Gartner, 2005). Aside from the benefits an infant receives breastfeeding, the mother also benefits, for example, “decreased postpartum bleeding and more rapid uterine involution attributable to increased concentrations of oxytocin, earlier return to pre-pregnancy weight, decreased risk of breast cancer” (Gartner, 2005). The community benefits

from a mother breastfeeding her infant include: (a) decreased health care costs, (b) decreased costs for public health programs such as WIC, and (c) decreased environmental costs from using fewer bottles (Gartner, 2005). Research has shown that not only the mother and infant benefit from breastfeeding, but there needs to be an increase in encouraging and promoting breastfeeding and showing how the entire community benefits from mothers breastfeeding their infants.

Faraz (2010) examined factors that affect Hispanic women's decision to bottle feed, rather than breast feed, in order to counter the unfavorable trend. He found that the decline in breast feeding appears to be a result of several factors: the belief that bottle feeding is the "American way" and the subsequent desire to adapt to that belief; recommendations from hospital staff regarding formula supplementation; and fewer family members in the country to support and guide breastfeeding. Further, he found that those who were more acculturated tended to breast-feed, not because of the influence of educators, but because they were more likely to be influenced by family and friends, who also tended to be more acculturated and aware of the benefits of breastfeeding. This pointed to the importance of involving family and friends in promoting breastfeeding.

Acculturation appeared to be an important factor in affecting the decision to breast-feed. In addition to acculturation, interpersonal support, self-efficacy, and immediate competing demands were influential in determining whether or not to breast-feed. However, the most important determining factor was the amount of social support in favor of breast-feeding.

Faraz (2010) surveyed the use of a scale to determine confidence and self-efficacy; these factors have been found to influence the achievement of health-promoting behaviors. It was found that the instrument could identify high risk to prematurely discontinue breastfeeding; however, further research is needed to determine the efficacy of this tool for Hispanic mothers.

Support from the community was found to be important as well. The *La Leche League*, composed of volunteer mothers, was developed to support communication between mothers and spouses, employers, and healthcare providers. Additional culturally sensitive programs have been developed, such as *fotonovelas*, which are photographic booklets with often-romantic stories that discuss health issues and offer education and support.

In developing a program, Faraz (2010) found that it is important that clinicians help Hispanic women conduct thorough intakes and develop personalized plans during prenatal

visits that incorporate Hispanic culture. Effective and regular follow-up and support is also very necessary, with family members and close friends identifying how they will support the breastfeeding mother.

The following clinical guidelines incorporate evidence-based recommendations for supporting new Hispanic mothers living in the United States.

A.P. Cleveland and S. McCrone (2005) to measure breast-feeding confidence in mothers developed the Breastfeeding Personal Efficacy Beliefs Inventory (BPEBI). It is based on Bandura's self-efficacy theory, which conceptualizes personal efficacy beliefs (perceived self-efficacy) as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments."

The researchers conducted a preliminary evaluation of their BPEBI to support breastfeeding promotion research. Their preliminary evaluation used 479 volunteers who returned the BPEBI after it was mailed to 700 randomly selected female students enrolled at a university in West Virginia. They report an internal consistency reliability of 0.89.

Cleveland and McCrone (2005) found five factors from an exploratory factor analysis (viable eigenvalues ranged from 7.3 to 1.2) consistent with the conceptual basis of the inventory. They named the factors Confidence to: Manage Duration, Manage Technique with Social Support, Manage Motivation, Manage Different Environments, and Manage Possible Challenges. Total variance explained by these five factors was 52.7%. The authors recommended additional reliability and validity assessments with ethnically and academically heterogeneous women with different breast-feeding experience.

The authors concluded that the BPEBI addresses an important worldwide health issue, and were designed to measure the self-efficacy of adult women for the purpose of health promotion. The instrument assesses breast-feeding confidence and supports the development of interventions for women as they have children and make decisions about breast-feeding. The authors claim that the BPEBI has demonstrated preliminary reliability and validity. They suggest and hope that continued testing will further evaluate this instrument for use with a variety of populations of women and among women with different breast-feeding experience.

Breastfeeding promotion has been identified as a critical component to increasing initiation and duration of breastfeeding rates worldwide, however, lack of breastfeeding knowledge and competency among healthcare workers has been identified as a key barrier to

success. In response, Radcliff & Payne (2011) designed a study to increase competency among nutrition and dietitian undergraduate students at a large university in Australia through a process that included assessment, intervention, and evaluation of breastfeeding curriculum.

Due to the absence of an extant validated assessment tool, a panel of experts created a 50-question survey. The survey included questions on: knowledge-based content, attitudes and beliefs about breastfeeding, the training the respondent received, and students' future intentions with regard to breastfeeding. Furthermore, with the authors' interest on the impact of participants' attitudes and behaviors, Radcliff & Payne (2011) incorporated Daneault's Theory of Planned Behavior which looks at personal attitudes, perceived social pressure, and perceived behavioral control. First-year students were surveyed in 2005 as a baseline evaluation, with curriculum interventions integrated throughout the program to address the deficiencies identified at baseline. Post-intervention surveys were given to final-year undergraduate students in 2010. Results showed that while there were increases in basic knowledge, attitudes and beliefs about breastfeeding, some areas, such as when to stop breastfeeding and the risks associated with not breastfeeding, showed little to no increase in knowledge. However, there were significant increases in the students' interest in work involving breastfeeding and in their perceptions about their exposure to information on breastfeeding.

The authors concluded that the results show curriculum intervention can have an influence on new graduates' intent to promote breastfeeding by improving knowledge gaps and addressing attitudes, beliefs and social issues. However, because their survey was not validated, was only given to one cohort, and showed many instances where knowledge did not increase or increased very little between baseline and post-intervention, these conclusions may be unreliable.

An important concern in developing breastfeeding tools and curriculum is having an adequate theoretical foundation. In their study, Schlickau and Wilson (2004) integrated the Health Promotion Model (HPM; Pender et al., 2002) as it has been utilized as a behavioral perspective application in the education of health professional. These authors explored the literature for possible breastfeeding promotion techniques for the female Hispanic population. Hispanic women were the primary focus of their research as the US Census reports a 4.5% increase in the number of Hispanics in the United States by the year 2020. Therefore, the sponsorship of breastfeeding as a health-promoting behavior in this growing group will serve for a healthy start of life for newborns. The needs specific to this population are of special interest,

namely the effects of returning to work on breastfeeding-mothers. Returning to work as a barrier to continue breastfeeding was addressed at length by Witters-Green (2003). Similarly, the current program focuses on the breastfeeding-knowledge implementation for Hispanic women in the Health Sciences Master's program at California State University, Northridge. This group is identified as being effective servicers to the local community in the lactation-consulting domain.

#### **IV. Evaluation Framework**

The present evaluation will examine the current use of a USDA-NIFA Breastfeeding grant in order to track progress for long-term goals. It is the organization's goal to: (a) increase the enrollment of Hispanic graduate nutrition science students from 9% to 18% by June 30, 2016; (b) increase the two year graduation rate of Hispanic graduate nutrition science students from 36% to 45% by June 30, 2016; and (c) increase the professional competencies of 72 Hispanic graduate nutrition science students in the area of lactation education by June 30, 2016.

The present objective is to assess current students (Spring 2014) in the Lactation Education course offered by the Health Sciences Department at California State University, Northridge. Participants in the evaluation will take part in self-report questionnaires and lactation competency assessment during the regularly scheduled class time at the end of the academic semester.

#### **V. Method**

The study population for the USDA Breastfeeding study consisted of twenty-six students who are currently enrolled in the HSCI-496LA course, which is being offered at California State University, Northridge (CSUN). The sampling frame for this study was that of students who are currently enrolled in the HSCI-496LA course. There was also a control comparison group of twenty-five students who are enrolled in a program evaluation course, SOC 572, also at CSUN.

Paper-and-pencil surveys were administered during the regularly scheduled class to both groups. Participants in the breastfeeding course were also given a second copy of the survey to complete at home during the week. However due to the lack of experimental control, these post surveys were not analyzed. The survey assessed knowledge, attitudes, and skills on content related to breastfeeding. Greater proportion correct on knowledge and skills, and more positively valence attitudes indicates greater success of the lactation course intervention. Specifically, high knowledge and confidence in knowledge is classified by a minimum of 90% correct on scales.



Positive attitudes are defined as having 90% total agreement with positively valence items on the attitudes portion of the scales.

For the study, a questionnaire was developed based on the USDA core competencies. A short survey with Likert-type items, exploring the students' perceptions of the course and their opinions on their preparation to apply the concepts in practice was also developed. The questionnaire and survey were be integrated into the class examination package and tested knowledge, skills, and attitudes. There were three major sources that were adapted to create the survey tool: Radcliff and Payne (2011), Jepson-Sullivan, and Parker (2005).

Quantitative:

*Participants.* The participants in the intervention ( $n = 26$ ) were mostly female (96%), under the age of 25 (72%), undergraduate students (84%), did not have children (84%), and had never been married (84%); see Table 1.

*Materials.* Attitudes questions were selected from the United States Breastfeeding Committee's Core Competencies (2010).

Qualitative:

A single qualitative question was included on the Breastfeeding Assessment Survey. The students enrolled in the lactation education course (HSCI496LA) who completed the initial survey ( $N = 26$ ) were asked to complete this question. The question was: In the space provided below, please describe how this course has influenced your views towards breastfeeding.

Using the United States Breastfeeding Committee Core Competencies (USBC, 2010) as a framework, the responses were coded, categorized and sub-categorized in an effort to recognize themes and patterns.

## **VI. Results**

Quantitative:

*Knowledge.* Independent sample's t-test revealed the students in the breastfeeding course ( $M = 17.81$ ,  $SD = 2.94$ ) preformed significantly better than the control program evaluation course ( $M = 13.32$ ,  $SD = 2.27$ ) on knowledge related questions,  $t(49) = 6.087$ ,  $p < .001$ . This difference is also present when the knowledge section is partitioned into questions related to content and procedural knowledge,  $t(49) = 3.70$ ,  $p = .001$ , and  $t(49) = 6.78$ ,  $p < .001$ , respectively (Table 2).

However, item-by-item chi-square tests revealed only a few (8 of 20) significant differences (Table 3 & 4).

*Attitudes.* The lactation consultant course intervention group displayed far more positive attitudes towards and beliefs about breastfeeding in comparison to the program evaluation course participants (Table 5).

*Skills.* There were not clear differences between the intervention and control groups in regards to skills, except when the skill required was in regards to the role of a lactation consultant (Table 6 & 7).

*Satisfaction.* Participants in the lactation consultant course presented overwhelmingly positive satisfaction with the course (Table 8).

Qualitative:

A single qualitative question was included on the Breastfeeding Assessment Survey. The students enrolled in the lactation education course (HSCI496LA) who completed the initial survey (N=26) were asked to complete this question. The question was: In the space provided below, please describe how this course has influenced your views towards breastfeeding.

Every respondent answered the question, and many offered rich, descriptive data, which provided the opportunity for in-depth analysis of the question. Using the United States Breastfeeding Committee Core Competencies (USBC, 2010) as a theoretical framework, three overarching categories were identified: Knowledge, Attitudes, and Agents of Change. The category Attitudes was then divided into three subcategories: Values, Myths and Barriers, and Self-Efficacy. Agents of Change was divided into two subcategories: Now and Future.

*Knowledge.* All 26 of the respondents included some mention of the knowledge they had gained about breastfeeding as a result of this course. The Knowledge portion of the USBC Core Competencies lists a range of topics which health professionals should understand, including physiology and anatomy of the breast, health benefits to the mother and infant, and adverse effects of not breastfeeding (USBC, 2010, pg. 4). Respondents answers such as, “Now that I have taken this class I understand the workings of breastfeeding, and the dynamics that go along with it, from ... physiology to positioning and latching.”; “I didn’t know all the things your breasts has to go through when preparing to breast-feed exclusively [like] your nipples need stimulation”; “This course has allowed me to understand the benefits of breastfeeding, and how

much on average the baby will want to eat ...”; and “this course helped me understand the pros of breastfeeding and the cons of formula” are all examples of students gaining understanding within the guidelines of the USBC Core Competencies.

*Attitudes.* The Attitudes portion of the USBC Core Competencies addresses issues related to the health professional’s values and personal biases related to breastfeeding, as well as the ability to “recognize and respect philosophical, cultural, and ethical perspectives influencing the use and delivery of breastfeeding care and services” (USBC, 2010, pg. 4) This includes understanding barriers and myths, and feeling confident to communicate and educate.

*Values.* 10 of the 26 respondents (38.5%) specifically mentioned that the course had changed their values about breastfeeding. One respondent reported that because of the course, “I have more respect for the commitment and dedication it takes to exclusively breast-feed”, while another said, “Before, when I used to see mothers breastfeeding in public, I would think ‘How are they not embarrassed?’ However, today I do not see it as embarrassing at all. It is natural and beautiful”. The course even changed the way some feel about breastfeeding, personally, with several saying things, such as, “This class has made me want to exclusively breast-feed my child”, “Because of the knowledge gained in this class, I will breast-feed whenever I have children”, and “It helped me come to the conclusion that I do want to breast-feed my children one day.” Perhaps the most interesting value shift came from one respondent who said, “Now, I almost attribute people’s shortcomings to lack of breastfeeding. Although that is a little extreme to say, this class documents the importance of breastfeeding in all aspects of life. It is the best thing a mother can do for her baby”

*Myths and Barriers.* 11 of the 26 respondents (42.3%) mentioned that the course helped them understand barriers to breastfeeding and/or dispelled myths that they had about it. Several respondents addressed the issue of myths and how to deal with them, saying things like “When people throw out myths about breastfeeding and I don’t know the answer I will go to the book and search for it”, and “[I know] the best methods to address myths, concerns or problems mothers have.” One respondent pointed out that myths like not breastfeeding when sick are barriers and that “knowing that such issues can’t interfere with breastfeeding helps to have a

more positive attitude toward this behavior.” Another barrier that was mentioned by several respondents was lack of support, with one respondent noting, “I learned about the barriers new mothers experience – lack of support from family and friends, embarrassment due to stigma of breastfeeding in public, lack of support at work/school places”, and another saying, “It made me aware of the lack of support and utility needed by women and families for a healthy breastfeeding experience, in addition to combating social norms, socioeconomics, different cultural and ethnicity needs/understanding.”

*Self-efficacy.* 2 of the 26 (7.8%) respondents specifically mentioned that as a result of taking this course they feel empowered to teach. The first respondent reported that she “Feel(s) confident enough to educate mothers, fathers and family members why it is important to breast-feed.” The other said, “I have always had very positive views toward breastfeeding, but now that I have taken this class I fully understand how important breastfeeding is and how to educate others both pre and post-partum.” While there were only 2 respondents who specifically mentioned self-efficacy, we believe there is merit to considering this sub-category. Self-efficacy seems to be a valid component of the attitude changes being reported by the respondents, and is the one most closely connected to our final category, Agents of Change.

*Agents of Change.* The respondents reported gaining knowledge about, and changing attitudes toward, breastfeeding as a result of being students in the lactation education course (HSCI496LA). In addition to this, many respondents spoke of becoming agents of change, both now and in the future, in the field of breastfeeding promotion.

1) Now: 11 of the 26 respondents (42.3%) mentioned that as a result of taking this class they are now engaging in some form of breastfeeding promotion behavior. One respondent, who currently works in the healthcare field, said “I’ve already started implementing my knowledge into my current job by providing HR with suggestions to make our workplace more baby friendly.” Several have become agents of change within their families and communities, where they are working to overcome some of the cultural and/or other social barriers they are recognizing as a result of this course. One respondent shared, “This class has allowed me to notice how many people in my family did not breast-feed [and] has encouraged] me to teach on why these actions are damaging to infants and their own health” and another said, “The knowledge I have gained about breastfeeding has given me the opportunity to help my friends and family understand the

importance of it”, and yet another who said, “It has instilled a strong calling to help educate others in my neighborhood about the benefits.” One respondent said that as a result of the course she now has the “personal motivation to continue breastfeeding my four-month-old daughter”

2) Future: 8 of the 26 respondents (30.8%) mentioned that as a result of this class they have plans to continue working in the field of breastfeeding education in the future, including several who said things like, “I have a strong interest in incorporating lactation education into my long term career goal”, and, “I believe this course has expanded my knowledge about breastfeeding and has made me want to work in this specific area after graduating from CSUN.” Another respondent said simply, “This class makes me look forward to continuing my lactation education.” Several respondents claimed that as a result of the class they now plan to pursue lactation consultant certifications, like this respondent who said, “I definitely would like to take this class and move forward toward becoming an IBCLC (International Board Certified Lactation Consultant)”, or this one who said “This course has truly helped me confirm that I am becoming an IBCLC.”

Although this was a self-report question, the respondents all gave rich, descriptive answers (none were less than two sentences, most filled the whole page) and the responses showed anecdotal evidence of gains in breastfeeding knowledge, attitude changes regarding breastfeeding, and reports of personal behavior and goal changes related to breastfeeding promotion.

In summary, students in the breastfeeding course had significantly greater knowledge of breastfeeding practices than students in the program evaluation control group. In addition, students in the breastfeeding class had much more positive attitudes, and they reported that the breast feeding course helped change their attitudes about breastfeeding in a positive way. Although these results seem promising, no meaningful or accurate generalizations can be made from this data due to the methodological design of the study.

## **VII. Discussion**

Although valuable descriptive data that could be used to direct future research was obtained, this study has many limitations which could be better controlled, as discussed in the following paragraphs.

Sample size for both groups was small; therefore, many useful advanced statistical

techniques could not be used. For example, the idea of using item response theory would be interesting but, of course, this study is woefully under the minimum sample size to even consider using those types of statistical techniques. Also, a potential issue is that all of the students in the breastfeeding course are essentially a singular statistical unit, due to the likelihood that any scores obtained from the breastfeeding participants would be correlated due to their long-term shared experience in the class setting. One can overlook this in favor of obtaining useful data, but it would be ideal to have multiple sections of the same class to compare.

It is also difficult to compare breastfeeding and control groups because the breastfeeding group had chosen to enroll in a breastfeeding class, while the control group had not. Any group differences could be due entirely to a self-selection bias and not to any change created by the breast feeding course. It is easy to conceive that people in health-related majors have different initial attitudes about and knowledge of breast feeding than those in other majors.

Test-retest reliability could not be evaluated because the difference between testing conditions for the initial test and retest were dramatically different. In the initial test, students were in a classroom setting and researchers were there to instruct and provide directions to the participants. For the retest, participants took a survey home and were instructed to take the survey in similar conditions as they could to the classroom, but there was no control over how the participants took the retest. Any comparison between the two would be irrevocably confounded by the test location difference. In addition, there was a fairly poor response rate for the retest, only about half of the participants completed the second survey. Split half reliability, using Cronbach's alpha, was also impossible to assess due to the extremely small sample size.

Many improvements could be made in order to improve the reliability and validity of the breast feeding survey. In an effort to improve reliability, in an ideal world, several hundred people would be randomly assigned to either take the breast feeding course or be in a control group that does not take the breast feeding group. Participants would be assessed at the beginning of the course and at the end with multiple reliability analyses on that data.

Unfortunately, this is highly impractical. Students would be unlikely to participate in a study that would take a whole semester, if they didn't have some initial, internal motivation to take the class. Instead, a more viable alternative is to use the convenience sample of people who will be taking the course next semester, and give them the survey at the beginning and end of the course and perhaps additional time in between.

In order to achieve test-retest reliability from this sample, the researcher would need to be in full control of the conditions each time the survey is given to assure that the conditions are consistent. The survey tool would then be modified, as needed, based on the reliability results.

Several methods could be used to assess validity in the future. The most simple and convenient approach is to correlate students' test scores in the class with the knowledge-based questions on the survey. A better way to reach convergent validity is to contact students after taking the course to determine if they enter the lactation field and obtain at least a self-report assessment of how they felt the class affected their career choice and ability to perform in their profession. In addition, it would be valuable to assess the students' teaching ability at first hand in real world situations. Ideally this would be a professional, qualitative assessment of the participants' applied abilities.

With the proposed design changes (i.e., a larger sample size, better control over experimental conditions, and repeated use of the tool), this study has the potential to assess the efficacy of the breastfeeding class.

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## Appendix A: Tables

**Table 1.** Brief profile of intervention respondents

Characteristic	Intervention (n = 25)
Gender	
Female	96%
Male	4%
Age	
20-25	72%
26-30	16%
30+	12%
Student Status	
Undergraduate	84%
Graduate	16%
Have children	
No	84%
Yes	16%
Marital Status	
Never Married	84%
Married	12%
Divorced	4%

\*One respondent did not provide any demographic information

**Table 2.** Group Means on Content, Procedural, and Combined Knowledge

	Course	N	Mean	SD	<i>t</i>	df	<i>p</i>
Content	Breastfeeding	26	9.27	1.43	3.7	49	0.001
	Control	25	7.76	1.48			
Procedural	Breastfeeding	26	8.54	1.65	6.78	49	0.000
	Control	25	5.56	1.47			
Combined	Breastfeeding	26	17.81	2.94	6.09	49	0.000
	Control	25	13.32	2.27			

**Table 3.** Results for true or false questions relating to breastfeeding content knowledge

Content knowledge questions (correct answer)	Percentage of respondents		
	Intervention (n = 26)	Correct Answer Control (n = 25)	P- value <sup>(a)</sup>
Since breastfeeding requires additional calories, women who breastfeed may take longer to return to their pre-pregnancy weight. (False)	89%	72%	0.14
Infants who are breastfed are less likely to develop allergies and asthma than children who are formula fed. (True)	96%	84%	0.15
Infants who are formula fed are less likely to develop diabetes or become obese later in life compared to infants who are breastfed. (False)	92%	68%	0.03*
Women who breastfeed will likely decrease their risk for uterine, endometrial, breast and ovarian cancer. (True)	92%	84%	0.36
Breastfed infants will form a closer bond with the mother than formula-fed infants because of the increased skin-to-skin contact between the mother and child. (True)	96%	96%	0.98
Ear infections and diarrhea are less common in breastfed infants. (True)	96%	83%	0.13
Breastfeeding can decrease an infant's risk of sudden infant death syndrome (SIDS). (True)	92%	67%	0.03*
With the addition of ingredients such as docosahexaenoic acid (DHA), arachidonic acid (ARA), and iron, formula has become almost identical in composition to breast milk. (False)	96%	68%	0.008**
Breast milk changes in composition and volume produced depending on the age and needs of the infant. (True)	85%	76%	0.44
Breast milk and formula are equal in their digestibility. (False)	92%	84%	0.36

<sup>(a)</sup>Chi-square, \* $p < .05$ , \*\* $p < .01$ ,

\*\*\* $p < .001$

**Table 4.** Results for true or false questions relating to breastfeeding procedural knowledge

Procedural knowledge questions (correct answer)	Percentage of respondents		
	Intervention (n = 26)	Correct Answer Control (n = 25)	P- value <sup>(a)</sup>
A woman can produce more milk by increasing the frequency of breastfeeding. (True)	96%	76%	0.04**
If a breastfeeding women does not eat the recommended servings for all food groups for lactation, her breast milk will not be of adequate quality for infant growth. (False)	92%	24%	.001***
A mother will not be able to continue exclusive breastfeeding once she goes back to work or school. (False)	96%	80%	0.07
To avoid a decrease in length of breastfeeding duration, it is recommended that pacifiers be avoided until one week after birth. (True)	65%	71%	0.68
Babies should be fed on demand. (True)	85%	52%	0.01**
A woman will produce less milk by increasing the frequency of breastfeeding. (False)	96%	25%	.001***
The first sign a baby makes to communicate his or her hunger is crying. (False)	65%	24%	0.003**
Most babies who are breastfed will need supplemental formula during growth spurts. (False)	92%	83%	0.33
The amount of milk removed from a mother's breasts influences the amount of milk a mother produces. (True)	85%	80%	0.66
Breast fullness around 2 -3 days postpartum is a warning sign that breastfeeding is not going well. (False)	81%	38%	0.15

<sup>(a)</sup>Chi-square, \* $p < .05$ , \*\* $p < .01$ ,  
\*\*\* $p < .001$

**Table 5.** Attitudes and beliefs related to breastfeeding

Statement	Percentage of respondents				P-Value <sup>(a)</sup>
	Agree or strongly agree		Disagree or strongly disagree		
	Intervention	Control	Intervention	Control	
I value breastfeeding as an important health promotion and disease prevention strategy.	100%	96%	0%	4%	0.001***
I understand the importance of tailoring information and services to the family's individual needs. (culture, knowledge, or language level).	100%	96%	0%	4%	0.03*
I recognize the limitations of my own lactation knowledge and breastfeeding expertise.	92%	87%	8%	13%	0.04*
I have the ability to recognize when personal values and biases may interfere with breastfeeding care and services provided to families.	100%	74%	0%	26%	0.03*
I encourage workplace support for breastfeeding.	100%	83%	0%	17%	0.03*
I would support breastfeeding colleagues.	100%	96%	0%	4%	0.06
I would support family-centered policies at federal, state, and local levels.	100%	83%	0%	17%	0.05*
As a health professional, I believe it would be my responsibility to highlight the health problems associated with the use of infant/artificial formula when giving advice about infant feeding.	96%	84%	4%	16%	0.162
I am confident in my ability to educate others on the benefits of breastfeeding.	100%	53%	0%	47%	0.001***
I am confident in my ability to educate others on strategies to breastfeed discretely in public.	88%	35%	0%	65%	0.001***
I am confident in my ability to help mothers develop a plan to maintain their milk supply while they are separated from their baby.	88%	37%	12%	63%	0.002**
I am confident in my ability to educate mothers on strategies to build and maintain a good milk supply.	92%	42%	8%	58%	0.001***
I am confident in my ability to address most concerns a pregnant woman may have about breastfeeding.	88%	37%	12%	63%	0.001***
I am confident in my ability to provide breastfeeding mothers with the knowledge needed to meet their breastfeeding goals.	96%	42%	4%	58%	0.001***

<sup>(a)</sup>Chi-square, \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 6.** Results for the rating scale questions relating to breastfeeding skills

Statement	Percentage of respondents				P-Value <sup>(a)</sup>
	Agree or strongly agree		Disagree or strongly disagree		
	Intervention	Control	Intervention	Control	
In my professional capacity, I will be able to, directly or indirectly, influence a woman's decision to initiate breastfeeding.	100%	43%	0%	57%	0.001***
In my professional capacity, I will be able to, directly or indirectly, influence a woman's ability to reach her breastfeeding duration goal.	96%	48%	4%	52%	0.001***

<sup>(a)</sup>Chi-square, \*\*\* $p < .001$

**Table 7.** Results for multiple choice questions relating to breastfeeding skills

Skills questions (correct answer)	Percentage of respondents		P-Value <sup>(a)</sup>
	Intervention	Control	
What kind of personally identifiable health information is protected by the Health Insurance Portability and Accountability Act privacy rule? (All of the above)	100%	96%	0.29
Health Insurance Portability and Accountability Act security and privacy regulations apply to: (Anyone working in the facility)	89%	73%	0.37
Copies of personally identifiable health information may be disposed of in any garbage can in the facility. (False)	100%	83%	0.03*
All of the following are reasons a lactation educator would refer a mother to a health care provider (e.g. pediatrician, lactation consultant, primary care provider) EXCEPT: (mother is returning to work and needs resources for pumping.)	96%	17%	0.001***
All of the following situations that are within a lactation educator's scope of practice EXCEPT: (Mother reports that her six day old baby's bowel movements are green.)	100%	65%	0.02*

<sup>(a)</sup>Chi-square, \* $p < .05$ , \*\*\* $p < .001$

**Table 8.** Results for satisfaction questions relating to the intervention lactation consulting course

Satisfaction question	Percentage of respondents			
	Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied
How satisfied are you with this course?	0%	0%	27%	73%
How satisfied do you feel with your knowledge regarding the benefits of breastfeeding and your ability to promote them?	0%	4%	31%	65%
	Strongly Disagree	Disagree	Agree	Strongly Agree
I am competent to go out in the field and inform people about breastfeeding.	0%	0%	39%	62%
I feel this course provided me with the content needed to provide pregnant and breastfeeding women with the knowledge necessary to meet their breastfeeding goals.	0%	0%	35%	65%
I would like to participate in a lactation education internship, which would provide me with the opportunity to apply the knowledge I learned in the lactation education course.	0%	0%	12%	89%
The lactation education course has sparked an interest in me to work in an area that involves breastfeeding.	0%	0%	23%	77%
The lactation education course has sparked an interest in me to pursue becoming an International Board Certified Lactation Consultant.	0%	4%	31%	65%

## Breastfeeding Assessment Survey

The purpose of this survey is to assess the effectiveness of the Lactation Education course. Your participation in the survey is completely voluntary. You have the right to decline to answer any question, or to stop the survey at any time. No personally identifying information will be collected. Your responses will be kept strictly confidential; only an aggregate summary report will be shared with your instructor. If you have any questions or concerns, please ask the researcher. Thank you for your participation!

## I. Knowledge

For each of the following questions, please fill in the circle indicating the correct answer.  
(True or False)

<b>Breastfeeding Content Knowledge</b>		
1. Since breastfeeding requires additional calories, women who breastfeed may take longer to return to their pre-pregnancy weight.	<input type="radio"/>	<input type="radio"/>
2. Infants who are breastfed are less likely to develop allergies and asthma than children who are formula fed.	<input type="radio"/>	<input type="radio"/>
3. Infants who are formula fed are less likely to develop diabetes or become obese later in life compared to infants who are breastfed.	<input type="radio"/>	<input type="radio"/>
4. Women who breastfeed will likely decrease their risk for uterine, endometrial, breast and ovarian cancer.	<input type="radio"/>	<input type="radio"/>
5. Breastfed infants will form a closer bond with the mother than formula-fed infants because of the increased skin-to-skin contact between the mother and child.	<input type="radio"/>	<input type="radio"/>
6. Ear infections and diarrhea are less common in breastfed infants.	<input type="radio"/>	<input type="radio"/>
7. Breastfeeding can decrease an infant's risk of sudden infant death syndrome (SIDS).	<input type="radio"/>	<input type="radio"/>
8. With the addition of ingredients such as docosahexaenoic acid (DHA), arachidonic acid (ARA), and iron, formula has become almost identical in composition to breast milk.	<input type="radio"/>	<input type="radio"/>
9. Breast milk changes in composition and volume produced depending on the age and needs of the infant.	<input type="radio"/>	<input type="radio"/>



<p>10. Breast milk and formula are equal in their digestibility.</p>	<input type="radio"/>	<input type="radio"/>
<p><b>Procedural Breastfeeding Knowledge</b></p>		
<p>11. A woman can produce more milk by increasing the frequency of breastfeeding.</p>	<input type="radio"/>	<input type="radio"/>
<p>12. If a breastfeeding women does not eat the recommended servings for all food groups for lactation, her breast milk will not be of adequate quality for infant growth.</p>	<input type="radio"/>	<input type="radio"/>
<p>13. A mother will not be able to continue exclusive breastfeeding once she goes back to work or school.</p>	<input type="radio"/>	<input type="radio"/>
<p>14. To avoid a decrease in length of breastfeeding duration, it is recommended that pacifiers be avoided until one week after birth.</p>	<input type="radio"/>	<input type="radio"/>
<p>15. Babies should be fed on demand.</p>	<input type="radio"/>	<input type="radio"/>
<p>16. A woman can produce more milk by increasing the frequency of breastfeeding.</p>	<input type="radio"/>	<input type="radio"/>
<p>17. The first sign a baby makes to communicate his or her hunger is crying.</p>	<input type="radio"/>	<input type="radio"/>
<p>18. Most babies who are breastfed will need supplemental formula during growth spurts.</p>	<input type="radio"/>	<input type="radio"/>
<p>19. The amount of milk removed from a mother's breasts influences the amount of milk a mother produces.</p>	<input type="radio"/>	<input type="radio"/>
<p>20. Breast fullness around 2 -3 days postpartum is a warning sign that breastfeeding is not going well.</p>	<input type="radio"/>	<input type="radio"/>

## II. Skills

For each of the following questions, fill in the circle indicating the most correct answer.

1. What kind of personally identifiable health information is protected by the Health Insurance Portability and Accountability Act privacy rule?

- Paper
- Electronic
- Verbal
- All of the above

2. Health Insurance Portability and Accountability Act security and privacy regulations apply to:

- Attending physicians, nurses, and other healthcare professionals.
- Health information managers, information systems staff, and other personnel only.
- Anyone working in the facility.
- Only staff that have direct patient contact.

3. Copies of personally identifiable health information may be disposed of in any garbage can in the facility.

- True
- False

4. In my professional capacity, I will be able to, directly or indirectly, influence a woman's decision to initiate breastfeeding.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

5. In my professional capacity, I will be able to, directly or indirectly, influence a woman's ability to reach her breastfeeding duration goal.

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

6. All of the following are reasons a lactation educator would refer a mother to a health care provider (e.g. , pediatrician, lactation consultant, primary care provider) **EXCEPT**:

- Baby has a fever.
- Mother is using a nipple shield incorrectly.
- Mother is returning to work and needs resources for pumping.
- Baby has yellow skin and eyes.

7. All of the following situations that are within a lactation educator's scope of practice  
**EXCEPT:**

- Mother has question about breastfeeding positions she can use at night so she can get more sleep.
- Exclusively breastfeeding mother is concerned about her milk supply. Her baby was just seen (i.e., early that day) by a pediatrician who reported that her baby's weight gain is normal.
- Mothers reports that her six day old baby's bowl movements are green.
- Older baby is refusing to breastfeed.

### III. Attitudes

Please fill in the bubble that best indicates your opinion of the following statements:

1. I value breastfeeding as an important health promotion and disease prevention strategy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I understand the importance of tailoring information and services to the family's individual needs. (culture, knowledge, or language level).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I recognize the limitations of my own lactation knowledge and	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>breastfeeding expertise.</p> <p>4. I have the ability to recognize when personal values and biases may interfere with breastfeeding care and services provided to families.</p> <p>5. I encourage workplace support for breastfeeding.</p> <p>6. I would support breastfeeding colleagues.</p> <p>7. I would support family-centered policies at federal, state, and local levels.</p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>
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<p>8. As a health professional, I believe it would to be my responsibility to highlight the health problems associated with the use of infant/artificial formula when giving advice about infant feeding.</p> <p>9. I am confident in my ability to educate others on the benefits of breastfeeding.</p> <p>10. I am confident in my ability to educate others on strategies to</p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>
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<p>breastfeed discretely in public.</p> <p>11. I am confident in my ability to help mothers develop a plan to maintain their milk supply while they are separated from their baby.</p> <p>12. I am confident in my ability to educate mothers on strategies to build and maintain a good milk supply.</p> <p>13. I am confident in my ability to address most concerns a pregnant woman may have about</p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>	<p><input type="radio"/></p> <p><input type="radio"/></p> <p><input type="radio"/></p>
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<p>breastfeeding.</p> <p>14. I am confident in my ability to provide breastfeeding mothers with the knowledge needed to meet their breastfeeding goals.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**IV. Satisfaction**

Please fill in the bubble that best indicates your opinion of the following statements:

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<p>1. How satisfied are you with this course?</p> <p>2. How satisfied do you feel with your knowledge regarding the benefits of breastfeeding and your ability to promote them?</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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<p>3. I am competent to go out in the field and inform people about breastfeeding.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>4. I feel this course provided me with the content needed to provide pregnant and breastfeeding women with the knowledge necessary to meet their breastfeeding goals.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>5. I would like to participate in a lactation education internship, which would provide me with the opportunity to apply the knowledge I learned in the lactation</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

education course.				
6. The lactation education course has sparked an interest in me to work in an area that involves breastfeeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The lactation education course has sparked an interest in me to pursue becoming an International Board Certified Lactation Consultant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. This course, so far, has included:

- Very little material on breastfeeding
- Some material on breastfeeding
- A significant amount of material concerning breastfeeding
- Education on all aspects of breastfeeding (i.e. physiology, biochemistry, clinical management, personal and social barriers, pros and cons, etc.)

9. In the space provided below, please describe how this course has influenced your views towards breastfeeding.

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**V. Demographics**

Please answer the following demographic questions to the best of your ability.

1. Do you have any children? (Yes or No)

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2. What is your:

Age: \_\_\_\_\_

Sex: \_\_\_\_\_

Major: \_\_\_\_\_

3. Are you an undergraduate student or a graduate student?

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4. What is your marital Status?

- Married
- Divorced
- Separated
- Widowed
- Single, never married
- Other: \_\_\_\_\_

5. Race: Please select all that apply

- African American/ Black
- American Indian
- Asian/Pacific Islander
- Caucasian
- Hispanic/Latino
- Middle Eastern
- Other: \_\_\_\_\_