

**Online Breastfeeding Training for Increasing Staff Knowledge and Breastfeeding Initiation
Rates on a Mother/Infant Unit**

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Abstract

Breastmilk is recognized as the ideal source of nutrition for infants from birth throughout the first year of life. Healthcare providers, who are positioned in women/infant settings, are benefactors in breastfeeding support and care. The purpose of this quality improvement project was to retrospectively evaluate an evidence-based, online breastfeeding education series for staff on a mother/infant unit at a Missouri hospital. The outcomes measured were staff knowledge and hospital breastfeeding rates. A cohort of staff members on a mother/infant unit participated in the project, including registered and unlicensed personnel. Data was retrieved at baseline, n=65, and post-education, n=68, on breastfeeding knowledge. Breastfeeding rates were assessed for change, pre- to post-intervention. An increase in knowledge was found in 14 of the 15 questions with nine demonstrating significance ($p < 0.05$). Hospital breastfeeding rates are excluded from this submission for confidentiality. The educational program can be used in other healthcare facilities to influence nursing care, healthcare practices, and health and wellness for the mother and infant.

Keywords: breastfeeding education, healthcare professional breastfeeding support, healthcare professional breastfeeding education, maternal breastfeeding education, healthcare professional breastfeeding experience, and online breastfeeding education

Online Breastfeeding Training for Increasing Staff Knowledge and Breastfeeding Initiation Rates on a Mother/Infant Unit

Breastfeeding is known as a symbolic step for mother and infant after birth and through childhood. Evidence supports that breastfeeding provides innumerable benefits to the health of mother and infant. Breastfeeding support may come from professional or personal sources such as healthcare professionals and involved family members (Johnson et al., 2016; Nelson, 2007). Breastfeeding rates have increased worldwide; however, breastfeeding initiation and continuation results are lower than the standard. A gap remains in breastfeeding support measures from healthcare professionals (Johnson et al., 2016). Healthcare professionals have a common knowledge of breastfeeding support; they often fail to encourage it (Lucchini-Raies et al., 2019; Nelson, 2007).

Significance

Evidence suggests that online learning increases the knowledge of healthcare professionals in many areas of patient care, including breastfeeding education. Critical to low breastfeeding rates are the concepts of healthcare professional breastfeeding support and associated professional education. Prior research recognizes that healthcare professionals are not properly equipped to provide breastfeeding support (DeIoian et al., 2015). According to the Center for Disease and Control (CDC) (2014), although breastfeeding initiation rates begin with 79% of newborns born in the United States, breastfeeding declined to under 49% at six months and 27% at the 12-month mark. Research supports that breastfeeding initiation and continuation rates are increased and supported by healthcare professionals who maintain breastfeeding education (Johnson et al., 2016; Lu, 2006; Whelan et al., 2011). This need for education has been noted in the Surgeon General's Call to Action to Support Breastfeeding released in 2011,

recognizing that nurses and healthcare providers that influence the care of women and infants should be required to obtain and maintain breastfeeding education (CDC, 2019; Deloian et al., 2015; World Health Organization [WHO], 2017).

Although education and training alone are not solely responsible for improving breastfeeding rates, research supports that breastfeeding initiation and continuation rates are increased and supported by healthcare professionals who maintain breastfeeding education (Johnson et al., 2016; Lu, 2006; Whelan et al., 2011). Following a study by Whelan et al. (2011), healthcare providers recognized education was needed on various breastfeeding support measures. These areas include knowledge of breastfeeding and providing support, confidence in dealing with breastfeeding initiation and barriers, and the approach to provide support (Whelan et al., 2011). Almeida et al. (2015) recognized that healthcare professionals have been a source of adverse support by conveying inconsistent breastfeeding practices and recommendations to mothers. Healthcare providers who are inadequately educated on breastfeeding support measures are reported to give inadequate guidance on breastfeeding practices. Women who are encouraged to breastfeed by educated healthcare professionals are four times more likely to continue breastfeeding (Lu, 2006).

Local Issue

In addressing breastfeeding support, a need was identified for formal breastfeeding education at a Missouri hospital. A single lactation consultant was utilized as a resource for patient breastfeeding education, including addressing breastfeeding difficulties and other needs of breastfeeding mothers. No formal education was present on breastfeeding for obstetric and pediatric staff. The Missouri hospital is a 165-bed hospital that services patients in the hospital setting, Outpatient Center, Cancer Center, and Women's Center. This Missouri hospital offers

various services, including ultrasounds, mammography, pelvic health treatment and therapies, baby and me tobacco free education, a prenatal centering pregnancy program, and lactation support to assist women who plan to breastfeed or are breastfeeding. This project intervention was designed for the obstetrical and pediatric staff on a mother/infant unit. Staff members on this unit care for mothers with an increased need in postpartum care, including assisting and educating patients on breastfeeding.

Diversity Considerations

Numerous diversity factors are considered on the initiation and continuance of breastfeeding, including socioeconomic status and race. Breastfeeding initiation at birth in most countries is below 50%, with poor countries having higher initiation and continuation rates (Wallingford, 2016). As education is disseminated to these individuals of all classes, breastfeeding initiation and continuation rates are shown to improve (Newton, 2004; Wallingford, 2016). As socioeconomic status is a factor for breastfeeding success, race, maternal age, and maternal education are imperative to effective breastfeeding (Newton, 2004; Wallingford, 2016). When controlling age, education, and income, breastfeeding rates increase as breastfeeding benefits are recognized (Wallingford, 2016). Healthcare professionals are recognized as role models in affecting breastfeeding initiation and continuation rates. Women are more likely to continue breastfeeding practices if they receive adequate breastfeeding education from a healthcare professional (Bernaix et al., 2010). Higher levels of education, for the mother and healthcare professional, have more impact on the continuation of breastfeeding than the initiation (Bernaix et al., 2010; Newton, 2004).

Problem and Purpose

As healthcare professionals are positioned at the bedside with breastfeeding mothers, it is pertinent to their role to provide consistent and accurate education and support. Although breastfeeding rates are slowly on the rise in the United States today, there remains a gap within breastfeeding education and support (Bernaix et al., 2010; Cohen et al., 2018; Deloian et al., 2015; Gavine et al., 2017; Radzaminski & Callister, 2015). Healthcare professionals often lack the education that is needed to properly manage breastfeeding instruction, stipulating inconsistency in professional breastfeeding support; this influences the mother's frustration and overall experience of breastfeeding (Graffy & Taylor, 2005; Martinez et al., 2016; Radzaminski & Callister, 2015; Rosin & Zakarija, 2016).

Problem Statement

Inadequate breastfeeding educational modalities for staff on mother/infant units are associated with insufficient healthcare professional support, decreased staff and patient knowledge of breastfeeding, and decreased initiation and continuation rates of breastfeeding.

Intended Improvement with Purpose

Although educational modalities have been used throughout the healthcare system to increase breastfeeding knowledge, limited research has been piloted towards online breastfeeding education and effects on increasing breastfeeding rates. A need was identified for a formal breastfeeding education series to assist with orientation and continuing education for staff on a mother/infant unit. The purpose of this project was to evaluate an evidence-based online breastfeeding education series for staff on a mother/infant unit at a Missouri hospital. The overall goal of this educational series was to increase breastfeeding knowledge and breastfeeding rates at the project site.

Facilitators and Barriers

Facilitators for this intervention included a myriad of support systems, stakeholders, and champions of care for mother/infant care. As this educational series was implemented for annual and new hire training, interest has been expressed in pursuing assessment of outcomes that support breastfeeding initiatives to increase initiation and continuation of breastfeeding measures as encouraged by the World Health Organization (WHO). This project supports a low-cost initiative that further facilitates the economics of implementation. Breastfeeding providers have difficulty considering breastfeeding as relevant to practice, the ability or availability to assist with breastfeeding issues, and insecurities about implementing new knowledge into practice. Implementing new training into practice includes a change in routine that may cause hesitation amongst healthcare professionals protecting the safety of mothers and infants (Brodrigg, 2011). No barriers for change were recognized in the implementation of this project.

Sustainability factors supporting the implementation of this project were multi-factorial. The implementation of this evidence-based online breastfeeding education series was implemented in 2017, allowing the evaluation of this series as minimal in invasiveness from the QI leader and stakeholders. Although the sustainability of this project is durable, one source of reserve was related to patient sensitive information when collecting data on breastfeeding rates. This data was deidentified by research staff. Increasing breastfeeding rates through an online-educational series can increase funding sources and meet criteria to remain a Show-Me 5 breastfeeding hospital.

Review of Evidence

Inquiry

For staff on a mother/infant unit, does completing an online breastfeeding training series, compared to no breastfeeding education, improve breastfeeding knowledge and hospital breastfeeding initiation rates, over one year of implementation at a Missouri hospital?

Literature Search Strategies

The databases used for the literature search included MEDLINE with Full Text, CINAHL Complete, EBSCO Host, Cochrane Database, Cochrane Central Register, ProQuest, PubMed, Medline through Ovid, and Nursing and Allied Health Database at the University of Missouri-Kansas City with the additional online search engine of Google Scholar (see Appendix A for definition of terms). Keywords used for this search included, but not limited to, *(a) breastfeeding education, (b) healthcare professional breastfeeding support, (c) healthcare professional breastfeeding education, (d) maternal breastfeeding education, (e) healthcare professional breastfeeding experience, (f) online breastfeeding education*. This search included quantitative and qualitative research articles between the years of 2005 to 2020 of the English language.

After the initial search of literature yielding approximately 100 articles, an additional ten articles were added through a secondary or third search. Approximately 50 articles met eligibility criteria with 18 articles meeting exclusion criteria. Thirty-two articles and two evidence-based guidelines were included within the review to support evidence-based practice on implementing an online education series for maternal/infant healthcare professionals within the hospital setting (see Appendix B for PRISMA). These studies consisted of two evidence-based guidelines for healthcare professionals and the breastfeeding mother, five systematic reviews (Level I evidence), one randomized control trial (Level II evidence), and three control trials (Level III evidence). The non-experimental studies and qualitative studies included three cohort studies (Level IV evidence), six quantitative descriptive studies (Level V evidence), 13 qualitative

studies (Level VI evidence), and one expert opinion (Level VII evidence; Melnyk & Fineout-Overholt, 2019; Appendix C for synthesis of evidence table).

Synthesis of Evidence by Themes

Major themes included are healthcare professional support aids in successful breastfeeding, continuity of care enhances breastfeeding practices, breastfeeding experiences effect breastfeeding success, lack of breastfeeding knowledge and inconsistent education, and online learning improves staff breastfeeding practices. These themes are conclusive to the primary goal of increasing healthcare professional support through breastfeeding education (see Appendix D for evidence grid). The principal outcome for this inquiry includes healthcare professional support on gaining knowledge to alter breastfeeding experience and breastfeeding rates.

Healthcare Professional Support Aids in Successful Breastfeeding

Exclusive breastfeeding in the first six months of life is insufficient in many countries, including the United States (Almeida et al., 2015; Graffy & Taylor, 2005; Lu, 2006; Nelson, 2007). Primary outcomes of breastfeeding, analyzing exclusivity, initiation, and breastfeeding duration are often unrecognized within research and by healthcare professionals (Wood & Woods, 2018). Healthcare professionals lack consistency when applying supportive care measures (Wood & Woods, 2018). Factors that lead to successful breastfeeding rely on self-efficacy, emotional support, and confidence from the healthcare provider (Balyakina et al., 2016; Cohen et al., 2018; Graffy & Taylor, 2005; Wood & Woods, 2018; Yang et al., 2018). Whelan et al. (2011) recognized in one study that 63% of mothers were given conflicting advice from healthcare professionals. Mothers who were provided proper breastfeeding support were encouraged to continue breastfeeding (DeIoian et al., 2015; Graffy & Taylor, 2005; Radzyminski & Callister, 2015). Support is insufficient and results in mothers discontinuing breastfeeding

around six weeks postpartum (Graffy & Taylor, 2005; Palmer & Ericson, 2019; Radzysinski & Callister, 2015). Healthcare professionals are lacking in support of breastfeeding mothers as the professionals are limited in the time they have with each patient (Nelson, 2007; Rosin et al., 2016).

Consistent support from a healthcare professional is significant in providing appropriate steps, time, and resources (Almeida et al., 2015; Folker et al., 2018; Harilla-Acevedo, 2018; Sinha, 2015; Wade et al., 2009). Lu (2006) recognized that mothers who were encouraged to breastfeed by a healthcare professional were four times more likely to initiate breastfeeding; this includes increasing breastfeeding three-fold in populations of women who are less-educated and 11-fold amongst single mothers. Research displays that healthcare providers are not engaging in support or education with both the mother and infant (Almeida et al., 2015, Harilla-Acevedo, 2018; Lu, 2006; Martinez et al., 2016; Sinha et al., 2015; Wade et al., 2009; Wood & Woods, 2018; Zamani et al., 2019).

Continuity of Care Enhances Breastfeeding Practices

A lack of healthcare professional support creates conflicting relationships between providers and the mother/infant dyad (Gavine et al., 2017; Weddig et al., 2011). Continuity of care is another gap recognized throughout the literature. Balyakina et al. (2015) recognized that women who had breastfeeding support and education from a nurse or nurse-midwife were twice as likely to continue breastfeeding. Mothers who are not offered breastfeeding support from a healthcare provider are estimated 70% more likely not to exclusively breastfeed (Balyakina et al., 2015; Nelson, 2007). Zamani et al. (2019) recognized that healthcare providers possess greater knowledge when connected with other colleagues. Lactation consultants have the most accurate knowledge regarding breastfeeding, and mothers often receive their basis of breastfeeding knowledge from additional healthcare professionals such as obstetricians and

bedside nurses (Balyakina et al., 2015; Whelan et al., 2011). Healthcare professionals demonstrate a need for education and guidance on learning their role as experts and proper clinical development to support breastfeeding practices (Bigger & Long, 2008; Palmer & Ericson, 2019).

Breaches are also recognized in breastfeeding practices between providers concerning breastfeeding exclusivity, supplementation, and transitional responsibility from nurse to nurse (Nelson, 2007; Souza et al., 2015; Weddig et al., 2011). These inconsistencies result in erratic policies for providers to follow in providing proper breastfeeding support and allowing for valid adoption of policies into breastfeeding practices (Bigger & Long, 2008; Radzyminski & Callister, 2015; Souza et al., 2015; Sinha et al., 2019; Weddig et al., 2011). The results of improved continuity of care and collaboration demonstrate both direct and indirect knowledge, self-efficacy, and self-concept of breastfeeding practices (Balyakina et al., 2015; Bigger & Long, 2008; Cohen et al., 2018; Lucchini-Raies et al., 2019; Whelan et al., 2011; Zamani et al., 2019).

Breastfeeding Experiences Effect Breastfeeding Success

The WHO (2017) recognized that supporting the mother/infant dyad early and with a close relationship with breastfeeding practices increases breastfeeding rates. Past maternal breastfeeding experiences with healthcare professionals will either enhance or degrade current breastfeeding processes. Breastfeeding mothers are more likely to lean on their understanding and experiences rather than the inconsistencies provided by the healthcare provider (Cohen et al., 2018; Colaceci et al., 2017; Martinez et al., 2016; Nelson, 2007; Sinha et al., 2015). Studies remain consistent that healthcare providers are the leading threat to breastfeeding cessation as current interventions are disjointed and do not address various determinants for breastfeeding care (Johnson et al., 2016). Within the breastfeeding contact periods of postpartum, mothers are in vertical and homogenizing relationships with healthcare providers (Martinez et al., 2016). The

experiences of healthcare providers impact furthering breastfeeding practice to mothers, and the lack of accurate breastfeeding facts from healthcare professional peers decreases initiation and continuation of breastfeeding (Bernaix et al., 2010).

Experiences of breastfeeding care from healthcare providers and the mother/infant dyad are highly associated with overcoming barriers to breastfeeding. When healthcare professionals have the basic knowledge about breastfeeding, the concern of overcoming breastfeeding barriers was not reduced (Johnson et al., 2016; Nelson, 2007; Wood & Woods, 2018). Although mothers are unprepared for the realities of breastfeeding, they want to know more as they breastfeed their infant (Graffy & Taylor, 2005; Johnson et al., 2016; Zhang et al., 2018). Due to the lack of breastfeeding support from healthcare professionals, including their professional experiences, mothers are often offered a supplement instead of encouragement to continue breastfeeding measures (Palmer & Ericson, 2019; Radzysinski & Callister, 2015; Woods & Wood, 2018). Healthcare professionals feel as if the infant will understand how to breastfeed, and the task is left to the breastfeeding mother to overcome the error with a *what works* outlook (Radzysinski & Callister, 2015; Nelson, 2007). Healthcare providers set unrealistic expectations and do not genuinely understand the vulnerable group of breastfeeding mothers (Martinez et al., 2016; Radzysinski & Callister, 2015; Nelson, 2007).

Lack of Breastfeeding Knowledge and Inconsistent Education

Healthcare professional support of breastfeeding may be due to a deficiency in knowledge related to breastfeeding practices (Folker et al., 2018). Healthcare professionals are affected by personal experience and often give mothers inconsistent advice, furthering a negative maternal breastfeeding experience (Folker et al., 2018; Weddig et al., 2011; Yang et al., 2018). This lack of knowledge impedes confidence furthering a depletion in education to breastfeeding

mothers (Folker et al., 2018; Ramos et al., 2018; Yang et al., 2018). In a Level I systematic review with meta-analysis, addressing factors that affect breastfeeding initiation and continuation, the study recognized four high impact factors, including a) smoking, b) mode of delivery, c) maternal personal education, d) and maternal breastfeeding education (Cohen et al., 2018). Mothers who had a higher level of personal education were associated with increased breastfeeding initiation and continuation rates. Forty-one percent of mothers who received education on breastfeeding practices from a healthcare professional initiated and continued breastfeeding compared to those who did not receive education (Graffy & Taylor, 2005). In a qualitative intervention and comparison study by Folker et al. (2018), a breastfeeding toolkit with basic breastfeeding information increased breastfeeding knowledge between the control and intervention groups. Following Baby-Friendly initiatives set by the WHO, there remains significant evidence that the increase of breastfeeding education for healthcare providers and breastfeeding mothers improves initiation and continuation worldwide (CDC, 2019; Cohen et al., 2018; Gavine et al., 2017; WHO, 2017; Yang et al., 2018).

Ward and Byrne (2011) report that less than 50% of pediatric and neonatal nurses who give direct breastfeeding education receive any type of breastfeeding education upon hire or with continuing education. In various maternal and childcare practices, resistance is shown in including more education as this requires change and effort related to the continuation of educational practices (Folker et al., 2018; Gavine et al., 2017). Interventions tailored to education are less effective over time, thus increasing the need for continuous educational efforts (Wood et al., 2018). Gavine et al. (2017) recognized that education outcomes are rarely measured consistently due to their inconsistency within the implementation. Breastfeeding knowledge increases breastfeeding duration and further provides professional support to decrease

educational inconsistencies (Almeida et al., 2015; Bigger & Long, 2010; Colaceci et al., 2017; Graffy & Taylor, 2005; Nelson, 2007; Wood & Woods, 2018). Education increases the overall knowledge of breastfeeding and implications of practice for the healthcare provider (Bigger & Long, 2008; Whelan et al., 2011).

Online Learning Improves Staff Breastfeeding Practices

Educational programs have been evaluated in providing effective education to healthcare professionals (Bernaix et al., 2010; Sinha et al., 2019; Watkins et al., 2017). The Surgeon General's 2011 Call to Action to Support Breastfeeding recommends that all nurses and healthcare providers that influence women and infant care should initiate and maintain proper breastfeeding education (Deloian et al., 2015). Educating mother/infant staff is one of the main facilitators of the Baby-Friendly initiatives set by the WHO (WHO, 2017). Responding to the widespread need for healthcare professional breastfeeding education, online learning is increasing in effectiveness (Colaceci et al., 2017). Deloian et al. (2015), in a cross-sectional study initiating an evidence-based online breastfeeding education series, suggest no difference in baseline knowledge from unlicensed assisted personnel to physicians caring for mothers and infants (Deloian et al., 2015). After a free online breastfeeding basics course, Deloian et al. (2015) documented that a statistical and clinical increase was witnessed in all areas measured in posttest scores. As the content within this research was online, gaps were exposed in knowledge using a pre and posttest of breastfeeding basics content (Colaceci et al., 2017; Deloian et al., 2015).

Continuing education improves knowledge and furthers clinical skills and practice (Ward & Byrne, 2011; Yang et al., 2018). In addition to bedside training, evidence finds that 18 or more hours of formal education is most beneficial (Ward & Byrne, 2011). Online educational content may be beneficial for annual breastfeeding education for healthcare professionals and

breastfeeding mothers. When implementing online learning for breastfeeding mothers, a decrease in physiological stress and an increase in proper breastfeeding care are witnessed (Colaceci et al., 2017; Roch et al., 2018). When using online versions of education, harmonization between the healthcare professional and breastfeeding mother is probable (Roch et al., 2018). This partnership has the potential to renovate the outlook of current breastfeeding education practices, furthering the optimization of guidelines set by the WHO and the American College of Obstetricians and Gynecologists (ACOG) focusing on the initiation and continuation of breastfeeding practices (ACOG, 2018; WHO, 2017).

Evidence Discussion

The literature review resulted in various studies witnessing the relationship between mother, infant, and healthcare professional. Several points are essential for discussion, including healthcare professional support and the influence healthcare professionals have on breastfeeding initiation and continuation (Zamani et al., 2019). Conclusively, no article contained information specific to one recognized theme, further recognizing breastfeeding support as a multifaceted healthcare professional approach. With 32 studies of inclusion and two sets of related guidelines, there was a variety of supporting evidence that directly addresses the stated inquiry. Direct evidence supporting the related inquiry was witnessed throughout an array of articles supporting all levels of evidence (level I through VII). Related guidelines were associated with breastfeeding friendly initiatives or baby-friendly hospital measures and outcomes (Wood & Woods, 2018).

The creation of healthcare professional support is derived from the creation of relationships and provider encouragement of breastfeeding practices across the continuum (Gavine et al., 2017; Palmer & Ericson, 2019; Weddig et al., 2011). Subsidiary to the term

support, healthcare professionals are not well prepared in providing education, furthering a lack of knowledge and opposing attitudes towards breastfeeding practices (Gavine et al., 2017; Martinez et al., 2016). Given the international attention to breastfeeding education, standards are yet to be met. Baby-friendly hospital initiatives include 10 points of guidance, including training healthcare staff on ways to support the woman/infant dyad (ACOG, 2018; CDC, 2019; WHO, 2017). Research suggests that these initiatives should be met with nationwide objectives of increasing exclusive breastfeeding rates per infant age increments (CDC, 2019; Ward & Byrne, 2011).

The body of evidence addresses the issue of healthcare professionals being a primary support source of breastfeeding; the idea of cessation is encouraged as mothers report inadequate knowledge, time, and involvement (Gavine et al., 2017; Radzyninski & Callister, 2015). A break in knowledge originates between healthcare professionals such as nurses, lactation consultants, and physicians (Martinez et al., 2016; Palmer & Ericson, 2019). At healthcare institutions that follow guidelines related to breastfeeding-friendly initiatives, cohesive knowledge and support furthering continuity of care is a dominant finding (Martinez et al., 2016; Radzyninski & Callister, 2015; Zamani et al., 2019).

In studies reviewed, the problematic approach to breastfeeding from both mother and healthcare professional were tailored by inadequate education and prior experience with breastfeeding (Radzyninski & Callister, 2015; Weddig et al., 2011; Wood & Woods, 2018; Zamani et al., 2019). Categorically, many authors have established the awareness that vicarious experiences shape the self-efficacy of all participants furthering the proliferation of vulnerability. This defenseless state within the healthcare professional and mother creates an environment directed by obstacles. Researchers have witnessed this vulnerability in healthcare professionals

to reduce the intent to initiate and sustain breastfeeding support processes (Gavin et al., 2016; Martinez et al., 2016; Zamani et al., 2019).

Gaps and Limitations

Within this review, a primary focus was addressing healthcare professional support and how the lack of education reduces overall breastfeeding initiation and continuation rates within healthcare institutions. Although many studies recognized a gap in healthcare professional support, there was limited evidence on the follow-up of online breastfeeding education and effects on breastfeeding rates (Gavine et al., 2017). Additionally, studies concluding the results from online breastfeeding education focus on the outcome of increasing knowledge. These studies are appropriate and supportive of the inquiry, and the outcome of knowledge alone offers weak sustenance in increasing breastfeeding rates. Moreover, extensive information is needed on how educational efforts will impact breastfeeding support, initiation, and duration (Gavine et al., 2017; Martinez et al., 2016).

A variety of articles were used to support the inquiry; the level of evidence was witnessed across the continuum. Though all levels of evidence are pertinent to the application of the related intervention, qualitative studies were used to address a variety of experiences in cultures. Cultural aspects of care are often addressed within breastfeeding support. A solitary way of addressing cultural characteristics of breastfeeding care was not witnessed throughout literature, leading to a weakness in addressing areas of concern for the healthcare professional. Cultural characteristics are an inference of patient and nurse ethnicity and the cultural dynamics within each healthcare system. Evidence has recognized a weakness in the method of dissemination of education throughout the healthcare system (Wood & Woods, 2018). No one consistent modality of education was noted throughout the literature to support hospital versus outpatient education.

Outcomes of these modalities will then assist in supporting both the healthcare professional and woman/infant dyad.

Theory

The Theory of Planned Behavior (TPB) provides a framework for healthcare providers and patients in explaining a range of human behaviors. The central concept of this theory is to predict and explain certain behaviors that motivate humans to do what they do (Bai et al., 2019; Harillo-Acevedo et al., 2019; Zhu et al., 2017). This theory has been widely used in the lactation field and has a primary role in supporting the concepts of support, education and knowing, and experience within the inquiry. The TPB focuses on attitude, perceived control, and subjective norms that are cognitive factors that determine behavior (Bai et al., 2019; Zhu et al., 2017).

Using the TPB for the healthcare professional in providing breastfeeding support increases breastfeeding rates as mothers gain breastfeeding knowledge in addition to the belief that breastfeeding is best for infants (see Appendix E for theory application; Harillo-Acevedo et al., 2019; Zhu et al., 2017). The TPB is a framework that may be used to help predict and explain behaviors that healthcare professionals display in conjunction with their compliance to education (Lau et al., 2018; Watkins et al., 2017; Zhu et al., 2017). As breastfeeding education is integrated into the health system, this theory is comprehensive and identifies social pressures to integrate breastfeeding education, attitudes towards breastfeeding, and other control factors that healthcare providers associate with breastfeeding promotion and support (Lau et al., 2018; Watkins et al., 2017).

Methods

Institutional Review Board (IRB) and Site Approval

The Institutional Review Board (IRB) at the Missouri hospital serving as the project site reviewed the classification of the project (see Appendix F for approval). This evidence-based practice project was categorized as Evidence-Based Quality Improvement (EBQI), a non-research project. The primary goal of the EBQI was to retrospectively evaluate the effect of an evidence-based online breastfeeding education series on healthcare professional knowledge and hospital breastfeeding rates over one year of implementation.

Ethics Considerations

Privacy, protection, confidentiality, and investigator conflicts were addressed throughout the implementation of this project and were addressed in the evaluation of the collected data. A video release form was obtained for approval of recording (see Appendix G for video release). The online platform kept data confidential, including those who completed the course, pretest, posttest, and evaluations. Participants had no direct contact or instruction from the QI leader during this improvement initiative. Completion of the online module was voluntary during the first implementation phase, and all answers were anonymous and reported as aggregate group data. No conflicts of interest were recognized by the QI leader. The intervention was not biased to culture and was pertinent to those located in the geographical location of the study.

Funding

The approximate amount of funds estimated for this project was \$1760. Work paid costs were estimated to be \$900, including project supplies, travel, presentation materials, staff salary, administration salary, and student time. The project implementation cost estimate was approximately \$660, and the evaluation cost estimate was \$1,100 (see Appendix H for cost table). A grant was not required or sought for this project related to minimizing expenses.

Setting and Participants

The participants consisted of staff members on a mother/infant unit, including registered nurses and unlicensed personnel, at a public Missouri hospital. Inclusion criteria included over 16 years of age, licensure as a registered nurse (RN), licensed practical nurse (LPN), certified nurse's assistant (CNA), patient care assistant (PCA), and employment at the project site with direct patient contact in mother/infant care. Certified staff currently in orientation were also included in the study, as this education series was intended to reach experienced and new staff. Exclusion criteria were float or temporary staff and non-certified healthcare professionals such as nursing students and externs. Upon initial implementation, the intervention was made mandatory to staff meeting inclusion and exclusion criteria from October 2017 to February 2018. The intervention was open for completion to those meeting inclusion and exclusion criteria after the mandatory intervention timeframe. The educational initiative included a convenience sample consisting of all the staff who completed the educational intervention and knowledge surveys from 2017 through July 2020. The expected number of participants was at least 45 staff members.

EBP Intervention

The intervention was implemented to improve breastfeeding knowledge among staff interrelated to care of the mother/infant dyad, having a direct effect on breastfeeding initiation and continuation practices. The overarching goal was to improve breastfeeding rates at the project site. The educational program participants were assessed on their knowledge of breastfeeding before and after the online educational series. The data was analyzed for achievement of improved knowledge. Hospital data on breastfeeding rates was assessed to address the influence of breastfeeding education on an increase in rates.

EBP Intervention Steps

The evidence-based online breastfeeding education series was developed and implemented in the fall of 2017. The series was developed and evaluated by stakeholders from April of 2017 to October of 2017. Retrospective data collection was completed to review pre and posttest data on breastfeeding knowledge during the fall of 2020. The QI leader and stakeholders collected hospital data on breastfeeding rates from one year prior to implementation (2017) of the educational program through December of 2020 (see Appendix I for project flow).

In 2017, after the QI leader discovered an educational need for breastfeeding education at a Missouri hospital, a project planning committee was formulated, and collaboration occurred through face-to-face meetings and email correspondence to discuss pertinent areas to include in an online education series. A video was recorded with a lactation consultant on breastfeeding for new mothers. This video was used in conjunction with PowerPoint slides to build the evidence-based online breastfeeding series (see Appendix J for PowerPoints). After completing the videos and resources, the planning committee approved an online six-part series of breastfeeding education. The learning management systems coordinator uploaded the education to an online education platform for review. Once the program was approved, it was assigned and released to staff on a mother/infant unit (see Appendix K for educator approval).

Using the convenience sample, the QI leader assigned the online educational series to staff meeting inclusion and exclusion criteria. The education was explained to each participant at the beginning of the online educational series. As each participant completed the education program, electronic consent was implied for participation in the educational series and data collection. Questionnaires included the American Academy of Pediatrics (AAP) breastfeeding curriculum addressing breastfeeding knowledge (pre- and post-intervention) and a 5-point Likert scale questionnaire to address learner satisfaction. In a retrospective review, hospital quality

compliance data was used for breastfeeding rates pre- and post-intervention (see Appendix L for intervention flow).

Evidence-Based Model

This program implementation used the Rosswurm and Larrabee model for change to evidence-based practice. Rosswurm and Larrabee's model focuses on assisting healthcare professionals through a systematic process of change, furthering the encouragement of providers to utilize research to guide practice outside of relying on current clinical practices (Rosswurm & Larrabee, 1999). The first two steps of this process include the healthcare professional recognizing a change for breastfeeding education is needed in practice, reaching out to stakeholders involved with the problem, and identifying interventions to make a realistic and evidenced-based change of an online breastfeeding series. The next two steps, steps three and four, include synthesizing literature and defining a clear change to solve the related problem. As breastfeeding practice is often associated with quantitative and qualitative, this process encourages a synthesis combining both natures of data; the alteration in practice is then based on this synthesis and identifying tools to produce change. The last two steps in the process encourage implementation, evaluation of the change, and further integration and maintenance of the change with healthcare professionals (Rosswurm & Larrabee, 1991).

Organizational Change Process

Kotter and Cohen's model of change was used to address the commencement of implementation. This model has been used in nursing education, increasing its usefulness to the educational intervention (Chowthi-Williams et al., 2016). In applying this model to the related inquiry, a state of urgency is recognized within the clinical setting. As a guiding team is established, stakeholders are included who have specific connections and training to the area of

identification. Throughout this team, the correct vision can be established with appropriate buy-in to empower leaders, including staff, in the mother/infant units to establish a desire for change. Short term goals can be addressed by rewarding the staff for their time spent on completing the education. Disseminating positive data of the educational series will assist in maintaining a Show-Me five hospital setting. As this intervention is completed, success is disseminated, then change will sustain while meeting the educational needs of healthcare professionals and the mother/infant dyad.

Study Design

The project included a retrospective evaluation of an improvement program with a quasi-experimental, non-randomized design initiated at a Missouri hospital from 2017 to July 2020. The online educational intervention focused on increasing knowledge of breastfeeding and improving hospital breastfeeding rates. Two tools were used to evaluate the evidence-based intervention on knowledge, a pretest-posttest evaluation of knowledge and a post-course evaluation of learner satisfaction and intent to use knowledge in practice. The secondary outcome of increased hospital breastfeeding rates was analyzed through hospital quality measure data retrieved from hospital quality compliance staff from 2016 to June of 2020.

Validity

The QI leader reviewed internal and external validity factors, allowing for a strong core base of this educational modality. Internal validity was established through screening the participants of inclusion with stakeholders associated directly with the targeted population; providing evidence that was unit specific increased internal validity. The evidence-based breastfeeding educational intervention has been recognized by the AAP (2020) to address gaps in breastfeeding education, increase breastfeeding knowledge, and further increase breastfeeding

rates. Participants were given questions developed and maintained by the AAP who train and associate with ACOG (ACOG; 2020). With the use of nationally recognized intervention plans from the AAP and ACOG, external validity was strengthened as the results apply to those employed on a mother/infant unit (AAP, 2020; ACOG, 2020; Melnyk & Fineout-Overholt, 2018). Generalizability of the results was recognized throughout these measures but may be susceptible to creating concern as the intervention was reviewed as a retrospective study with convenience sampling (Melnyk & Fineout-Overholt, 2018).

Outcomes

The primary outcome explored the increase in knowledge after initiation and completion of the evidence-based online breastfeeding education series. The secondary outcome evaluated the improvement in hospital breastfeeding rates. The anticipated degree and direction of the intervention was an increase in breastfeeding rates as knowledge is increased (see Appendix M for data collection template). Post-only learner satisfaction data assessed the participant's perception of the education content and impact on practice.

Measurement Instruments

Two tools evaluated the evidence-based intervention impact on knowledge and learner satisfaction, and breastfeeding rates were used as pre and posttest measures, representing the potential influence of education and knowledge on practice.

Knowledge Test

A pre and posttest were developed by the QI leader utilizing questions from the AAP lactation review. The AAP breastfeeding curriculum was developed to increase confidence and skills when assisting the breastfeeding mother and infant (AAP, 2020). The pre and posttest were organized based on Accreditation Council for Graduate Medical Education Core Competencies;

it was developed to use all, or partial curriculum pieces based on unit needs (AAP, 2020; Appendix N for pre and posttest questionnaire). Although reliability and validity have not been tested, the curricular needs have been adjusted and used to provide generalizability for staff on mother/infant units (AAP, 2020).

Fifteen questions were used to evaluate knowledge pre- and post-intervention. Each question was multiple choice or multiple answer and ranged from a single answer question to select all that apply. The question score change was determined by the difference in knowledge from pretest to posttest. The pre and posttest were within a public domain; therefore, permission was not required for use.

Learner Satisfaction

A formal learner satisfaction evaluation tool was created by the QI leader, using GoogleDocs. This evaluation tool was completed at the end of the course and comprised of eight questions. Five questions examined learner satisfaction, while three free-text questions were utilized to assess participant desire to utilize new knowledge into practice, learner perception on education module strengths, and learner perception on education module weaknesses. A 5-point Likert scale was utilized with choices ranging from *Strongly Disagree* to *Strongly Agree*. Another Likert scale used the options of *Poor* to *Outstanding*. Reliability and validity were not tested for all evaluation methods (see Appendix O for post course evaluation).

Breastfeeding Rates

To assess the second major pre and posttest measure, hospital breastfeeding rates were obtained through System Quality Compliance from the Missouri hospital. Breastfeeding quality compliance data was utilized to assess for a change in hospital breastfeeding rates pre- and post-intervention. Although not a formal evaluation tool, trending quality compliance data provided

rates on exclusive breast milk feeding from 2016 to 2020. Trending breastfeeding rates were reviewed by System Quality Compliance and reported via quarterly review. At the local Missouri hospital, breastfeeding data was reported each quarter with four quarters in a year. Two quarters of 2020 were not included in this review, as the data collection IRB approval timeframe ended after quarter two. Some information was excluded in this submission for confidentiality.

Quality of Data

The quality of data was promoted using multiple methods, first with finding the statistical power through post-hoc power analysis. The pre and posttest transferred online were aggregate group scores obtained for each of the 15 questions. Therefore, the post-hoc analysis was based on a chi square z test with two proportions, alpha of 0.5, and a critical z of -1.6448536. Data was collected and analyzed on pre and posttest data from 2017 to 2019, while hospital data on breastfeeding rates were collected from 2016 for pre-implementation and 2017-2020 for post-implementation. Data on the course evaluation by the healthcare professional was collected retrospectively from 2017-2019. The QI leader collected the data in conjunction with hospital stakeholders. The QI leader statistically analyzed the data with educational mentors and a statistician. The data was placed into easily read charts and tables for consistency. The QI leader compared data to published benchmarked studies and a systematic review to generalize data and strengthen reliability (Bernaix et al., 2010; Cohen et al., 2018; Deloian et al., 2015; Gavine et al., 2017; Graffy & Taylor, 2005; Nelson, 2007; Sinha et al., 2015; Souza et al., 2015; Wade et al., 2009; Watkins et al., 2017; Ward & Byrne, 2011; Weddig et al., 2011; Whelan et al., 2011; Wood & Woods, 2018; Yang et al., 2018).

Statistical Analysis Plan

Pre and posttest data were analyzed by using a chi-square, one-tailed, z test with a difference of two proportions of nominal data that addressed the primary outcome of knowledge. For the secondary outcome of breastfeeding rates, descriptive data assessed the change in rates. Learner satisfaction data was reported by descriptive statistics (see Appendix P for statistical analysis template; Leech et al., 2015).

Results

Setting and Participants

The setting was a mother/infant unit at a Missouri hospital. The RN's, LPN's, CNA's, and PCA's on the unit consisted of approximately 65 staff members. Retrospective data for the intervention was collected from July 2020 to December 2020. The healthcare system deidentified demographic data from the participants. Sixty-five staff completed the baseline knowledge test, and 68 completed the post-education knowledge test. Data were analyzed on all participants and represented staff members >16 years of age with direct patient contact in mother/infant care, meeting inclusion and exclusion criteria.

Intervention Course

A six-part breastfeeding education series was developed and placed into an online education platform for leadership review in October of 2017. The online education series was implemented to the appropriate participants in December of 2017. During this time, the staff participated in the intervention, and a review of data was complete in February of 2018. The module remained open for participants and training. In the spring of 2020, leadership members in mother/infant care settings were contacted to review the intervention. Pre and posttest data collection were completed with hospital research staff from July through December of 2020. Hospital breastfeeding data was obtained through the Missouri hospital project site, System

Quality Compliance, from November through December of 2020. A retrospective analysis of pre and posttest knowledge, hospital breastfeeding data, and post-only learner satisfaction with evaluation data was completed by December of 2020.

Outcomes

Knowledge

In the pre and posttest data set, the cohorts were analyzed as two independent groups because of the lack of paired data. An increase in knowledge was found in 14 of the 15 questions from pretest (n=65) to posttest (n=68; q. 1-11 and 13-15). Nine questions demonstrated significance ($p < 0.05$, 95% CI, q. 2, 3, 6, 7, 8, 9, 10, 14, 15). A post-hoc power analysis, 65 and 68 participants and z test with two proportions, indicated a range of power (0.05 – 0.97 with 56% > 0.6; see Appendix R, table 1 for pre and posttest data results).

Breastfeeding Rates

Breastfeeding data pre- and post-intervention remained stable across 2016 to 2020. Some information was excluded in this section for confidentiality. After the initial implementation of the project, the public Missouri hospital passed a *fed is best* model supporting all feeding sources for infants. The facility supports each caregiver's choice of feeding modalities for their infant. Although this action further supported maternal mental health, it may have decreased breastfeeding rates after implementation (see Appendix R, table 2 for hospital breastfeeding rates data results).

Learner Satisfaction, Course Evaluation

Overall evaluation of the course was positive. A course evaluation sheet was developed by the QI leader and completed by staff after completing the education series. The instrument consisted of a 5-point Likert scale addressing four questions ranging from *strongly agree* to

strongly disagree, one question ranging from *outstanding* to *poor*, and three free text questions to assess participant desire to utilize new knowledge in practice, learner perception on education module strengths, and learner perception on education module weaknesses. Learners identified that the course materials were clearly presented, increased understanding, assisted in developing skills, improved learner problem solving, and was overall effective to learning. The free text questions demonstrated a range of short response with unmeaningful themes (see Appendix R, table 3 for course evaluation data results).

Missing Data

Demographic data for participants and hospital breastfeeding data were not provided as this data was removed in the deidentification process of hospital research stakeholders.

Breastfeeding data from quality compliance discarded exclusive breast milk feeding data on infants admitted to the neonatal care unit, with a diagnosis of galactosemia, infants receiving parenteral nutrition, death, transferred to another healthcare facility, under 37 weeks of gestation, and infants admitted to the hospital for more than 120 days. These exclusions were criteria specifications for the Joint Commission National Quality Measures, although not specified as exclusions from the QI leader.

Discussion

Successes

Within the study outcomes, the most critical successes reside in a positive staff response, partnership with hospital leaders, and increased staff knowledge from education. Approximately 65 participants completed the pre and posttest for evaluation, providing a significant response. The intervention provided flexibility and relevant literature to participating staff members, further assisting in an appropriate response. The staff demonstrated increased knowledge of

breastfeeding basics overall. An increase in knowledge further assisted the healthcare professional in supporting mothers and infants in successful breastfeeding measures. Partnerships between hospital leadership established discussion on additional educational needs. These partnerships furthered connection with local community leaders advocating for maternal/infant wellness with the QI leader's dedication to maternal infant health, postpartum support, and maternal wellness.

Study Strengths

A primary success of the EBP project and intervention included the demonstration of leadership enthusiasm and envelopment of the project topic and outcomes. Leaders from a variety of hospital departments incorporated instruction and input to the QI leader on measures to assist in the success of the intervention. The intervention was successful upon implementation and retrospective review. The intervention was helpful for new colleagues and graduates who are novices in the mother/infant care settings. Staff knowledge was increased overall, and a positive outcome was witnessed upon course review. The organization continues to support the QI leader in their involvement with maternal infant care to improve healthcare quality.

Results Compared to Evidence in Literature

Results compared to published evidence were similar as an increase in knowledge occurred post education. In a similar study comparing pre and posttest scoring, Deloin et al. (2015) found that online breastfeeding education assisted in exposing gaps in healthcare professional knowledge of breastfeeding with median posttest scores demonstrating statistical significance in all online educational modules ($p < .001$). A minimal difference in scores was witnessed between provider types. By exposing these gaps, healthcare providers can support the mother and infant to increase breastfeeding duration in the first year of life. More studies are

needed on online education for breastfeeding support. Recognizing that breastfeeding competencies are not consistent throughout healthcare professions, Watkins et al. (2017) acknowledge a 45-hour breastfeeding education course among diverse healthcare professionals as beneficial. Posttest score data indicated a significant increase in knowledge ($p < .001$). Additionally, healthcare providers expressed a need to incorporate more evidence-based practice measures in their practice (Watkins et al., 2017).

In a workshop presenting the importance of breastfeeding, knowledge, and complications of breastfeeding, and evidence-based practices of breastfeeding intervention, Bigger and Long (2008) found a significant difference in pretest to posttest scores on breastfeeding knowledge ($p < .001$). Although pretest data reviewed that healthcare provider knowledge of breastfeeding was high, pretest data also recognized that healthcare providers had difficulty applying skills to overcome breastfeeding challenges. Breastfeeding benefits are widely recognized; however, healthcare professionals fail to encourage the practice (Nelson, 2007). In a study recognizing the significance of breastfeeding support, healthcare professionals were inconsistent in knowledge and practice among mothers (Nelson, 2007). In two systematic reviews, breastfeeding knowledge was needed among healthcare professionals to provide adequate support to mothers. An outcome of increased knowledge was found to have a positive effect on breastfeeding support compliance in two studies (Gavine et al., 2017). In 14 studies reviewed by Yang et al. (2018), healthcare professional breastfeeding was limited in assessment and management skills. Further research is needed on breastfeeding online education for healthcare professionals.

Limitations

Internal and External Validity Effects

Possible sources of confounding factors that may have affected study outcomes were the possible participation of staff outside of the intervention unit. The project was scheduled for staff on a mother/infant unit; however, upon assessment of data, hospital research personnel recognized that mother/infant staff outside of the inpatient unit might have taken the exam. Due to deidentification of the data within the online education system, there was an inability to determine staff location. The lactation consultant filmed for the intervention is a current staff member with participants involved with the intervention. This provides a potential bias source as there may be a personal/professional relationship with the staff participating in the intervention. Support through stakeholders and the use of clinically supported education from ACOG assisted in the internal validity of the intervention.

Hazards to external validity included convenience sampling, increasing the probability of selection bias, and limiting the generalizability to populations with similar characteristics. This sampling threat to validity was decreased by offering the intervention with survey completion to completion to all staff meeting inclusion criteria. A factor hindering transferability of the intervention data includes an error in pretest versus posttest data. Within the evaluation of pre and posttest data, more participants completed the posttest than the pretest. The project recognized the intervention might not have required posttest review after initial implementation. Factors enhancing the intervention transferability include a sample size of over 40 participants, the utilization of internationally recognized resources developed by ACOG and AAP, and similar outcome findings as the existing research. The resources were readily available to providers online and are transferrable with the intervention developed by the QI leader.

Sustainability and Plan to Maintain Effects

The intervention was accepted by hospital management and overall increased staff knowledge. Upon completion of the intervention, the QI leader discussed the data with appropriate leaders. This communication began a movement of developing additional education on maternal/infant attachment and further breastfeeding education. To maintain and strengthen the sustainability of this intervention, the QI leader entertains communication with community leaders on maternal/infant care and will continue to develop education based on community needs (see Appendix S for logic model).

Efforts to Minimalize Study Limitations

To minimize study limitations, the QI leader incorporated the intervention in an online format while including online resources for staff. The inclusion of licensed (RN's and LPN's) and non-licensed staff (CNA's and PCA's) were factors incorporated to minimize limitation impacts. A limitation of the intervention was the population setting after the first implementation period. The intervention was scheduled to staff on a mother/infant unit during the initial implementation phase. In a retrospective review, other staff in the healthcare institution were able to review the module without a mandatory completion status. This limitation led to an increase in posttest responses by three participants. Although a statistically significant knowledge increase was witnessed on most pre and posttest items, other questions on the evaluation may have shown significance if additional individuals were not included on the posttest. Further efforts to minimize this limitation would be to provide the education as mandatory training for specific staff during a timeframe when the investigator can review updated data.

Interpretation

Expected and Actual Outcomes

The expected outcomes for the online training series were to recognize a significant increase in knowledge in the majority of the content areas with a positive response from staff on the education module. This outcome was met in the approximately 65 participants. Statistical analysis revealed a statically significant knowledge increase from pretest to posttest. The expected outcome for breastfeeding data was to have an increase in breastfeeding rates. The actual outcome included a sustained breastfeeding rate over the time of study. As many changes were witnessed within the healthcare system both pre- and post-intervention, education either had minimal effect on breastfeeding rates or served as a factor to maintain breastfeeding involvements throughout change at the healthcare site.

Intervention Effectiveness

As healthcare providers have minimal time to complete seated education, online programs are an effective method to increase knowledge on many topics. Online programs reinforce old concepts or the integration of new ideas for healthcare providers. The intervention was offered at convenience during a window of time to allow healthcare professionals to concentrate and apply the education. The intervention could be effective in most healthcare settings due to flexibility; however, the intervention would most likely be found effective in community settings as well as non-healthcare related participants.

Intervention Revision

Intervention modifications that can improve the attainment of the course outcomes include course revision and updates. Healthcare professionals and others community workers interested in the education could benefit from a condensed course. The condensed version could also benefit from updated research and community resources to present healthcare providers and other community participants a greater sense of control of readily available resources. Additional

revisions include a specialized technical team to review the online platform evaluation template settings before implementation.

Expected and Actual Impact to Health System, Costs, and Policy

The intervention was expected to impact breastfeeding awareness and education at a hospital in Missouri. The secondary expectation was for breastfeeding rates to increase hospital wide. Statistically, knowledge was increased post intervention. In the QI leader's collaboration with hospital leaders, a substantial need for breastfeeding and maternal mental health education and support was identified in the surrounding community. The project site had no formal breastfeeding education at the time of intervention; therefore, this project served as a resource for staff. The estimated cost of this project was \$900 after work paid costs; however, actual costs remained at \$0. The intervention was placed into an online platform already in use by the health system, enriching sustainability. The QI leader paid for dissemination costs related to the intervention. No outside funding was used for this project.

Opportunities

Discussion around the intervention topic brought forth recognized needs among the maternal/infant health group. Although education surrounding breastfeeding is a continuous assessment in healthcare, maternal/infant attachment and maternal mental health are often reviewed in conjunction. The QI leader provided additional educational slide decks on maternal/infant bonding with inclusive education on breastfeeding and bonding physiological processes. A community response occurred, supporting the educational needs. Partnerships grew between the QI leader and leadership at three priority non-profit institutions in the surrounding community. The QI leader worked in conjunction with a group of members in the community to open a non-profit Postpartum Support International chapter for the state of Missouri, obtained

certification in perinatal mental health (PMH-C), and became a founding member of the Missouri PSI board.

Conclusion

As proper breastfeeding is established, an irreplaceable bond occurs between mother and infant, and a cascade of health benefits occurs. Breastfeeding is a process that requires the mother, infant, nursing staff, and other support systems to remain educated to provide proper support and success. Without evidence-based education on breastfeeding support, healthcare professionals will vary in their practices and may lead to an increase in unsupportive breastfeeding care (Deloian et al., 2015). Education for the healthcare provider will assist in providing further success for the mother/infant dyad in breastfeeding initiation and continuation, thus meeting the main facilitators of the Baby-Friendly initiatives set by the WHO (WHO, 2017). The inquiry intervention is designed to increase breastfeeding knowledge, promote the importance of utilizing the knowledge in practice, and further breastfeeding rates with online learning. Responding to the widespread need for healthcare professional breastfeeding education, online learning is increasing in effectiveness (Colaceci et al., 2017) and provides healthcare professionals flexibility in completing necessary training. Similar evidence-based education interventions may be useful in other healthcare facilities.

Further study measures are suggested at additional hospitals and community groups to address healthcare provider involvement outside of inpatient care. The intervention has served as a supportive measure in addressing breastfeeding care; however, further study is needed in other diverse populations of both maternal/infant caregivers and providers.

Dissemination for this project included a poster presentation at the Missouri League of Nursing's 19th Annual Nurse Educator Convention in Branson, Missouri, and the 45th Annual

Midwest Nursing Research Society Virtual Conference. Breastfeeding education will increase awareness and knowledge, thus increasing breastfeeding rates throughout the United States, providing for greater health outcomes for both mother and infant.

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Appendix A

Definition of Terms

Exclusive Breastfeeding – feeding an infant only breastmilk expressed or directly from the breast.

Breastfeeding Support – providing mothers appropriate knowledge and tools to initiate and continue breastfeeding.

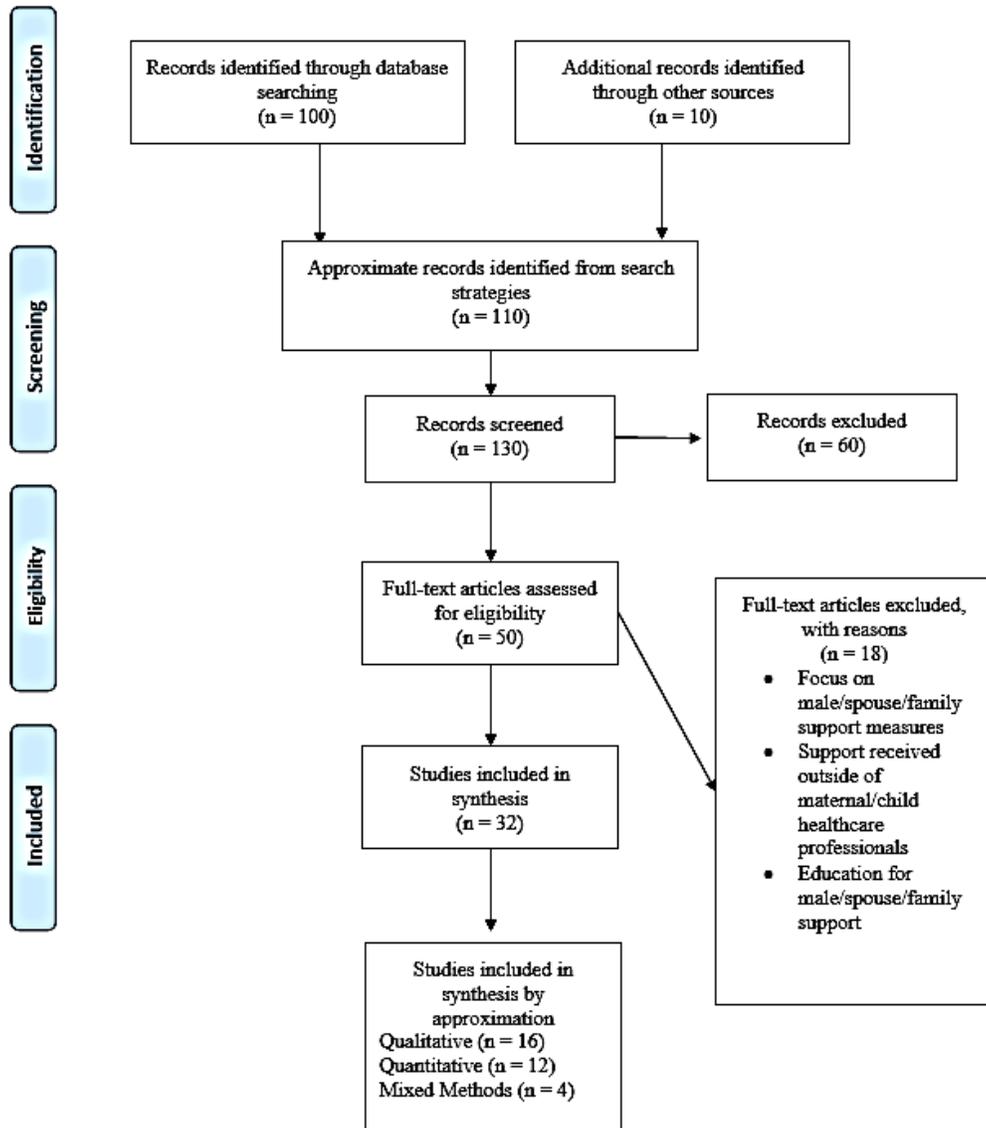
Intent- a mother or healthcare professionals showing expression or determination to do a task.

Initiation of Breastfeeding- to begin breastfeeding an infant.

Lactation – secretion of milk from mammary glands in the breast.

Appendix B

PRISMA Diagram



Appendix C

Synthesis of Evidence Table

Inquiry: For staff on a mother/infant unit, does completing an online breastfeeding training series, compared to previous breastfeeding education modalities, improve breastfeeding knowledge and hospital breastfeeding initiation rates, over one year of implementation at a Missouri hospital?

First author, Year, Title, Journal	Purpose	Research Design ¹ , Evidence Level ² & Variables	Sample & Sampling, Setting	Measures & Reliability (if reported)	Results & Analysis Used	Limitations & Usefulness
Theme: Healthcare professional encouragement, self-efficacy, and education aid in successful breastfeeding						
Jonathen Graffy; 2005; What information, advice, and support do women want with breastfeeding?; Birth	To survey mother’s perspectives on the <i>information, advice, and support</i> they obtain with breastfeeding .	Single qualitative study; Level VI; Variable of inclusion include the breastfeeding mother’s perspective, and support measures including breastfeeding information, advice and suggestions, and feelings.	Qualitative analysis; randomized control trial of additional support individuals; 720 women, between 28- and 36-weeks’ gestation, recruited during antenatal care at 32 general practices in London; questionnaire completed by intervention and control groups	Mailed surveys, reliability is not reported	Grounded theory used for qualitative analysis; triangulation used to compare categories of responses; Of the 654 that completed the questionnaire began breastfeeding postnatally, 492 were mothers for the first time, at 6 weeks gestation exclusive	Limitation in assessing perceptions from women alone; implications are made towards efforts to engage in other individuals and support measures, allowing healthcare professionals to develop effective ways to educate both the mother and their support system.

					breastfeeding versus bottle fed infants were relative in number, and many women reported they did not receive the appropriate information they needed to be successful.	
Michael Lu; 2006; Provider encouragement of breast-feeding: Evidence from a national survey; Obstetrics and gynecology	To review the encouragement of healthcare provider breastfeeding support amongst a variety of social and ethnic groups	Mixed methods; Level V; Primary independent variable of provider encouragement; outcome variable of initiation of breastfeeding	1229 women of white, black and Hispanic origin; -17 to 34 years of age; national survey; parents of children younger than 3 years of age; data use from the national survey of American families	Commonwealth fund; a series of 26 minutes phone interviews; census-tract data	Over 1/3 of respondents did not initiate breastfeeding, 3.4 were encouraged by a physician or nurse to breastfeed; 74.6% were encouraged compared to 43.2% who were not; those who were encouraged were 4 times as likely to initiate breastfeeding; those who were less likely to	Potential recall error and bias; breastfeeding initiation was not clearly defined; duration of breastfeeding was not examined; relative in use for training healthcare professionals on the importance of breastfeeding encouragement and support

					breastfeeding increase breastfeeding initiation through provider encouragement; analyzed through SAS; bivariate comparisons use Pearson x2; multivariate analysis for independent variable; regression model used for variables associated with the literature review	
Antonia Nelson; 2007; Maternal-newborn nurses' experiences of inconsistent professional breastfeeding support; Journal	To study the significance of inconsistent professional breastfeeding support	Qualitative phenomenological one sample study; Level VI; variables consist of inconsistent breastfeeding support on the success of breastfeeding	Two hospitals in Northeast USA; Solicited for audiotaped interviews; Non-international board-certified lactation consultants and 12 noncertified mother-newborn nurses for data saturation; age	Existential-phenomenological approach; interviews; audio-taped; reliability is not reported	Supporting a breastfeeding woman is a multidimensional process; breastfeeding is a maternal choice, and all mothers and healthcare professionals	Phenomenological study; small sampled; qualitative methodology; addressing factors that hinder inconsistent breastfeeding support such as staffing ratios and

of Advanced Nursing			ranged from 32 to 60 years of age		have ‘buy-in’ that look different for all; analyzed via thematic patterns	educational opportunities will further enable professionals to understand breastfeeding processes.
Deborah Wade; 2009; Breastfeeding peer support: are there additional benefits?; Community Practitioner	To determine if research support that breastfeeding support from peers offers benefit to the breastfeeding mother and infant	Single qualitative study; Level VI; Variable include the effect of a) breastfeeding peer support on b) healthy breastfeeding practices and outcomes	16 local women who have received breastfeeding peer support from a variety of supporters; 80 women contacted initially; 16 women placed in two groups with children ages 2 months to two years	Focus groups; \$10 voucher given for participation; reliability not recognized	Breastfeeding supporters are shown to have an impact on increasing breastfeeding rates and decreasing health concerns of both mother and infant such as postpartum depression, obesity, diarrhea, etc.; Grounded theory was used for analysis and further by all members of the research team to recognize key thematic patterns	Small qualitative study with low participation rate; leader of the focus groups was a breastfeeding peer supporter that supports breastfeeding potentially causing bias; relative in use; healthcare professionals were not a key topic of research; women frequently mentioned then allowing this study to highlight healthcare professional influence

<p>Barbara Whelan; 2011; What primary health professionals need to promote breastfeeding; Practice Nursing</p>	<p>To assess barriers that hinder breastfeeding support</p>	<p>Quantitative cross-sectional study; Level V;</p>	<p>North Dublin; health professionals including public health nurses, practice nurses, and general practitioners; Returned by 101 GPs, 96 PHNs, 59 Pns; sampling done with a questionnaire</p>	<p>Freed and Wallace validated questionnaire; reliability not reported</p>	<p>There are many issues that hinder breastfeeding support from healthcare providers; some of these witnessed in this study include breastfeeding knowledge, perceived barriers of breastfeeding, and self-efficacy; data coded and analyzed using SPSS.</p>	<p>No resolved as to why each professional had a different level of breastfeeding knowledge; low response rate; potential response bias; relative in use; there are gaps of knowledge recognized to further breastfeeding education and support</p>
<p>Jordana Almeida; 2015; Support of breastfeeding by health professionals: Integrative review of the literature; Revista Paulista de Pediatria</p>	<p>To assess how healthcare professionals support breastfeeding</p>	<p>Integrative review; Level VII; breastfeeding professional role with breastfeeding support</p>	<p>1396 studies retrieved, 18 for use; Integrative review; 1993 to 2013 inclusion; Scopus, LILACS, MEDLINE, SciELO; focused on breastfeeding support by healthcare providers</p>	<p>CINAHL and web of science database results removed as they did not include healthcare professional support; reliability not reported</p>	<p>Breastfeeding is a challenge despite what level of care they are associated with, lacking practical skills; methodological analysis</p>	<p>No common evaluation method; no proposed solutions; relative in use; as healthcare professionals work in isolation, mothers and infants are affected and not</p>

						supported; professionals have many rules and regulations in which may hinder support; further supporting the need for professionals to consider a mother's perspective
Sharon Radzysinski; 2015; Health professionals' attitudes and beliefs about breastfeeding; The Journal of Perinatal Education	To address and assess how healthcare professionals perceive their role in caring for the breastfeeding mother.	Qualitative descriptive; Level VI; variables include healthcare professionals and breastfeeding support measures such as assessment and therapeutic skills.	53 healthcare professionals who have a role in breastfeeding support; convenience sampling; interview questioning; age of the participants ranged from 20 to 59 years of age, all from the District of Columbia.	Data analyzed by principle investigator; interviews conducted in-person; reliability is not reported	A variety of themes were generated from interviews that women acknowledged as needing fulfillment including the lack of assessment and therapeutic skills, gaps of knowledge in clinical practice, lack of assessment skills, understanding barriers of breastfeeding.	Qualitative in nature, further research needed on the results of this study with initiation and continuation of breastfeeding rates. This literature supports to further support and promotion of breastfeeding practices.

Bireshwar Sinha; 2015; Interventions to improve breastfeeding outcomes: A systematic review and meta-analysis; Acta Paediatrica	To address and recognized the effect of interventions on the early initiation, exclusive, and continued breastfeeding rates within five different settings	Systematic-review and meta-analysis; Level I; variables include breastfeeding interventions on health systems, home and family environments, community environments, and work environments (including policy) and the rates of breastfeeding (initiation, continuation, and exclusivity).	23977 articles assessed, 195 articles of inclusion; PUBMED, Cochrane, and CABI; specific articles focused on interventions that affect breastfeeding initiation, exclusive breastfeeding in the first 6 months, continuation of breastfeeding 12 to 23 months.	Outcomes of breastfeeding defined by the World Health Organization; Reliability not noted; studies were processed with three research assistants to decrease bias	Intervention, if completed in multiple settings, proves to increase breastfeeding rates; greater rates are seen when education and counseling are given; Analyzed by subgroups; meta-regression; setting-wise analysis to show extent of interventions were delivered	Few studies related to work environment and policy; No studies found for community interventions; heterogeneity; potential recall bias; relative in use; There must be engagement in multiple “sectors” to provide synchronized care
Natsuko Wood; 2018; Interventions that enhance breastfeeding initiation, duration, and exclusivity: A systematic	To evaluate current breastfeeding interventions and to determine what is needed for future needs	Systematic review (RCTs); Level I; Major variables recognized are (independent) prenatal period, postpartum period, and	Randomized clinical trials and randomized control trials; Literature search to include 6 articles for review from 263 yielded articles; settings within studies range	PRISMA guidelines; reliability not reported	This review was focused on three factors: acquisition of knowledge and skills, emotional support by healthcare	Methodological heterogeneity, small number of studies (resulted in limited comparison of studies); potential selection bias based on English

<p>review; The American Journal of Maternal Child Nursing</p>	<p>in breastfeeding research.</p>	<p>breastfeeding education. Dependent variables include retained knowledge, self-efficacy, and emotional support.</p>	<p>from hospital and clinical settings prenatal to home and clinic settings postpartum; participants of studies include multiparous or primiparous women whom were breastfeeding and had received support from healthcare professionals</p>		<p>providers, and breastfeeding self-efficacy. Results show that mothers had difficulty in using breastfeeding knowledge in real-life practice. Breastfeeding is discontinued when mothers misinterpreted infant behavior, furthering the decrease in breastfeeding rates and maternal understanding of breastfeeding practices. Analysis was not determined.</p>	<p>language as a search strategy; recall bias in self-reports may cause misclassification of studies. Relative use for healthcare professionals providing supporting measures for breastfeeding; will further assist in providing measures in allowing mothers to use proper breastfeeding practices to further increase breastfeeding rates alongside overall maternal and infant health</p>
<p>David Harilla-Acevedo; 2018; Factors associated with breastfeeding support from</p>	<p>To determine if implementing guidelines on breastfeeding</p>	<p>Observational cross-sectional study; Level IV; Outcome variables include factors</p>	<p>Healthcare professionals that work in all categories of maternal and pediatric care;</p>	<p>Ontario guideline implementation program; questionnaire of healthcare</p>	<p>Areas that implemented guidelines were found to have higher standard of care and</p>	<p>Unequal size of study groups reducing the statistical power; data was determined on</p>

health care professionals by implementing a clinical practice guideline; Birth issues in perinatal care	increase healthcare professional support	that affect breastfeeding support	supported by nursing and health care research unit of Carlos III health institute; three settings include primary care centers, hospital settings, and BFHI accredited areas;	professional breastfeeding support; reliability not reported	increased professional support; Exploratory analysis; theory of planned behavior; SPSS for data analysis	2011 data and no further subsequent data; This article is practical in use and shows that there was a need in practical activities to increase healthcare professional support.
Theme: Continuity of care enhances breastfeeding practices						
Jennifer Weddig; 2011; Perspectives of hospital-based nurses on breastfeeding initiation best practices; Journal of Obstetric, Gynecologic, & Neonatal Nursing	To assess variations of breastfeeding knowledge and practices between registered nurses and policies related to breastfeeding support.	Qualitative cross-sectional study; Level VI; Independent variables include nursing perspective and support; dependent variables include education and policies related to breastfeeding	Nurses from labor and delivery (9), postpartum care (13), labor and delivery recovery (12), and neonatal intensive care (6) placed in 8 different focus groups; Completed throughout eight Colorado state hospitals in which were stratified by socioeconomic status; focus group interviews recruited through flyers,	Focus groups were taped, the breastfeeding expert took notes, and taped sessions were transcribed; data analyzed and summarized by research consultant to establish interrater reliability	The majority of the sample was knowledgeable about proper breastfeeding practices; facilities who had baby-friendly guidelines and initiatives were often not following current best practices; hospital policies were found to be a barrier and knowledge	Sample was restricted to a small sample, qualitative in nature; There was a lack of breastfeeding policies and/or outdated policies of breastfeeding, education programs can be changed to meet guidelines of breastfeeding by using the World Health Organization

			emails, and sign-up sheets.		deficits were found in continuity of care and delegation throughout transition of care. Analysis completed by research professional and categorized via thematic patterns.	Baby Friendly Standards.
Rosangela Souza, 2015; Nursing strategies in the clinical management of breastfeeding: A descriptive and exploratory study; Online Brazilian Journal of Nursing	To recognize strategies used by nurses in the clinical management of breastfeeding .	Descriptive, exploratory study with a qualitative approach; Level VI; independent variables include age, gender, and work status (health assistants, nurses, coordinators, and managers) contribution to breastfeeding management. Dependent	107 nurses working in an obstetrical unit; semi-structured interviews; conducted at 7 public hospitals of the Metropolitan region of the State of Rio de Janeiro.	Data was semi-structured interviews; Reliability was not reported.	There are a variety of techniques used by healthcare professionals, especially the nurse, to assist in proper breastfeeding support and maintenance. Clinical management of breastfeeding is a strategy that is use to promote breastfeeding and this includes	Qualitative study in nature thus potentially resulting in unsupportive data; Study was completed outside of the U.S and specific in location nature. Relative use. Breastfeeding management recognized within this article is similar to all breastfeeding practice measures

		variable is the management of breastfeeding.			promoting breastfeeding, management of complications, and allowing for mothers to grow in exclusivity of breastfeeding. Interviews were analyzed through using thematic categories.	throughout other sources of literature.
Elizabeth Balyakina; 2015; Association between healthcare provider type and intent to breastfeeding among expectant mothers' Maternal Child Health Journal	To determine the association between the intent to breastfeed and healthcare professional type.	Self-report study – single qualitative; Level VI; variables of study include the intent to breastfeed based on an independent variable of healthcare provider type	455 expectant mothers whom met eligible criteria at the Women, Infants, and Children (WIC) clinics in Fort Worth, Texas; self-report study	Recruitment through the North Texas Primary Care Practice-Based Research Network; cash compensation given for survey; reliability not reported	Having a midwife, nurse, or physician increased the intent to breastfeeding amongst mothers. More than one healthcare professional increased the intent to breastfeed. SPSS was used for analysis, descriptive measures were calculated for	Only intent to breastfeed, not initiation or continuation was addressed; differences of healthcare provider were not addressed specifically; Results may not be generalizable in other counties; provider type per the intent to breastfeed has a strong association; relative in use

					demographic characteristics, frequencies were cross tabulated for thematic patterns, independent samples t tests and chi square analysis were used. Logistic regression.	
Stafanie Rosin; 2016; Towards integrated care in breastfeeding support: A cross-sectional survey of practitioners' perspectives	Identifying barriers and facilitators towards integrating breastfeeding practices with healthcare professionals	Mixed-methods; Level V; variables of assessment include the integration of breastfeeding care on self-efficacy and quality of care.	900 participants at 3 international breastfeeding conferences; 62 item survey; 85% had previous breastfeeding experience and 90% in breastfeeding counseling; convenience sampling	Likert-scale questionnaire; dispersed at conference with 18 follow up emails; reliability not reported, however, questionnaire was created in the context of a PhD program.	96% of participants measured integrative care as the most important aspects of breastfeeding support; the primary response to the survey was that healthcare professionals felt they lacked health promotion strategies, followed by lacking the	Professionals taking this survey have breastfeeding exposure on a daily basis with their job; self-selected convenience sample; by providing incentives to healthcare professionals, continuity of care may increase; policies can assist in integrating collaboration

					ability to integrate care; there was a lack in sharing decision-making with breastfeeding practices; Analysis completed using chi-square tests and cross-tabulation; statistical analysis completed using SPSS.	across the continuum.
Camila Lucchini-Raies; 2019; Care during breastfeeding: Perceptions of mothers and health professionals; Investigacion y Educacion en	To review perceptions of mothers and healthcare professionals related to breastfeeding care received with primary health care.	Qualitative exploratory study; Level VI; Variable include perceptions against primary health care support	10 breastfeeding mother, 24 primary health care professionals responded; determined through data saturation; two family health centers in metropolitan region of Santiago, Chile.	In-depth interviews; focused in nature; reliability not recognized.	Experience of providing and receiving care from a primary health provider was found to be supportive to mothers; analysis was conducted using thematic patterns using Dedoose software; methodological	Focused on primary care; mothers were of the public health system and not the private sector; relative in use and provides information on how providers influence breastfeeding measures

					rigor was assured by Guba and Lincoln protocols.	
Zamani Fereshteh; 2019; Sources of health care providers' self-efficacy to deliver health education: a qualitative study; BMC Medical Education	To explain the sources that assist in increase self-efficacy of healthcare providers in delivering health education	Conventional qualitative study; Level VI; Dependent variable is self-efficacy and the independent variable includes unexpected events and client trust	23 health educators, 3 nurses, 6 with degrees in health education, 11 public service workers, 2 social pathologists, and 1 individual with a PhD in health education and promotion; purposeful sampling; Isfahan's hospital	Semi-structures in-depth interviews; reliability not reported	Two new findings were present to affect self-efficacy including encountering unexpected events and client trust; Open-coding was use for analyzation for all interviews until patterns emerged; sub-categories formed based on similarities	Applied to Banduras theory; the information was not applied to reducing self-efficacy in regards to health education; appropriate instruments are needed for support; relative in use to support health education
Theme: Maternal and professional breastfeeding experience affect breastfeeding success						
Laura Bernaix; 2010; Success of an educational intervention on maternal/newborn nurses' breastfeeding knowledge and	To test the effect of a breastfeeding educational program for improving breastfeeding knowledge, attitudes, and	Quasi-experimental; Level III; independent factor is education; dependent factors includes knowledge,	Convenience sampling of 240 registered nurses; 206 located at experimental sites and 34 at control sites	Sample sized was determined using the planned bivariate and multivariate analysis; GPower program;	The education strategy improved maternal and newborn nurses' knowledge, attitudes, and beliefs of	Study was generalized; no measure for nursing practice; potential sample bias; relative in use; cost-effective way to get healthcare

<p>attitudes; Journal of Obstetric, Gynecologic, and Neonatal Nursing</p>	<p>beliefs regarding maternal and newborn nurses to assist in improving breastfeeding support</p>	<p>attitudes, beliefs, and intentions.</p>		<p>chronbachs alpha of .75 to .93.; Spearman- Brown coefficient test.</p>	<p>breastfeeding and intentions to support breastfeeding practices; multivariate analysis; descriptive statistics in SPSS; p < 0.05 was set.</p>	<p>professionals to support breastfeeding practices</p>
<p>Nydia Martinez; 2016; Breastfeeding education: Disagreement of meanings; Investigacion y Educacion en Enfermeria</p>	<p>To investigate how educational processes have been developed and the inclusion of healthcare professionals , mothers, families and other healthcare staff on its meaning.</p>	<p>Methodological design; qualitative and ethnographic approach; Level VI; Variables are not stated; they are conclusive to altering education based off of mother, family, and healthcare professional experience</p>	<p>8 mothers, 8 healthcare staff, and two panel discussions implemented with the additional 5 non- participant observation education activities; Hospitals in Medellin Columbia</p>	<p>Semi-structured interviews; reliability not reported</p>	<p>Categories of interested emerged from the study including <i>breastmilk is the ideal food, breastfeeding practice is influenced by mother's experience, cultural barriers are noted in family belief systems and there are disagreements on educational processes.</i> Analysis completed</p>	<p>Qualitative in nature decreasing the dissemination to other facilities who do not have the same experience; Useful in providing new educational research</p>

					through Microsoft excel with the constant comparison method, incentive coding, and triangulation further the encoding for 16 categories.	
Angela Johnson; 2016; Enhancing breastfeeding through healthcare support: Results from a focus group study of African American Mothers; Maternal Child Health Journal	To explore and determine the attitudes, thoughts and experiences with healthcare professionals and the influence these professionals have on breastfeeding behaviors.	Qualitative experimental; Level VI; variables include breastfeeding mothers thoughts, opinions, and attitudes, and healthcare professional intent and involvement of care	Purposeful sampling methods; participants were professionals, women breastfeeding or planning to breastfeeding, and women not planning or not breastfeeding; Southwest Michigan; women of African American descent or black; recruited by distribution of flyers from local health departments, non-profit agencies, schools, child care centers, hair salons,	Focus groups; question guides informed by the grounded theory; all groups were audiotaped	The majority of participants agreed that breastfeeding is best for infants; healthcare professionals are not supportive of that measure; Analysis was completed using the grounded theory, generating themes and interpreting data; thematic analysis to inductively	Focus groups had a small amount of healthcare professionals in focus groups; no physicians were in this study; qualitative and exploratory in design; Midwestern setting and not generalizable to other settings; breastfeeding experiences are diverse; training will increase diversity and experience; relative in use

			and community churches.		analyze focus groups and content analysis used to organize data into a structured format to interpret accuracy	
Yan Zhang; 2018; Breastfeeding experience, challenges and service demands among Chinese mothers: A qualitative study in two cities; Appetite	To address challenges assessed in breastfeeding mothers and what factors affect breastfeeding support	Single qualitative study; Level VI; Variables include interactions of healthcare professionals and further support on the effect of breastfeeding success	Shanghai, Weifang; 10 mothers; 1 Yuesao (employed to care for breastfeeding women); 1 kainaishi (one with formal breastfeeding training); one midwife; sampling conducted through poster display in hospitals and local child care facilities; interested parties called or emailed a research assistant	In-depth interview; focus group discussions	One policy maker, researcher, pediatrician, and head obstetrics and gynecology nurse independently coded information and developed common themes; analyzed further with NVIVO V8.0; Interrater reliability Kappa = 0.68; translated to English	Study only from two cities; potential confounding factors such as number of children per participant; mothers encountered different problems but success of breastfeeding was evident with those whom had support from healthcare professionals
Lina Palmer; 2019; A qualitative	To address the gaps experienced	Randomized control trial of qualitative	493 mothers of preterm infants to 12 months after birth;	Questionnaire with open-ended questions	Results were organized into themes such as	Comments from mothers are short and the study was

<p>study on breastfeeding experience of mothers of preterm infants in the first 12 months after birth; International breastfeeding journal</p>	<p>in breastfeeding care of mothers of preterm infants up to 12 months after birth</p>	<p>nature; Level VI; Variables include demographic variables and maternal variables (independent) that affect perception (dependent)</p>	<p>discharged from six neonatal units in Sweden; 27 mothers of follow up after 8 weeks discharged, 6 and 12 months</p>	<p>regarding breastfeeding and breastfeeding experiences</p>	<p>navigating smoothly, with a struggle, and with ambiguity making one global theme of finding a way to successful breastfeeding; Hermeneutical philosophy forming epistemological foundation for analysis; Interpretation through thematic patterns; relative in use; mothers are in a vulnerable state when breastfeeding; having awareness of breastfeeding outcomes will assist in increased support</p>	<p>given over a short period of time, not allowing mothers to properly take advantage of the study; only mothers who were breastfeeding at discharge, mothers who were not breastfeeding and mothers whom had stopped breastfeeding; useful for study; enables healthcare providers involved with breastfeeding care to both prepare and care for the mother/infant dyad</p>
<p>Theme: The lack of breastfeeding knowledge leads to inconsistent patient education</p>						

<p>Marina Bigger; 2008; Breastfeeding education for health professionals; Journal of Community Nursing</p>	<p>To investigate the efficacy of a 3-day workshop on the education of breastfeeding professionals .</p>	<p>Quasi-experimental design; Level III; Variables of study include professional knowledge and how a workshop affects knowledge; how this education is benefit of mother and baby and collaboration of providers.</p>	<p>Data was collected from two groups; intervention group being health visitors and community children nurses; the control group was students enrolled in a community nursing program; questionnaire was developed by using the Cattaneo and Buzzetti’s research tool; University of Ulster and attending hospitals</p>	<p>Questionnaire to obtain quantitative information; pre-posttest for intervention and control group; Cronbach alpha of 0.738 with a standardized alpha of 0.7346</p>	<p>Significant results were noted between intervention and control groups; knowledge increased of overall breastfeeding practices, understanding of policies was increased post-test; and the control group did not show any significant change as they did not attend the workshop.</p>	<p>Randomization was not included in this study related to visitors within the health system; sample was purposeful; those in the sample were invested in breastfeeding prior to the workshop; there was a significant relationship between practice, research, and education; healthcare professionals can work cohesively to provide better hospital practices.</p>
<p>Kathryn Ward; 2011; A critical review of the impact of continuing breastfeeding education provided to nurses and midwives;</p>	<p>To analyze the effects of education on breastfeeding</p>	<p>Systematic review without meta-analysis; Level I; Variables include educational interventions on breastfeeding</p>	<p>Medline, Cinahl, and Ovid; 15 studies of inclusion; 5 RCT, 6 quasiexperimental, 4 non-experimental; variety of locations (Canada, UK, Italy, Australia).</p>	<p>Lactation resource center; Sage publications; critical appraisal skills program; no reliability reported</p>	<p>Continuing breastfeeding education increases knowledge, skills, and practices such as clinical practices; thematic</p>	<p>Potential confounding results from a variety of settings; inconsistent breastfeeding policies; studies focused on different cultures;</p>

Journal of human lactation					patterns addressed by authors	relative in use; proved that healthcare professionals involved with mother and infant should have at least 18 hours of breastfeeding education
Anna Gavine; 2017; Education and training of healthcare staff in the knowledge, attitudes, and skills needed to work effectively with breastfeeding women: A systematic review; International Breastfeeding Journal	To determine if education programs have an effect on knowledge and attitudes to support breastfeeding women; additionally to determine if there are any discrepancies in training of staff members.	Systematic review; Level I; Variables include an independent variable of education and dependent variable of knowledge, attitude, and compliance.	Randomized controlled trials in systematic review; Cochrane pregnancy and childbirth groups trials registrar; records are lactation and breastfeeding specific; international reports included	Specific review for breastfeeding education and/or training; reliability not reported	1192 studies were included; three studies were two-arm clustered randomized control trials, one was two-arm individual randomized trial; meta-analysis was not done related to heterogeneity of measuring outcomes; structured observations; clustering	Inconsistency was noted throughout research in measuring the effects of interventions; high potential risk of bias; there was a lack of evidence to support breastfeeding education for staff leading this review to support the need for breastfeeding education' relative in use
Ana Ramos; 2017; Knowledge of	To analyze breastfeeding knowledge of	Cross-sectional study; Level VI; Variables	Descriptive research, Professionals from the Primary Health	Simple random sample calculated on	Approximately 40% of professionals	Methodological design; did not evaluate casual

<p>healthcare professionals about breastfeeding and supplementary feeding; Rev Bras Enferm</p>	<p>primary healthcare providers</p>	<p>include knowledge regarding breastfeeding practices and the healthcare professionals that knowledge is associated with</p>	<p>Care team of the municipality; 25 teams in urban areas, 11 in rural areas, totaling 296 healthcare professionals</p>	<p>the basis of population; Reliability not reported</p>	<p>had knowledge about breastfeeding and 3% about supplemented feeding; there was a positive correlation between provider type, education, and breastfeeding support; Analyzed through Microsoft office and Action stat using means and medians of the percentage of knowledge; Shaprir Wilk test completed for quantitative variables</p>	<p>relations or outcomes related to knowledge; potential information bias; relative in use; Providers did have more knowledge about exclusive breastfeeding than supplemental which is contrary to the popular belief.</p>
<p>Sarah Cohen; 2018; Factors associated with breastfeeding initiation and continuation: A meta-analysis;</p>	<p>To review consistencies of studies of maternal and infant characteristics in relation to</p>	<p>Meta-analysis; Level II; All variables not listed throughout paper; independent variables</p>	<p>Systematic review using PubMed and CINAHL reviewing 396 articles and including 39 research papers total; reviewing perinatal factors</p>	<p>6 factors suitable for measure including <i>smoking, mode of delivery, parity, dyad, maternal</i></p>	<p>A variety of papers were placed into thematic form: smoking (39), deliver (47), parity (31), dyad (17),</p>	<p>Methodological and heterogeneity limitations related to maternal education and breastfeeding education; factors studied in simple</p>

<p>The Journal of Pediatrics</p>	<p>breastfeeding initiation and continuation.</p>	<p>predicted breastfeeding outcomes in which were grouped into distinct categories</p>	<p>associated with initiation and continuation of breastfeeding</p>	<p><i>education and maternal breastfeeding education</i>; reliability is not noted.</p>	<p>education (62) and breastfeeding education (32); meta-analysis</p>	<p>terms however are complex in practice; useful throughout maternal child practice; assists in targeting interventions that assist in breastfeeding continuation and initiation.</p>
<p>Catherine Folker-Maglaya; 2018; Implementing a breastfeeding toolkit for nursing education; Journal of Perinatal Neonatal Nursing</p>	<p>To review the effectiveness of a breastfeeding toolkit on increasing essential breastfeeding knowledge</p>	<p>Cohort study; Level IV; Independent variable of education and dependent variable of breastfeeding toolkit</p>	<p>Pretest/posttest survey; intervention comparison groups; Midwestern urban community college nursing program; 114 participants, 54 in a control group and 60 in the experimental group.</p>	<p>Conceptual framework (KSVME); reliability is not noted.</p>	<p>The control groups score was higher in pretest compared to the interventions groups, posttest scores were similar between the two groups; no statistical significance; both groups grew within the intervention timeframe; the intervention group was statistically higher (p < .05, 2-tailed t test);</p>	<p>Small sample; may not be generalizable for other educational interventions; unable to control variables; this toolkit would be beneficial in a clinical setting as the lack of healthcare professional support is a barrier to breastfeeding.</p>

					Totals calculated for intervention and control groups, a group mean evaluated with f test; pre/posttests analyzed using t test	
Shu-Fei Yang; 2018; Breastfeeding knowledge and attitudes of health professional students: A systematic review; International Breastfeeding Journal	To address students' knowledge, attitudes, or experiences related to breastfeeding	Systematic Review; Level I; Independent variables being knowledge and attitudes studied with a dependent variable of an educational program	Literature review; 14 papers of inclusion after review; including the primary population of healthcare professional students	Critical appraisal skills programmed; reliability not reported	Mid-range scores noted when addressing breastfeeding assessment and management; breastfeeding programs and education increased knowledge; timing of education programs affected experience and breastfeeding practice; analysis completed by authors in	Most studies included a small response rate; reliability was not present in all studies; potential recall bias; The overall synthesis includes that healthcare professionals, and students, should be included in ongoing breastfeeding education to meet challenges in healthcare

					thematic patterns	
Theme: Online learning for staff breastfeeding education improves breastfeeding practices						
Barbara Deloian, 2015, Use of web-based education program improves nurses' knowledge of breastfeeding; Journal of Obstetrical, Gynecological, and Neonatal Nursing	To evaluate the baseline knowledge and knowledge gained of professionals that completed "Breastfeeding Basics" (an online educational program).	Cross-sectional study; Level IV; Variables include demographic variables (independent variables) such as age, gender, professional level of experience (rn, midwife, etc), breastfeeding experience (personal or partner), and if this training was required or not for job or school requirements (this determined knowledge gaps). The dependent variable was nurse baseline knowledge.	3736 nurses, 728 nurse practitioners/midwives, and 3106 nursing students from the United States; stratified sampling; Online – members of the United States Breastfeeding Committee	Baby Friendly Hospital guidelines were used to evaluate knowledge; pre-test and post-test data; Cronbach alpha not reported; p value in all posttest were $p < .001$.	Results: No differences were shown between the baseline knowledge of nurses, nurse practitioners, and midwives. Knowledge improved in all areas particularly those with low pretest scores. Analysis: Chi-squared test to compare categorical variables; Mann-Whitney U, and Kruskal-Wallis used to compare pretest and posttest scores including demographic factors; Wilcoxon Signed-Rank	Large sample size without randomization; did not evaluate if the professionals retained the knowledge or would be using that knowledge in practice. This study is realistic in use, widely available, and can be used with hands-on training to improve breastfeeding support to further increase breastfeeding rates.

					test was used to compare overall pretest and posttest answers.	
Amanda Watkins; 2017; Online lactation education for healthcare providers: A theoretical approach to understanding learning outcomes; Journal of human lactation	To address if knowledge, perceived behavior control, attitudes, and intention increases after taking a 45 hour lactation course.	Self-report survey design; mixed-methods; Level V; independent variable being education and dependent being knowledge, attitudes, behavioral control and intention.	119 participants; lactation course took place through a continuing education department in southwestern United States; online platform tailored to the metropolitan area; convenience sampling	Nonexperimental pretest/posttest design; self-report surveys; breastfeeding knowledge questionnaire; 45 hour lactation course between public health and lactation officials; Cronbach's alphas .84 for two-tailed paired samples t-tests	Scores for post-tests were found to be significantly higher than pretest for knowledge, beliefs about breastfeeding, and behavioral control. Self-efficacy increased and the intention to change breastfeeding practices in the workplace was affected; Collected via Redcap; exported and encrypted with SPSS; paired t tests	Convenience sampling; absence of a control group; limited generalization; weak outcome with knowledge; useful in measuring learning tools; relative in use to identify broad learning outcomes
Sofia Colaceci; 2017; E-	To address if a	Mixed-methods study using	Healthcare professionals who	CME evaluation tool;	The breastfeeding	Lack of control group; selection

<p>learning to improve healthcare professionals' attitudes and practices on breastfeeding; Breastfeeding medicine</p>	<p>breastfeeding course improved attitudes and practices with breastfeeding</p>	<p>pretest and posttest; Level V; variables include an e-learning module affecting attitudes and breastfeeding practice</p>	<p>had completed the course, passed the knowledge posttest, completed the satisfaction questionnaire, and answered the questions regarding attitudes and practices; Italian healthcare professionals; funded by the National Institute of Health</p>	<p>Pre/posttest using a 20 minute questionnaire; separate questionnaire for attitudes and practices; attitudes Cronbach's alpha of 0.76 for attitudes; Cronbach's alpha of 0.94 for practices</p>	<p>course improved attitudes and had an effect on professionals implementing proper breastfeeding care into practice; descriptive and inferential analysis; ANOVA for attitudes and practices between samples; Statistical analysis using SPSS version 15.0; paired t-test for changes in attitudes and practices; lower means meant an increase in positive attitudes and an increase in breastfeeding practices by healthcare</p>	<p>bias; performance and outcomes were not measured; relative in use; E-learning is useful in increasing breastfeeding support measures as well as influence attitudes of healthcare professionals</p>
-----------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

					professionals that favor breastfeeding	
Genevieve Roch; 2018; Impacts of online and group perinatal education: A mixed methods study protocol for the optimization of perinatal health; BMC Health Services Research	To evaluate the impacts of group and online perinatal education as well as the perinatal services maintained by community health partners.	Prospective cohort study; Level IV; Main outcome/variable is perinatal knowledge with the second being psychological distress	Semi-structure interviews; Two health and social services centers adjacent to regions of Quebec, Canada; Women, partners, and perinatal professionals; 445 pregnant women, 445 partners	Health pregnancies knowledge survey; General health questionnaire; Breastfeeding self-efficacy scale; Strat- trait anxiety inventory; parent expectations survey; Edinburg postnatal depression scale; Oxford worries about labour scale; Labour agency scale; personal control of pain relief scale; pretest and post retest to assess reliability	Online perinatal/perinatal education has an impact on multiple health determinants and provides harmonization in social services settings for women, partners, and healthcare professionals; QDA minor software	Assessed on level of education; generalizable for social services/community settings, however, not for others; did not include great detail about healthcare providers; relative in use to support online education use

Appendix D

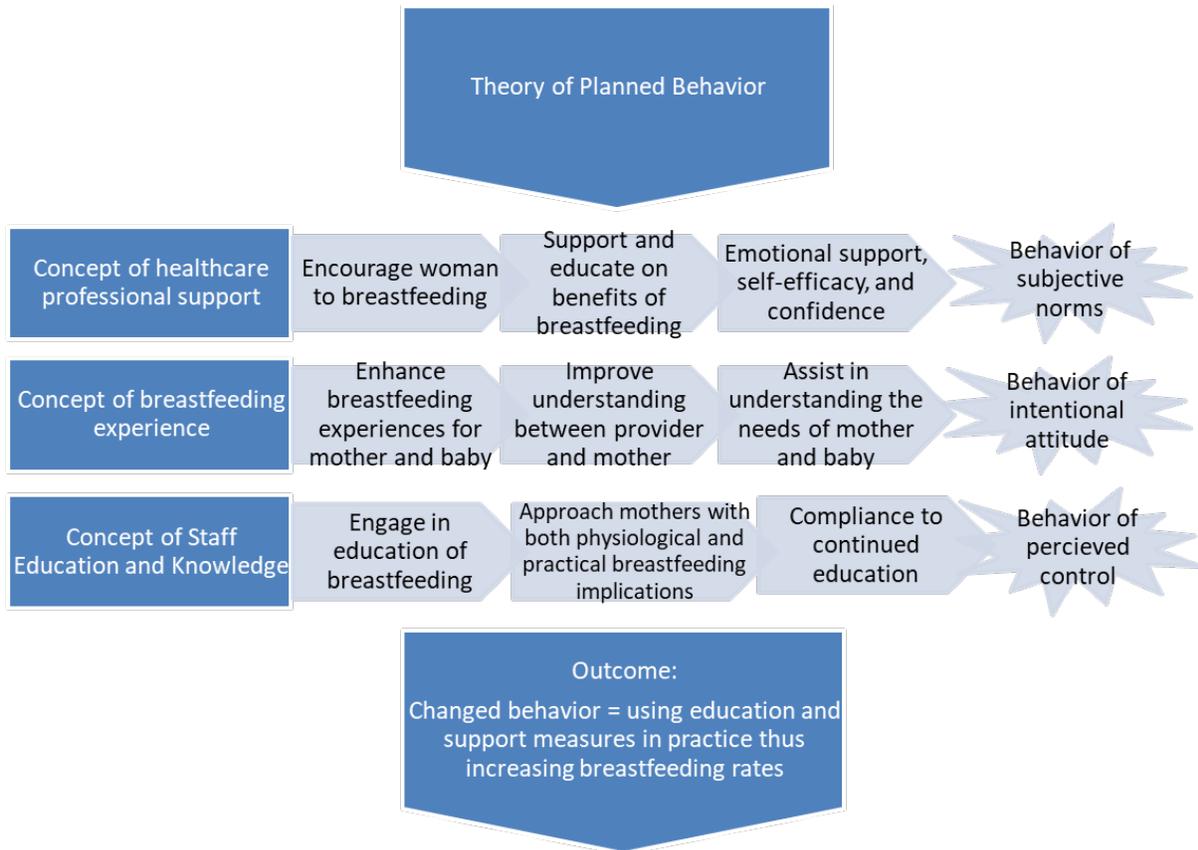
Evidence Grid

Article	Subtheme				
	Healthcare professional encouragement, self-efficacy, and education aid in successful breastfeeding	Continuity of care enhances breastfeeding practices	Maternal and professional breastfeeding experience affect breastfeeding success	The lack of breastfeeding knowledge leads to inconsistent patient education	Online learning for staff breastfeeding education improves breastfeeding practices
Almeida, 2015	x			x	
Balyakina, 2016	x	x			
Bernaix, 2010	x		x	x	x
Bigger, 2008		x		x	
Cohen, 2018	x	x	x	x	
Colaceci, 2017			x	x	x
Deloian, 2015	x			x	x
Folker, 2018	x			x	x
Gavine, 2017		x		x	x
Graffy, 2005	x		x	x	
Harilla-Acevedo, 2018	x	x			
Johnson, 2016	x	x	x		
Lu, 2001	x				
Lucchini-Raies, 2019		x	x		
Martinez, 2016	x		x		
Nelson, 2007	x	x	x		
Palmar, 2019	x	x	x		
Radzyminski, 2015	x	x		x	
Ramos, 2018		x		x	
Roch, 2018		x		x	x
Rosin, 2016	x	x	x		
Sinha, 2015	x	x	x	x	x
Souza, 2015	x	x		x	
Wade, 2009	x				

Article	Subtheme				
	Healthcare professional encouragement, self-efficacy, and education aid in successful breastfeeding	Continuity of care enhances breastfeeding practices	Maternal and professional breastfeeding experience affect breastfeeding success	The lack of breastfeeding knowledge leads to inconsistent patient education	Online learning for staff breastfeeding education improves breastfeeding practices
Ward, 2011	x	x		x	x
Watkins, 2017	x			x	x
Weddig, 2011		x		x	
Whelan, 2011	x	x		x	
Wood, 2018	x		x	x	
Yang, 2018	x	x		x	x
Zamani, 2019	x	x			x
Zhang, 2018		x	x		

Appendix E

Theory to Application Diagram



(Bai et al., 2019; Zhu et al., 2017).

Appendix F
IRB Approval Letter



Cox Center for Research
3801 S. National Ave. #720
Springfield, MO 65807
(417)269-7114

TO: Heather Shackelford

EMAIL: [REDACTED]

Proposal ACTION: Approved

ACTION DATE: 27Jul2020

STUDY TITLE: Online Breastfeeding Training for Increasing Staff Knowledge and Breastfeeding Initiation Rates on a Mother/infant Unit

The study qualified as a Quality Improvement project: **The project has been determined to be a quality improvement activity not requiring IRB review** by Cox Center for Research.

Regarding publication: Dissemination and reporting of QI program successes, and methodologies including sharing such information externally is acceptable. This may include presentations and/or publication. Intent to publish does not necessitate review so long as the project is determined to be solely for quality improvement.

Please retain a copy of this letter for your records.

Center for Research and Innovation , 3801 South National Avenue #720, Springfield, Missouri 65807

coxhealth.com

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Appendix G**Video Release Form****INTERVIEW, PHOTO, AUDIO AND VIDEO RELEASE AND AUTHORIZATION**

In consideration of the terms stated below, I hereby give CoxHealth, its agents, employees, representatives and contracted vendors, the absolute right and unrestricted permission to copyright, use, publish, broadcast and otherwise make use of interviews, pictures or videos of me and/or my child or ward through television facilities, education and staff training, print media, CoxHealth productions, websites, social media etc. using my own name or a fictitious name. I further authorize the sharing of any medical or health related information that I choose to reveal as part of an interview or other discussions as part of signing this form. I understand that I have the right to request cessation of the production of the recordings, films, audio files or images.

I hereby waive any right to inspect or approve the finished video, soundtrack, photograph, billboard, website or other printed or electronic material that may be used in conjunction herewith or to the eventual case that it may be applied.

I hereby release, discharge and agree to hold harmless CoxHealth, its agents, employees, representatives and contracted vendors acting under its authority from and against any liability resulting from the contemplated use whatsoever.

I understand that any disclosure of my information carries with it the potential for unauthorized re-disclosure and the information may then not be protected by federal confidentiality rules. This authorization is valid unless and until revoked. I have the right to revoke this authorization at any time. Revocation must be made in writing to CoxHealth. Revocation will not apply to information that has already been released, shared or disclosed in response to this authorization. I understand that treatment may not be conditioned on whether or not I sign this authorization.

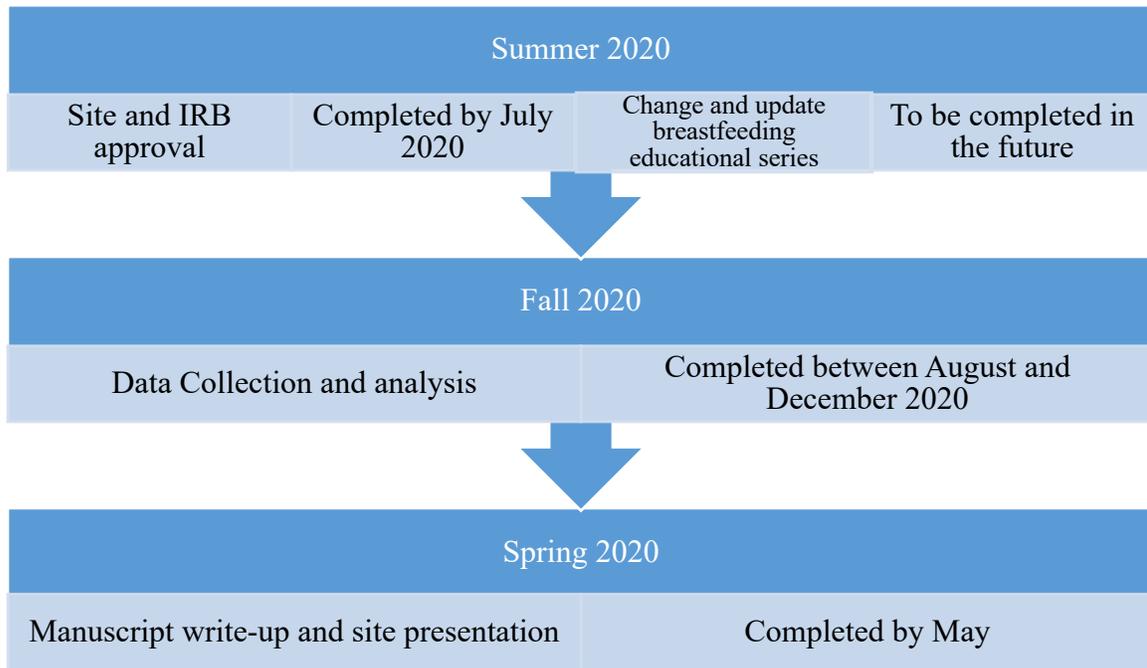
ACKNOWLEDGEMENT

I have had time to read this form and discuss the information on this form with a CoxHealth representative. I have had a chance to ask questions and my questions, if any, have been answered. I have read and understand the information. I hereby release the hospital, its personnel, and any other persons participating in my care from any and all liability which may or could arise from the taking or authorized use of such photographs and/or video recordings.

Appendix H**Cost Table for Project**

Item	Item Description/Notes	Anticipated Costs
Supplies	Paper, Ink	\$100
Travel	Conference fees, poster presentation fee, hotel accommodations, gas	\$700
Presentation Materials	Poster, handouts	\$100
	Online education platform – paid and utilized by healthcare facility for all healthcare professionals	\$0
Staff Salary	Time the staff utilizes to complete educational series (approx. \$20/hr per staff member/ \$800) – work allowed time paid by a Missouri hospital	\$0
Administration Salary	Time administration utilized pulling data and providing resources to the QI leader – (approx.. \$20/hr per staff member/ \$60) - Work paid time paid by a Missouri hospital	\$0
Student Time	Heather Shackelford/QI leader - Approximately 350 hours of work/university allowed time	\$0
Total	Pre work paid time: \$1760	\$900

Appendix I
Project Timeline Flow Graphic



Appendix J

PowerPoint Slides Integrated into the Breastfeeding Course

Mother Makes the Very Best.....



Breastfeeding Basics

Why should a mother breast feed?

Benefits for baby

- Healthier baby
 - Less gastric upsets
 - Less infections
 - Less risk of childhood obesity
- Decreased incidence of Sudden Infant Death (SIDS). Exclusive breastfeeding at one month of age reduced risk of SIDS death by 50%
- Human milk contains essential fatty acids and changes with the growing needs of baby

Benefits for the mother

- Less risk of postpartum bleeding due to release of oxytocin
- Required caloric needs increase 200-500 cal/day (the equivalent of bicycling uphill for one hour day)
- Reduces risk of some types of cancer
- Reduces risk of adult onset diabetes
- Reduces risk of coronary artery disease
- Reduces risk of postpartum depression
- Convenience
- Cost savings

Lactation Education Program
Nutrition Policy and Education

Consumer costs* for formula for 1 year:

Similac Regular	\$1,043.89
Similac Advance	\$1,576.80
Enfamil Regular	\$1,104.73
Enfamil Lipil	\$1,623.43

* Based on average 5 oz. Per feeding and average 7 feeds per day.
* Based on Columbia, MO pricing. Prices may vary throughout the state.

How do the breasts make milk?

- **SUCKLING** Stimulates the nerves to send a message to the brain
- **THE BRAIN** signals the release of hormones from the pituitary gland
- **THE BREAST** makes milk (prolactin)
- **MILK** release (oxytocin)

Types of Breastmilk

Colostrum: The "first milk." Colostrum is thick, yellow, high in protein, antibodies and vitamins

- Liquid Gold
- Loosens mucous in baby
- Easily digested
- Serves as a laxative to clear the intestinal tract
- Coats the stomach and intestines and protects against invading organisms. Allows important vitamins to be absorbed by the intestine.

Transitional Milk

- Transitional: 48-72 hours after delivery. Thin and white. The sooner the mother can breast feed her baby and the more often she breast feeds the baby will determine how much milk is produced and how soon the transitional milk comes in
- Mature milk: 7-10 days after delivery, contains foremilk and hindmilk

Mature Milk

- Mature milk: 7-10 days after delivery, contains
 - foremilk – produced at the beginning of the feeding
 - Hindmilk- Higher fat content, energy and essential nutrients
- Immunological properties

The Newborns Stomach

- Size of a marble 
- Can hold 5-7ml the first day 
- From 7-10 days increases to size of a golf ball and holds 1.5-2 oz.
- The amount of colostrum/milk the mother makes corresponds closely to the size of the newborn's stomach

Where do you start?

Achieve adequate latch on



The mouth should be open wide, with the lips flanged

Lactation Education Program
Nutrition Policy and Education

Improper positioning and latch on is the #1 cause of sore nipples

- Particularly in the first few weeks
- Lips should be flanged open wide, getting about one inch of the areola
- Chin should touch the breast, nose slightly away from the breast.

- **The best treatment for nipple soreness is prevention**
- Lanolin cream or olive oil can be applied after nursing
- Breast shells are also helpful to heal sore nipples

Methods of holding the baby during breastfeeding

Find a position that is
Comfortable
Calm
Close

13

Traditional Cradle Hold



Place pillows or Boppy pillow for comfort

14

Cross Cradle



Mother can visualize latch

15

Football Hold



Works well for C-sections

16

Side-Lying



Allows mother rest. She does not need to hold the breast

17

Breastfeeding Basics

- Mothers should nurse the baby 8-12 times in 24 hours. Newborns frequently "cluster feed."
- Watch the baby, not the clock. Hunger cues include rooting, putting the hands to the face.
- Put baby to the breast before the baby is crying

18

How do mothers know that baby is getting enough breast milk?

- Six or more wet diapers a day once the breast milk comes in
- The baby seems satisfied and sleeps for an hour or so after feeding
- Most breast fed babies have several small watery, yellow, seedy bowel movements a day
- The baby should regain back to their birth weight by day 10-14

19

Hunger Cues

- Sucking on tongue
- Moving hands or arms toward mouth
- Turning head from side-to-side

Signs of Being Full

- Falls asleep
- Body relaxes
- Let's go of the nipple

20

A combination of less frequent breastfeeds with formula supplementation decreases milk production and supply.

No water or formula supplementation is necessary, unless medically needed

21

Lactation Education Program
Maternity Policy and Education

Indicators of adequate milk intake

- Weight: gain 4-7 oz./week
- Surpass birth weight by day 10-14

Infrequent and ineffective nursing are primary causes of inadequate infant weight gain.

22

Breastfeeding is Supply and Demand

- The more often the baby goes to breast, the more milk you will produce
- Mothers should nurse the baby often
- The baby may go through "growth spurts" and want to nurse frequently
- Put the baby to breast more and mothers will start producing more milk in 48-72 hours

23

Engorgement

- Engorgement may happen during the first couple of week when supply exceeds demand
- Do not leave breasts full and engorged, if the baby won't nurse both breasts then pump to relieve the engorgement
- Unrelieved engorgement for extended periods may lead to a reduction in milk supply

24

Treatment for Engorgement

- Nurse Frequently
- Apply warm compresses to initiate let-down with massage five minutes prior to feeding
- Manually express or pump out milk to soften the areola and nipple (the baby cannot latch if it is too hard).
- Apply cold compresses after nursing to relieve swelling.

25

Breast feeding Challenges

- ❖ Sleepy baby 
- ❖ Flat nipples/sore nipples
- ❖ Maternal Fatigue

26

Skin-to-Skin



27

Skin-to-Skin Contact

- If the newly born baby is breathing well and not experiencing any problems at birth, they should be placed skin-to-skin immediately after delivery. The baby will go through various stages and should latch onto the breast within the first hour after delivery.

28

Benefits of Skin-to-Skin

- Babies
 - Breastfeed better
 - Cry less and are calmer
 - Have better blood sugar levels
 - Are protected by some of your good bacteria
- Mothers:
 - Breastfeeding more easily
 - Learn cues that their baby is hungry
 - Bond more with their baby
 - Gain confidence and contentment in caring for the baby

29

Keys to Successful Breastfeeding

Put the baby to breast early (within one hour after birth for a vaginal delivery, two hours for Cesarean) and often

Avoid artificial nipples, bottles and pacifiers until the baby is latching on well and consistently

DETERMINATION!

30

Appendix K

Intervention Approval



Fri 11/17/2017, 12:17 PM

Heather,

Everyone is pleased with how the HealthStream turned out and we would like to go forward with it. What are you thinking the assignment and testing would look like. I would like to use it during my reorientation in March if at all possible.

Thanks!

Appendix L

Intervention Flow Diagram

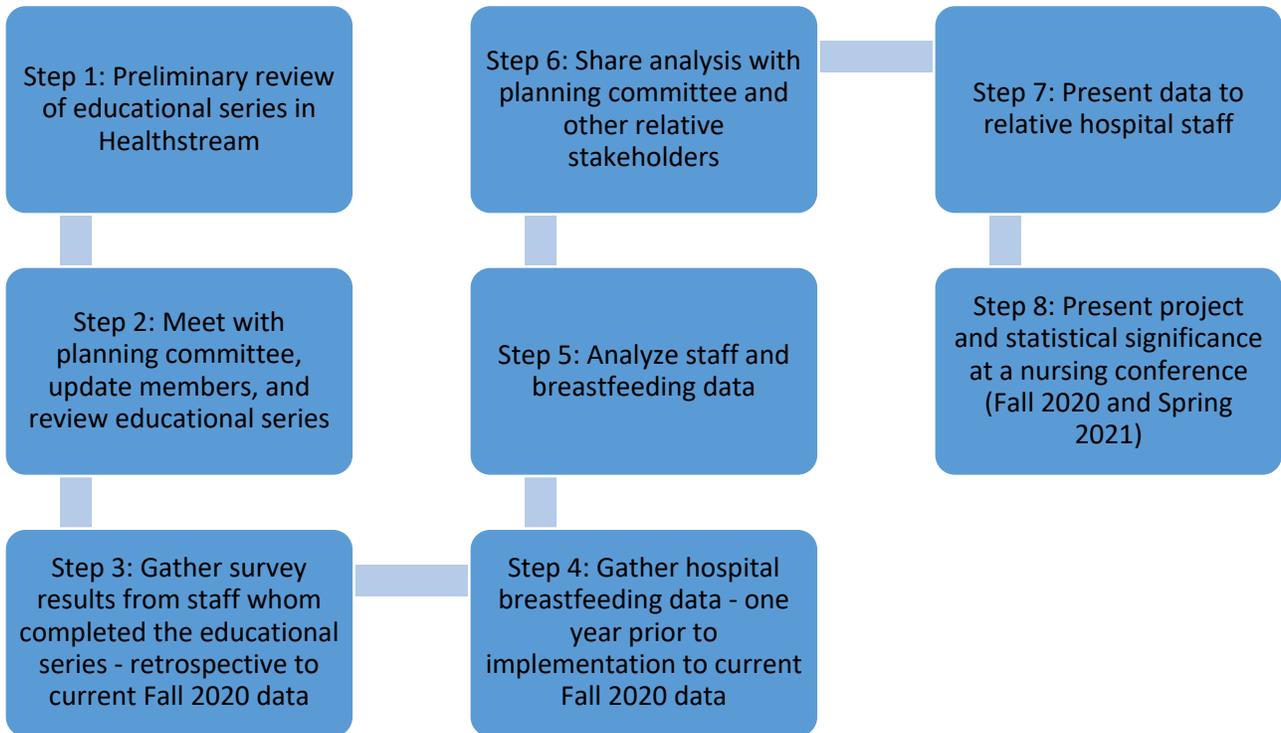


Table 3.

Breastfeeding Rates	Pre-Intervention	Post-Intervention

Appendix N

Breastfeeding Questionnaire Pre and Posttest

Question
<p>All of the following are recommended to encourage successful breastfeeding EXCEPT:</p> <ul style="list-style-type: none"> A. Initiation of breastfeeding within 1 hour of birth B. Avoiding the use of pacifiers and artificial nipples in term breastfeeding infants C. Continuous rooming in with breastfeeding on demand D. Restricting length of breastfeeding time to prevent nipple soreness and engorgement E. Avoiding the use of supplemental formula during the early stages
<p>Which of the following is a correct statement about the latch during breastfeeding?</p> <ul style="list-style-type: none"> A. The baby must take all of the areola in to the mouth to achieve a good latch B. A narrow angle at the corner of the infants mouth is indicative of a good latch C. The baby needs to be latched so that he compresses the milk sinuses when suckling at the breast D. The baby needs to be latched so that he compresses the base of the nipple when feeding E. Mother who have had previous breastfeeding experience rarely require assessment of the baby's latch in the hospital setting
<p>Compared with mature milk, colostrum is:</p> <ul style="list-style-type: none"> A. Lower in sodium, potassium, and chloride B. Higher in fat and sodium C. Higher in protein, sodium, and fat soluble vitamins D. Lower in fat and carotenoids E. Higher in water-soluble vitamins
<p>A mother with a 3-day old baby presents with sore nipples. The problem began with the first feeding and has persisted with every feeding. The most likely source of the problem is:</p> <ul style="list-style-type: none"> A. Baby's suck is too strong B. Feeding time is too long C. Lack of nipple preparation during pregnancy D. Inverted nipples E. Poor attachment to the breast

During the postpartum stay, a breastfeeding mother reports that she is having difficulty getting her infant to breastfeed. Your best response to this situation should be to:

- A. Explain that most babies have a difficult time starting out and to just keep trying
- B. Advise that the baby may be getting dehydrated, so he is not interested in feeding
- C. Encourage supplementation until the baby learns to breastfeed
- D. Discharge the infant, so the mother will be more relaxed breastfeeding at home
- E. Request assistance for the mother at the infants next feeding to evaluate the breastfeeding technique

An adequately breastfed healthy, term infant can be expected to have all of the following **EXCEPT**:

- A. Infrequent stools in the first 2 weeks of life
- B. Loss of no more than 8-10% of birth weight initially, with regain of birth weight by about 2 weeks of age
- C. Loose, yellow, seedy stools after most feedings in the early weeks of life, beginning when the mother experiences an increase in her milk production
- D. Desire to feed frequently, at least every 2-3 hours
- E. Weight gain pattern of 15-30 grams per day beginning with the mothers increased milk production

When positioning a newborn to the breast, all of the following are correct **EXCEPT**:

- A. After a cesarean section delivery, the side-lying or football hold positions are most comfortable for mother
- B. When using the cradle hold, the infant should be placed in a supine position across the mothers lap, with the infants next extended and rotated to latch on to the nipple
- C. The mother needs to be sitting or lying in a comfortable position without excessive strain on her shoulders, arms, or back
- D. The cross-cradle, or transitional, hold usually works well for most breastfeeding infants and mothers when learning to breastfeed
- E. Alternating or rotating 2 or more breastfeeding positions may help to prevent nipple discomfort in the early days after delivery

Milk production is increased by:

- A. More frequent milk removal
- B. Forcing fluids

- C. Increasing maternal caloric intake
- D. Vitamin D
- E. Hearing an infant cry

Signs of adequate breast milk intake in the first 4-6 weeks include all below **EXCEPT**:

- A. At least 3-4 stools in 24 hours
- B. At least 4-6 wet diapers wet with urine in 24 hours
- C. Baby gaining weight
- D. Baby sleeping through the night
- E. Sounds of swallowing

The best time to put the infant to the breast is during the quiet, alert phase. This phase usually occurs:

- A. Within the first hour after birth
- B. 2-3 hours after birth
- C. After the first 6 hours of life

Sally, a nurse on the obstetrical unit, is providing education to a breastfeeding mother and her husband on safe sleep practices. Which of the statements below indicates that Sally is providing appropriate safe sleep education? Select all that apply.

- A. "Always place your baby in his or her back to sleep. This includes naptime and at night".
- B. "You should keep your baby's sleeping area close to you; however, the baby should not be sleeping in the same bed as you".
- C. "Your spouse is a great resource for you. He has the opportunity to assist you during night time feedings, positioning the baby, changing your baby's diaper, and allowing you to maintain rest".
- D. "Your baby's mattress should be soft, as this will reduce the severity of flat spots on your baby's skull".
- E. "It is okay to breastfeed your infant while rocking in the rocking chair at night. If you fall asleep, your baby will be safe as the head is elevated to reduce the risk of aspiration".

Breast milk is the most complete form of nutrition for infants. This has led to which of the following health benefits for infants:

- A. Less digestive issues as breast milk is easier digested as compared to formula
- B. Enhanced immune system and increased resistance to infection

- C. Greater brain development due to the presence of healthy fats present in breast milk
- D. Less unnecessary weight gain in which leads to a decrease rate of being overweight later in life
- E. All of the above

Which of the following should be the first action implemented by the nurse for successful breastfeeding initiation?

- A. Complete infant care directly after delivery, prior to handing the infant to the mother
- B. Placing the infant skin-to-skin contact with the mother, directly after delivery
- C. After delivery of the infant, allow dad to hold the infant while the physician completes care for the mother
- D. A and B
- E. B and C

The nurse is caring for a patient who is 6 hours postpartum, and the baby will not latch. Which of the following scenarios indicates concern for implementation of successful breastfeeding?

- A. The nurse assesses the latch and notes the infant is not latching appropriately. The nurse initiates the use of a nipple shield to assist as a temporary solution for appropriate feeding.
- B. The nurse notes that the mother is attempting to shove the breast to the baby; therefore, the nurse instructs the mother to bring baby to breast while pointing the nipple towards the infant's nose.
- C. The nurse notes that the mother is in an uncomfortable position that is not working well with the infant. The nurse then sits the mother up and assists her in the football hold to allow greater visualization of the infants latch.
- D. The nurse notes that the father has been holding the baby the majority of the hospital stay. The nurse encourages and educates the mother on skin-to-skin contact, including demonstration with her infant in the sniffing position.
- E. None of the above

Breastfeeding benefits the mother in the following ways **EXCEPT**:

- A. Decreased post-partum bleeding
- B. Lowered risk of cancer
- C. Time consuming and uncomfortable

- D. Promotes bonding and relaxation
- E. Economically beneficial

Appendix O

Participant Course Evaluation

Breastfeeding Basics Evaluation

The Breastfeeding Basics series clearly presents the skills to be learned, including breastfeeding concepts and techniques.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The Breastfeeding Basics series increased my understanding of breastfeeding education.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

The Breastfeeding Basics series helped me develop my breastfeeding communication/presentation skills.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

The Breastfeeding Basics series helped with improving my problem-solving skills for the breastfeeding mother.

Strongly Disagree

Disagree

Neutral

Agree

Strongly Agree

Considering both the limitations and possibilities of the subject matter and the course, how would you rate the overall effectiveness of this course?

Poor

Fair

Average

Good

Outstanding

Other: _____

Free text questions.

6. Please identify what you consider to be the streng (Free Text)

Please identify what you consider to be the strengths of the course. - |

7. Please identify area(s) where you think the course (Free Text)

Please identify area(s) where you think the course could be improved. ·

8. After completing the Breastfeeding Basics series, (Free Text)

After completing the Breastfeeding Basics series, list one thing you will incorporate into your personal breastfeeding education that you have not implemented before. [REDACTED]

Appendix P

Statistical Analysis Table Template

Table 1.

	State	Measurement Instrument Name	Tool validity and reliability	Permission Need	Statistical Analysis
Primary Outcome	Increase in basic breastfeeding knowledge	Pre and Posttest	Not Applicable	Not Applicable	Chi-Square, Z Test, Difference in Proportions
Secondary Outcome	Increase in hospital breastfeeding rates	Hospital Data	Not Applicable	Not Applicable	Descriptive Statistics
Participant Completion of the Measurement Tool (Procedure): Knowledge of breastfeeding will be assessed from a variety of healthcare providers; retrospective data will show the effects of knowledge on increasing or decreasing breastfeeding rates.					

Table 2.

	Breastfeeding Knowledge Pretest	Breastfeeding Knowledge Posttest	p-value for knowledge increase
Intervention Group n = 40	NA	NA	NA
Breastfeeding Knowledge Overall Score	Group Proportion Pretest	Group Proportion Posttest	p-value – Difference in proportion
Q1	Group Proportion Pretest	Group Proportion Posttest	p-value
Q2	Group Proportion Pretest	Group Proportion Posttest	p-value
Q3	Group Proportion Pretest	Group Proportion Posttest	p-value
Q4	Group Proportion Pretest	Group Proportion Posttest	p-value
Q6	Group Proportion Pretest	Group Proportion Posttest	p-value
Q7	Group Proportion Pretest	Group Proportion Posttest	p-value
Q8	Group Proportion Pretest	Group Proportion Posttest	p-value
Q9	Group Proportion Pretest	Group Proportion Posttest	p-value
Q10	Group Proportion Pretest	Group Proportion Posttest	p-value
Q11	Group Proportion Pretest	Group Proportion Posttest	p-value
Q12	Group Proportion Pretest	Group Proportion Posttest	p-value
Q13	Group Proportion Pretest	Group Proportion Posttest	p-value
Q14	Group Proportion Pretest	Group Proportion Posttest	p-value
Q15	Group Proportion Pretest	Group Proportion Posttest	p-value

Table 3.

Breastfeeding Rates	Pre-Intervention	Post-Intervention	Comparison, Change

Appendix Q
Faculty DNP Approval Letter



July 10, 2020

UMKC DNP Student, Heather Shackelford

Congratulations. The UMKC Doctor of Nursing Practice (DNP) faculty has approved your DNP project proposal, *Online Breastfeeding Training for Increasing Staff Knowledge and Breastfeeding Initiation Rates on a Mother-infant Unit*.

You may proceed with IRB application

Sincerely,

A handwritten signature in purple ink that reads "Lyla Lindholm".

Lyla Lindholm, DNP, RN, ACNS-BC
Clinical Assistant Professor, DNP Faculty
MSN-DNP Program Coordinator
UMKC School of Nursing and Health Studies
lindholm1@umkc.edu

A handwritten signature in black ink that reads "Cheri Barber".

Cheri Barber, DNP, RN, PPCNP-BC, FAANP
Clinical Assistant Professor
DNP Program Director
UMKC School of Nursing and Health Studies
barberch@umkc.edu

DNP Faculty Mentor Name, DNP
UMKC School of Nursing and Health Studies

Appendix R
Statistical Analysis Results Table

Table 1. Pre and Posttest Data Analysis

Data Analysis Response

In this data set, a group is compared to a group, analyzed by a chi-square, one-tailed, z test with a difference of two proportions with nominal data. The alternative hypothesis is that the post ratio will increase from the pre ratio, meaning that healthcare professional knowledge has increase.

Overall analysis statement: An increase in knowledge was assessed in 14 out of 15 questions from pretest to posttest (q. 1-11 and 13-15). Of the 15 questions, 9 out of 15 demonstrated clinical significance $p < 0.05$ and 95% confidence interval (q. 2, 3, 6, 7, 8, 9, 10, 14, 15). A post-hoc power analysis to compute achieved power was completed using 65-68 participants post data collection, resulting in different outcomes per question in pretest and posttest (alpha 0.05, critical z of -1.6448536). Overall G*power supports statistical significance as calculated in z test with two proportions.

Question	Significance	Conclusion	G*Power Analysis
Question 1	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.98) pretest to posttest ($z=1.4753$; $p=0.0701$).</p> <p>0.9% (0.98) difference in proportions (CI -0.031 – 0.2287; interval half width 0.1303).</p> <p>We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p> <p>G*Power= 0.429</p>	<p>Most participants recognized items that did not encourage breastfeeding; however, there minimal respondents who did not recognize that formula supplementation and pacifier/artificial nipple use discourages breastfeeding. A small portion of participants had an increase in knowledge.</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s)</p> <p>= One</p> <p>Proportion p2</p> <p>= 0.769231</p> <p>Proportion p1</p> <p>= 0.867647</p> <p>α err prob</p> <p>= 0.05</p> <p>Sample size group 1</p> <p>= 65</p>

	Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.98) pretest to posttest (z=1.4753; p=0.0701).		<p>Sample size group 2</p> <p>= 68</p> <p>Output: Critical z</p> <p>= -1.6448536</p> <p>Power (1-β err prob)</p> <p>= 0.4290258</p>
Question 2	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.21) pretest to posttest (z=2.5362; p=0.0056).</p> <p>21% (0.21) difference in two proportions (CI 0.05-0.37; interval half width 0.1604).</p> <p>We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	Participant’s demonstrated an increase in knowledge on the mechanisms and clinical importance of infant to nipple latch. A variety of responses indicated that staff felt the mother did not require frequent breastfeeding assessment if she had breastfed in the past, compression of the nipple was occurring with latch instead of the milk ducts, and that a good latch meant the infant had the whole areola in the mouth.	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s)</p> <p>= One</p> <p>Proportion p2</p> <p>= 0.523076923</p> <p>Proportion p1</p> <p>= 0.735294118</p> <p>α err prob</p> <p>= 0.05</p> <p>Sample size group 1</p> <p>= 65</p> <p>Sample size group 2</p> <p>= 68</p> <p>Output: Critical z</p> <p>= -1.6448536</p> <p>Power (1-β err prob)</p> <p>= 0.8183824</p>
Question 3	Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.158) pretest to posttest (z=2.3375; p=0.0087).	Participants demonstrated an increase of knowledge on the constituents of mature breast milk; recognizing that breast milk is high in	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p>

	<p>15% (0.158) difference in two proportions (CI 0.0296-0.2876; interval half width 0.1290). We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	<p>protein, sodium and fat-soluble vitamins.</p>	<p>Input: Tail(s) = One Proportion p2 = 0.738461538 Proportion p1 = 0.897058824 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.7690799</p>
<p>Question 4</p>	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.048) pretest to posttest (z=1.1060; p=0.1344). 4.8% (0.04819) difference in proportions (CI-0.0374-0.1338; interval half width 0.0856). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Most of the participants recognized that sore nipples from breastfeeding may be a sign of a poor infant attachment to the breast; however, there was a small increase in knowledge amongst other participants.</p>	<p>z tests - Proportions: Difference between two independent proportions Analysis: Post hoc: Compute achieved power Input: Tail(s) = One Proportion p2 = 0.907692308 Proportion p1 = 0.955882353 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68</p>

			<p>Output: Critical z = -1.6448536 Power (1-β err prob) = 0.2899336</p>
Question 5	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.0468) pretest to posttest (z=1.4194; p=0.0779).</p> <p>4.6% (0.046833) difference in proportions (CI -0.0182-0.1119; interval half width 0.0651). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Many of the participants recognized that when a breastfeeding mother is having difficulty getting her infant to breastfeed, it is important to evaluate the breastfeeding technique during the infant feeding session; however, there was a small increase in knowledge amongst other participants.</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s) = One Proportion p2 = 0.938461538 Proportion p1 = 0.985294118 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68</p> <p>Output: Critical z = -1.6448536 Power (1-β err prob) = 0.4015196</p>
Question 6	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.20) pretest to posttest (z=3.2048; p=0.0007).</p>	<p>A significant increase in knowledge was witnessed pretest to posttest on the expected outcomes of healthy breastfed infants. These include weight gain and loss, assessment of</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s) = One</p>

	<p>20% (0.2027) difference in proportions (CI 0.0821-0.3233; interval half width 0.1206). We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	<p>stool, desire to feed frequently, and stool frequency.</p>	<pre> Proportion p2 = 0.738461538 Proportion p1 = 0.941176471 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.9456472 </pre>
<p>Question 7</p>	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.1739) pretest to posttest (z=2.5672; p=0.0051). 17% (0.173982) difference in proportions (CI 0.0434-0.3046; interval half width 0.1306). We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	<p>An increase in knowledge was recognized on the appropriate breastfeeding positioning for both infant/mother. Posttest the participants demonstrated understanding that the infant should not be placed in a supine position with the infant's neck extended and rotated. They recognized the mother and infant should be in a comfortable position without strain in a cross-cradle, or transitional, hold for vaginal birth</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s) = One Proportion p2 = 0.723076923 Proportion p1 = 0.897058824 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536</p>

		mothers or a side lying or football hold for caesarian deliveries while allowing the mother to rotation positions frequently for comfort for her body and breasts.	$\text{Power } (1-\beta \text{ err prob}) = 0.8245085$
Question 8	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.141) pretest to posttest (z=2.4375; p=0.0074).</p> <p>14% (0.141176) difference in proportions (CI 0.0290-0.2534; interval half width 0.1122).</p> <p>We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	An increase of knowledge was indicated as the staff recognized that frequent milk removal is how milk production is increased; however, pretest it was recognized that staff identified incorrect measures of increasing supply such as forcing fluids and infant cry.	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s) = One Proportion p2 = 0.8 Proportion p1 = 0.941176471 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68</p> <p>Output: Critical z = -1.6448536 Power (1-β err prob) = 0.7861848</p>
Question 9	P = 0.0270 (reject the null hypothesis).		z tests - Proportions: Difference between two independent proportions

	<p>12% (0.128507) difference in proportions (CI -0.0012-0.2582; interval half width 0.1297).</p>		<p>Analysis: Post hoc: Compute achieved power Input: Tail(s) = One Proportion p2 = 0.753846154 Proportion p1 = 0.882352941 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.6084105</p>
<p>Question 10</p>	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.108) pretest to posttest (z=2.4872; p=0.0064).</p> <p>10% (0.108371) difference in proportions (CI 0.0235-0.1932; interval half width 0.0848). We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	<p>An increase of knowledge was recognized on the appropriate time to put infant to the breast, emphasizing skin to skin contact in the first hour after birth.</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power Input: Tail(s) = One Proportion p2 = 0.876923077 Proportion p1 = 0.985294118 α err prob = 0.05 Sample size group 1 = 65</p>

			<p style="text-align: right;">Sample size group 2</p> <p>= 68</p> <p>Output: Critical z</p> <p>= -1.6448536</p> <p style="text-align: right;">Power (1-β err prob)</p> <p>= 0.7980807</p>
Question 11-A	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.108) pretest to posttest (z=0.0566; p=0.4774).</p> <p>0.2% (0.002036) difference in proportions (CI -0.0686-0.0726; interval half width 0.0706).</p> <p>We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Select all that apply differentiation.</p> <p>Many participants recognized that infants should be placed on their back for sleep and naptime. Minimal change was recognized between groups.</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s)</p> <p>= One</p> <p style="text-align: right;">Proportion p2</p> <p>= 0.953846154</p> <p style="text-align: right;">Proportion p1</p> <p>= 0.955882353</p> <p style="text-align: right;">α err prob</p> <p>= 0.05</p> <p style="text-align: right;">Sample size group 1</p> <p>= 65</p> <p style="text-align: right;">Sample size group 2</p> <p>= 68</p> <p>Output: Critical z</p> <p>= -1.6448536</p> <p style="text-align: right;">Power (1-β err prob)</p> <p>= 0.0560173</p>
Question 11-B	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.0174) pretest to posttest (z=0.4497; p=0.3264).</p>	<p>Select all that apply differentiation.</p> <p>Most participants recognized that infants should be kept in a space lose to the parents while</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p>

	<p>1.7% (0.017421) difference in proportions (CI -.0587-0.0935; interval half width 0.0761). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>asleep; however, not in the same bed. Minimal change was recognized between groups.</p>	<p>Input: Tail(s) = One Proportion p2 = 0.938461538 Proportion p1 = 0.955882353 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.1147197</p>
<p>Question 11-C</p>	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.0328) pretest to posttest (z=0.7954; p=0.2132). 3.2% (0.032805) difference in proportions (CI -0.0483-0.1139; interval half width 0.0414). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Select all that apply differentiation. Most participants recognized the spouse as a resource for success in the sleep/breastfeeding process. Minimal change was recognized between groups.</p>	<p>z tests - Proportions: Difference between two independent proportions Analysis: Post hoc: Compute achieved power Input: Tail(s) = One Proportion p2 = 0.923076923 Proportion p1 = 0.955882353 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68</p>

			<p>Output: Critical z = -1.6448536 Power (1-β err prob) = 0.1946344</p>
Question 12	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (-0.01471) pretest to posttest (z=-0.9925; p=0.8368).</p> <p>-1% (-0.01471) difference in proportions (CI -0.0433-0.0139; interval half width 0.0286). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Most participants recognized a variety of health benefits of breastmilk for infants including causing less digestive upset than artificial sources, enhances the immune system, encourages great brain development, and causes less unnecessary weight gain furthering positive effects later in life.</p>	<p>Could not run g power due to proportion being under 1</p>
Question 13	<p>Healthcare professionals who engaged in the breastfeeding online module did not show a statistically significant increase in knowledge (0.0997) pretest to posttest (z=1.4108; p=0.0791).</p> <p>9% (0.099774) difference in proportions (CI -0.0383– 0.2379; interval half width 0.1381). We are not 95% confident there was a significant change in knowledge as the difference falls outside the tail of confidence.</p>	<p>Participants recognized that skin to skin contact directly after delivery as the first step to encourage successful breastfeeding for mother and infant. Although not statistically significant, scores increase from pretest to posttest.</p>	<p>z tests - Proportions: Difference between two independent proportions</p> <p>Analysis: Post hoc: Compute achieved power</p> <p>Input: Tail(s) = One Proportion p2 = 0.738461538 Proportion p1 = 0.838235294 α err prob = 0.05 Sample size group 1</p>

			<pre> = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.4042983 </pre>
Question 14	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.307) pretest to posttest (z=3.5511; p=0.0002).</p> <p>30% (0.307919) difference in proportions (CI 0.1462-0.4697; interval half width 0.1617).</p> <p>We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>	<p>Participants in this discussion struggled to recognize what may hinder breastfeeding in a mother and infant 6 hours postpartum. An increase in participants in the posttest recognized that the use of nipple shields can hinder natural breastfeeding; however, both pretest and posttest participants recognized skin to skin, readjustment of feeding position, and the sniffing/football holds as hinderances as well although they are not.</p>	<pre> z tests - Proportions: Difference between two independent proportions Analysis: Post hoc: Compute achieved power Input: Tail(s) = One Proportion p2 = 0.353846154 Proportion p1 = 0.661764706 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.9774226 </pre>
Question 15	<p>Healthcare professionals who engaged in the breastfeeding online module shown a statistically significant increase in knowledge (0.108) pretest to posttest (z=2.4872; p=0.0064).</p>	<p>Participants were able to delineate the benefits of breastfeeding for mom from the disadvantages.</p>	<pre> z tests - Proportions: Difference between two independent proportions Analysis: Post hoc: Compute </pre>

	<p>10% (0.108371) difference in proportions (CI 0.0235-0.1932; interval half width 0.0848). We are 95% confident that there was a significant increase in knowledge as the difference falls inside the tail of confidence.</p>		<p>achieved power Input: Tail(s) = One Proportion p2 = 0.876923077 Proportion p1 = 0.985294118 α err prob = 0.05 Sample size group 1 = 65 Sample size group 2 = 68 Output: Critical z = -1.6448536 Power (1-β err prob) = 0.7980807</p>
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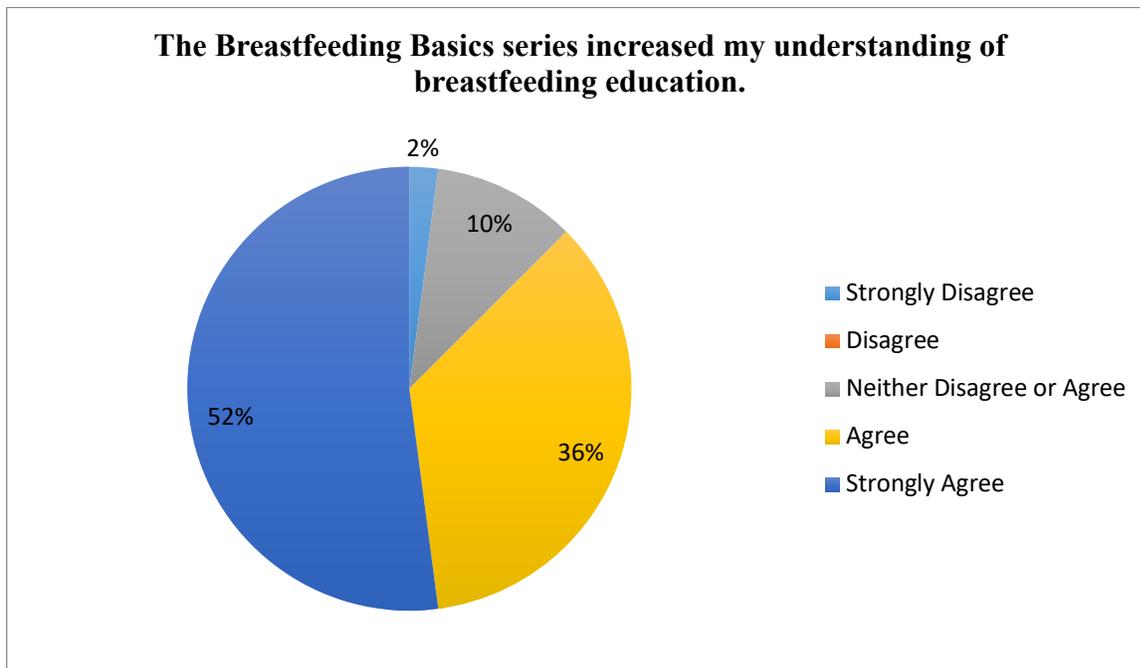
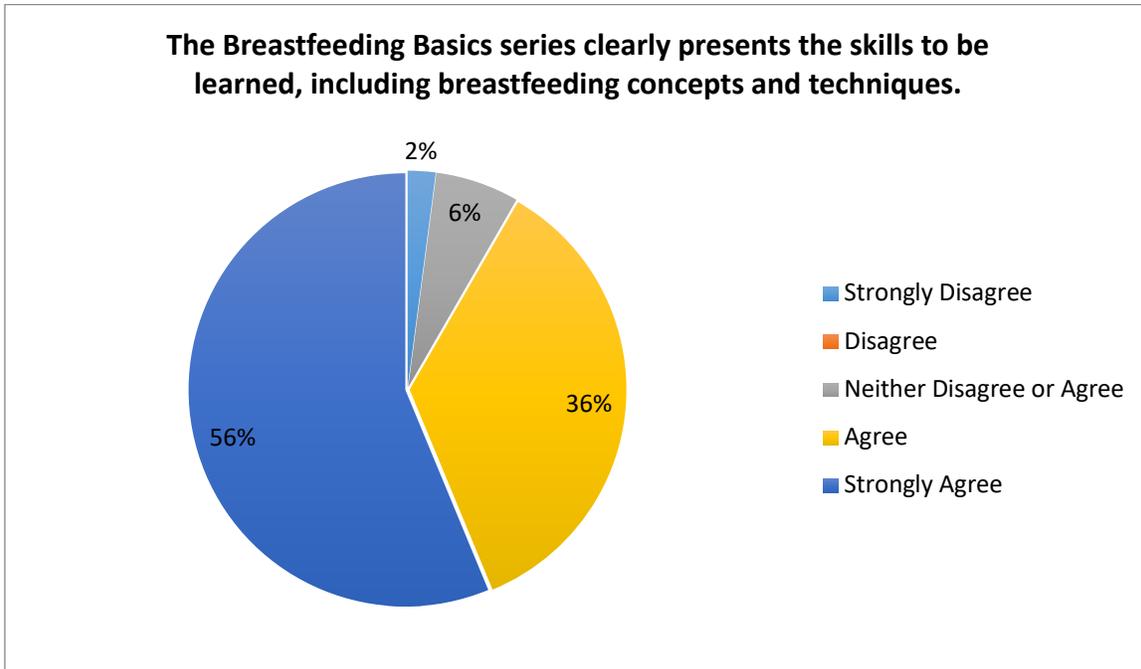
Table 2. Breastfeeding Hospital Data

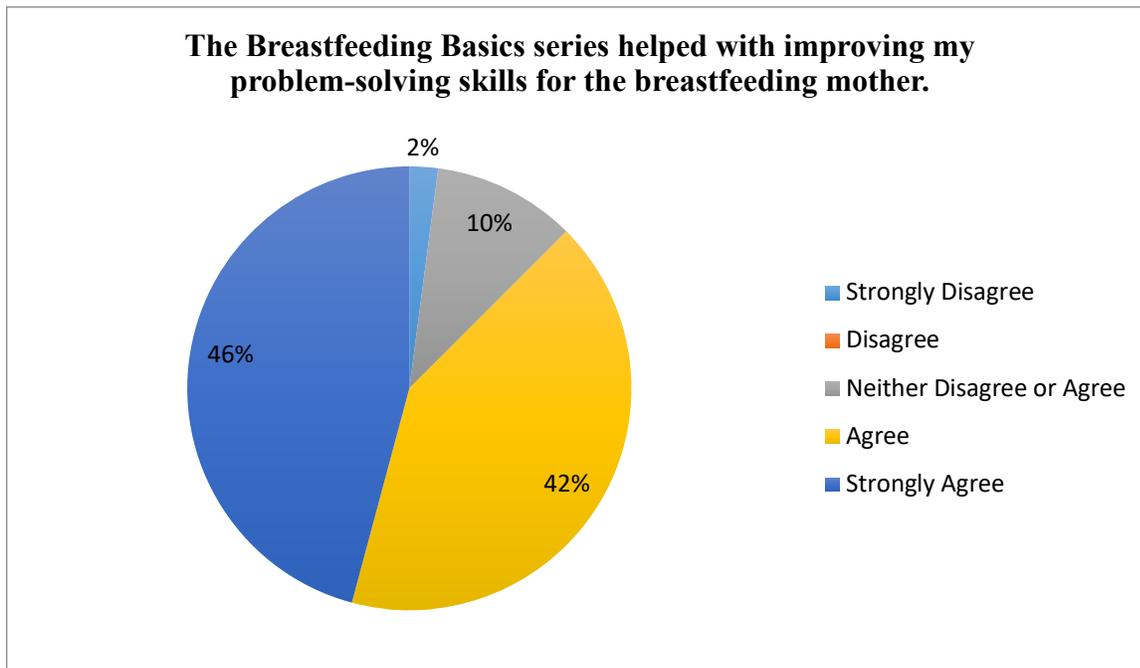
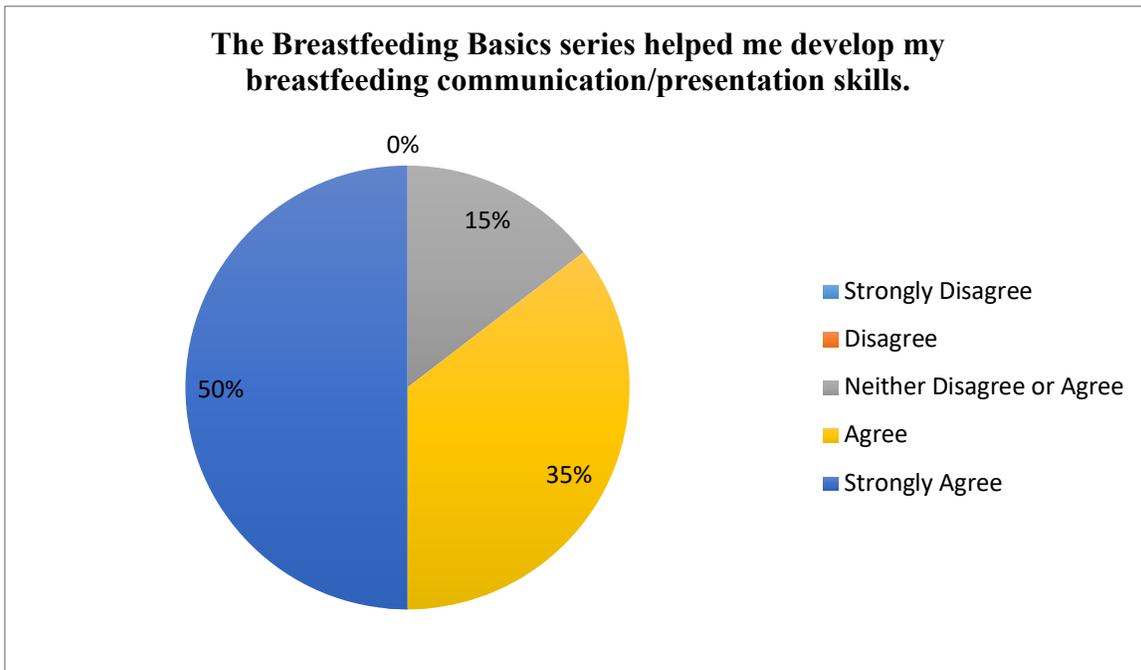
Breastfeeding Trending Data

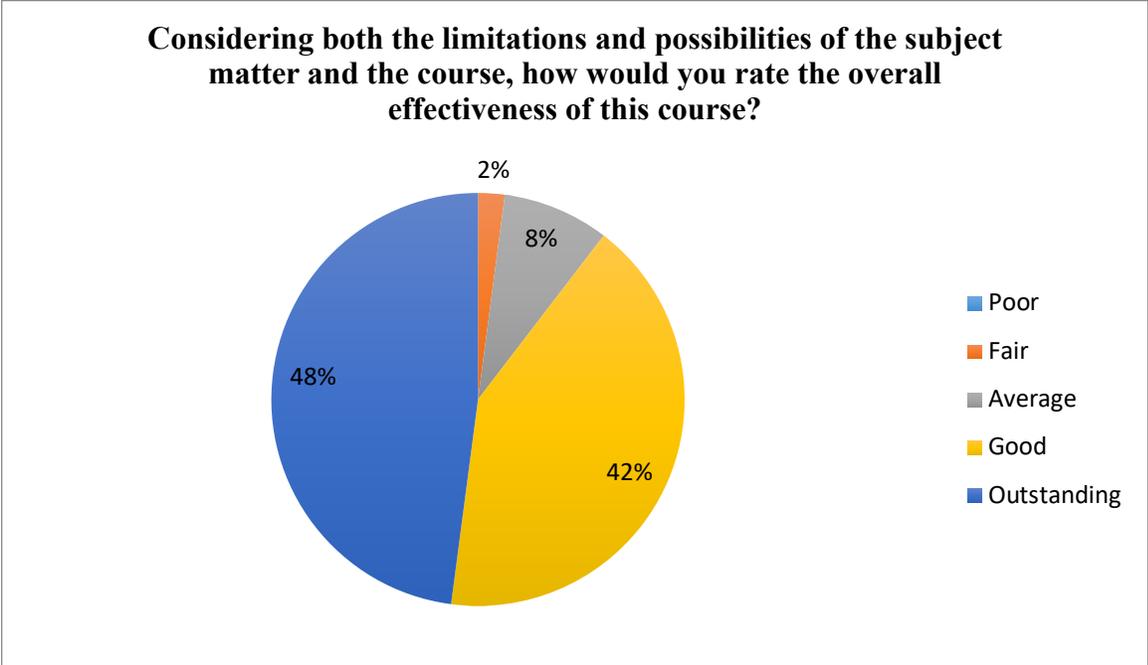
Omitted for confidentiality.

Table 3. Participant Course Evaluation

Evaluation Score Report







Appendix S

Logic Model

Logic Model for DNP Project					
Student: Heather Shackelford MSN, RN, DNP Student					
Inquiry, PICOTS: For staff on a mother/infant unit, does completing an online breastfeeding training series, compared to previous breastfeeding education modalities, improve breastfeeding knowledge and hospital breastfeeding initiation rates over one year of implementation at a Missouri hospital?					
Inputs	Intervention(s) Outputs		Outcomes -- Impact		
	<i>Activities</i>	<i>Participation</i>	<i>Short</i>	<i>Medium</i>	<i>Long</i>
<p>Evidence, sub-topics</p> <ol style="list-style-type: none"> 1. Healthcare professional support 2. Continuity of care in breastfeeding 3. Breastfeeding experience 4. Lack of breastfeeding knowledge 5. Online learning for staff breastfeeding education <p>Major Facilitators or Contributors</p> <ol style="list-style-type: none"> 1. Multi-level stakeholders 2. WHO supported recommendation 3. Show-Me 5 indicators 4. Economically sound <p>Major Barriers or Challenges</p> <ol style="list-style-type: none"> 1. Increase demand for attention 2. Increased education for staff 3. Change in practice for staff 	<p>EBP intervention:</p> <p>Increasing breastfeeding basic education and modalities of care to further staff knowledge while increasing breastfeeding initiation and continuation rate using online education</p> <p>Major steps of the intervention (brief phrases)</p> <ol style="list-style-type: none"> 1. Stakeholder meeting 2. Identify use of educational series 3. Data collection retrospectively to current for breastfeeding rates 	<p>The participants</p> <p>Registered Nurses:</p> <p>Labor and Delivery; Pediatric</p> <p>Other personnel:</p> <p>Nursing Technicians, Nurse manager, Nursing education manager, Nursing director</p> <p>Site</p> <p>A Missouri hospital</p> <p>Time Frame</p> <p>Initial implementation in 2017</p> <p>Further evaluation and data collection July 2020 through August 2020</p>	<p>(Completed during DNP Project)</p> <p>Outcome(s) to be measured</p> <p>Primary: Staff knowledge and utilization of knowledge into practice</p> <p>Secondary: Increase in breastfeeding rates</p> <p>Measurement tool(s)</p> <ol style="list-style-type: none"> 1. AAP modified questionnaire 2. Pre and posttest 3. Likert scale analysis <p>Statistical analysis to be used</p> <ol style="list-style-type: none"> 1. Chi-square, z test with difference of two proportions 	<p>(after student DNP)</p> <p>Outcomes to be measured</p> <p>Primary: Improved breastfeeding care by healthcare professionals</p> <p>Secondary: Further increased breastfeeding rates at the Missouri hospital</p>	<p>(after student DNP)</p> <p>Outcomes that are potentials</p> <p>World Health Organization (WHO) initiatives associated with becoming a baby-friendly hospital</p> <p>Local community engagement on maternal and infant wellness</p>

	<p>4. Data collection of staff knowledge and intent</p> <p>6. Utilize data for change and dissemination</p>	<p>Consent or assent Needed</p> <p>No consent needed</p> <p>IRB approval by facility</p> <p>Other person(s) collecting data</p> <p>Yes – health system gathering data on breastfeeding rates</p> <p>Others directly involved in consent or data collection</p> <p>No</p>	<p>2. Descriptive statistics</p>		
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