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Evaluation of Breastfeeding Interventions to Improve Duration in Women at Risk of Breastfeeding Attrition

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This project is dedicated to all the people that are working tirelessly to make sure that breastfeeding becomes the norm again in infant feeding across the globe.

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Abstract

Breastfeeding has numerous health benefits for infants, children, and mothers. (Simonetti, Palma, Giglio, & Ciccolini, 2012). These benefits are dose dependent (Smith, et al., 2017). To optimally attain these benefits, the World Health Organization ([WHO], 2017), and the American Academy of Pediatrics (Eidelman, & Schanler, 2012) recommends mothers to exclusively breastfeed for the first six months of the infant's life and to continue breastfeeding while introducing complementary food until the infant is at least one year old. Though breastfeeding initiation rates are much improved, breastfeeding continuation rates are low worldwide including in the United States of America (Haroon, Das, Salam, Imdad, & Bhutta, 2013). Numerous studies have addressed reasons, women choose to wean from breastfeeding earlier than the WHO recommendations, the characteristics of these women and postpartum interventions to curb breastfeeding attrition. There are fewer studies that attempt to address breastfeeding cessation risk from the prenatal to the postpartum periods. The purpose of this translational project is to explore the identification of women at risk for early breastfeeding attrition and to provide at risk women with an evidenced based intervention during both the prenatal and postpartum period to help increase breastfeeding rates closer to the WHO and the Healthy People set target.

Keywords: breastfeeding, breastfeeding attrition, breastfeeding duration, breastfeeding interventions, breastfeeding self-efficacy, prenatal breastfeeding education

Chapter I

Introduction: Benefits of Breastfeeding

Breastmilk produced by a woman after childbirth as food for her infant is globally acknowledged as the perfect food with ideal nutrition for humans from infancy to childhood (WHO, 2001). Labbok, & Starling (2012) defined breastfeeding as the act of feeding an infant/child, breastmilk either directly from the mother ‘s breast or expressed in a bottle or cup to provide the nutrients they need for healthy growth and development. The Centers for Disease Prevention and Control ([CDC], 2016), recognized breastfeeding as vital to improving the health of Americans. The benefits of breastfeeding to the infant, child, mother and society are abundant. Leading among this is the relationship between breastfeeding and infant/maternal mortality and morbidity.

Several research studies have reported a strong positive correlation between breastfeeding and reduced infant morbidity and mortality when compared to non-breastfed infant (Gabbe, et al., 2017; Khan, Vesel, Bahl, & Martines, 2015; Rollins et al. 2016; Victora et al. 2016). Chowdhury et. al. (2015) noted that the risk of all-cause mortality was higher in predominantly bottle-fed, and non-breastfed infants when compared to breastfed infants from birth to five months. Children six months to two years who were not breastfed were found to have two-fold higher risk of mortality, when compared to those who were breastfed (Chowdhury et. al., 2015). Similarly, risk of infection-related mortality was two-fold higher in non-breastfed children than in breastfed children. While most of this result was seen in exclusively breastfed infants, any breastfeeding is associated with a 64% reduction in the incidence of nonspecific gastrointestinal tract infections in infants. This effect persists for two months after cessation of breastfeeding (Khan et al., 2015).

Empirical evidences demonstrates associations between breastfeeding and reduced risk of acute and chronic diseases, such as diarrhea, respiratory tract infections, and otitis media in breastfed infants (Simonetti, Palma, Giglio, & Ciccolini, 2012; Chowdhury et al., 2015; Khan et al., 2015; Smith et al., 2017; Beyene, Geda, Habtewold, & Assen, 2017). Breastmilk has been referred to as a child's first vaccine due to its antibodies content and the health protection it offers children during their first two years of life, as well as later in life (UNICEF, 2016). As such, it contributes to healthy growth and development.

The act of breastfeeding promotes bonding for the mother and infant which is beneficial for infants' psychological development (Simonetti et al., 2012). Horta, Loret de Mola, & Victora, (2015) noted an association between breastfeeding and higher intelligence quotients (IQ) in children. Likewise, Papp (2013) found improved relationship quality, between mothers and their breastfed children specifically through changes in maternal behavior.

Research also supports extension of short and long term benefits of breastfeeding to the mother. The short-term benefits of breastfeeding to the mother include reduction of uterine bleeding in the immediate post-partum period and early uterine involution. (Simonetti et al.,2012; Chowdhury et al, 2015). Breastfeeding has a protective effect on the mother's postpartum mental health thereby reducing depressive symptoms (Figueiredo, Canário, & Field, 2014). Long term benefits include, reduced risk of breast, endometrial, and ovarian cancers (Su, Pasalich, Lee, & Binns, 2013) In addition, Gunderson, et al. (2015) noted a relationship between longer breastfeeding duration and lower incidence of developing diabetes mellitus in women that had gestational diabetes while pregnant when compared to women with similar diagnosis that only bottle-fed. Societal benefits from breastfeeding include less health care expenses and less environmental waste than is found with formula feeding (Bomer-Norton, 2014). Breastfeeding is

also regarded as an enabler to ending poverty, promoting economic growth, and reducing inequalities especially in resource low countries (Holla-Bhar, Iellamo, Gupta, Smith, & Dadhich, 2015).

In contrast, there is extensive evidence of significant health risks to infants, children and adults associated with not breastfeeding. Among infants that were not breastfed, there was an increase in hospitalization for gastroenteritis, respiratory diseases, and sudden infant death syndrome (SIDS), with resultant rise in mortality (Haroon, Das, Salam, Imdad, & Bhutta, 2013; Victora et al, 2016). Research has noted an increase in the prevalence of childhood diabetes and obesity, in children that were not breastfed. Adults that were not breastfed as infants had higher mean blood pressure, higher total cholesterol, celiac, and cardiovascular diseases (Haroon et al., 2013). As well, not being breastfed had been shown to impact a child's IQ, educational and behavioral outcomes (Quigley, 2012; Daly, Bernard, J. et al., 2013; Pollard, Phillips, & Binns, 2014).

Likewise, increased risks of breast cancer, and diabetes was seen in women that did not breastfeed. Hellwig et al., (2015) showed that thirty-one women (38.3%) with rheumatoid arthritis who did not breastfeed exclusively had a relapse within the first six months post -partum when compared with 29 women (24.2%) who breastfed exclusively for at least two months. A cost of $ 17.4 billion dollars is linked to premature maternal death from breast cancer, hypertension, and myocardial infarction related to suboptimal breastfeeding rates (Bartick et al., 2013; Bartick et al., 2017). Globally not breastfeeding or premature cessation of breastfeeding is estimated to result in economic losses of about $302 billion annually (0.49 %) of the world gross national income from lost productivity and health care costs to treat preventable illnesses and chronic diseases. (Victora et al. 2016).

Background

Optimal breastfeeding practice could help prevent 823,000 child deaths and 20,000 maternal deaths from breast cancer per year worldwide (Rollins et al. 2016; Victora et al. 2016; Khan et al., 2015). Evidence illustrates that the immense health benefits derived from breastmilk and breastfeeding are dose dependent, resulting in the longer the breastfeeding duration the higher the chance of optimal acquisition of the enumerated breastfeeding benefits (Miller, Miller, Taylor, & Way, 2017). The World Health Organization (2017) recommends that optimal breastfeeding duration is attained when mothers exclusively breastfeed infants' the first six months of life after which complementary food should be introduced and breastfeeding continued for two years. The American Academy of Pediatrics (AAP) and the CDC supports exclusive breastfeeding of infants the first six months of life and continued breastfeeding till at least one year of an infant life. (Eidelman, & Schanler, 2012). Other United States leading health organizations such as the Academy of Breastfeeding Medicine (ABM), American College of Nurse- Midwives (ACNM), the Association of Women's Health Obstetric and Neonatal Nurses (AWHONN) and the American College of Obstetrics and Gynecologist (ACOG) also support this breastfeeding duration recommendation.

Worldwide, 44% of mothers initiate breastfeeding and 40% of children are exclusively breastfed for the first six months of life. This is less than the target of at least 50% by the year 2025 set by WHO & UNICEF (2014). The U.S. Department of Health and Human Services (DHHS) through the Healthy People 2020 initiative established breastfeeding goals to help increase breastfeeding initiation and continuation rates and consequently improve the health of the nation. The Healthy People2020 (2015) goals are to increase breastfeeding initiation rate to 81.9%, increase the rate of any breastfeeding at six-month to 60.5%, and any breastfeeding rate

at one year to 34%. In addition, goals for exclusive breastfeeding is that 44.3% of infants will be breastfed at three months, and 23.7% of infants breastfed at six months by the year 2020.

In the USA, and most of the world, breastfeeding duration or continuation rate is significantly, below the rate set by the Healthy People2020 initiative and the WHO recommendation (CDC, 2016). The latest CDC Breastfeeding Report Card (2018), illustrates that the breastfeeding initiation goal set by the healthy people 2020 initiative has been met. Eighty-three percent of mothers in the USA initiated breastfeeding (CDC, 2018). However, breastfeeding continuation rate is still lagging. Regrettably, only 57.6% of mothers practiced any breastfeeding of their infants up to six months after delivery and 35.9% of mothers were practicing any breastfeeding at one-year post-partum (CDC, 2018). In terms of exclusivity of breastfeeding, 46.9% of mothers in the nation exclusively breastfed at three months and 24.9 % at six months (CDC, 2018). In the state of Georgia, 84% of mothers initiated any breastfeeding, 55.5.7% breastfed up to six months, and 34.9% for one year. Forty-three percent exclusively breastfed up to three months and 22.1% up to six months. (CDC, 2018). It was also noted that while 31% of live births occurred at baby friendly designated facilities, 20.6% of breastfed infants received formula before they were 48 hours old (CDC,2018).

Problem Statement

Children that are optimally breastfed have the healthiest start in life (UNICEF, 2016). Early cessation of breastfeeding less than the WHO recommended duration is prevalent worldwide, as such most children are denied the health benefits from breastmilk and a healthier start in life. Globally only 44% of mothers initiate breastfeeding and 40% of children are exclusively breastfed for the first six months of life as recommended by WHO. (UNICEF, 2016). In the United States 83% of women initiated breastfeeding but many stopped prematurely (CDC,

2018). Despite numerous demonstrated evidence of the benefits of breastfeeding, infant feeding choices and practices by mothers varies worldwide.

Purpose Statement / Aims

The U.S. Preventive Services Task Force recognized that the provision of support both prenatally and post-partum is one of the best ways to improve breastfeeding duration (Department of Health and Human Services, 2011). Equally, research has identified that women that receive early and evidence based prenatal education are more likely to initiate breastfeeding and breastfeed for longer duration (Haroon et al, 2013). In the same way, women that deliver in hospitals that practice the baby friendly initiative tend to breastfeed for longer duration (Baby-Friendly USA, 2012). The purpose of this translational research project is to explore if women at risk for early breastfeeding cessation can be identified during pregnancy, and to determine the impact prenatal education and postpartum support will have on breastfeeding duration of the women identified at risk for early breastfeeding attrition.

The goal for this project is to determine if breastfeeding duration can be improved by identifying women at risk of early breastfeeding cessation during the prenatal course and the effect of existing interventions that promote longer breastfeeding duration on breastfeeding continuation rate. The project aims include:

1. To determine if women at risk for breastfeeding cessation can be identified during the prenatal period, using the breastfeeding attrition prediction tool.
2. To determine if support provided during prenatal and immediate post-partum will increase the breastfeeding duration.

The project clinical questions include: Among women receiving prenatal care at a Midwifery and Women's Center in GA:

1. Will the use of the Breastfeeding Attrition Prediction Tool (BAPT) identify women at risk for breastfeeding cessation during pregnancy in this population?
2. Will women at risk for breastfeeding attrition have increased self-efficacy in breastfeeding following education intervention?
3. Were there demographic factors or characteristics that were associated with being identified at risk for breastfeeding attrition with the BAPT?
4. Will there be a difference in the breastfeeding rate at six weeks postpartum between the at risk and not at risk groups?

Significance

To meet the Healthy People 2020 breastfeeding initiative goal and gain the benefits associated with breastfeeding, breastfeeding duration need to be improved. The southern states of the united states such as Georgia were this project was implemented has the lowest rates of both breastfeeding initiation and duration. This study result will help strengthen the breastfeeding education provided at the prenatal practice site were the project is implemented This study also will serve as baseline evaluation tool of interventions that might be effective in improving breastfeeding duration at this practice and community. In addition, it will serve to support the practice and its affiliated hospital in meeting the annual evaluations needed by the baby friendly organization to maintain membership.

Definition of Terms

Definition of terms: The terms used in the study will be introduced and defined. The definition provided is based on the WHO definition.

Exclusive breastfeeding. This is the act of an infant receiving only breastmilk either directly from the mother or expressed and not receiving synthetic formula preparations or other forms of liquid.

Ever Breastfed. Is defined as infants who receive any amount of breastmilk for any length of time.

Breastfeeding self-efficacy. Is defined as a mother's confidence in her ability to breastfeed her baby.

International Board-Certified Lactation consultant (IBCLC). This is an expert whose focus is to protect, promote and support breastfeeding through education, advocacy and facilitation of policy development (International Board of Lactation Consultant Examiners, [IBLCE], 2013-2016).

Peer counselor. The breastfeeding peer counselor is a paraprofessional that advocates for and provides breastfeeding support and breastfeeding education to mothers enrolled in the Women, Infants, and Children (WIC) program. She is expected to have breastfed at least one baby for six months or longer.

Conclusion

Breastmilk offers significant health and economic benefits to the nation. In the United State of America, about 83% of mothers initiate lactation. This high initiation rates demonstrates mothers in the United States wish to breastfeed. Unfortunately, breastfeeding continuation rate is less than optimal as only 55% continue to breastfeed by six months after delivery (CDC, 2018). Breastfeeding duration needs to be improved for the benefits attributed to it be realized. There are plethora of studies that have investigated this phenomenon. There are advances in some parts

of the world including the United States but there still exists a significant gap between what is desired, mother's decision to initiate breastfeeding, and breastfeeding duration for optimal health of the society. This study seeks to explore means to bridge the gap between breastfeeding initiation and duration by implementing interventions in the pre and postpartum arenas reported to ameliorate this problem and evaluate its impact on breastfeeding duration in southeastern United States.

Chapter II

Review of the Literature and Synthesis of Evidence

Introduction

This chapter reviewed the existent literature on breastfeeding attrition and interventions that supported breastfeeding duration. The review was organized in sections beginning with search criteria, background summary of literature, followed by theoretical paradigm for the project. This project explored the screening of women during the prenatal period for risk of breastfeeding attrition. Those identified at risk were given extra breastfeeding education prenatally and postpartum support that included lactation consultant support within 24 hours after giving birth, referral to community breastfeeding support upon discharge from the hospital. Finally, those at risk were given a follow up support phone call one week postpartum. Since one of the interventions reported to increase breastfeeding duration is improvement of self-efficacy, this study compared the breastfeeding self-efficacy scores of women in the at risk group before and after breastfeeding education was provided. Lastly, breastfeeding rate at six weeks postpartum from both groups was evaluated.

Search Description

A literature search was conducted using Galileo, CINAHL, and ProQuest for studies conducted in the years 2012 through 2018. The process is detailed in Figure 1. The search terms used were breastfeeding attrition, breastfeeding duration, self-efficacy and breastfeeding interventions. This returned a total of 8,594 studies. A secondary search was performed using PubMed and ProQuest and included the search term prenatal breastfeeding education. This returned 80 studies. The author reviewed all 80 abstracts. From this,15 studies addressed the focus of this study and were included in the literature review.

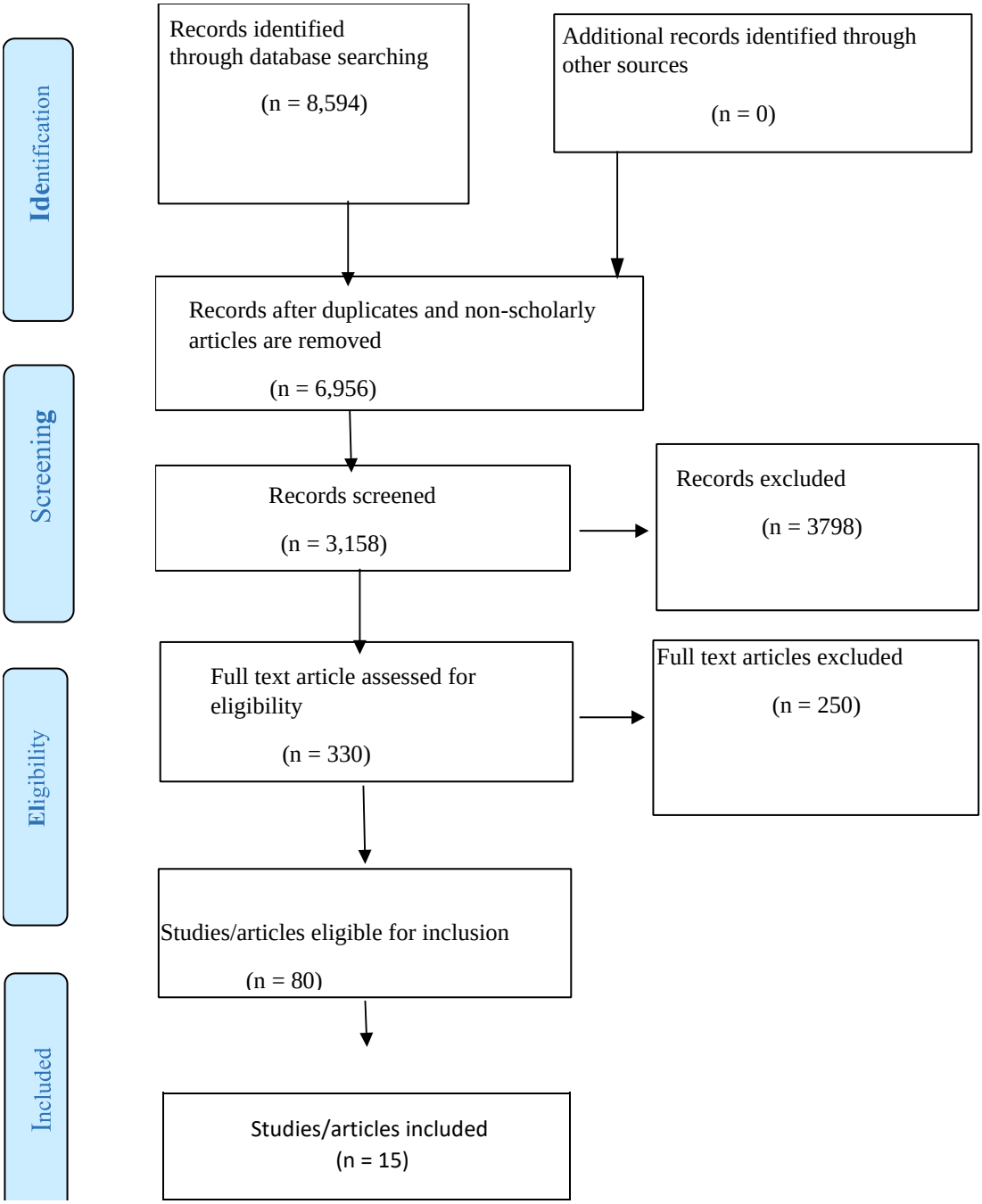

Figure 1. Flow diagram of literature search. Adapted from "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement" by D. Moher, A. Liberati, J. Tetzlaff, and D. Altman, 2009, *PLoS Med 6*(6): e1000097. Doi:10.1371/journal. pmed1000097

Summary of Evidence

The articles obtained were reviewed and synthesized. The synthesis of literature revealed Two major areas of concentration: Barriers to breastfeeding duration or continuation and impact of multi-level interventions on Breastfeeding duration. Within barrier to breastfeeding the focus was on modifiable attributes such as breastfeeding knowledge and prenatal education, major lactational problems mothers encounter, professional and family support, hospital culture, employment and psychosocial factors.

Barriers to Breastfeeding Initiation and Duration

Exploring the barriers to continuation of breastfeeding is crucial to identifying modifiable attributes to overcome these barriers and potentially institute initiatives that can improve breastfeeding duration. Several barriers were recognized as contributory to the decline in breastfeeding duration. Some of the most common barriers were lack of breastfeeding knowledge, lack of professional and social support, low breastfeeding self-efficacy, post-partum employment, hospital culture, and lactational problems (Daly, et al., 2014; Bai, et al., 2015; Oakley et al., 2014; Demirci, et al., 2013; Wagenen et al., 2015; Danawi, Estrada, Hasbini, & Wilson, 2016; Grubesic, & Durbin, 2017; Spitzmueller et al., 2018; U.S. Department of Health and Human Services, 2011).

Lack of Breastfeeding Knowledge

The Surgeon General and other research investigators identified inadequate breastfeeding knowledge as a major deterrent to breastfeeding initiation, and continuation (Kang, Choi, Hyun, & Lee, 2015; U.S. Department of Health and Human Services, 2011). This knowledge deficit is focused on the benefits of breastfeeding and the management of breastfeeding challenges. A study by Daly, et al., (2014) appraised breastfeeding knowledge in a

western Australia community and found that the general community including women underestimated the health benefits and importance of breastfeeding. One in fifteen participants could not identify a single benefit of breastfeeding. A similar study conducted in the United States of America by Wagenen, Magnusson & Neiger (2015) measured men's knowledge about breastfeeding and attitudes toward breastfeeding. They found that 33 % of these men presumed formula was as healthy as breastmilk, while 57 % believed that formula was more convenient than breastfeeding. This exposed a need for comprehensive breastfeeding education at the community level.

Prenatal Education

Leading authorities recommends prenatal care providers initiate breastfeeding education in the first trimester of pregnancy to correct breastfeeding knowledge deficit (U.S. Department of Health and Human Services, 2011). Sadly Demirci, et al. (2013) found that prenatal breastfeeding education was rarely addressed by providers. In their study, only 29% of visits discussed breastfeeding. Key reason for prenatal care providers not offering their clients breastfeeding education was that some providers lacked knowledge about breastfeeding. Pound, Williams, Grenon, Aglipay, & Plint (2014), found that more than 71% of both practicing pediatricians and obstetricians felt they had little or no breastfeeding education or training and consequentially lacked confidence in counseling their patients on infant feeding choices. Similarly, Svendbya, Løland, Omtvedta, Holmsenb, & Lagerløv, (2016) found that some general practitioners lacked basic breastfeeding knowledge to effectively promote breastfeeding. They attributed this lack of knowledge to not receiving breastfeeding education in medical school. Interestingly Shah (2013) noted that some providers failed to provide prenatal breastfeeding

education so women that chose to bottle fed will not feel guilty. This study however did not address if those providers felt they had a good knowledge of breastfeeding.

When providers gave breastfeeding education to patients, the time spent, method of delivery and the content of the education impacted how the knowledge was received. This has created misperception as to the effect of prenatal breastfeeding education to breastfeeding duration. In a randomized controlled study to increase breastfeeding duration through improved primary care support by motivational interview, there was significantly higher rates of exclusive breastfeeding (OR 1.88; 95%CI 1.01-3.50; $p = 0.047$) and full breastfeeding (OR 1.95; 95%CI 1.03-3.69; $p = 0.04$) in the intervention group at four months (Elliott-Rudder, Pilotto, McIntyre, & Ramanathan, 2014). Tahir, & Al-Sadat, (2013) through a randomized control study also demonstrated that the use of telephone lactation counselling by certified lactation counselor improved breastfeeding practices in the first postpartum month. A qualitative study with primigravids noted that the women felt ill-prepared for the realities of breastfeeding due to conflicting and idealized information that was given during prenatal education (Hinsliff-Smith, Spencer, & Walsh, 2014; Lagan, Symon, Dalzell, & Whitford, 2014).

Pitts, Faucher, and Spencer (2015), conducted a prospective descriptive study with 23 pregnant women that evaluated the effect of three prenatal breastfeeding education modules on breastfeeding initiation and duration. The participants completed breastfeeding education modules developed by the research group via computer tablets at 32, 34, and 36 weeks gestation. They also completed surveys after each module and at 6 weeks post-partum. Sixty-seven percent of the women reported that the modules promoted their decision to breastfeed which suggests that education may increase breastfeeding initiation and duration.

A systematic review of 24 randomized controlled studies on the effect of antenatal breastfeeding education on duration of breastfeeding did not find overwhelming evidence that supports antenatal breastfeeding education in improving initiation or continuation of breastfeeding at three or six months (Lumbiganon et al., 2016). It should be noted that the measured outcome variables were breastfeeding initiation, duration and exclusivity. However, an earlier systematic review by Haroon et al, (2013) compared breastfeeding education or support to routine care, reported that breastfeeding education and or support had a positive impact on breastfeeding initiation and duration of any breastfeeding and exclusive breastfeeding. The results showed statistically significant increase in breastfeeding initiation and exclusive breastfeeding duration, but no impact was noted on predominant breastfeeding or partial breastfeeding. The studies included in this review were both randomized controlled trials and quasi experimental trials. It is noteworthy that these studies did not address identification of women at risk of attrition and concentrated education to them.

Lactational Problems

Lactational problems such as nipple pain and inadequate milk supply have been linked to premature breastfeeding termination. Odom, Li, Scanlon, Perrine, & Grummer-Strawn (2013) in a population survey of 1177 mothers reported that 60% stopped breastfeeding earlier than they planned due to lactational problems. Kent et al., (2015) found that 36% of cases for consultation by mothers was for nipple pain. This nipple pain can be occurred with varied intensity and characteristics such as with or without trauma (McClellan, et al., 2012). A systematic review by Dennis, Jackson, and Watson (2014) assessed the interventions for treating nipple pain in breastfeeding mothers. They did not find significant evidence that any specific type of treatment for painful nipples alleviated the pain among breastfeeding women. Of note was that irrespective

of the treatment used, nipple pain reduced to mild severity approximately seven to ten days postpartum (Dennis, Jackson, & Watson, 2014).

Milk supply concern was another main barrier to breastfeeding continuation. Mothers with milk supply concerns were much less likely to be breastfeeding at 6 months (Flaherman, Beiler, Cabana, & Paul, 2016). Similarly, 30% of mothers stopped breastfeeding before six months due to perceived insufficient milk (PIM). Lack of knowledge in the management of breastfeeding challenges has been identified as a contributory factor to the problem of milk supply (Gao et al., 2016; Dietrich, & Misskey, 2015). A multi staged study in Ethiopia assessed the predictors of exclusive breastfeeding duration by a mixed method cross sectional study. They found that mothers that did not receive feeding counseling complained of inadequacy of breastmilk supply and subsequently stopped breastfeeding early when compared to mothers that received postpartum feeding counseling on child feeding (Kasahun, Wako, Gebere, & Neima, 2017).

Professional and Family Support

Research has shown that breastfeeding support especially in the post-partum period influences breastfeeding duration (Haroon et al.2013; Renfrew, McCormick, Wade, Quinn, & Dowswell, 2012). This support can be from peers' professionals' families or her social network. Professional support from nurses, peer counselors' lactation consultants and clinicians has been identified as important to the success of breastfeeding (Renfrew et al., 2012). The positive impact of support was noted despite venue or style of presentation (Haroon et al., 2013; Renfrew et al., 2012). A Web-based interactive breastfeeding monitoring system instituted after hospital discharge had a positive impact on breastfeeding duration, exclusivity, and intensity (Ahmed, Roumani, Szucs, Zhang, & King, 2016). The participants in this study had a statistically

significant increase in breastfeeding duration at one, two and three months when compared to mothers that were not exposed to it. Rayfield, Oakley, Quigley, (2015) detected that mothers that received breastfeeding support in the hospital and were given contact details for breastfeeding support groups in the community breastfed term infants up to 6 weeks and late preterm infants 10 days. The timing of support was important. Support provided in the immediate post-partum period was associated with increase in breastfeeding rate and duration (Fu et al.,2014).

In addition to professional support, family and social network support has equally been attributed to impact breastfeeding duration. Evidence supports that some mothers' decision to discontinue breastfeeding were influenced by the perceptions of persons in their social networks such as family members, friends, and their spouse or father of the child, (Asiodu, Waters, Dailey, & Lyndon, 2017). The spouse or significant other had a dominant influence on the success of breastfeeding among mothers in the United States and worldwide (Johnson et al., 2013; Şencan, Tekin, & Tatl, 2013; Nigel Sherriff, Hall, & Panton, 2014). Nigel, et al., 2014 observed that when fathers exhibited positive attitude to breastfeeding, were involved in the breastfeeding decision-making process, had breastfeeding knowledge, offered practical and emotional support to their partners, breastfeeding duration was positively impacted. Conversely, Abu-Abbas, Kassab, & Shelash, (2016) noted a link between breastfeeding discontinuation and lack of support from fathers or negative attitudes toward breastfeeding. Interestingly, McInnes, Hoddinott, Britten, Darwent, & Craig, (2013) found that while social network influenced breastfeeding duration, they was no leading family member that had more influence on breastfeeding. Most of these family members lacked accurate information about breastfeeding and thus offer poor support to breastfeeding women Asiodu, et. al., (2017). This was supported by Cardoso, Silva, & Marin (2017) who found that fathers that were poorly informed of

breastfeeding did not participate in feeding choice. Co-parenting breastfeeding support was identified by Abbass-Dick, & Dennis (2018) as a way to resolve this problem.

Hospital Culture

WHO and the United nations Children Emergency Fund (UNICEF) launched the Baby friendly hospital initiative (BFHI) and the Ten Steps to Successful Breastfeeding to strengthen hospital practices and enable hospitals to provide evidence-based breastfeeding support to mothers (WHO, 2017). A mixed study by Hawley, et al., (2015), looked for effects on infant feeding and potential barriers to exclusive breastfeeding. They found that women who introduced formula prior to hospital discharge reported not receiving sufficient breastfeeding support while in the hospital. These women also had more pain during breastfeeding and were less able to recognize infant satiety cues. Barriers to breastfeeding included lack of skin to skin contact after delivery, delays in the initiation of breastfeeding pain during breastfeeding, and a lack of education about infant satiety cues.

Employment

Several research studies have noted an association between mothers return to work postpartum and shorter breastfeeding duration than mothers who are not employed (Johnson, Kirk, & Muzik, 2015; Rivera-Pasquel, Escobar-Zaragoza, & González de Cosío, 2015; Bai et al. 2015). The time of resuming work and the nature of the work had the most impact on breastfeeding (Bai, et al., 2015; Bonet, et al., 2013; Rivera-Pasquel, et al., 2015; Skafida, 2012). A prospective study by Bai et al. (2015) of 1,738 post-partum mothers found that most (85 %) returned to work within 10 weeks postpartum of these, 90 % were employed full-time. Unfortunately, only 32 % of mothers were able to continue breastfeeding after resuming work. Those that returned to work later at eight to ten weeks postpartum had longer breastfeeding

duration. Mothers working as full or part-time employees had a higher risk of breastfeeding cessation than non-working mothers but mothers that were self-employed had similar breastfeeding duration as non-working mothers. (Skafida, 2012). Rivera-Pasquel, Escobar-Zaragoza, & González de Cosío, (2015) noted a difference of 5.7 months, 4.7 months and 6.7 months in the average duration of breastfeeding between formally employed and unemployed mothers in the years 1999, 2006 and 2012 respectively ($p>0.05$). Reasons attributed to the negative effect of employment on breastfeeding were inadequate lactation breaks, a lack of privacy for the expression of breastmilk, and unsatisfactory employer and coworkers support (Cripe, 2017). Cooklin, Rowe, & Fisher (2012) saw a positive association between paid maternity leave and breastfeeding in the first three months postpartum in a nulliparous, pregnant women prospective study that examined for an association between paid maternity leave and employment.

Psychosocial Factors

Psychosocial factors such as maternal confidence and self-efficacy have been documented as having strong influence on breastfeeding outcomes (deJager et al., 2014). Several studies have reported an association between breastfeeding duration and maternal self-efficacy. They noted that women with higher levels of breastfeeding self-efficacy handled breastfeeding difficulties better and breastfed for longer duration (Kadzikowska-Wrzosek, 2016; Fernandes do Carmo Souza, & Fernandes, 2014). Maleki-Saghooni, Barez, Moeindarbari, & Karimi (2017) suggested that maternal income was a factor on breastfeeding self-efficacy were women with higher income had significantly higher breastfeeding self-efficacy than those with low family income. But Silva, Pereira, Ferreira, & Souza (2018), identified that receiving prenatal care, having a planned pregnancy, vaginal delivery and initiation of breastfeeding during the first hour

after birth was associated with higher breastfeeding self-efficacy scores. A study by Otsuka, et al., (2013) noted a statistically significant difference in breastfeeding self-efficacy and breastfeeding duration between women that delivered at a hospital with baby friendly status and those that delivered in a non-baby friendly hospital. The women from the baby friendly hospital with higher breastfeeding self-efficacy scores had longer breastfeeding duration when compared to those that delivered in a non-baby friendly hospital.

Impact of Multi-level interventions on Breastfeeding Duration

Many studies have evaluated varied single interventions in relation to breastfeeding promotion and effect on duration, in either the prenatal, postpartum, or both periods. Recent studies demonstrated that breastfeeding duration was best extended with multiphasic breastfeeding interventions that were initiated during the prenatal era and continued postpartum both in the hospital and the community (Meedya et al., 2014; Nabulsi, et al., 2014; Edmunds, Lee, Eldridge, & Sekhobo, 2017; Martinez-Brockman, Shebl, Harari, & Pérez-Escamilla, 2017; Kim, Park, Oh, Kim, & Ahn, 2018).

Meedya et al. (2014) in a multiphasic quasi experimental study with 366 nulliparous women revealed that prenatal group education and postpartum telephone support interventions when compared to standard care significantly raised breastfeeding duration at one month (83.7% vs 61.3%, P=0.001), four months (64.5% vs 37% p=0.001) and at six months (54.3% vs 31.4% p=0.001). Edmunds, Lee, Eldridge, and Sekhobo, (2017) conducted a study to appraise the efficacy of the “You Can Do It” (YCDI) model at promoting exclusive breastfeeding. Their quasi-experimental design study with 1,397 multi ethnic pregnant women participants had three arms. The intervention arm had 362 women, the non-intervention arm had 347 women, and a baseline group had 688 women. The intervention arm were screened for attrition with the

breastfeeding attrition tool survey in the 1st trimester of pregnancy. Those that were at high risk for breastfeeding cessation were followed with a personalized intervention to address the problems identified. From the result analysis, the subjects of black and Hispanic ethnicity in the intervention arm were significantly more likely to breastfeed at seven, 30, and 60 days post-partum, than their counterparts in the non-intervention arm.

Applying the evidence

The literature review illuminates the multifaceted nature of the problems associated with breastfeeding attrition and duration. As such there is no one best approach to resolve it as there are differences in communities which might account for attrition within it. The Review provided compelling evidence that breastfeeding knowledge by patients, the community, and providers is crucial as a starting point by all to engage in the dialogue of prolonging breastfeeding duration and circumvent attrition. While there are many studies addressing interventions, recent focus on multi-level interventions seem to best address this problem especially when there are diverse ethnicities. Despite the plethora of studies, a gap exits in screening for women that are most likely at risk for attrition prenatally, then directing interventions to the attrition noted. Doing this will help with best use of resources which are not always plentiful especially in rural America and low resource countries. This project focuses on closing this gap by identifying women at risk for attrition in a Midwifery practice followed by provision of interventions to increase breastfeeding duration.

Theoretical Framework

The theory of planned behavior (TPB) shown in figure 2 is the theoretical framework to support this study. The fundamental paradigm of this theory is that a person's behavior is governed by the person's intention to perform that behavior. This intention to perform a behavior

is inspired by three concepts: attitude, subjective norm, and perceived behavioral control (PBC) (Ajzen, 1991). Attitude about a behavior is influence by the belief that performing a behavior will lead to an outcome, positive or negative. If the outcome is judged to be positive, then there is a greater chance of the behavior being performed. Similarly, if a negative outcome is expected the behavior will likely not be performed. Subjective norm is the value attached to opinions of social referents about a behavior and motivation to comply with those referents (Ajzen, 1991). Perceived behavioral control is the degree of difficulty associated with a behavior. Behaviors that are seen as less challenging are more likely to be performed. (Ajzen, 1991).

According to the TPB, perceived behavioral control mediates behavioral intentions and requires a plan (Ajzen, 1991). These plans have various limitations based on internal factors like individual differences, available information, skills, abilities, power of will, emotions and compulsions, and external factors such as time, opportunity, and dependence on other people influencing the individual (Ajzen, 1991). When an individual has a positive attitude to perform a behavior, perceives that the subjective norms will be pleased with the intended behavior and views the behavior as easy to perform, there is a higher likelihood of the behavior been enacted.

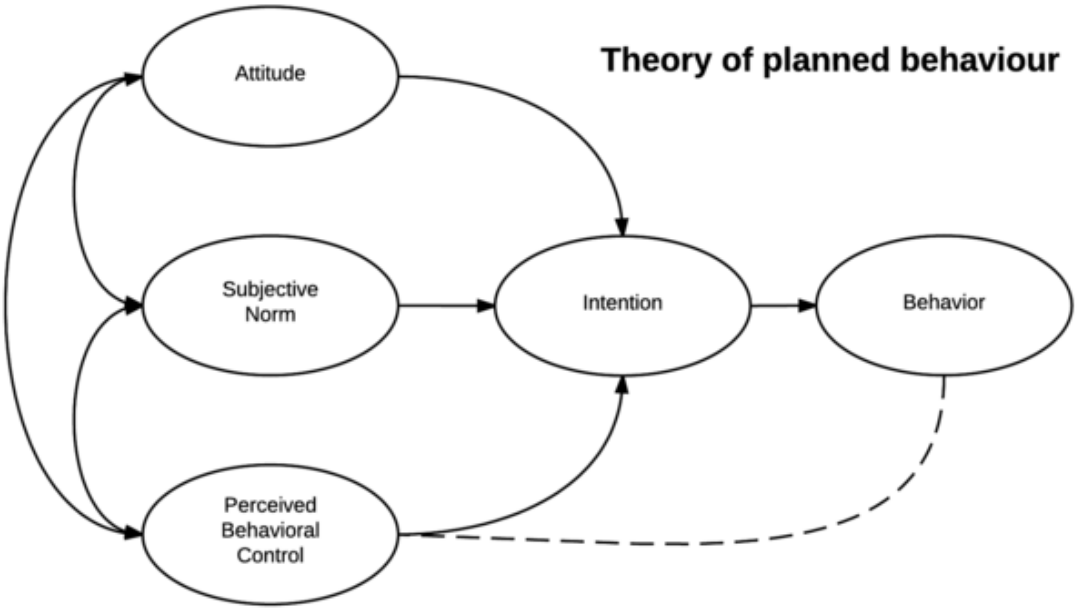

Figure 2. Theory of planned behavior by Robert Orzanna (2015) retrieved from https://creativecommons.org/licenses/by-sa/4.0.

Application to Breastfeeding Behavior

The Theory of Planned Behavior (TPB) it has been used in predicting and explaining health behaviors such as breastfeeding. It has been used to identify factors related to the decision to perform the breastfeeding behavior and provided evidence that intention leads to breastfeeding behavior (Bai et al., 2011). Thus, it starts by screening the mother for her feeding choice especially intention to breastfeed. This will best be accomplished during the prenatal era of pregnancy. For a mother that has the intent to breastfeed the actual performance of the act is further determined by her attitudes about breastfeeding, and if she believes that her partner, family, and friends will be supportive of her decision. This attitude can be heightened by providing evidence-based knowledge about breastfeeding. Finally, her intention is influenced by her perception of how easy or difficult it will be to carry out the behavior which is to breastfeed.

If she and her subjective norms are provided early and effective education, this may lead to a positive breastfeeding attitude in her and her subjective norms. Likewise, with adequate knowledge and support, she may view the act of breastfeeding to be less challenging therefore she is more likely to initiate and prolong breastfeeding for six months or greater.

Conclusion

Existent literature revealed there are many barriers that lend to the gap between breastfeeding initiation and duration. They also exposed that successful and prolonged breastfeeding practice depends on the mother, the child, and a supportive environment from professional health care team, employers and her social network. Chief among this support is availability of accurate breastfeeding knowledge that is provided by knowledgeable practitioners from the prenatal period and continued in the community after discharge from the hospital. In addition, to lessen time constraint on prenatal breastfeeding education, identification of women with breastfeeding attrition is needed for prenatal care provides to effectively support breastfeeding. Similarly, social support from spouse, family, and friends is vital likewise a supportive work environment that facilitates pumping to maintain milk production.

The theory of planned behavior when applied to breastfeeding practice illustrated that the intent to breastfeed is existent from the increase in breastfeeding initiation. However, the unique challenges of lack of knowledge and support faced by these women makes sustaining breastfeeding difficult. While some of these challenges are not adaptable the identification of women at risk for attrition during the prenatal period will be a good beginning and afford providers and social networks time to influence her, attitude, and perceived behavioral control so that the behavior of breastfeeding is performed and sustained. For the available interventions to be disseminated, there is a need for further studies applying them in other population. This

project seeks to hasten the dissemination of interventions that have been linked to prolonged breastfeeding by replicating them and evaluating their impact in a population that is vulnerable to attrition.

Chapter III: Methodology

Introduction

This translational project is an implementation study that seeks to promote the dissemination of research findings of interventions that prolong breastfeeding duration into routine practice, and, hence, improve the quality of health of the society. Thus, interventions to increase breastfeeding duration was examined starting with identification of women at risk of early breastfeeding cessation. Those identified were given additional breastfeeding education prenatally, followed with referral to hospital lactation consultants for immediate postpartum support, and further referred to community support upon discharge from the hospital, Lastly, they received telephone support at one week postpartum. The prenatal education curriculum was on the importance/ benefits of breastfeeding, importance of early breastfeeding initiation and following the ten steps of the baby friendly initiatives to enhance breastmilk production and sustain duration. The objective was to increase maternal self-efficacy. This was tested after the education was given. All interventions were examined to determine if the evidenced based interventions provided increased breastfeeding rates in the women with attrition closer to the USA Healthy People 2020 breastfeeding goals and WHO stated recommendations.

Aims

1. To determine if women at risk for breastfeeding cessation can be identified during the prenatal period, using the breastfeeding attrition prediction tool.
2. To determine if support provided during prenatal and after birth will increase the breastfeeding initiation and duration.

Research Design

Women seeking prenatal care at a Midwifery and Women's center in Georgia who were 34 to 36 weeks gestation participated in this project. Recruitment was by convenience sample. The study is a quasi-experimental design with two groups: Women identified as at risk for breastfeeding attrition and women identified as not at risk for breastfeeding attrition. The at risk group were given extra breastfeeding education during the third trimester of pregnancy, they received immediate postpartum support within 24 hours after delivery from lactation consultants and were referred to community breastfeeding support upon discharge from the hospital. In addition, they received telephone support at one week postpartum. This project principally sought to identify women at risk of early breastfeeding termination and, provided interventions in the prenatal and postpartum period that have been linked to prolonged breastfeeding duration.

Research Questions

The clinical questions for this project were: Among women receiving prenatal care at the Midwifery and Women Center:

1. Will the use of the Breastfeeding Attrition Prediction Tool (BAPT) identify women at risk for breastfeeding cessation during pregnancy in this population?
2. Will the at-risk group have increased self-efficacy score (PBSES) following a breastfeeding educational support?
3. Were there demographic factors or characteristics that were associated with being identified at risk for breastfeeding attrition with the BAPT?
4. Will there be a difference in the breastfeeding rate at six weeks postpartum between the at risk and not at risk groups?

Setting

This project was conducted in the state of Georgia which is one of the Southern states in the USA. This Northeastern community in the state has a population of 209,27. The prenatal screening for breastfeeding attrition and postpartum follow up phone calls occurred at the Midwifery and Women's Center practice while lactation support occurred at a hospital affiliated with the practice. This hospital-based practice employed eight certified Nurse Midwives, four Board Certified Obstetricians and Gynecologist, and a Certified Family Nurse Practitioner. They performed approximately 700 deliveries annually and provided comprehensive obstetric and gynecological care. The practice has diverse clients made up of 33% Caucasians, African Americans, Hispanics and 1% Asians.

Population and Sample

The population for the study was pregnant women from the Midwifery and Women's Center, aged 18-45 years with singleton pregnancy who were 34-36 weeks pregnant, and delivered at the hospital affiliated to the practice. Participants that did not meet the criteria were excluded from the study. The participants were recruited by convenience sample during scheduled prenatal visit by the principal investigator. Sixty two participants were approached and 56 consented.

Data Collection

Data was collected at four intervals; twice during the third trimester from 34-36 weeks gestational age, one week postpartum, and at six weeks postpartum. The project implementation from planning to completion of data collection occurred in four phases

Planning Phase

The Principal Investigator (PI) was a staff member at the office were this project was implemented. Prior to beginning the study, consents were obtained from the Midwifery center and its affiliated hospital, and Georgia College and State University Institutional Review Boards. The staff at this office were informed of the project and enlightened of the aim and process for the project during an office meeting one month prior to the implementation. The PI had meetings with the lactation consultants, labor and delivery nurses and postpartum nurses likewise to inform them of the study. The WIC office director, the lactation nurses and the hospital prenatal educator were likewise approached for guidance about the education curriculum and leaflets given to the participants.

Project Implementation Prenatal Phase

The principal investigator reviewed the office schedule each day for patients that met the eligibility criteria for the project. The identified subjects were invited in person to participate in the project by the PI and the care technicians. The PI obtained consent from the participants after explaining the aim of the project to them. The participant were given three self-administered surveys to complete at the end of the appointment namely the demographic questionnaire, the breastfeeding attrition tool (BAPT)and the Prenatal breastfeeding self-efficacy (PBSES) tool. The completed surveys were placed in a locked box in the PI office by the PCTs. The PI reviewed the surveys, scored the BAPT and the self-efficacy tools daily.

From the BAPT score the potential for breastfeeding attrition risk was determined. An overall score of 20 or less was an indication of a participant at risk for breastfeeding attrition and a score of 21 or higher was a participant not at risk for attrition. The participants with risk for attrition were given additional breastfeeding education and educational materials a week later at her next

prenatal appointment. Following the breastfeeding education, they repeated the Prenatal breastfeeding efficacy survey. The PI included breastfeeding attrition risk as a problem to the participants electronic record to communicate to other midwives, nurses and lactation consultants of participant's breastfeeding risk.

Project Implementation While in Hospital

The midwife who delivered the participant identified at risk for breastfeeding attrition informed the labor and delivery nurse to affix a loving support card to the patient's door when patient was moved to the postpartum unit. The lactation consultants offered support to the participants with breastfeeding attrition risk within 24 hours after delivery and provided them the local breastfeeding community resources before discharge, including a card from the PI to remind the patient of a follow up phone call by the PI in one week. The card included a list of the questions the PI will address during the phone call. The at risk participants eligible were referred to WIC program after discharge from the hospital for community support given by peer counselors. Those that were not eligible for WIC were referred to the hospital outpatient breastfeeding support services.

Project Implementation Post-Partum

The PI called the participants with breastfeeding attrition risk one week after delivery. The participants were asked questions about breastfeeding success and hospital environment. All participants both with and without breastfeeding attrition risks were seen approximately six weeks after delivery at the midwifery and women center. At this visit, the patients were given a three item survey, (the breastfeeding rate survey) to complete while waiting to be seen. Those that did not come for their appointment at six weeks completed the survey via telephone. All data collected were analyzed to answer the research questions.

Instrumentation

All tools and educational materials were available in the English and Spanish languages.

Demographic/ Confidence Tool. The demographic survey was developed by the principal investigator. The questions included age, ethnicity, parity, education level, and prior breastfeeding experience. This was used to describe the subjects. A visual confidence analog scale developed by Sauro (2010) was imbedded in the demographic survey and measured participants' confidence about their chosen feeding choice for their infants. The scale was scored from one to seven where one was not at all confident and seven was extremely confident. The higher the mark the higher the confidence felt by participants about their chosen method to feed their babies.

Breastfeeding Attrition Prediction Tool. This tool was created by Janke (1991) to identify women at risk for early breastfeeding cessation. It was modified by Gill, Reifsnider, Lucke, & Mann (2007). It is based on the Theory of Planned Behavior. It measured negative and positive breastfeeding attitude, maternal control, social, and professional support. (Janke, 1991). This scale predicted 78% of women that stopped breastfeeding at eight weeks and 68% of those that continued to breastfeed. It has a high Cronbach Alpha of .81-.86. It has been used in several studies that addressed early breastfeeding cessation and has been translated into several languages. The initial scale had 94 questions, but the modified and adapted form for this project has 24 questions. It was initially scored on a 6-point Likert scale with 1 being strongly disagree and 6 strongly agreed. However, the adapted version for this project has a 3 point Likert scale with one being disagree and three represents agree.

The Prenatal Breastfeeding Self-Efficacy Scale. This instrument was created by Wells (2006), to measure breastfeeding self-efficacy in the prenatal period. It is based on Bandura 's social

learning theory. It is a self-report instrument. The scale has 20-item, with a high Cronbach alpha of .89 that provides evidence of reliability. All the items have a 5- point Likert scale from one to five. One means not at all sure and five is completely sure. Total score ranges from 20 to 100. Higher scores mean higher level of breastfeeding self-efficacy.

Telephone breastfeeding survey. This survey is a list ten of questions created by the Vermont WIC program about hospital conditions as defined by the baby friendly hospital initiative that have been associated with breastfeeding promotion. The questions were scored as yes or no answers. The principal investigator added one open ended question to enquire about difficulties with breastfeeding while at home. Those that admitted to having problem were provided support as indicated by their problem and further referred to the practice or community resources for appropriate intervention.

Breastfeeding Rate Survey. This survey was developed by the PI. It was a three-item questionnaire that was given to all the participants at the six weeks post-partum visit. This survey identified participants that were still breastfeeding at six weeks, those that stopped, and reason for stopping.

Potential Risks, Benefits, and Human Participants Protection

Approval for the study was obtained from the hospital and Georgia College institution review boards. Participants were consented also prior to data collection. The data collected from participants was limited to answering the research questions and all data was reported in aggregate to minimize the risk to participants. To maintain confidentiality, no participant was identified individually. The surveys each had a unique identification number however, the principal investigator had a master list that matched the participants medical record number to the survey number was used to identify the right participants for lactation support postpartum.

This list was locked in a cabinet in the PI office and she was the only one with access to it. Completed surveys were given to the principal investigator. She scored surveys were indicated and entered data into statistical software for analysis on her personal password protected computer. The records will be retained for three years and then be destroyed and deleted.

The participants completed the surveys during scheduled appointments. No harm was seen from participation in this project however the participants appointment time was prolonged by 15-20 minutes. Those identified at risk for attrition some were embarrassed, but all were happy of the extra education given prenatally and support they received from the lactation consultants.

Conclusion

Short breastfeeding duration may be best ameliorated by addressing modifiable variables that have been identified as contributory. Various studies suggested that multi-level approach were more effective in promoting breastfeeding initiation and duration. Some of these approaches such as improved prenatal education both by content and style especially culturally sensitive education in demographics associated with lower breastfeeding practice, is imperative. Furthermore, breastfeeding support offered in the immediate postpartum and continued community support is invaluable to breastfeeding continuation. Likewise, a hospital culture that practices the ten steps of baby friendly initiatives provides a better environment to cultivate breastfeeding practice. Thus, when the family and community embrace breastfeeding as the optimal feeding choice for a baby and offer continued support, self-efficacy is improved, and duration is prolonged.

CHAPTER IV

Results

Analysis of Data

This quality improvement project tested strategies identified in prior research as contributory to improved breastfeeding duration in a population in Northeast Georgia with the purpose to help sustain breastfeeding to meet the Healthy People2020 and WHO goals. The Participants were recruited by convenience sampling (n = 56), The participants were first screened for risk of breastfeeding attrition and then divided into two groups after screening. Those identified to be at high risk for breastfeeding attrition (n = 21) were labeled the at-risk group and participants who were not considered at high risk (n = 35) were labeled the not at-risk group. This chapter will detail the results of the data analysis starting with the descriptive statistics to describe the characteristics of the participants including means/median, standard deviation values, or frequencies and percentiles for key variables. This will be followed by inferential statistics of the categorical and non-categorical variables to answer the clinical questions.

All the variables were examined for evidence of normal distribution. Maternal age was the only variable determined to be normally distributed. As such, the nonparametric tests Chi-square, Mann Whitney U and Wilcoxon Signed Ranks were selected for statistical analysis to answer the research questions and bivariate analysis for relationships were examined with the Spearman Rho test. The significance level of the tests was set at 0.05. All study participants in the not at- risk group provided complete data. Data was missing for two subjects in the at-risk group from the telephone survey because they could not be contacted by the phone number provided. Data was also missing for one of the subjects from the postpartum survey due to a

neonatal death, so they were not included in postpartum analysis but their response for other parts of the project was retained.

Data collection occurred at four intervals for the at-risk group and twice for the not at-risk group over 10-12 weeks. The initial data for all participants was obtained on the day of recruitment for the project. This included demographic data, BAPT and PBSES surveys. The participants were assigned to a group based on their score on the modified BAPT. Participants in the at-risk for attrition group had BAPT scores of 20 or less while those not at-risk for attrition had scores above 20. The at-risk for attrition group repeated the PBSES survey after receiving a breastfeeding education support. They also completed a telephone survey one week postpartum. All the participants then completed a breastfeeding status survey at their six weeks post-partum visit. Data was collected via telephone for those that did not come to their appointments.

Data analysis was performed using SPSS version 24. The demographic data obtained included items on socio-demographic characteristics (age, ethnicity, education, marital status), reproductive experience (Parity) and breastfeeding factors (breastfeeding experience, intention to breastfeed, feeding choice and confidence in choice). Table 1. presents descriptive statistics of baseline characteristics for the participants and Appendix A1. has the comparisons between the at risk and not at risk groups demographic and breastfeeding characteristics.

Of the 64 eligible candidates approached, 56 consented to participate: the at risk group (n =21) and not at risk group (n = 35). The participants in both groups ranged in age from 18 years to 40 years (M = 29, SD =28.57). Twenty percent of the participants were African American, 32.8% Caucasian and 42.1% Hispanics. Analyses was restricted to African American, Caucasian, and Hispanics due to the relatively small Asian group (n = 1). Majority of the participants

completed high school (42%) or attempted college/technical school (29 %). Likewise, more than half were unemployed (60%) and not married (54 %). With regards to the breastfeeding factors, 50% of the women planned to breastfeed exclusively, 45% wished to breast and bottle feed and 5% were unsure of their feeding choice. Most reported they were extremely confident of their feeding choice (68%). Seventy two percent were multigravida. Of these, 64% had past breastfeeding experience and some admitted to past problems with breastfeeding (n =8). A few (4%) had breast augmentation surgery.

When comparing the demographic characteristics of both groups, similarity were noted in age, ethnicity, employment status, plan to breastfeed, and past breastfeeding problems. In contrast, the were some differences between the groups. The not at risk group had higher BAPT scores. Eleven percent of the not at risk group had college or associate degrees, whereas the at risk group had no college graduates. Likewise, more of the not at risk subjects were married with higher confidence in their feeding choice. The at risk group had more primiparas (42.9%, n = 9). More than half of the women in the at-risk group planned to breast and bottle feed and they had more children than the not at-risk group. Appendix A, Table A1 shows the characteristics of the participants based on group.

Table 1.

Characteristics of all participants.

Demographic/Breastfeeding Variables	Frequency (%)	M (SD)
Age		28.57 (5.92)
Race		
African American	10 (17.9)	
Asian	1 (1.8)	
Caucasian	21 (37.5)	
Hispanic	24 (42.9)	
Education Level Completed		
Less than high school	5 (8.9)	
High school	23 (41.0)	
College/Technical school attempt	17 (30.4)	
Associate Degree	4 (7.1)	
Bachelor's Degree	2 (3.6)	
Master's Degree	3 (5.4)	
Doctorate Degree	2 (3.6)	
Employment		
Yes	22 (39.3)	
No	34 (60.7)	
Marital Status		
Married	26 (46.4)	
Single	30 (53.6)	
Breastfeeding Factors		
Parity		
Primipara	16 (28.6)	
Multipara	40 (71.4)	
Number of Children		1(1.87)
Previous Breastfeeding Experience		
Yes	36 (64.3)	
No	20 (35.7)	
Breast Surgery		
Yes	2 (3.6)	
No	54 (96.4)	
Prenatal Intention to breastfeed		
Yes	55 (98.2)	
No	1 (1.8)	
Feeding Choice Confidence		7 (1.52)
Past Breastfeeding Problems		
Yes	8 (22.2)	
No	28 (77.8)	
Plan for Feeding Baby		
Breast Only	28 (50)	

Breast and Bottle	25 (25)
Bottle only	0
Unsure	3 (5.4)

Note M = mean, *SD* = standard deviation

Clinical Question 1. *Will the use of the Breastfeeding Attrition Prediction Tool (BAPT) identify women at risk for breastfeeding cessation in this population?* The participants BAPT scores ranged from 12-34, (*M* = 24.75, *SD* = 5.67), 37.5% of the participants (n =21) had scores less than 20 and were identified as at high risk for attrition based on a score set by the instrument. The at risk group had BAPT scores that ranged from 12 to 19.5 and a mean score of 18.29 (SD = 2.04), while the not at risk group had scores that ranged from 21-34 and a mean score of 28.24 (SD= 3.38). The Mann Whitney U test displayed in table 2 and table 3, showed there was a significant difference in the BAPT score among the groups, the at risk group had lower scores (*M* = 18.29), than the not at risk group (*M* = 28.24), U =0, *Z*= -6.27, *P*=<.001. Also, from chi square analysis displayed in tables 4 and 5, significant association was seen between the BAPT scores and breastfeeding rate at 6 weeks, X^2 (1) =7.44, p = .006. For clinical question one, the result obtained suggests that the BAPT could identify women at risk for attrition due to significant difference in the BAPT scores between the two groups and chi square analysis showed an association between breastfeeding rate at 6 weeks and the BAPT scores.

Table 2.

Mann Whitney U test. (Ranks) on BAPT scores of At-Risk and not A-Risk groups

Variable	Study groups	N	Mean Rank	Sum of Ranks
Total BAPT Scores	At-Risk	21	11.00	231.00
	Not At-Risk	35	39.00	1365.00

Table 3.

Mann- Whitney test of statistics on BAPT scores

Mann-Whitney U	.000
Wilcoxon W	231.000
Z	-6.268
Asymp. Sig. (2-tailed)	.000*

*Significance set at ≤ 0.05

Table 4.

Comparison of At-Risk vs Not At-Risk breastfeeding rate at 6 weeks

		At-Risk Group Frequency (%)	Not At-Risk Group Frequency (%)	Sum
Breastfeeding at 6 weeks	Yes	11 (55)	30 (85.7)	41 (74.5)
	No	9 (45)	5 (14.3)	14 (25.5)
Total		20	35	55

Table 5.

Chi square analysis of breastfeeding at 6 weeks and BAPT score

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.436[a]	1	.006 *
Likelihood Ratio	7.312	1	.007
Linear-by-Linear Association	7.304[c]	1	.007
N of Valid Cases	55		

Note *significance set at p≤ 0.05

Clinical Question 2. *Will the at-risk group have increased self-efficacy score (PBSES) following a breastfeeding educational support?* The Wilcoxon Signed Ranks Test detailed in tables 6 and 7 was used to compare the pre and post PBSES scores collected. Prenatal breastfeeding self-efficacy scores were significantly greater after the breastfeeding education intervention (M = 82.57, SD = 14.52) than before the intervention (M = 71.57, SD = 21.18), z = -3.92, $p \leq 0.001$; r = -.86. Clinical question two was supported by significant change seen in the PBSES (self-efficacy) score after a prenatal breastfeeding education.

Table 6.

Comparison of PBSES scores in the At-Risk group pre/post education

Variables	N	Mean	Std. Deviation	Range minimum	Range Maximum
Total first PBSES score	21	71.5714	21.18861	20.00	97.00
Total second PBSES score	21	82.5714	14.52781	50.00	100.00

Note N = number of participants

Table 7.

Wilcoxon Rank Test statistics of PBSES scores

	Pre/Post PBSES score
Z	-3.923[b]
Asymp. Sig. (2 tailed)	.000*

*Note**significance set at p≤ 0.05, b. Based on negative ranks

Clinical Question 3. *Were there demographic factors or characteristics that were associated with being identified at high risk for breastfeeding attrition with the BAPT?* The frequency table showed there were some demographic difference between the groups. The women in the at risk group were less likely to not have a college education and had higher number of children. However, Spearman correlation showed weak relationship between being at risk for attrition by low BAPT score and demographic variables of age, education, ethnicity, past breastfeeding experience and the number of children. Age and education were positively associated with attrition were the older the subject and more education level completed, the higher the BAPT score and less likely hood for attrition. Question three, was not fully supported. As detailed in table 8, there were weak association noted between the demographic variables and being

identified at high risk for breastfeeding attrition with the BAPT, but this association was not statistically significant.

Table 8.

Correlation table of BAPT scores of At-Risk group and the Demographic variables

Demographic Variables	1	2	3	4	5	6	7	8	9	10
1 BAPT Score less than 20	-	.								
2 Age in years	.35	-								
3 Education level completed	.33	-.19	-							
4 Employment status	-.17	.05	-.19	-						
5 Ethnicity	-.20	.48*	-.54*	.32	-					
6 Marital Status	-.15	-.38	.09	.14	-.46	-				
7 Parity	.16	.39	-.11	.20	.20	.00	-			
8 Number of children	.22	.28	.22	.30	.10	-.17	.63**	-		
9 Past breastfeeding experience	-.24	.66**	.06	.00	-.27	.20	-.75**	-.60	-	
10 Feeding choice confidence	.05	.31	.04	.02	.12	-.22	-.02	-.42	.05	-

*Note *p =.05, ** p =< .001*

Clinical Question 4. *Will there be a difference in the breastfeeding rate at six weeks postpartum between the at-risk group and the not at-risk group?* The proportion of participants that breast fed at six weeks in the at risk group was 52% and 85% in the not at risk group. Test for significance was completed using the Mann Whitney U Test and displayed in Tables 9 and 10. The breastfeeding rate at 6 weeks in the at-risk group (M = 34.33) differs significantly from the rate in the not at-risk group (M = 25), U = 245, Z = - 2.70, p = 0.007, r =-0.36

Table 9.

Mann Whitney U test. (Ranks) on Breastfeeding at 6 weeks in both groups

Variable	Study groups	N	Mean Rank	Sum of Ranks
Breastfeeding at 6weeks	At-Risk group	20	34.33	721.00
Postpartum	Not At-Risk group	35	25.00	875.00

Table 10.

Mann- Whitney test of statistics on breastfeeding duration at 6 weeks

Mann-Whitney U	245.000
Wilcoxon W	875.000
Z	-2.703
Asymp. Sig. (2-tailed)	.007*

*Note**Significance set at ≤ 0.05

Other Results

Additional analysis was performed to compare the PBSES and the demographic variables. Comparison of PBSES scores and demographic variables detailed in Appendix A2 noted a significant correlation between self-efficacy scores and ethnicity, education level, and plan for infant feeding. African Americans and Hispanics had lower PBSES scores than the other ethnicities. Women that had higher education had higher PBSES scores and women that planned to breast and formula feed or only bottle feed had lower PBSES scores.

From the at risk group an association was explored by spearman Rho correlation between the Baby friendly hospital practices and breastfeeding practice at six weeks postpartum (Appendix A3). No relationship was seen with the Baby Friendly Hospital Practices. Reasons given for stopping breastfeeding was evaluated. Appendix A4 showed that perceived milk insufficiency was the predominant reason (50%) given by the women in the at risk group that stopped breastfeeding while medical condition of either baby (21%) or mother was the main reason given by the women in the not at risk group that stopped breastfeeding. In both groups the average length of time from initiation to cessation of breastfeeding was two weeks. Chi square analysis as detailed in table 11 showed a strong association between not breastfeeding at six

weeks postpartum and a maternal complaint of having problem with breastfeeding at one-week post-partum, $X^2(1) = 5.6$, $p = .018$.

Table 11.

Chi- square test of Breastfeeding at 6 weeks PP and having problem at 1 week pp

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.630[a]	1	.018
Likelihood Ratio	7.192	1	.007
Linear-by-Linear Association	5.333[c]	1	.021
N of Valid Cases	19		

Note $p \leq .05$

Conclusion

The following four clinical questions were addressed in this chapter; *Will the use of the Breastfeeding Attrition Prediction Tool (BAPT) identify women at risk for breastfeeding cessation in this population? Will the at-risk group have increased self-efficacy score (PBSES) following a breastfeeding educational support? Were there demographic factors or characteristics that were associated with being identified at high risk for breastfeeding attrition with the BAPT? and Will there be a difference in the breastfeeding rate at six weeks postpartum between the at-risk group and the not at-risk group?* Data collected from the surveys were used to answer the clinical questions. Additional result not addressed by the clinical questions were also noted. The predominant reason reported for breastfeeding attrition by mothers in this project was the perception of insufficient milk. The average time from breastfeeding initiation to cessation in those with attrition was two weeks postpartum. Further analysis of the demographic variables and PBSES (breastfeeding self-efficacy) showed significant relationship between PBSES scores and education, ethnicity, prenatal feeding choice, and confidence.

Chapter V

Discussion

Discussion of Findings

The aim of this project was to identify women at risk for breastfeeding attrition, implement interventions that were identified by research as ways to improve breastfeeding duration, and examine their effect in this population. A secondary aim was to investigate demographic variables associated with breastfeeding attrition in this population. This chapter will discuss the data analysis and overall effectiveness of the clinical project in addressing the specific aims and answering the clinical research questions in the context of existing body of literature. The implications for clinical practice will also be addressed.

Research Question One. *Will the use of the Breastfeeding Attrition Prediction Tool (BAPT) identify women at risk of breastfeeding cessation in this sample population?* This question was supported as the BAPT identified 37.5% (n = 21) of the study participants as at risk for breastfeeding attrition. About 48% (n = 10) of the participants from the at-risk group stopped breastfeeding before six weeks postpartum. Whereas only 14% (n = 5) of participants from the not at-risk group stopped breastfeeding prior to six weeks postpartum. Thus, despite interventions, provided to the at-risk group to improve breastfeeding duration, they still had more women stop breastfeeding earlier when compared to the not at-risk group. It should be noted that the not at-risk group had higher average BAPT scores (M = 30, SD = 3.38) with a range of 21-34, than the at-risk group (M = 19.5, SD = 2.04) and a range of 12-19.5. In both groups, women who were breastfeeding at six weeks had higher mean BAPT scores, compared to those who stopped breastfeeding. The Mann Whitney U test showed there was a significant difference in the BAPT score among the groups were the at risk group had lower scores (M = 18.29), than the

not at risk group (M = 28.24), U =0, Z= -6.27, P=<.001. Also, significant association seen between the BAPT scores and breastfeeding rate at six weeks X^2 (1, n =55) = 7.44, p = .006, demonstrated that the BAPT scores and the breastfeeding rate at six weeks postpartum were not independent of one another.

This result was similar to a study by Bortree, Decher, & Flynn, (2013), that used the same instrument. They reported that the BAPT was able to identify mothers at risk of weaning prematurely. In comparison, Bortree, Decher, & Flynn, (2013), had a larger sample (n =256) and examined both overall BAPT scores and the BAPT sub scale scores while this project examined only the overall BAPT scores. Based on the overall BAPT scores, 26% of the study participants were identified at-risk for breastfeeding attrition. It was noted that only the at-risk group completed the BAPT survey but in this project both groups completed the survey. The modified BAPT survey used in both studies were easier to score and the results obtained support the use of a screening tool prenatally to evaluate women for risk of early weaning. Such a tool would make it easier to identify those at risk sooner and would provide opportunity for focused interventions to address the problem of breastfeeding attrition.

Research Question Two *Will the at-risk group have increased self-efficacy score (PBSES) following a breastfeeding educational support?* Breastfeeding self-efficacy is a mother's confidence in her ability to breastfeed (Wells, 2006). Self-efficacy was explored with an analog scale in the demographic survey to evaluate confidence in feeding choice and with the prenatal breastfeeding self-efficacy (PBSES) tool. In this project the average PBSES score was 79.87 (*SD* = 19.91) with a range of 20-100, the at-risk group (n = 21) had an average score of 71.57 (*SD* = 21.18) range of 20- 97 and the not at-risk group (n = 35) had a score average of 84.85 (*SD* = 17.57) range of 44-100. The Wilcoxon signed rank analysis revealed that the PBSES scores in

the at-risk group were significantly greater after a breastfeeding education intervention (M =82.57) than before the intervention (M=71.57), $z = -3.92$; $p > 0.001$; $r = -.86$. However, there was no correlation between breastfeeding duration at six weeks and the PBSES scores when compared.

In a study by Pineiro-Albero, et al. (2013), where the PBSES tool was used with larger sample size (n = 234) and three groups: women with intent to breastfeed, women with intent to formula feed, and undecided. The average PBSES score for all participants was 72.32 (*SD* = 13.36). The women that expressed intent to breastfeed (n = 205), scored 73.94 (*SD* = 12.44). Those who intended to formula feed (n = 9) scored 56.11 (*SD* = 18.14) and the undecided group (n = 19) had an average score of 63.05 (*SD* = 12.37). Significant difference between the scores were noted (KW = 19.61; $p < 0.001$). There was an association between the PBSES score and breastfeeding duration and the PBSES score also strongly predicted exclusive breastfeeding at discharge for that study. In this project, there was no association between the PBSES and breastfeeding duration. The reason for no association between the breastfeeding scores and breastfeeding duration at six weeks may be due to the small sample size of this study. Pineiro-Albero et al. (2013) sample included only Hispanic women while this project has diverse ethnicity. Also, the reason for not seen any association between the PBSES scores and breastfeeding may be due to difference in the curricula of the breastfeeding education provided. The Pineiro-Albero et al. (2013) education curriculum was specific for self-efficacy attrition only. However, the education provided to the at-risk group for this project had a broader focus on knowledge of breastfeeding health benefits, the Baby Friendly hospital characteristics, what to expect when in hospital, self-efficacy, and support.

Research Question Three. *Were there demographic factors or characteristics that were associated with being identified at high risk for breastfeeding attrition with the BAPT?* A comparative analysis was used to explore for relationship between the demographic variables and the BAPT scores of the participants. There was no association between the BAPT score and the demographic variables. This was followed by a split analysis of the demographic variables of the women at risk for attrition and their BAPT scores. This analysis showed a weak positive association between BAPT scores and demographic variables of age, education level completed, past breastfeeding experience and the number of children the participant had. These associations were not statistically significant.

This result was in contrast to other studies that have evaluated relationship between demographic variables and early breastfeeding cessation. Goncalves (2017), examined the relationship between socioeconomic, demographic, family-related, pregnancy and birth factors, and bottle feeding/early breastfeeding cessation in the United Kingdom. The results demonstrated that early breastfeeding cessation was associated with age, marital status, race, education employment in manual occupations and number of children. Younger white women that were single, with less education had more children and worked in manual occupations, were significantly associated with early breastfeeding cessation. This result could be due to dissimilarities' in education, gravida, parity and sample size seen in this study. This project had more Hispanic participants while the Goncalves (2017) study likewise other studies that have examined this phenomenon had predominantly Caucasian, Middle eastern and African American participants. As such this might be a characteristic more commonly seen in the African Americans and Caucasians than in the Hispanic ethnicity.

Research Question four *Will there be a difference in the breastfeeding rate at six weeks postpartum between the at risk and not at risk groups?*

There was a difference in breastfeeding rates at six weeks post-partum between the groups. More of the women in the not at-risk group were still breastfeeding by six weeks postpartum than the women in the at risk group. A study by Thomson et al. (2017) found that increased knowledge and addressing barriers for breastfeeding were insufficient to empower women to continue breastfeeding their infants. Of note, that study primarily focused on African Americans that resided in the southern states of the nation as the participants in this study. While the geographical locations are similar the participants in this study were diverse and included more Hispanics and Caucasians than African Americans.

Limitations

Limitations of the project were identified. All participants in the project were from a suburban to rural areas in the southeastern United States. The sample although diverse was small and included convenience sampling of subjects that presented for care during recruitment for this project making transferability to other population limited. The effect size may be less modest due to the small sample, and similarly the at-risk group was smaller than the not at-risk which may have affected the results obtained from statistical analysis. Another limitation to consider was the timing of this project. This project recruitment occurred during the 3rd trimester. Most studies with a prenatal component started enrollment in the first trimester when mothers have not decided on how to feed their baby than during the third trimester when decision about feeding choice had already occurred. Also, the women in the third trimester are more focused on delivery expectations and may not have had enough time to process the information provided.

Strengths

Studies have explored the concept of breastfeeding attrition and many interventions have been generated to address this problem. This project, however, is the first to address this concept in this population, and first to test research strategies to improve breastfeeding duration. The involvement of a multidisciplinary team is an asset as intra and inter professional collaboration is needed to solve this multifaceted problem. The institution where the project was implemented recently acquired the baby friendly recognition. This recognition is followed by yearly evaluation of progress in breastfeeding promotion by the baby friendly USA organization. This study will serve as a benchmark for this practice and help to assess progress made in meeting the baby friendly hospital practice. The results from this project will serve as a guide for future studies on this subject.

Implications for Practice

Empirical evidence suggests breastfeeding attrition is multifactorial. As such, addressing it demands a diverse approach. One approach is to screen women for attrition risk during the prenatal period. Identification of women most likely to stop breastfeeding during the prenatal period is the first step in solving this problem. This is also relevant in women that intend to breastfeed. The project finding a relationship between BAPT score and breastfeeding duration indicates that the BAPT can serve as a valid tool to use prenatally in screening for attrition in this population. This proposes that prenatal care practitioners adopt the practice of routinely screen for breastfeeding attrition prenatally using a valid tool.

During the postpartum implementation phase of this project, a card was attached to doors of postpartum rooms of women that were identified at-risk for attrition. The card alerted lactation

nurses to visit the mother within 24 hours post-delivery. Consequently, all women at risk for attrition were seen by a lactation nurse to provide postpartum breastfeeding support before 24 hours post-birth. Although the hospital protocol for postpartum breastfeeding support is for all breastfeeding women to be evaluated by a lactation nurse within 24 hours from delivery this is not the usual process in this facility. During busy days and months some women reported being seen as late as 48th hour post-delivery and the visit most times were short. Since the implementation of this project there has been a decrease in the number of lactation nurses employed. This further decreases the availability of lactational support to all women at this facility.

Immediate effective postpartum support is crucial to the initiation and continuation of breastfeeding (Chaput et al., 2015). Studies have shown that lactation nurses and consultants are best prepared to advance breastfeeding duration (Wambach et al., 2011). This advocates that hospitals recognize the benefits and cost effectiveness of supporting breastfeeding and should explore alternative ways to meet the postpartum breastfeeding support needs of the clients. Educating and cross training nurses to give breastfeeding support is a potential solution to be considered in postpartum units.

The women in this project identified at risk for breastfeeding cessation were referred to community breastfeeding support by the WIC program following hospital discharge. They were also contacted one week after delivery by a phone call. During that conversation those that acknowledged difficulty with breastfeeding were referred to the midwifery and women center or the WIC office for assistance. However, women failed to keep the WIC or lactation appointments. The main reason given was the unavailability of suitable appointment time from WIC. Most appointments were set for three to four weeks postpartum. Unfortunately, most of the

women had stopped breastfeeding by two weeks postpartum. Interestingly all the women kept their appointments with their pediatricians within two to three days postpartum. This suggests that the process of scheduling WIC appointment should be altered. The development of a shared vision with interprofessional collaboration between prenatal care practitioners, hospitals, WIC, and other community breastfeeding supporters may help to support breastfeeding and potentially impact duration. It also echoes the need of having a lactation expert at the pediatrician office to address lactational needs when women present for infant visits.

During the project's postpartum phone call, 11 questions were asked. The initial ten questions addressed the hospital's practice of the baby friendly initiatives during their hospitalization. The answer to these questions were either yes or no. The last question was open ended. It asked if the women had any breastfeeding problems. Those having breastfeeding problems provided a description of the problem and were appropriately counseled. However, they were not asked any specific breastfeeding problems or concerns nor were, they provided with a list of common specific breastfeeding problems to choose from. Similarly, those that denied any problem were not asked about cues that might suggest a problem exists such as how many wet diapers their child had per day. Asking specific red flag questions may uncover specific breastfeeding problems. This is an area for further improvement as the project continues.

One of the questions in the breastfeeding rate survey is "what was the reason for stopping to breastfeed." The answer to this question revealed that women at-risk for attrition stopped breastfeeding early due to their perception of milk insufficiency. Self-efficacy has been associated with the perception of milk insufficiency (Otsuka, et al., 2013) The self-efficacy scores were significantly different between the not at-risk and at-risk groups. The not at risk group had higher scores. In the at-risk group their scores increased after a breastfeeding

education with a broad curriculum. Some studies with only self-efficacy focused breastfeeding education curricula noted a significant improvement in breastfeeding duration at six months. To that effect, there could be a consideration made to modify the office breastfeeding education curriculum to include contents that more effectively address self-efficacy.

Lastly, the decision made prenatally to breastfeed had a strong positive association with breastfeeding duration in both groups. The fundamental paradigm of the theory of planned behavior, the framework of this project is that a person's behavior is governed by the person's intention to perform that behavior. Thus, most of these women intended to breastfeed but some didn't due to the influence of attitude, subjective norm and perceived behavioral control. The prenatal period should be used to empower women, provide the support and education that will help them make this choice early in the pregnancy. This may be achieved by restructuring the prenatal visits to include focused breastfeeding education at each trimester.

Recommendations for Future Research

The findings from this project brought up questions that can be appraised with future research. There is a need to evaluate the feasibility of scheduling postpartum WIC appointment within two weeks after hospital discharge for women at risk for breastfeeding attrition. There is also a need to implement a self-efficacy focused breastfeeding education and evaluate its impact on maternal perception of milk supply. In addition, a need exists to further study the variables that might contribute to breastfeeding attrition in each ethnicity in this population. A replication of this study with randomized sampling will aid in in a cause and effect application of the results. Also, evaluation of clinical interventions such as targeted education for each subset of the BAPT which can be implemented by prenatal care providers to increase breastfeeding duration.

Conclusion

Breastfeeding is the gold standard infant nutrition, endorsed by leading health organizations for health of the infant child mother and the community. Early cessation of breastfeeding is prevalent globally. However, studies have shown that most mothers intend to breastfeed but due to several factors some default to formula feeding. The, development of effective interventions to prolong duration of breastfeeding is essential. The proliferation and successful marketing of formula has made breastfeeding cease to be the norm in many cultures. Measures such as health policy directives, effective support from providers, family, employers and the community are all required to change this culture and make breastfeeding the norm for infant feeding.

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Appendix A

Table A1.

Demographic Characteristics of the at risk vs not at risk groups

	At risk group Frequency (%) n = 21	Not at risk group Frequency (%) n = 35
Age *M* (*SD*)	27 (5)	29 (7)
Race/Ethnicity		
African American	5 (24)	5 (14)
Asian		1 (3)
Caucasian	7 (33)	14 (40)
Hispanic	9 (43)	15 (43)
Education Level Completed		
Less than high school	2 (10)	3 (9)
High school	9 (43)	14 (40)
College/technical school attempted		
Associate/technical degree	10 (48)	7 (20)
Bachelor's Degree		4 (11)
Master's Degree		2 (6)
Doctorate Degree		3 (9)
		2 (6)
Employment Status		
Employed	7 (33)	15 (43)
Not Employed	14 (67)	20 (57)
Marital status		
Married	7 (33)	19 (54)
Not Married	14 (67)	16 (46)
Breastfeeding Factors		
Parity		
Primipara	9 (43)	7 (20)
Multipara	12 (57)	28 (80)
Past Breastfeeding Experience		
Yes	9 (43)	27 (77)
No	12 (57)	8 (23)
Breast Surgery		
Yes	0	2 (6)
No	0	33 (94)
Prenatal Intention to Breastfeed		
Yes	20 (95)	35 (100)
No	1 (5)	
Number of Children *M* (*SD*)	2 (33)	1(26)
Past breastfeeding problems		

Yes	3 (33)	5 (14)
No	6 (67)	30 (86)
Plan for Feeding Baby		
Breastfeed	7 (33)	21 (60)
Breast/Bottle	11 (52)	14 (40)
Bottle		
Unsure	3 (14.3)	
Feeding Choice Confidence		
Extremely confident	10 (48)	28 (80)
Very confident	3 (14)	3 (9)
fairly confident	1 (5)	
Confident	4 (19)	3 (9)
Somewhat confident	1 (5)	
Slightly confident		1 (3)
Not at all confident	2 (10)	

Note M = mean, *(SD)* = standard deviation

Table A2.

Correlation table of PBSES scores of and the Demographic variables

Demographic Variables	1	2	3	4	5	6	7	8	9	10
1 PBSES	-									
2 Age in years	.14	-								
3 Education level completed	.31*	.19	-							
4 Employment status	-.25	-.28*	-.52**	-						
5 Ethnicity	-.31*	-.04	-.57**	.43**	-					
6 Marital Status	-.16	-.31*	-.13	-.22	.20	-				
7 Parity	-.10	.22	.07	.00	-.01	-.12	-			
8 Number of children	-.05	.43**	.08	-.06	.08	-.12	.72**	-		
9 Past breastfeeding experience	.03	-.48**	-.07	-.08	.07	.20	-.92**	.00	-	
10 Feeding choice confidence	.51**	.20	-.02	.13	.06	-.17	-.04	-.09	-.09	-

*Note *p =.05, ** p =.01*

Table A3.

Baby friendly hospital characteristics and breastfeeding status of the At-Risk group

Hospital Characteristics	Breastfeeding status frequency (%)	
	Yes	No
Hospital staff gave information about breastfeeding	19 (100)	
Baby roomed-in	18 (94.7)	1 (5.3)
Breastfed baby in hospital	17 (89.5)	2 (10.5)
Breastfed baby in the first hour	15 (78.9)	4 (21.1)
Hospital staff helped learn how to breastfeed	19 (100)	
Baby fed only breast milk in hospital	13 (68.4)	6 (31.6)
Hospital staff told me to feed-on-demand	15 (78.9)	4 (21.1)
Received gift pack with formula	11 (57.9)	8 (42.1)
Hospital gave phone number to call for breastfeeding help	18 (94.7)	1 (5.3)
Baby used pacifier in hospital	17 (89.5)	2 (10.5)
Have problem breastfeeding 1st week	4 (21.1) *	15 (78.9)

Table A4.

Frequency table of Reasons Given for stopping breastfeeding before 6 weeks Postpartum visit

Reason	Frequency %
Milk insufficiency	7 (50)
Mother of infant sick	1 (7.1)
NICU admit of infant	1 (7.1)
Sick infant	3 (21.4)
Mother embarrassed	1 (7.1)
Difficulty with latch	1 (7.1)

Appendix B
Demographic Survey

Please circle the answer that best describes you.

1. How old are You? _____
2. What is the highest grade you completed in school?

Elementary/primary

Middle school

High School

Some College

College Graduate

3. What is your ethnicity?

African American

Asian

Caucasian

Hispanic

Other

4. Are you currently employed?	Yes	No
5. Are you currently Married?	Yes	No
6. How many children do you have? _____		
7. Have you breastfed before?	Yes	No
8. Did You have any problem in the past with breastfeeding?	Yes	No
9. Do you plan on breastfeeding your baby after delivery?	Yes	No
10. Have you had any breast surgery?	Yes	No

11. If yes which breast surgery did you have

Cyst removal,
Biopsy,
Breast augmentation/reduction
Other

12. How do plan on feeding your baby Breastfeed Bottle Breast/bottle Unsure

Please show how confident you feel about your chosen method of feeding your baby by drawing a line on the diagram below between 1 and 7.

13. I am confident about the method I have chosen to feed my baby

Not at all Confident 1	2	3	4	5	6	Extremely Confident 7
○	○	○	○	○	○	○

by Jeff Sauro (Measuring U 2010)

Appendix C

Prenatal Breastfeeding Attrition Prediction Tool Survey (BAPT)

Date:

Survey Number:

Please circle the word that most closely describes how you feel about each statement. Would YOU…

1. Breastfeeding is more convenient than formula feeding. Agree Neither Disagree

3. Breast milk is more nutritious than infant formula. Agree Neither Disagree

5. Breastfeeding makes you closer to your baby. Agree Neither Disagree

7. Breastfeeding is more economical than formula feeding. Agree Neither Disagree

9. Mothers who formula feed gets more rest than breastfeeding mothers. Agree Neither Disagree

11. Breastfeeding is messy. Agree Neither Disagree

13. Breastfeeding helps you bond with your baby. Agree Neither Disagree

For each of the following individuals, indicate how they think you should feed your infant.

15. The baby's father thinks I should: Formula No Opinion Breast N/A

17. My mother-in-law thinks I should: Formula No Opinion Breast N/A

19. My doctor thinks I should: Formula No Opinion Breast N/A

Please indicate whether you agree or disagree with the following statements. Would YOU…

20. I have the necessary skills to breastfeed. Agree Neither Disagree

Appendix D

PRENATAL SELF-EFFICACY OF BREASTFEEDING SCALE

For each of the following items, I want you to tell me how sure you are that you could do each of the things described

NS = not at all sure, SS = slightly sure, FS = fairly sure, VS= very sure, CS= completely sure

1. I can find the information I need about problems I have breastfeeding my baby.	NS	SS	FS	VS	CS
2. I can find out what I need to know about breastfeeding my baby.	NS	SS	FS	VS	CS
3. I know who to ask if I have any questions about breastfeeding my baby.	NS	SS	FS	VS	CS
4. I can talk to my partner about the importance of breastfeeding my baby.	NS	SS	FS	VS	CS
5. I can talk to my health care provider about breastfeeding my baby.	NS	SS	FS	VS	CS
6. I can schedule my day around the breastfeeding of my baby.	NS	SS	FS	VS	CS
7. I can make the time to breastfeed my baby even when I feel busy.	NS	SS	FS	VS	CS
8. I can breastfeed my baby even when I am tired.	NS	SS	FS	VS	CS

9. I can breastfeed my baby when I am upset.	NS	SS	FS	VS	CS
10. I can use a breast pump to obtain milk.	NS	SS	FS	VS	CS
11. I can prepare breastmilk so others can breastfeed my baby.	NS	SS	FS	VS	CS
12. I can breastfeed my baby even if it causes mild discomfort.	NS	SS	FS	VS	CS
13. I can breastfeed my baby without feeling embarrassed.	NS	SS	FS	VS	CS
14. I can breastfeed my baby when my partner is with me.	NS	SS	FS	VS	CS
15. I can breastfeed my baby when my family or friends are with me.	NS	SS	FS	VS	CS
16. I can breastfeed my baby around people I do not know.	NS	SS	FS	VS	CS
17. I can call a lactation counselor if I have problems breastfeeding.	NS	SS	FS	VS	CS
18. I can choose to breastfeed my baby even	NS	SS	FS	VS	CS

if my partner does not want me to.

19. I can choose to breastfeed my baby even if my family does not want me to. NS SS FS VS CS

20. I can breastfeed my baby for one year. NS SS FS VS CS

Appendix E

Curriculum for Prenatal Education and Educational materials given to patients

Curriculum for Prenatal Education

Health benefits of breastfeeding to baby and mother
Importance of Planning for breastfeeding before delivery
Where to seek breastfeeding help in the hospital and community
What to expect when in the hospital for optimal breastfeeding
How to Assess for Milk transfer during breastfeeding

Educational material given to patients

Breastfeeding Begins Before Birth (leaflet)
Resource: Lactation Education Resources.

What to expect in the early days of breastfeeding (leaflet)
Resource: Journal of Midwifery & Women's Health

Five Keys to Successful Breastfeeding (leaflet)

Resource: Lactation Education Resources

Help from Friends and Family (leaflet)

Resource: Lactation Education Resources

The Employed Breastfeeding Mother(leaflet)

Resource: Lactation Education Resources

The Importance of Latch-on (leaflet)

Resource: Lactation Education Resources

Making Milk: Ten steps to make plenty of milk (leaflets)

Resource: Massachusetts Breastfeeding Coalition

Increasing Your Breastmilk Supply (leaflet)

Resource: Lactation Education Resources

Calming a crying newborn (leaflet)

Your Guide to Breastfeeding (booklet)

Resource: U. S. Department of Health and Human Services Office of Women's Health

Breastfeeding Support Group Information

Resource: Various organization

Appendix F

Informed Consent FORM

The Effectiveness of Breastfeeding Intervention on Breastfeeding Duration in Women at Risk for Breastfeeding Attrition.

PURPOSE OF PROJECT

You are invited to participate in a research project on breastfeeding. The primary goal of this project is to determine whether identifying women that might stop breastfeeding early and providing them support while pregnant and immediately after delivery will be effective in increasing the length of time they breastfeed

You were selected as a possible participant in this study because you are currently pregnant and in the last trimester of your pregnancy.

VOLUNTARY PARTICIPATION

Your participation in this study is entirely voluntary. You should not feel obligated to agree to participate You are free to terminate your participation in this study at any point without reason. If you have questions about the project, please notify Anthonia Anukam at Anthonia.Anukam@bobcats.gcsu.edu or by phone at 706-340-6033

PROCEDURES

If you choose to participate, you will be asked to complete 3 surveys about breastfeeding today. This will take about 15 minutes to complete. Your response will be used to determine if you are at risk of stopping breastfeeding early. If you are identified at risk, you will be given additional breastfeeding education at your next visit. All participants will be seen by a lactation nurse after delivery and given breastfeeding support based on your needs. The women that are at risk of stopping breastfeeding early will receive a phone call One week after delivery to find out if you have any problems with breastfeeding. At your post-partum visit you will be asked if you are still breastfeeding or not.

POTENTIAL BENEFITS

The expected benefits of this study include {helping the participant to breastfeed for a longer period. This will in turn help your baby be healthier, save you money from buying formulas and protect you from some cancers like breast and endometrial

CONFIDENTIALITY

This survey is confidential. Do not indicate your name on the survey. Only the Principal Investigator will be able to identify your answers on the survey. All answers will be reported in an aggregate. Your identity and/or your personal health information will not be disclosed.

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Signature of Participant **Date**

Appendix G

GCSU IRB Approval Letter

DATE: 2018-03-07

TO: anthonia c anukam

FROM: Whitney L. Heppner, Ph.D. Chair of Georgia College Institutional Review Board

RE: Your IRB protocol 9626 is Approved for 2018-03-07 - 2019-03-07

Dear anthonia c anukam,

The proposal you submitted, "The Effectiveness of Breastfeeding Intervention on Breastfeeding Duration in Women at risk for Breastfeeding Attrition," has been granted approval by the Georgia College Institutional Review Board. PLEASE NOTE: YOU MUST ADD IRB CONTACT INFORMATION INCLUDING DR. HEPPNER'S INFORMATION TO YOUR CONSENT FORM. You may proceed but are responsible for complying with all stipulations described under the Code of Federal Relationship 45 CFR 46 (Protection of Human Subjects). This document can be obtained from the following address:

http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html

The approval period is for one year, starting from the date of approval. After that time, an extension may be requested. It is your responsibility to notify this committee

of any changes to the study or any problems that occur. You are to provide the committee with a summary statement. Please use the IRB Portal (https://irb-portal.gcsu.edu/) to request an extension, report changes, or report the completion of your study.

Finally, on behalf of IRB, we wish you the best of luck with your study. Please contact GC IRB at any time for assistance.