

The Effects of Breastfeeding and the Importance of Teen Education

A Senior Project submitted in partial fulfillment of the requirements for the Bachelor of Science
Degree in Child Development

by

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CHAPTER ONE

INTRODUCTION

Breastfeeding can have important benefits to the infant and the mother, therefore, education and support to women is necessary. Research shows that breastfed infants are less likely to have health problems such as bacterial meningitis and respiratory infections. In regards to cognitive development the research is contradictory and inconsistent; researchers have struggled to separate breastfeeding from other variables that may skew the data. Due to this, cognitive development increasing because of breastfeeding has not yet been proven. There is evidence, however, that breast fed preterm infants perform better on cognitive tasks than formula fed preterm infants. Similarly, socioemotional benefits to breastfed infants is a highly debated topic among researchers. Research has been done on the “Kangaroo Care” position, which suggests that mothers who spend more time skin to skin with their infant have better perceived emotional bonds with their infant. There may also be a hormonal change in women who breastfeed which may increase mother-infant bonding. However, perceived bonding tends to decrease by the infant's first birthday, suggesting that bonding due to breastfeeding is only short term. It is important to note that these studies are correlational and based on self-selected groups, therefore, predetermining breastfed versus non-breastfed groups would be unethical.

Recent research shows an increase in breastfeeding rates over the last decade, but the exact reason for the increase is still unknown. Part of this increase can be attributed to a higher average age and education level of mothers at the time of the birth. Research shows many factors that influence mothers' decisions to breastfeed, including: the impact of breastfeeding on social and intimate relationships, the availability of social support, the physical demands of

breastfeeding, mothers' knowledge of breastfeeding practices and benefits, and mothers' perceived sense of comfort in breastfeeding. A deficit in anyone of these areas can create a difficult environment for successful breastfeeding. Along with these factors, returning to work can also create stressors in the mother's environment and make it more difficult to breastfeed. Research states that one-third of mothers return to work three months after giving birth; this number increases to two-thirds of mothers returning to work six months after giving birth. The results indicate that mothers who did not work were more than twice as likely as working mothers to breastfeed for longer than six months. Further, the research found that working full time has a negative effect on breastfeeding outcomes. When looking at the increase in breastfeeding rates over the last ten years, researchers attribute this to state laws mandating workplaces to establish designated breastfeeding/pumping rooms. Although legislation has helped to increase breastfeeding rates, it is still a challenge for women in the workforce to breastfeed exclusively; this makes working mothers one of the lowest demographics to breastfeed.

Due to lack of education and knowledge of the importance of breastfeeding practices, teen mothers are the least likely demographic to breastfeed in the United States. After a 5% increase in 2007 the rate of teen pregnancies has steadily decreased since, reaching a low in 2010. Research shows that teens' decisions to stop breastfeeding resulted from inadequate skills, physically unpleasant or painful early experiences with breastfeeding and inadequate advice from doctors. The National Survey of Family Growth states that 36% of new mothers less than 20 years attempt to breastfeed their newborns, averaging four months. In the rare cases that mothers sustained breastfeeding for an extended period of time, being well educated and having the resources to know why and how to breastfeed had a large influence on their success. Parents

with positive early experiences were able to identify a support system, gain knowledge through the experience, and gain a belief in their own ability to be parents at a young age. As shown in the research, teen moms show an increase in breastfeeding rates when they have higher education and have a support system to help them through the process. New mothers can find a support system through family members, doctors, lactation consultants, organizations, websites and other resources that can demonstrate a positive attitude towards the breastfeeding process to encourage continuation of breastfeeding.

Due to this research we felt it was essential to create an educational tool to inform teens of the benefits of breastfeeding. We decided to develop a Prezi as our educational tool. One week prior to the presentation, we distributed a pre-survey to gauge the participants' existing knowledge. We then designed a Prezi with interactive components to keep participants engaged. This icebreaker activity consisted of students writing down their first impressions of four pictures displaying women breastfeeding. We had students share their thoughts and then discuss the negative stigma associated with breastfeeding. Following the presentation we issued a post-survey identical to the pre-survey. This was intended to grasp how much participants learned from the presentation as a whole. Additionally, we distributed an evaluation survey to measure how successful our overall presentation was in educating participants on benefits and trends of breastfeeding.

The results of our project showed that through education, teens' knowledge on breastfeeding increased. After analyzing the data collected from the pre and post-survey we found that all 29 of the participants planned to breastfeed in the future. The surveys revealed an increase in the number of participants (n=25) that planned on breastfeeding exclusively from 26% on the pre-survey to 36% on the post-survey. Furthermore, the duration of breastfeeding

increased on the post-survey, where 75% of the participants stated that they planned to breastfeed for 7 to 12 months. Additionally, there was a 17% increase in the comfort level of participants' breastfeeding in public places after the educational presentation was given. Lastly, the survey indicated that there was a 43.5% increase in the participants' knowledge of the American Academy of Pediatrics' recommended breastfeeding duration.

We interpreted our findings to mean that education truly does impact teens' decision making and improves their overall knowledge of the topic. For example, we found that after viewing the educational workshop teens increased their intent of breastfeeding duration as well as the rates of breastfeeding exclusivity. The literature we researched found that after viewing sexual education presentations, teens were more likely to use contraception and were more likely to have delayed onset of first sexual experience. This supports our finding that teens respond to education in a positive manor. Furthermore, we found an increase in teens' decision to breastfeed exclusively after viewing our educational Prezi. It is important to note that our findings are based on the participants' intentions and their actions later in life may not match previous plans. The literature presented shows teens' and adults' breastfeeding decisions are not statistically different before the child is born, but end up contrasting after giving birth. Unfortunately, we are unable to follow up with participants to uncover their breastfeeding decisions after becoming a parent, so we are unable to determine if our presentation has long-term benefits. However, the short-term benefits of our educational workshop are vast and according to the data, truly beneficial in increasing teens' overall knowledge on the effects and trends of breastfeeding.

CHAPTER TWO

LITERATURE REVIEW

According to the Centers for Disease Control and Prevention, 70.9% of women breastfeed their babies immediately after they are born, however this number drops drastically to only 50.2% by the time the infant reaches three months of age (Borkowski & Weaver, 2006). Attention to breastfeeding rates is important because breastfed infants have advantages over formula fed infants across developmental domains. According to the American Academy of Pediatrics (2005), breastfed infants are less likely than formula fed infants to contract such illnesses as bacterial meningitis, urinary tract infections, and respiratory tract infections. Additionally, infants who are breastfed are less likely than formula fed infants to die from SIDS. Also, infants who were breastfed showed a decreased risk for behavioral issues as children and adolescents when compared to those who did not experience breastfeeding for longer than six months (Oddy, Kendall, Jacoby, Robinson, & Klerk, 2010). Furthermore, Schulze and Carlisle (2010) found that premature or small for gestational age infants who were breastfed were cognitively better off than those who were premature and formula fed. Finally, there are social emotional benefits of breastfeeding for preterm infants as well, such as, positive mother-infant bonding (Flacking, Ewald, and Wallin, 2011).

Despite the research indicating that breastfeeding is related to positive developmental outcomes in infancy, some mothers who are able to breastfeed choose not to do so. For example, adolescent mothers are much less likely to breastfeed than any other population group in the United States (Smith, 2012). This is a concern because the teen birth rate in the United States in 2010 accounted for 367,752 births that year (Pinzon & Jones, 2012). Due to the high rates of teen

pregnancy, educating teen moms about the positive effects of breastfeeding is crucial in order to promote an increase in this group's breastfeeding rates and, ultimately, the wellbeing of the infant. In the following sections, benefits of breastfeeding to both mother and infant are examined.

Although breastfeeding is highly encouraged, there are some women who are unable to breastfeed due to medical reasons. For instance, women who are HIV positive could pass the virus onto the baby. Also, women who are taking certain medications that could pass to the baby may be advised by their physicians not to breastfeed (Centers of Disease Control and Prevention, 2000).

Benefits of Breastfeeding

Breastfeeding affects many aspects of children's development including: health, behavior, cognitive development, and social emotional development. In addition, breastfeeding has benefits to the mother in terms of her health and emotional state. Evidence supporting these varied benefits is considered below.

Benefits of Breastfeeding to Infant

Physical benefits. Among the long-term benefits of breastfeeding are a decreased risk of infections and chronic diseases. The Academy of Pediatrics (2005) summarized the main benefits of breastfeeding; they stated that breastfeeding lowers infants' risk of contracting bacterial meningitis, diarrheal issues, urinary tract infections, respiratory tract infections, and decreases the risk of dying from SIDS. Consequently, the AAP points out that the infant mortality rate among breastfed infants is 21% lower than that of infants who are formula fed. Consistent with the AAP report, The Department of Health and Human Services (2003) conducted a meta-analysis of studies done on infant development in relation to breastfeeding and

found that infants who were breastfed had better resistance to infectious diseases and an enhanced immune system. Further, this meta-analysis also suggested that breastfed infants have a reduced risk for chronic diseases such as Celiac's disease, diabetes, and childhood cancer.

Behavioral benefits. In addition to physical health benefits, Oddy, Kendall, Jacoby, Robinson, and Klerk (2010) performed a study to understand if breastfeeding has any effect on the mental health status of children and adolescents. They followed 2,900 pregnant women for 14 years and evaluated their children at ages 2,6,8,10, and 14 years of age. They found that the children who were breastfed for more than six months had fewer behavioral problems than did those who were breastfed for under six months. This finding supports a dose-dependent theory of breastfeeding in which the duration of breastfeeding is considered to be positively correlated with health benefits.

Cognitive benefits. Complementing the research on health and behavioral benefits of breastfeeding is research suggesting a positive relationship between breastfeeding and cognitive development. A recent study conducted in France, for example, shows that preschool children who were breastfed as infants performed better on the Communicative Development Inventory (CDI) and Ages and Stages Questionnaire (ASQ) than preschool children who had not been breastfed. Furthermore, findings indicated a positive correlation between duration of breastfeeding and CDI and ASQ score (Bernard, De Agostini, Forhan, Alfaiate, Bonet, Champion, Kaminski, Lauzon-Guillan, Charles, Heude, 2013).

Findings linking the consumption of breast milk to higher levels of cognitive development are not undisputed. For instance, Schulze and Carlisle (2010) found that the only true cognitive difference regarding breast fed versus formula fed infants occurs in premature children. They found that premature or small for gestational age infants who were breastfed were

cognitively better off than those who were premature and formula fed. Further, they found that infants who had been breastfed for longer durations had higher math, IQ, reading, and scholastic ability than those who experienced breastfeeding for shorter lengths of time. This means that cognitive benefits of breastfeeding may be both dependent on infant health status and on duration of breastfeeding.

Other work, however, fails to reveal any relationship at all between breastfeeding and cognitive development. Holme, MacArthur, and Lancashire (2010) followed 1,218 children for the first 12 weeks after birth. They found that there was no statistical significance to the claim that breastfeeding increases cognitive development. In fact, they found that the best predictor of an elevated cognitive development score was mother's age, socioeconomic status, and her education level. They also found that these factors were correlated with increased rates of breastfeeding. This study suggests that assumptions that breast milk is an IQ booster are incorrect; rather it may be that mothers' socioeconomic status, age, and/or education level is the best determinant of both whether or not a mother will choose to breastfeed and of children's cognitive outcomes. Suggesting, perhaps, that mothers who breastfeed may also provide their children with more stimulating learning environments.

This interpretation is complicated by Sloan, Stewart, and Dunne (2010). These researchers interviewed 137 mothers and their infants to determine their sociodemographic backgrounds. They assessed stimulation from the home environment using the Home Observation Measurement of the Environment Scale. They also assessed infants' cognitive development, measured by the Bayley Scales of Infant Development, over the course of a year. They found that infants who were breastfed had a mean cognitive score that was significantly higher than infants who were formula fed, regardless of home stimulation. Their research

suggests that being breastfed for just a month can increase cognitive scores. Additionally, they also noted that as breastfeeding increased, so did cognitive scores. They interpreted this to mean that breastfeeding is dose-dependent and the boost in cognitive scores was due to breastfeeding regularly (2010). This interpretation suggests that there is a nutritional component to breastmilk that is particularly important to brain development.

Social and emotional benefits. Breastfeeding regularly may not only increase cognitive development, but it may also increase parent bonding. Many proponents of breastfeeding argue that this activity promotes an increase in maternal-infant bonding, however the evidence to support this argument is mixed. Else-Quest, Hyde, and Clark (2003) conducted a longitudinal study on the relationship between breastfeeding and bonding. The researchers interviewed 570 pregnant women with an average age of 29 years (range = 20-43 years). Else-Quest et al visited participants' homes during their 2nd trimester, and when their infants were four and 12 months of age. Findings showed that 16% of mothers' breastfed for less than a month, 34% breastfed beyond four months, and by the first birthday, only 14% of infants were still drinking breast milk (Else-Quest et al., 2003). Measures of mother-child relationship indicated that mothers reported higher levels of infant attachment at four months compared to twelve months, yet the positive bonding effects faded substantially by the first birthday of the infant (2003). Else-Quest et al. interpreted this to mean that breastfeeding does increase perceived maternal-infant bonding, but only short term.

According to Brizendine (2006), the longer the infant breastfeeds the more oxytocin is released into the mother's, as well as the baby's, bloodstream oxytocin is considered to be the main hormone that bonds the human species to one another. It is also the hormone that regulates stress levels. During breastfeeding, the skin-to-skin contact as well as the suckling from the

infant promotes a surge of oxytocin release which bonds the mother to her infant while, at the same time, lowering her stress levels. Furthermore, oxytocin dilates blood vessels in the mother's chest, which warms her infant while he or she feeds, creating a peaceful and calming experience. Breastfed infants also get a surge of oxytocin from the milk stretching out their stomachs during feedings.

Although the functions of oxytocin outlined by Brizendine (2006) support the argument that breastfeeding increases mother-infant bonding, Jansen, Weerth, and Riksen-Walraven (2007) challenged research that states that breastfeeding increases the maternal-infant bond through hormonal and sensory factors, such as increased levels of oxytocin. Jansen et al. argued that not enough empirical research has been done on this topic and the few studies that have been done reported findings that are not statistically significant. However, they do note that there is no evidence that breastfeeding negatively affects the mother-child relationship, but that there is not enough statistically significant evidence to say that it positively affects the relationship.

Flacking, Ewald, and Wallin (2011) explored an alternative explanation for increased mother-infant bonding, that of skin-to-skin contact from breastfeeding. Mothers of 103 preterm infants recorded the amount of time each infant spent in the Kangaroo Care position, a position in which the mother holds the naked infant against her bare chest. They documented this information from birth to six months of age. The majority of the participating mothers breastfed their infants (N = 72), whereas some participating mothers did not do so (N = 28). Results showed that mothers who breastfed their infants held their infants in the Kangaroo Care position for longer amounts of time than did mothers who did not breastfeed. Further, analyses revealed that there was a positive correlation between time spent breastfeeding and overall health of the infant. As a result, the researchers concluded that breastfeeding was an activity within which

infants bonded with their mothers and improved their health, and that skin-to-skin contact was the most likely mechanism to achieve these benefits (Flacking et al., 2011). In other words, breastfeeding simply increases the amount of time in the Kangaroo Care position, which increases bonding and health.

Benefits of Breastfeeding to Mother

Emotional benefits. Mezzacappa and Katkin (2002) examined the effects of breastfeeding on maternal stress and mood. Participants included 28 breast-feeding mothers and 27 formula-feeding mothers between 18 and 45 years of age. All of the infants were between the ages of one and twelve months. The mothers completed a Positive and Negative Affect Scale, rested for 10 minutes before feeding, fed their infant as long as required, and then took the Positive and Negative Affect Scale again. The results showed that women who breastfeed their infants are less likely than mothers who formula feed their babies to have negative moods or stress after feeding (Mezzacappa & Katkin, 2002). Therefore, the time-spent breastfeeding can be beneficial for the mother's overall mood.

Health benefits. Breastfeeding not only contributes to the mother's emotional state but also to her overall health. Dermer (2001) discusses both short and long-term benefits to the mother's health. Mothers who breastfeed are more likely to lose the weight they gained throughout pregnancy because they burn 200-500 calories a day. Breastfeeding mothers are also more likely to keep off the weight that they lost from breastfeeding. Mothers who do not breastfeed usually get their menstrual cycle back within six to eight weeks of giving birth, whereas mothers who do breastfeed produce different hormones and are able to go six months without a period. This gives breastfeeding mothers a natural birth control method with 98 to 99

percent effectiveness for the first six months. Lastly, Dermer explains that breastfeeding reduces the risk for breast cancer, and certain reproductive cancers such as ovarian and uterine.

Rates of Breastfeeding in the United States

There has been an increase within the last decade in breastfeeding rates throughout the United States, but the reason for this growth is unknown. According to the Centers for Disease Control and Prevention, the percent of babies being breastfed at twelve months increased from 16% in 2000 to 27% in 2010 (CDC). Jackowitz (2007) explored whether increases in breastfeeding rates between 1991 and 2002 can be attributed to the changes in demographic characteristics of women having babies. She examined such demographic factors as maternal age, maternal education, race and ethnicity, and geographic location of the birth. Results suggested that an increase in average maternal age at birth of child may be responsible for 9.8% of the rise in breastfeeding initiation rates, and that higher rates of maternal education may explain approximately 11.5% of the rise. The change in age and education of mothers not only relate to rates of initiating breastfeeding but also explains 10.2% and 9%, respectively, of the increased rate of maintained breastfeeding for 6 months after birth (Jackowitz, 2007). Geographic location did not help to explain any of the increases. As a result, Jackowitz (2007) concluded that increased age and education of the mother help to explain a rise in the rates of breastfeeding.

Although there has been a rise in the rates of breastfeeding, there are many factors that influence a mother's decision whether to breastfeed, as well their ability to maintain breastfeeding over time. Women in the workforce and teenage mother's have a particularly difficult time continuing to breastfeed because of the challenges that they face in the first few months after their infant's birth.

Women in the Workforce and Breastfeeding

The increased rate of breastfeeding reported by Jackowitz (2007) is a positive statistic to consider, yet it is important to remember that approximately 30% of new mothers do not attempt to breastfeed at all, and 50% do not maintain breastfeeding for 6 months after their child's birth. Efforts to promote breastfeeding must begin by addressing the challenges that woman who breastfeed face in fitting this important activity into their daily routines. According to the US Department of Labor, one-third of mothers return to work within three months of giving birth and two thirds return after six months. Returning to work affects a woman's choice to breastfeed. Using a national sample of new mothers (n= 228,000), Ryan, Zhou, and Arensberg (2006) designed a study to discover the prevalence of the initiation and duration of breastfeeding up to six months. Women employed full time, part-time, and those who were not employed outside the home participated. They found that, in 2003, the rate of initiation of breastfeeding was 66% and the rate of breastfeeding up to six months after delivery was 32.8%. The researchers then explored whether working mothers stopped breastfeeding at the same rate, as did non-working mothers. The results showed that mothers who did not work were more than twice as likely as working mothers to breastfeed for longer than 6 months. Mothers who worked part-time had a significantly higher rate of breastfeeding (68.8%) than those who were employed full time (65%) or who were not employed at all (64.8%). Thus, working full time had a significant negative effect on breastfeeding duration. At six months, 26.1% of mothers employed full time, 36.6% of part-time, and 35% of nonworking mothers breastfed their infants (Ryan et al., 2006).

Although these statistics might be interpreted as discouraging, they indicate an improvement across time. Ryan et al. compared rates of breastfeeding in 2003 to those in 1984 and revealed a large increase in the rate of breastfeeding at six months among full-time working

mothers (204.5%) over this time span. Not only are breastfeeding rates improving with time, perhaps due to demographic change in mother's age and education level (Jackowitz, 2007), but there is now strong evidence to support efforts to mandate laws designed to facilitate breastfeeding in the workplace.

Teen Mothers and Breastfeeding

Teen mothers are the lowest demographic to breastfeed in the United States and it is important to educate teens on the importance of breastfeeding because they account for more than 300,000 births each year. Pinzon and Jones (2012) report that from 2005 to 2007, there was a 5% increase in the rates of teen pregnancies between the ages of 15 and 19-year-olds in the United States. This rate has consistently declined since 2007, and in 2010 the teen birth rate reached a low of 34.3 births per 1000 females between the ages of 15 to 19 (Pinzon & Jones, 2012). Although the rate of teen pregnancies has started to decline over the last few years, the importance of education to teens about breastfeeding and knowledge of the benefits for the mother and infant has not changed.

Smith, Coley, Labbok, Cupito, and Nwokah (2012) made efforts to understand the factors that contribute to the breastfeeding decisions and practices of teen mothers. In 2009, they followed a cohort of five teens from pregnancy until two weeks after they terminated breastfeeding. Data consisted of the results of interviews and weekly self-reports of infant feeding practices. Results indicated that four out of the five teens breastfed at the breast for only nine days, with one out of the five breastfeeding for five months (Smith et al., 2012). Breastfeeding practices were closely connected with their experiences as new mothers in many areas: multiple roles, complex living situations, youth and dependency, and poor knowledge of the fundamentals of breastfeeding and infant development (Smith et al., 2012). The teens'

decisions to stop breastfeeding were influenced by inadequate skills, physically unpleasant or painful early experiences with breastfeeding and inadequate advice from doctors (Smith et al., 2012). The more rare instance of continued breastfeeding for one of the teens seemed to depend on a multitude of factors, such as being well educated and having the resources to know why and how to breastfeed. It is shown that the teens in the US with a positive early experience with breastfeeding are able to identify a support system, gain knowledge through experience, and gain a belief in their own ability to be parents (Smith, et al., 2012).

In a related study, Nesbitt, Campbell, Jack, Robinson, Piehl, and Bogdan (2012) sought to discover the influences and barriers to initiating, and continuing breastfeeding among adolescent mothers. This qualitative study included a sample of 16 adolescent mothers (15-19 years of age) who agreed to complete interviews. Results showed that the adolescent mothers in this study expressed that the decision to breastfeed or formula-feed was made prior to giving birth. Teens reported that although the father's and family members' opinions were noted, the decision whether to breastfeed was often made independently. Most of the participating adolescents reported that they were motivated to initiate breastfeeding due to the health benefits that breastfeeding provides to the child. Lower duration of breastfeeding was found in mothers who were just going to "try" to breastfeed rather than commit to do so (Nesbitt et al., 2012).

Additional influences that appeared to be relevant to teen mothers' decisions to maintain or terminate breastfeeding included: the impact of breastfeeding on social and intimate relationships, the availability of social support, the physical demands of breastfeeding, mothers' knowledge of breastfeeding practices and benefits, and mothers' perceived sense of comfort with breastfeeding (Nesbitt et al., 2012). This study provides new insight that informs understandings of the factors that influence the adolescent mothers' decisions. It suggests that educating young

mothers on benefits of breastfeeding alone may not be sufficient in encouraging them to maintain breastfeeding over time.

Harner and McCarter-Spaulding (2004) conducted a study to better understand the influence that the paternal father had on the decision to breastfeed or bottle-feed. They interviewed 86 teenage mothers were asked about such topics as: the age of the father, whether or not they chose to breastfeed, and whether or not the father stated an option on which feeding method they preferred. Of the 86 mothers included in the study, Harner and McCarter -Spaulding report that 24% reported breastfeeding during the postpartum hospital stay, while the other 76% chose bottle-feeding. This did not differ systematically by participant age, race, marital status, pregnancy and parenting history, prenatal care, type of delivery, gestational age, or infant birth weight. The mothers were then grouped into categories based on whether the father of the baby was an adult partner (>4 years older than mother) or a peer-aged partner (<4 years older than mother). Findings showed that teenage mothers with a peer-aged partner were more likely to breastfeed than mothers with adult partners. In addition, results revealed that 40% of the fathers had an impact on the decision to breastfeed or bottle-feed. Of the peer-aged partners that voiced their opinion, 81% of them encouraged breastfeeding, whereas only 62% of the adult partners that voiced an option encouraged breastfeeding. Although this study shows that teenagers with younger partners were significantly more likely to breastfeed than the mothers with adult partners, it is important to note that the decision was ultimately the mothers. Participants revealed that additional barriers to breastfeeding included inadequate knowledge about breastfeeding, lack of breastfeeding role models, and a fear of embarrassment about exposing their breast (Harner & McCarter-Spaulding, 2004).

Conclusion/Intervention

The health advantages infants' gain when breastfed are tremendous; they include a decreased risk for infections, chronic diseases, and behavioral disorders. In addition, breastfed infants' immune systems are much more developed and efficient than those of babies who are formula fed (Department of Health and Human Services 2003). In contrast to the relatively clear indications that breastfeeding provides benefits to physical health, research on the cognitive advantages to breastfed infants are conflicting. Studies show that premature infants benefit cognitively from breast milk over formula, but it is unclear whether full term infants get the same advantage through breastfeeding as pre term infants (Schulze et al., 2010). Lastly, breastfeeding's role in increasing the mother-infant bond is still unclear. More research needs to be done to clarify whether and how the act of breastfeeding, specifically skin-to-skin contact and oxytocin release, actually raises perceived bonding. Because empirical research cannot be done due to ethical limitations, it is more difficult to test for these answers. However, the research analyzed above shows support for breastfeeding and its positive outcomes to the mother and the infant.

Given the value of breastfeeding for infant health and development, and the finding that adolescent mothers are the least likely to breastfeed out of all the demographic groups (Smith et al., 2012), it is imperative that teens become educated on this topic. Research has shown that teens benefit from health education. For example, teens who receive sex education, regardless of the type, report delays in first sexual intercourse when compared to teens with no sex education (Smith et al., 2012). Furthermore, teens who were given instruction about both abstinence and birth control were significantly more likely to use a form of contraception than teens given no such information (Lindberg and Maddow-Zimet, 2012). Thus, research shows that teens do

respond to education and intervention. As a result, we reasoned that workshops on the importance of breastfeeding might be beneficial to teens and increase their likelihood of choosing to breastfeed.

CHAPTER THREE

METHODS

Based on the information we learned while conducting our literature review, we felt it extremely important to create an educational tool targeted towards increasing teen's awareness on breastfeeding benefits and trends. The process we took in developing and evaluating this tool is described below.

Development

We began our senior project by researching the effects of breastfeeding and current trends in breastfeeding rates. We found that teens were the lowest demographic to breastfeed, and that they respond to education in other domains. After exploring the research, we developed a literature review summarizing the results. This inspired us to create an educational tool in order to educate teens on the importance of breastfeeding. We wanted to make sure that our presentation was engaging, so we decided to use Prezi as a platform with which to share information on the following topics: overall trends of breastfeeding, health benefits, behavioral benefits, cognitive benefits, and socioemotional benefits to baby, as well as health and socioemotional benefits to the mother. We selected these topics because the research presented in our literature review shows benefits in these areas. To engage our audience, we decided to include an interactive element; we facilitated an icebreaker activity in which the students expressed their opinions on breastfeeding in public and then proceeded to present our educational tool.

Evaluation

Participants

The participants of our senior project included 29 undergraduate child development students. Of the 29 students, two were men and 27 were women. The participants ranged from 18-27 years, with a mean age of 19. This was a convenience sample given that we were unable to actually present our materials to a group of pregnant teens.

Materials

We created a Prezi presentation including research we found important on the topic of benefits and trend of breastfeeding (See Appendix A). After, we developed a pre- and post-presentation survey, which asked questions probing students' knowledge on breastfeeding (See Appendix B). Additionally, we composed an evaluation survey in order to assess whether and how students found our presentation to be engaging and educational (See Appendix C).

Procedure

We distributed the pre-presentation survey a week prior to our presentation to students in Dr. Linda Lee's Child Development 131 Observing and Interacting with Children course. The following week we presented our 20-minute Prezi to the same group of students. Immediately following our presentation, we distributed the post-presentation survey. The pre- and post-surveys were identical to each other in order to assess students' educational growth on benefits and trends of breastfeeding. Following the post-survey we provided an evaluation survey in order to assess students' response to our educational Prezi and solicit their suggestions for improvement.

CHAPTER FOUR

Results

This section includes the outcomes of the presentation, as measured by three strategies: (1) our own evaluation of audience response, (2) analysis of the data collected from surveys that we distributed to the participants one week before and then again immediately after our presentation, and (3) responses from the evaluation of the presentation that participants completed after the workshop.

Before presenting our educational workshop, participants were more likely to choose a combination of breastfeeding and formula as opposed to exclusive breastfeeding. Additionally, participants choose 4 to 6 months as breastfeeding duration more so than any other option. After viewing the presentation, participants altered their choice to breastfeed for a longer duration of time. Also, this group was less comfortable with breastfeeding in public and had a low understanding of the AAP's recommendation for breastfeeding duration before attending the educational workshop.

Our Perspective on the Presentation

We opened our presentation with an icebreaker activity in which we showed four different pictures of women breastfeeding. Of the four pictures, the most modest was shown first ending with a more exposed representation of breastfeeding. We asked participants to anonymously write down their first reactions to each subsequent photo. We then asked participants to crumple their papers and throw them across the room to ensure the responses were kept anonymous. After students picked up a paper near them, we asked them to share some of the responses on that particular paper as we reshown the pictures. Students participated in this activity enthusiastically. Their responses suggested that they associated exposed breastfeeding

with a negative stigma, using words and phrases such as “shameless”, “too much”, and “exposed”. However, their responses to the modest photos were more accepting.

After discussing the responses, we transitioned to the educational portion of the Prezi. We introduced the basic trends and demographics of breastfeeding, noting that teens were the lowest demographic to breastfeed. We discussed why some teens do not breastfeed and then told the audience about local resources that can help with some of the obstacles presented. Following this information, our presentation transitioned to the sharing of empirical evidence about the overall benefits of breastfeeding. We discussed the health, cognitive, and social/emotional benefits to the child, as well as the health and social/emotional benefits to the mother. We ended with a summary of the information we had presented. Throughout, we noted that, the audience seemed engaged and interested in the material presented.

Results of the Pre/Post Surveys

Immediately after our presentation we passed out a survey to evaluate students’ knowledge growth. After analyzing our survey data, we found that all 29 participants planned on having children and breastfeeding for some duration of time. Due to missing data from some participants (no response/missing survey), the number of respondents (n) fluctuated between questions. The following sections address specific questions from the survey distributed.

How long would you plan to breastfeed your child? The results from the pre-survey revealed that 28% of the participants (n=25) planned on breastfeeding exclusively, whereas in the post-survey this number increased to 36% of participants. Additionally, before the presentation, almost half of participants stated they planned to breastfeed their infant for 4 to 6 months. After the presentation, 75% of the participants reported in the post-survey that they would breastfeed their infant for 7 to 12 months (See Figure 1).

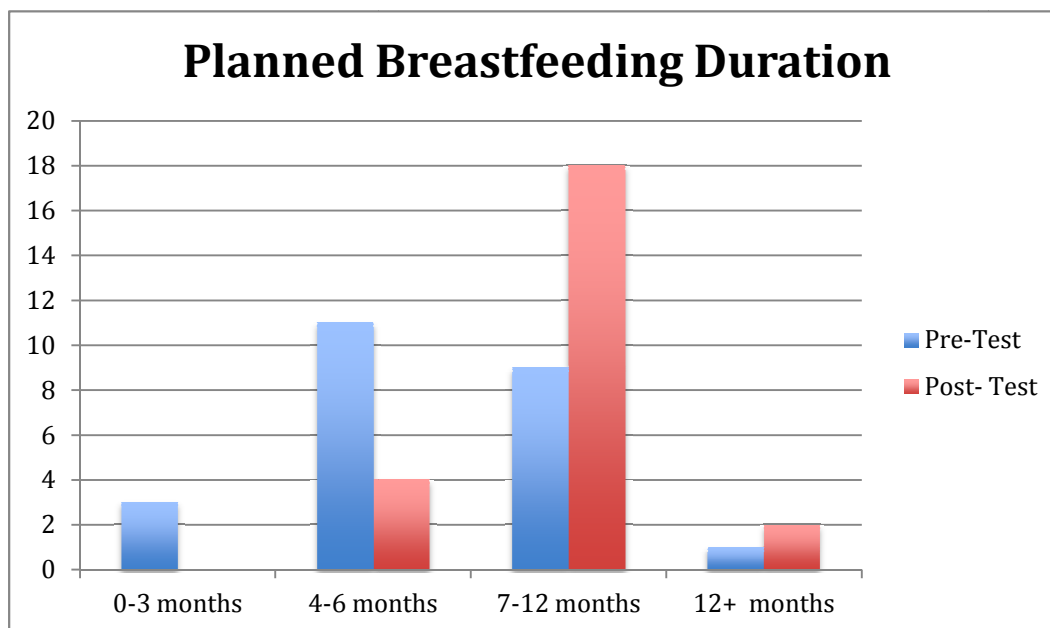


Figure 1. This graph shows the rise in planned breastfeeding durations.

These findings showed that after viewing our presentation, a greater number of participants were inclined to choose the 7 to 12 month age range, rather than the 4 to 6 month age range, which was previously favored among these participants. Furthermore, participants chose exclusive breastfeeding over exclusive formula feeding or a combination of the two more so in the post-survey.

If you plan on returning to work after your child is born would you continue to breastfeed/pump breastmilk? The pre-survey indicated that 82.6% of participants intended to breastfeed/pump breast milk after returning to work. After viewing the educational Prezi, all of the participants planned on breastfeeding/pumping breast milk once returning to work. This is a 17.4% rise, resulting in 100% of participants planning to breastfeed after returning to work.

Would you feel comfortable breastfeeding in public? With regard to the negative stigma of breastfeeding in public, only 43% of participants were comfortable with breastfeeding in

public before our presentation, However, after our presentation, comfort level in public increased to 60%. This is a 17% rise in comfort level after the educational workshop was presented.

Do you know the American Academy of Pediatrics' recommendation for breastfeeding duration? We found that from our educational Prezi, the participants' knowledge of the AAP's recommended breastfeeding duration increased by 43.5%. Before the presentation, only one participant knew the AAP's recommended breastfeeding duration. However, after viewing the educational Prezi almost half of the participants knew the correct breastfeeding recommendation.

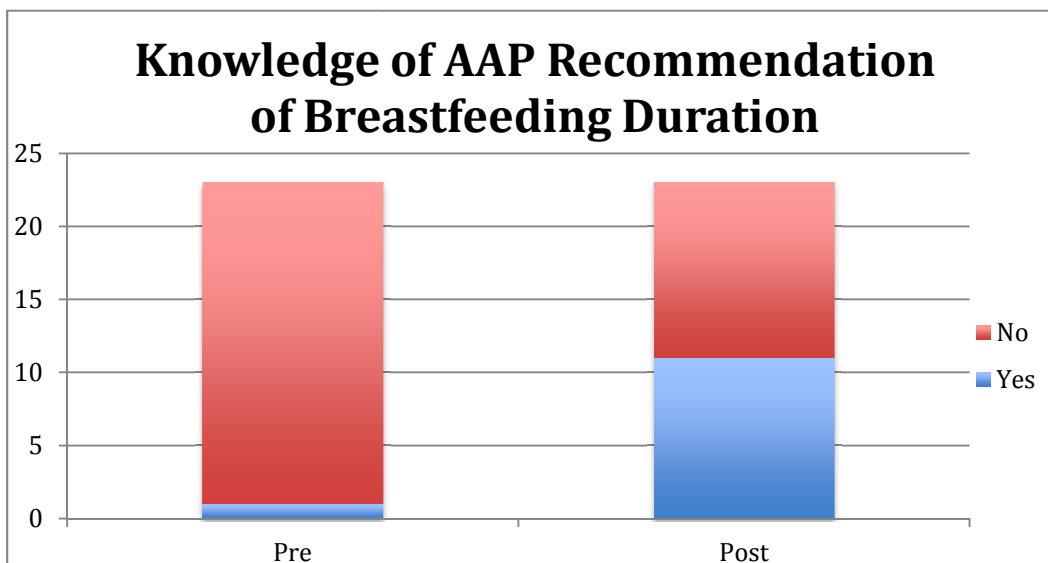


Figure 2. This graph shows the improvement of knowledge of the AAP recommendation for breastfeeding duration.

Evaluation of Presentation Survey

Following our post-survey, we administered an evaluation survey so that participants could provide us feedback about the effectiveness of our presentation. When questioned about the presentation's usefulness on educating participants on the relationship between trends and breastfeeding, 96.6% of the participants gave our presentation a 4 or a 5 using a five point Likert Scale. We designed the Likert Scale with 5 being highly useful and 1 being not useful. With

regards to the effectiveness of education on breastfeeding benefits, 100% of participants gave our presentation a 4 or 5. Furthermore, 57.1% of the participants stated that their perspectives on breastfeeding positively changed after viewing the presentation. The remainder of participants, 42.9%, reported no change because they had already planned on breastfeeding prior to the presentation.

CHAPTER 5

Discussion

Teen breastfeeding rates are the lowest among any other demographic in the United States. The goal of this project was to combat low teen breastfeeding rates by educating teen mothers about the benefits of breastfeeding young infants. In pursuit of this goal, we developed and tested an educational workshop directed towards teens.. Because we were unable to access a group of teen mothers, we targeted teens in an educational setting. The results show that the educational presentation positively affected the audience members' knowledge of breastfeeding benefits and trends. Before the presentation, our survey reflected that participants had little knowledge of breastfeeding, with a few outliers knowing more than their peers. After viewing the presentation, the teens showed a significant increase in the positive responses and overall knowledge. These findings are important because they suggest that teens respond well to education.

An overall increase after education in teens' knowledge is also shown in a study conducted by Smith et al. (2012). For example, this study found that sex education can delay the age of first sexual intercourse and can increase the rates of teen contraception use. This study and our own converge on the conclusion prove that teens do respond to education and intervention practices. For example, in the pre-survey all of the participants said that they would initiate breastfeeding, with about half stating they would only breastfeed for 4-6 months. After the presentation, 75% of the participants stated that they would breastfeed for 7-12 months. Research shows many benefits to the mother and the infant during sustained breastfeeding, including: health benefits, cognitive benefits, and social/emotional benefits. This information was presented

in our Prezi and could have influenced the participants' intention to breastfeed for a longer duration of time after hearing the presentation as compared to prior. This suggests that educating teens on breastfeeding benefits and trends has a large impact on the participants' general knowledge of the subject, as well as their behavioral intentions.

When comparing the knowledge that participants in the current project demonstrated regarding breastfeeding with the actual practices engaged in by teenage mothers, some differences can be seen that make it important to consider differences in these populations. In our pre-survey, 100% of the participants stated that they would at least attempt to breastfeed their infants. In contrast, research shows that only about 30% of new mothers less than 20 years attempt to breastfeed their newborns (Harner & McCarter-Spaulding, 2004). This difference may be due to the convenience sample that was used. The participants only included students from one Cal Poly Child Development course. We did not factor in diverse demographics.

According to Harner & McCarter-Spaulding (2004) adult mothers are two times as likely to breastfeed than teen mothers. However, Alexander, O'Riordan and Furman (2010) found the rate of intent to breastfeed was not statistically different between pregnant teens and pregnant adults. Therefore, teens' attitudes towards breastfeeding before giving birth could be significantly different from their actions after giving birth. This shows that intentionality does not determine that teens will breastfeed. Our participants were not mothers yet and their responses were solely based on intentions. Our study is at fault because we are unable to follow-up with our participants to determine if their intentions match their actions.

Despite our finding that Cal Poly Child Development majors held relatively advanced understandings about some aspects of breastfeeding, our results found that even these students were not fully educated on this topic. For instance, prior to the presentation, most of the

participants did not know the American Academy of Pediatrics recommendation for breastfeeding duration. This is important because it shows we can't assume that students already know this information, even undergraduates with a Child Development major are not fully educated on the importance of breastfeeding.

Although we found that teens respond to education, it is necessary to address the limitations in our evaluation of our breastfeeding educational presentation. In our opinion, the biggest limitation was our small non-representative sample; we did not include younger teens or teens of different demographic backgrounds. Furthermore, our participants were all Child Development students who may have had a general knowledge of the subject. Another limitation is that while presenting our Prezi, some important material relating to the survey was not clearly articulated. The AAP's recommendation for breastfeeding duration was accidentally stated prematurely; it was not verbally stated in congruence with the specific slide containing the information. Having said this, we believe that if this material was presented in a more concise manner more participants may have answered this specific question correctly. It is important to note that the post-surveys were administered directly after the presentation. Therefore, the new understanding of the material presented was current in-participants' minds and easily remembered for the survey questions. We are unable to follow the participants to assess whether or not they will stay true to their post survey answers. Therefore, it is an open question whether participants would remember the information for longer durations. In important next step might be to, conduct a longitudinal study assessing if the participants adhere to their post survey answers and are truly affected by the educational presentation.

Also, the evaluation of the presentation survey could have been more extensive. For instance, a question regarding possible changes that could have been made would have been

beneficial to the overall project. Additionally, we would have liked to address the negative stigma of breastfeeding more thoroughly. With more time, more research could have been done to further address society's attitudes towards breastfeeding rather than just the view of participants in our study. Due to the time constraint during the presentation, we were not able to discuss the relationship between breastfeeding and mothers returning to work. We included a question regarding this information on our survey, but because it was not addressed in the presentation, we feel this question was unnecessary on the survey.

Epilogue

In week nine of our project, new research was published claiming that breastfeeding does not have any affect on the well being of the child. Colen (2014) examined 8,000 children after the first year of life from ages 4-14. This new study is so influential to the public because it is the only one that analyzed discordant sibling pairs, meaning one child was breastfed and the other was formula fed. Due to same family contexts, this method controlled for race, age, family income, and mothers employment. These variables were difficult to control for in past studies. This study measured eleven outcomes previously claimed as benefits of breastfeeding, including: BMI, obesity, asthma, hyperactivity, parental attachment, behavior compliance, and achievement in vocabulary, reading recognition, math ability, intelligence, and scholastic competence The authors report that there are no differences between breastfed and formula fed children, with one exception. It was reported that formula fed infants had less cases of asthma than breastfed infants. It is important to note that these findings may be self-generated and not actual diagnoses.

The media attention that this study enjoys may be providing information to expectant mothers that will decrease their commitment to breastfeeding. However, prior studies with contrasting results cannot be entirely discounted. For example, Brizendine (2006) reports that

when breastfeeding, higher levels of oxytocin are released in infants and mothers' bloodstream. This hormonal change is said to cause an increase in mother-infant bonding and contradicts the new research presented. Additionally, Sloan, Stewart, and Dunne (2010) reported a higher mean cognitive score in breastfed infants over formula fed infants, even after controlling for home stimulation and other confounding variables such as maternal age and education. Furthermore, this new study does not take into account premature, who according to Shultz & Carlisle (2010) show a cognitive benefit of being breastfed versus formula fed. In addition, the AAP (2005) reports a lowered risk of bacterial meningitis, respiratory tract infections, urinary tract infections, as well as other health issues, which the new study failed to address. The Department of Health and Human Services states breastfed infants have a better immune system and are less likely to have certain cancers and diabetes. Colen's study does not test for any of these health issues and is, therefore, underdeveloped. Further research needs to be done in order to explore the true benefits of breastfeeding. This new study does not provide enough evidence to discourage breastfeeding and support still needs to be given to mothers who choose to breastfeed.

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