

# Effect of Heart Buttons Counseling on WIC Infant Feeding Practices

## Abstract

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federal assistance program addressing the healthcare and nutrition of low-income pregnant women, breastfeeding women, and infants and children under the age of five in both States and Tribes. Not only is WIC effective at improving the health of those it serves, but it is also one of the nation's most successful and practical nutrition intervention programs as supported by studies conducted by the USDA Food and Nutrition Services (Women, Infants, and Children, 2015). Obesity prevalence is increasing in the United States and is largely comorbid with other chronic conditions. Appropriate infant feeding practices are thought to counteract this and are believed to reduce an infant's later risk of obesity and disease. The Women, Infants and Children program administered by a Native American tribe in Oklahoma developed and implemented the Heart Buttons educational strategy in order to facilitate meaningful connections as part of nutritional counseling with the goal of increasing appropriate WIC infant feeding practices in participating mothers. The purpose of this project was to determine the effectiveness of the Heart Button educational strategy on infant feeding practices related to obesity prevention over the first six months of life. One significant difference in breast and/or bottle-feeding practices was observed between mothers receiving the Heart Buttons education versus those receiving the traditional educational strategy in this data collection from the survey administered at the initial infant certification visit.

## Introduction

For decades breastfeeding has been recommended as the best nutritional option for the health of infants and mothers despite research being somewhat limited. In recent years, advantages of breastfeeding for infants include its suitable balance of nutrients for infant digestion and the presence of antibodies that minimize the risk of developing infection and other illnesses (Blincoe, 2005).

The infant digestive system is not fully functional and requires a specific balance of nutrients to achieve optimal digestion and utilization of nutrients. Human milk is low in total protein and casein, making it more readily digestible and less taxing on infants' immature kidneys (Picciano, 1998). Additionally, the considerable lipid content of human milk provides enough energy for growth and development.

Furthermore, human milk contains immunologic agents, such as secretory antibodies, anti-inflammatory factors and leukocytes that act against viruses, bacteria, and parasites (Goldman, 1993). These components enhance the immune response and are thought to contribute to the lower incidence and severity of several infections including diarrhea, respiratory tract infections, otitis media, pneumonia, urinary infection, necrotizing enterocolitis, and invasive bacterial infection (Beaudry, Dufour, Marcoux, 1995). In

addition to this, evidence suggests breastfeeding leads to earlier maturation of the infant immune system, and children who were breastfed are reported to experience fewer illnesses (Howie, 1990).

There are also several accepted breastfeeding benefits for nursing women including a minimized risk of ovarian cancer, increased rate of uterine contraction, and socioeconomic gain (Enger, 1998). Numerous research-based studies have concluded there is an association between breastfeeding and breast and ovarian cancer. A multinational study showed a 20-25% decrease in ovarian cancer risk in women who had lactated at least two months per pregnancy in comparison to those who had not (Rosenblatt KA et al, 1993). Similar results were observed in a multi-center trial in the United States for breast cancer (Rosenblatt KA et al, 1993).

Another benefit associated with breastfeeding is accelerated uterine contraction. Following childbirth, the uterus involutes automatically, but breastfeeding can increase the rate at which this occurs due to the release of oxytocin in response to the suckling of an infant (Labbok MH, 2001). The more rapid return of the uterus to its pre-pregnant state reduces maternal risk of postpartum blood loss and more rapidly returns the uterus to its pre-pregnant state (Labbok MH, 2001).

Recent interest has arisen from claims that breastfeeding promotes weight loss in lactating women and reduces later obesity incidence in infants. While expressing breast milk is an active metabolic process that consumes 200-500 calories on average, there is mixed evidence that breastfeeding minimizes newborns' risk of developing unhealthy weight status, and experimental conclusions are highly controversial (Blincoe, 2005). In a 1989 study evaluating postpartum changes in maternal weight and body fat deposits in lactating vs. non-lactating women, researchers found mothers who chose not to breastfeed lost less weight than mothers who did breastfeed exclusively during the first year of life (Blincoe, 2005). Additionally, in this study mothers who did not breastfeed had a more difficult time sustaining weight loss than their breastfeeding counterparts. Despite these conclusions, numerous research studies challenge the common perception that breastfeeding promotes weight loss. A systematic review critically appraising literature relating the impact of breastfeeding on postpartum weight change, weight retention and maternal body composition found little to no association between breastfeeding and weight change or body composition in thirty-seven prospective studies and eight retrospective studies (Racine, 2009). To date, much of the literature assessing the relationship between breastfeeding and childhood obesity and/or maternal weight loss confirms that no causal link has been established.

The research reported here is a part of a larger study examining the breastfeeding behaviors of mothers receiving Heart Buttons education for the first six months of an infant's life. The mission of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is to protect the health of limited resource women, infants, and children up to age five at nutrition risk. In order to support at-risk groups, WIC provides healthful foods to supplement diets, information on wholesome nutrition habits, and referrals to health care. A specific objective of WIC is to increase the proportion of

participating mothers that breastfeed infants due to the many perceived health, nutritional, economical, and emotional benefits for both the mother and baby. WIC promotes breastfeeding to all pregnant women as the optimal nutrition source for infants, unless medically contraindicated.

Traditionally, WIC has advocated for breastfeeding by providing participating mothers with breastfeeding information by way of counseling and educational materials, follow-up support through peer counselors, longer eligibility to take part in WIC, and an enhanced food and breastfeeding support package including items such as breast pumps, breast shells or nursing supplements. All additional resources are meant to encourage the initiation and continuation of breastfeeding.

A study performed by Hildebrand et al (2014) on influential prenatal counseling was found to improve breastfeeding initiation in WIC participants. By aligning WIC's messages with values that influence decisions, it was hypothesized that WIC education would be better able to influence parents' child feeding practices. The influential prenatal counseling approach in this study focused on six principles of a person's tendency to move toward a desired behavior: reciprocity, consistency, consensus, liking, authority, and scarcity. These influence strategies resulted in parents feeling liked, freedom to discuss important topics, and recognizing WIC visits as a good use of time. When participants felt liked by others in the WIC environment and received something of value, they were more likely to reciprocate suggested behaviors. Researcher findings in this study that the quality of prenatal and postnatal services were critical to motivating participants to breastfeed. Overall, women receiving WIC services under the influence model during pregnancy were more likely to initiate breastfeeding than women receiving services under the traditional strategy. Comprehensive integration of the influence principles increased breastfeeding initiation rates, thus helping to achieve national breastfeeding goals.

Similar to the 2014 Hildebrand et al investigation, the research reported here is a part of a larger study examining a new educational strategy, titled Heart Buttons, implemented by a Native American WIC program in Oklahoma. The purpose of the Heart Buttons educational strategy is to build rapport between WIC educators and participating mothers so that WIC mothers are more likely to practice WIC appropriate breastfeeding behaviors. The research reported here is part of a larger study evaluating the effectiveness of the two WIC programs administered by tribes in Oklahoma. One tribe implemented the Heart Buttons educational strategy while the other tribe adhered to the traditional educational strategy. The infant feeding practices of WIC mothers were evaluated by a survey of infant feeding practices at the infants initial certification visit. Mothers receiving the Heart Buttons education strategy (intervention group) and mothers receiving traditional education (comparison group) were compared to evaluate the impact of education strategy on infant feeding practices. It was hypothesized that WIC participants receiving the Heart Buttons educational strategy would have increased occurrence of WIC appropriate breastfeeding behaviors versus the comparison group exposed to the traditional educational strategy.

The limitations of the study reported here are the small sample size, the nonrandomized

nature of participant selection, and the potential for cofounders that could have affected the results. The research reported here investigated the Heart Buttons strategy only at the time of the infants initial certification visit; therefore this data could change after continued exposure to either of the educational strategies. Secondly, study participants were not randomly assigned to groups, rather a participant's geographic location determined to which study group the participant was assigned. Additionally, potential cofounders for which data was not collected could have affected behaviors include specific reasons mothers may have chosen not to initiate breastfeeding, complications that prevented breastfeeding, or whether factors such as employment affected breastfeeding habits. Along with this, the retrospective character of the survey could have led to inaccuracies in reporting as WIC participants were asked to respond about breastfeeding habits that had occurred in the past week. Finally, the research reported here relied on self-report among WIC mothers, which could create bias in the results.

## Literature Review

### **WIC Overview**

Established in 1972, WIC was founded as a pilot program to provide low-income women, infants, and children up to age five with food, nutrition counseling, and access to health services (Women, Infants, and Children, 2016). Since then, WIC has become a permanent program funded at the Federal level by the Food and Nutrition Service of the U.S. Department of Agriculture. Nearly all State and Tribal WIC Programs supply vouchers for use at authorized food stores, and 46,000 stores nationwide accept WIC vouchers (Women, Infants, and Children, 2016). Studies conducted by the Food and Nutrition Service (FNS) and other non-government entities have demonstrated WIC is one of the nation's most beneficial nutrition intervention programs (Women, Infants, and Children, 2016).

Participants eligible for WIC assistance are pregnant, postpartum, and breastfeeding women, infants and children up to age five who meet certain criteria. These criteria consist of income eligibility and state residency. Furthermore, applicants must be deemed by a health professional or trained health official to be at "nutrition risk." Specifically, "nutrition risk" includes medically based risks such as anemia, underweight, history of pregnancy complications or poor pregnancy outcomes, and dietary risks (Women, Infants, and Children, 2016). Women, infants, and children at nutrition risk have an increased prevalence of health problems later in life, and the WIC program attempts to minimize these risks by providing nutrition resources.

A major goal of the WIC Program is to improve the nutritional status of infants by encouraging participating mothers to breastfeed their infants, unless medical contraindications are present. Breast milk is the most nutritious and wholesome source of food for infants, and provides nutritional, economical, and emotional benefits to both the mother and infant. Despite this, less than 30% of infants are breastfed at one year of age. In efforts to improve this, expectant mothers and new WIC members are supplied breastfeeding instructional materials and encouragement through counseling (Women,

Infants, and Children, 2016). Additionally, WIC offers extended services and an enhanced food package to women who choose to breastfeed.

The WIC assistance program has produced a multitude of benefits including safer gestations, fewer premature births and infant deaths, improved dietary outcomes for both infants and children, enhanced maternal health, and improved school performance (Women, Infants, and Children, 2016). Specific nutrition advantages of the WIC supplemental food program are increased nutrient density in the diet, a 61.2 % increase in the number of WIC infants breastfeeding at six months of age, and decreased incidence of iron deficiency anemia in children (Women, Infants, and Children, 2016). Furthermore, children to WIC mothers have shown enhanced cognitive development, which affects later school achievement and conduct. Participants reap benefits for both themselves and their children, and WIC is able to greatly diminish the health disparity that exists among low-income mothers (Women, Infants, and Children, 2016).

## **Need**

American Indians and Alaska Natives suffer many health disparities, such as two times the rate of heart disease, the highest blood pressure and cholesterol levels of any racial group, and almost two times the likelihood of being obese (Bell-Sheetter, 2004). Additionally, the proportion of Native Americans that die from diabetes is three times the national average (Bell-Sheetter, 2004). The National Congress of American Indians reports Native Americans have five years less life expectancy than all other American races, yet they receive one-third less spending per capita on Medicaid (Bell-Sheetter, 2004).

The reasons for these gaps in health are uncertain, but hypotheses are concerned with the environment of Native American communities. Often Native American communities are reliant on a limited number of nearby grocers due to geographic isolation (Bell-Sheetter, 2004). Inadequate access to healthy and/or culturally appropriate foods, like fresh fruits, vegetables, or foods recommended for diabetes or weight control, increases risk for unsuitable patterns of consumption among Native American families (Bell-Sheetter, 2004). Additionally, limited income Native Americans may rely on affordable foods, which are often the less healthy options (Bell-Sheetter, 2004).

These discrepancies show great need for improvement and require additional nutritional education and health programs. WIC attempts to aid in this area and promotes positive health behaviors for women, infants, and children enrolled in the program.

## **Educational Strategy Overview**

Since its initiation, WIC has enhanced the health of participants through the reinforcement of positive nutrition behaviors by nutritional education and counseling (WIC Tools and Training, 2009). In the past, WIC services were administered in a relatively business-like fashion, with little rapport between WIC personnel and participants. While this educational strategy was functional, a Native American WIC site in Oklahoma revamped the educational approach in an effort to enhance the number of

participants that comply with WIC appropriate nutritional behaviors. This new strategy, called Heart Buttons, appeals to the emotional desires that drive participants actions in order to encourage deference of WIC promoted nutritional behaviors (WIC Tools and Training, 2009).

The Heart Buttons strategy aims to appeal to participating mothers deepest desires: reinvention, family values, nurturing and fun (WIC Tools and Training, 2009). Reinvention emphasizes participants longing to be the person they always hoped to be. The Heart Button of family values refers to the goal of participating mothers to raise children with good character (WIC Tools and Training, 2009). Nurturing emphasizes mothers' desire to care for others, and lastly, fun highlights participants need for humor and fun memories in their life (WIC Tools and Training, 2009). In order to trigger these heart buttons, WIC administrators are taught four Heart Button Strategies: Start with the Heart, Tap & Trigger, Pivot & Turn to Practical Value, Aim and Act (WIC Tools and Training, 2009).

The first strategy, Start with the Heart, is meant to encourage WIC educators to remember the importance of attitude when providing care to WIC mothers. Prior to each session, WIC educators are urged to think positive thoughts and messages about the session to come (WIC Tools and Training, 2009). By doing so, WIC employees are more likely to remember the importance of their interaction with the client and the effect it can have on clients' later adherence to nutritional advice. Secondly, Tap & Trigger recommends WIC educators build relationships with participating mothers by tapping into their interests and triggering their heart buttons, the most powerful forces of behavior change (WIC Tools and Training, 2009). The intent of this strategy is to appeal to the WIC mothers' innermost aspirations and stimulate an inclination to partaking in the nutritional behaviors promoted by WIC (WIC Tools and Training, 2009). Then by continuing to the third strategy, Pivot & Turn to a Practical Value, WIC educators are able to connect the WIC mothers' deepest aspirations to an attainable and practical solution for achieving success (WIC Tools and Training, 2009). Solving problems that relate to participants' most valued desires will inspire them to follow through with positive nutrition and health behaviors for both their children and themselves. Lastly, AIM and ACT directs the WIC participant to identify the behavior changes she wants to commit to by having the participant herself recognize how it would improve her life (WIC Tools and Training, 2009). It is preferred that WIC educators let the client develop solutions to their own problems if possible so the client feels a sense of autonomy and commitment to their own resolutions (WIC Tools and Training, 2009).

Numerous studies have confirmed that the implementation of unique educational strategies at WIC sites can improve observed rates of breastfeeding initiation and duration. Various strategies have been evaluated at WIC sites nationally to determine effectiveness. A study by Campbell (2013) evaluated the effect of WIC peer counselors on breastfeeding initiation. The study concluded that the use of peer counselors for the dissemination of breastfeeding information increased the likelihood that primiparas and women who did not breastfeed with prior pregnancies would initiate breastfeeding. The women in this study who received a combination of peer counseling support and breastfeeding education had higher rates of breastfeeding initiation and duration than

those who received only education or support alone.

The success of the peer counseling strategy emphasizes the importance of exploring other educational methods, like that of Heart Buttons. Revamped educational strategies, like the addition of peer counseling to traditional WIC services, could increase the effectiveness of WIC counseling and enhance the WIC experience for participants. By revitalizing the way information is distributed, the health and nutrition outcomes experienced by participating mothers and their infants could be largely improved.

## Methods

The research reported in this paper is a small part of a study investigating breastfeeding practices over an infant's first six months of life. Only the results of the first survey, infant feeding practices at the first infant visit after birth (infant WIC certification visit), are included. The Infant Feeding Practices survey used in this evaluation was adapted from the CDC Questionnaires (<http://www.cdc.gov/ifps/questionnaires.htm>) (Appendix B). The survey was administered to participants on an iPad using the Qualtrics application. This application does not require Internet connectivity. In the event the iPad or applications encountered a technology problem, a paper option of the survey was administered.

Upon completion of each survey, participants were given a small thank you gift. On the completion of the **1<sup>st</sup> survey**, participants received the book entitled *Through the Eyes of the Eagle* and a reusable grocery bag. This study was approved by two Native American Institutional Review Boards and the Oklahoma State University Institutional Review Board.

## **Sample Population**

The sample population consisted of women enrolled in WIC who received education at one of two WIC sites administered by two Native American tribes in Oklahoma. Convenience sampling was employed. All participants enrolled in WIC with infants born during the study timeframe were asked to participate. When data was analyzed for this report, the intervention group consisted of approximately 155 participants and the comparison group included 86 participants completing the first survey. For the larger study, data collection continued past the time of the initial certification visit.

## **Experimental Duration**

Participants were asked to complete an initial survey at their infant certification visit to explore infant feeding practices. The infant feeding practices survey administration began in May 2015 and will continue through April 2016.

## **Study Design**

The study design was quasi-experimental. Participants from the Native American tribe with WIC clinics that created the Heart Buttons educational strategy were included in the intervention group and participants who attend a neighboring Native American tribe's WIC clinics were included in the comparison group. The investigators did not manipulate any of the educational strategies. The two WIC clinics continued with their required education during the data collection period with the exception of consistency in frequency of education. Participants in both groups attended educational sessions every two months. The Infant Feeding Practices survey was administered to participants on an iPad, but in the event the iPad or app encountered a technology problem, a paper option of the survey was available. No names were recorded on the surveys, whether paper or electronic. The researchers only had access to participants' household number. The WIC educator/receptionist asked participants to take part in the voluntary survey at the infants' initial WIC certification visit. A prepared script detailing the survey was read (Appendix A). The WIC educator/receptionist informed the participant that their participation was voluntary. Participants checked a box on the survey indicating their agreement to participate in the survey. There were no risks associated with completion of the survey. Participants who agreed to participate were handed an iPad (or paper survey if there were technology issues) and asked to complete the survey.

### **Data Collection**

Household ID numbers were the only unique information obtained on the survey to track WIC participants over time. Data was reported in aggregate, as the intent was to compare outcomes of educational strategies, not those of the individual. Data was stored on the iPad and downloaded monthly. Data access was password protected and only investigators were able to access the data. The surveys only included household ID numbers. Surveys were kept in a locked storage cabinet at the WIC site until the investigators' monthly visit to retrieve data. Paper surveys were transported to 330 Scott Hall and kept in a locked filing cabinet.

### **Statistical Analysis**

Data between the two groups was compared in order to determine the efficacy of the Heart Button educational strategy at the time of the infants' initial certification significantly impacting the frequency of appropriate infant feeding practices. The Statistical Analysis Software (SAS) was used to perform frequency, McNemar, and t-tests.

### **Results**

A total of 155 participants in the experimental group and 86 participants in the comparison group had completed the first Infant Feeding Practices survey at the time data was analyzed for this report. Table 1 summarizes the number of WIC participants that fed their infant breastmilk from the breast in the past week. Roughly 52% of intervention mothers and 48% comparison mothers fed their baby breastmilk from the breast during the week the survey was administered. At initial infant certification, there was no significant difference between the mean values of both groups ( $p > 0.05$ ).



In the past week, has your baby had breastmilk from the breast?				
	% yes	Mean	SD	P value
Intervention Group	52.3	1.48	0.50	0.50
Comparison Group	47.7	1.52	0.50	

\* Intervention Group n= 155  
\* Comparison Group n= 86

Table 2 shows the results of t-test analysis examining the foods fed to infants and the mechanism by which infants were fed in the week the survey was administered. A comparison of intervention and comparison WIC participants' infant feeding practices revealed that at initial infant certification, there was no significant difference in how foods were administered to an infant in past week the survey was given ( $p > 0.05$ )

In the past week, has your infant been fed any of the following foods?																
	Yes, bottle			Yes, cup				Yes, spoon				No				
Breastmilk				% yes	Mean	SD	P value	% yes	Mean	SD	P value	% no	Mean	SD	P value	
Intervention Group	41.3	1.59	0.49													
Comparison Group	37.2	1.63	0.49													
Formula				0.35	0.0	2.0	0.00	0.0	2.00	0.00		58.7	1.59	0.49	0.66	
Intervention Group	83.9	1.16	0.37					1.0	1.99	0.12		62.0	1.62	0.49		
Comparison Group	79.0	1.21	0.41												0.25	
Water				0.14	0.0	2.0	0.00	0.0	2.0	0.00		16.1	1.16	0.37		
Intervention Group	14.2	1.86	0.35					0.0	2.0	0.00		22.1	1.22	0.42		
Comparison Group	8.1	1.92	0.28												0.14	
S. Water				0.0	2.0	0.00		0.0	2.0	0.00		85.8	1.86	0.35		
Intervention Group	0.0	2.0	0.00					0.0	2.0	0.00		91.9	1.92	0.28		
Comparison Group	0.0	2.0	0.00												0.70	
Milk				0.70	0.0	2.0	0.00	0.0	2.0	0.00		95.5	1.95	0.21		
Intervention Group	1.0	1.99	0.08					0.0	2.0	0.00		96.5	1.97	0.18		
Comparison Group	1.2	1.99	0.11				0.32								0.70	
Fruit Juice				0.93	1.0	1.99	0.08	0.0	2.0	0.00		99.0	1.99	0.08		
Intervention Group	1.0	1.99	0.11					0.0	2.0	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11				0.16								0.93	
Veg. Juice				0.32	1.0	1.99	0.11	0.0	2.0	0.00		99.0	1.99	0.11		
Intervention Group	0.0	2.00	0.00					0.0	2.0	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11												0.32	
S. Drink				0.32	0.0	2.0	0.00	0.0	2.0	0.00		100.0	2.00	0.00		
Intervention Group	0.0	2.00	0.00					0.0	2.0	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11												0.32	
Baby cereal				0.63	0.0	2.0	0.00	0.0	2.0	0.00		100.0	2.00	0.00		
Intervention Group	2.0	1.98	0.14					0.0	2.0	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11								0.32				0.41	
Baby Foods				0.63	0.0	2.0	0.00	1.0	1.99	0.08		97.0	1.97	0.16		
Intervention Group	1.0	1.98	0.14					0.0	2.00	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11								0.32				0.41	
Food Mash				0.70	0.0	2.0	0.00	1.0	1.99	0.08		99.0	1.97	0.16		
Intervention Group	1.0	1.99	0.08					0.0	2.00	0.00		98.8	1.99	0.11		
Comparison Group	1.2	1.99	0.11				0.32				0.16				0.93	

\* Intervention Group n= 155  
\* Comparison Group n= 86

Table 3 details the feeding practices of intervention and comparison WIC mothers when

putting their infant to sleep. Table 3 includes t-test results of which foods and how frequently certain foods were given to an infant before a nap/bedtime. At initial certification, there was no significant difference between the two groups aside from the comparison WIC participants being more likely to put their infant to sleep at a nap with a bottle of formula ( $p < 0.05$ ). Aside from this measure, there was no significant difference between the infant feeding practices of the two groups.

Table 3. T-test comparison of infant feeding practices at nap time.																				
In the past week, have you put your baby to sleep with a bottle of any of the foods listed below?																				
	Yes, bedtimes				Yes, naps				Sometimes, bedtime				Sometimes, nap				Never			
	% yes	Mean	SD	P value	% yes	Mean	SD	P value	% yes	Mean	SD	P value	% yes	Mean	SD	P value	% no	Mean	SD	P value
Formula				0.93				0.04*				0.30				0.20				0.84
Intervention Group	47.1	1.53	0.50		12.3	1.88	0.33		6.5	1.94	0.25		10.3	1.90	0.31		39.4	1.39	0.49	
Comparison Group	46.5	1.53	0.50		23.3	1.77	0.42		10.5	1.90	0.31		5.8	1.94	0.24		40.7	1.41	0.49	
Breastmilk				0.28				0.34				0.57				0.77				0.59
Intervention Group	23.9	1.76	0.43		7.7	1.92	0.27		6.5	1.94	0.25		3.9	1.96	0.19		30.3	1.70	0.46	
Comparison Group	30.2	1.70	0.46		11.6	1.88	0.32		4.7	1.95	0.21		4.7	1.95	0.21		66.3	1.66	0.48	
Veg. Juice				0.32								0.32								0.70
Intervention Group	0.0	2.00	0.00		0.0	2.00	0.00		1.0	1.99	0.08		0.0	2.00	0.00		99.4	1.99	0.08	
Comparison Group	1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		98.8	1.99	0.11	
Fruit Juice				0.70				0.32												0.70
Intervention Group	1.0	1.99	0.08		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		99.4	1.99	0.08	
Comparison Group	1.2	1.99	0.11		1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		98.8	1.99	0.11	
Sweet Water				0.93																0.16
Intervention Group	1.3	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		98.7	1.99	0.11	
Comparison Group	1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	
Milk				0.32																
Intervention Group	0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	
Comparison Group	1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	
Sweet drink				0.32																
Intervention Group	0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	
Comparison Group	1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	
Baby cereal				0.70																0.32
Intervention Group	1.0	1.99	0.08		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		99.4	1.99	0.08	
Comparison Group	1.2	1.99	0.11		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00		0.0	2.00	0.00	

\* Intervention Group n= 155  
\* Comparison Group n= 86

## Discussion

The research reported here examined whether WIC appropriate breastfeeding behaviors at initial infant certification varied by educational strategy. Overall, no significant difference was observed between type of educational strategy administered and a greater occurrence of WIC appropriate breastfeeding behaviors during the preliminary analysis phase of this research aside from comparison WIC participants being more likely to put their infant to sleep at naps with a bottle of formula ( $p < 0.05$ ).

There is a scarcity of research examining educational strategy differences on WIC participants' learning and infant feeding practices. A study by Diana Birkett (2004) found

that the consideration of social issues and inclusion of interactive activities and practical information improved the effectiveness of health promotion programs for low-income families. This article reinforced the notion that culturally relevant health services are essential to providing the best nutrition education but concluded there was no single best approach to accomplish this (Birkett, 2004). Overall, this article reported that the most beneficial programs were client centered, incorporated research, and provided feedback to WIC participants (Birkett, 2004). This study largely supports the results of the research reported here; WIC education impacts infant feeding practices regardless of the mode in which information is disseminated. The data we collected revealed very little difference between the infant feeding practices at the time of infant certification of WIC participants exposed to the traditional strategy versus participants educated by the Heart Buttons educational strategy. However, one difference was noted which may speak to topic focused education as we are aware that not putting infants to nap with a bottle was a priority focus for the intervention group.

A study by Gerstein in 2010 evaluated the effect of learner-centered education on changing WIC participants' nutritional habits in relation to a specific topic, fruit and vegetable intake. This study focused on solely the topic of fruit and vegetable consumption, and WIC participants in the experimental group attended a fruit and vegetable class that implemented a learner-centered education model versus WIC participants in the comparison group who attended a conventional fruit and vegetable class (Gerstein, 2010). Intervention participants, who attended the revamped fruit and vegetable class, identified more value, importance, and relevance of fruit and vegetable information and were more willing to adopt new fruit and vegetable practices (Gerstein, 2010). Similar to our results, this study affirmed that topic related education that meets the needs of participating mothers was more effective at changing the participants' attitudes toward fruit and vegetable consumption (Gerstein, 2010). Further research that assesses the correlation between topic-centered education and behavior change in WIC participants could provide direction on its applicability as a new educational approach (Gerstein, 2010). If further data supports topic-centered education as an effective means for the dissemination of information, WIC sites could implement this as a strategy to enhance the experience and nutritional habits of participating mothers (Gerstein, 2010).

The survey design used in this study was derived from the CDC Infant Feeding Practices Study II and Its Year Six Follow Up Questionnaires. This tool was used for developing the surveys administered in the current study. There is much ongoing research to evaluate the CDC program, and a study by Chapman (2004) confirmed that peer counselors can significantly improve breastfeeding initiation rates and have an impact on breastfeeding rates at 1 and 3 months post partum. While this study did not confirm that a particular approach to education was most effective, it did reveal that nutrition education in general has an impact on infant feeding practices (Chapman, 2004).

## Conclusion

Breastfeeding is a critical behavior to encourage in order to promote public health. The

WIC program is in a position to promote beneficial breastfeeding habits within a high-risk population. This study provides evidence that WIC counselors can have a positive impact on infant feeding practices regardless of educational strategy utilized. The results in this study are preliminary, reporting from only a portion of respondents completing the first survey. Future research that evaluates a larger sample size or for a longer time frame could provide greater insight into the effectiveness of the Heart Buttons educational strategy for a more diverse range of WIC participants.

## Appendix

### **Appendix A- Script to be read by WIC Educator/Receptionist to Potential Participant**

I would like to tell you about a research project that intervention and comparison are participating in with Oklahoma State University. **The purpose** of the research study is to understand how effective WIC education is.

**What to Expect:** We will ask you to complete a short survey asking about what your infant is eating over the next six months. We will ask you to complete a total of 4 surveys with the first one beginning today. Each survey will last about 10 minutes.

**Risks/Benefits:** There are no risks associated with completion of the survey. Your completion of the survey could lead to improved WIC education over time.

**Compensation:** As a special thank you, we will give you some small gifts after completion of each survey that your family will enjoy like books and measuring cups.

**Your Rights and Confidentiality:** Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

**Confidentiality:** It is important for you to know that your name will not be shared. The researchers will only have access to your household number.

**Questions:** Do you have any questions about the survey or procedures?

**Participation:** Would you like to participate today?

**If participant says yes, say:** Great, thank you. If you have any questions, please ask and I will help you.

**If participant says no, say:** Thank you for listening to the information about this project. I will call you when your WIC educator is ready for you.

**Contacts (Give each participant a contact slip):** I am giving you this slip so that you can contact any of the researchers at the following addresses and phone numbers, if you would like to talk about your participation in the study and/or ask about the results of the study:

**WIC Survey Project Contacts:**

Stephany Parker, Ph.D., 301 Human Sciences, Dept. of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, 405 -744-6821. If you have questions about your rights as a research volunteer, you may contact [REDACTED] Nation IRB Chair, [REDACTED] or Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or [irb@okstate.edu](mailto:irb@okstate.edu)

### **Appendix B- Infant Feeding Practices Survey**

**Questions 1-6 will be completed on the first 3 visits. Questions 1-10 will be completed on the final survey.**

Q1 Note to WIC receptionist/educator. Enter the WIC Household Identification number of the participant. After entering the number, please ask the participant to complete the remaining portions of the survey on the iPad. Also, enter the clinic visit for the participant (ie, enrollment, 2<sup>nd</sup>, 3<sup>rd</sup>, mid certification visit). Thank you!

Q2 The following questions relate to your infant who is enrolled in WIC. Please answer honestly and openly. If you have questions, ask the receptionist for help. Thank you for helping us learn more about you so we can better serve our WIC clients! You will receive a small gift each time you complete the survey. Your answers will be kept confidential. Your participation is voluntary and you may choose to withdraw from the study at anytime.

- I agree to participate in this survey. (1)
- I do not want to participate in this survey. (2)

If I do not want to participate... Is Selected, Then Skip To End of Survey

**Q3 Which clinic are you visiting today?**

- [REDACTED] (1)
- [REDACTED] (2)
- [REDACTED] (3)
- [REDACTED] (4)
- [REDACTED] (5)
- [REDACTED] (6)
- [REDACTED] (7)
- [REDACTED] (8)
- [REDACTED] (9)
- [REDACTED] (10)
- [REDACTED] (11)

**Q4 In the past week, has your baby had breastmilk from the breast?**

- Yes (1)
- No (2)

**Q5 In the past week, has your infant been fed any of the following foods? Check all that apply.**

	Yes, from the bottle (1)	Yes, from a cup (2)	Yes, from a spoon (3)	No (4)
Breastmilk (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetened water with sugar, karo, or other sweeteners (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any milk other than breastmilk or formula (5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100% fruit juice (6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100% vegetable juice (7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweet drinks like Kool-Aid, sweet tea, soft drinks, juice drinks, soda, etc. (8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal (9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby foods (10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mashed foods (11)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q6 In the past week, have you put your baby to sleep with a bottle of any of the foods listed below? Check all that apply.**

	Yes, at most bedtimes (1)	Yes, at most naps (2)	Sometimes at bedtime (3)	Sometimes at naps (4)	Never (5)
Formula (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastmilk (2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100% vegetable juice (7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100% fruit juice (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetened water with sugar, karo, or other sweeteners (4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any milk other than breastmilk or formula (5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweet drinks like Kool-Aid, sweet tea, soft drinks, juice drinks, soda, etc. (6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal (12)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for completing this survey! You will be asked to complete another survey on your next visit. We appreciate your time and responses. To thank you for your time, you will receive a small gift each time you complete the survey. Please ask your WIC educator for the gift at the end of your session.

**CNWICsatisfaction Questions will be included on Survey 4 (Final Survey)**

**Q7 Please think about the WIC sessions you have attended and answer the questions below based on your experiences.**

	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)
I enjoyed my WIC visits. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was satisfied with my WIC visits. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my WIC visits were helpful. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my WIC visits were a good use of my time. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my WIC visits made a difference in my life. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend WIC to a friend or family member. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would come back to WIC in the future. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have tried something I learned from my WIC visits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



(8) I plan to try something I learned from my WIC visits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(9) I learned something at my WIC visits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(10) I learned what I wanted to know at my WIC visits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(11) I learned enough to be able to try something on my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(12) I like the way the WIC information was presented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(13) I think there were enough WIC sessions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(14) I think the WIC visits were about the right length of time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(15) I liked the take home educational materials I got at my WIC visits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(16)				

I received enough take home materials (email, text, handouts, etc.) (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**Q8 Please think about the way you prefer to receive education and respond to the following statements.**

	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)
I like to receive education in person. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to receive education by email. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to receive education by mail. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to receive education by text. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to receive education online/website. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q9 Now, please think about your experiences with your WIC educator. What letter grade would you give the educator?**

- A (1)
- B (2)
- C (3)
- D (4)
- F (5)

**Q10 Overall, think about the WIC education you received. What letter grade would you give the education?**

- A (1)
- B (2)
- C (3)
- D (4)
- F (5)

**Thank you for your participation in this survey. This is the last survey you will complete. Please ask the WIC educator for your gift. We appreciate all you have shared that will help us improve WIC education.**

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