

Breastfeeding Curriculum Literature Review

Breastfeeding curriculum for adolescent mothers in the prenatal stage in primary care settings

By

Gurkirat K. Randhawa

Honours BSc (University of British Columbia)

MPH Student (University of Toronto)

Prepared for:

Queen Square Family Health Team

Introduction & Background

Breastfeeding is a way to ensure that the nutrient needs, for healthy growth and development, for infants are being met for the first six months (WHOa, 2013; WHOb, 2013). Breast milk is readily available and affordable, which guarantees that infants get adequate nutrition (WHOc, 2013). Almost all mothers are able to breastfeed (WHOa, 2013). Exclusive breastfeeding is recommended for the first 6 months, and then continued breastfeeding, with appropriate complementary foods, is recommended to 2 years and beyond (WHOa, 2013).

Breastfeeding has many advantages. For instance, breast milk may help prevent chronic diseases and conditions such as childhood obesity, type 2 diabetes, and asthma (WHOb, 2013; WHOc, 2013). Since breast milk contains antibodies it can also protect against common childhood diseases such as diarrhea and pneumonia (WHOb, 2013; WHOc, 2013). In addition, breastfeeding also benefits mothers; for example, exclusive breastfeeding is associated with delayed fertility (98% effective method of birth control for 6 months), it reduces the risk of breast and ovarian cancers later in life, it helps women return to their pre-pregnancy weight faster, it lowers rates of obesity, and it has been associated with lower levels of post-partum depression (WHOc, 2013; Jessri et al., 2013; Nesbitt et al., 2012).

The benefits of breastfeeding have been illustrated throughout the literature and there is evidence that shows the benefits increase with duration and exclusivity (Wright et al., 2004). Breastfeeding is considered the best food source for infants and it has been advocated as a cost-effective means of improving child health, mother's health, and mother-infant bonding (Simard et al., 2005). There is also evidence that increasing breastfeeding duration rates can contribute to the improvement of maternal health and the reduction of child mortality (WHO, 2013). However, despite the many advantages and extensive promotion of breastfeeding, the current rates in Canada aren't ideal; even though breastfeeding initiation rates have started to rise in recent years, the number of women who continue to exclusively breastfeed through six months is still very low, especially in adolescent mothers (Simard et al., 2005; Volpe & Bear, 2000).

Breastfeeding Intent

Breastfeeding intent has consistently found to be a strong predictor of decisions to initiate and sustain breastfeeding in women (Betzold et al., 2007; Volpe & Bear, 2000). The decision about which type of infant feeding method mothers will use is often made before pregnancy, at the beginning of pregnancy, even before the second trimester (Volpe & Bear, 2000; Couto de Oliveira & Camacho, 2011; Lumbiganon et al., 2011; Renfrew et al., 2012). This decision is based on a variety of factors, such as, an individual's personal attitudes and beliefs surrounding their perceived benefits and disadvantages of breastfeeding (Léger-Leblanc et al., 2008). Breastfeeding intent expressed in the prenatal period is associated with increased rates of breastfeeding exclusivity and breastfeeding duration (Léger-Leblanc et al., 2008). In order to improve breastfeeding duration rates, interventions should target known predictors of

breastfeeding intent through education in the prenatal period (Léger-Leblanc et al., 2008). There are multiple factors that have been identified in the literature that are often associated with intention to breastfeed. For example, knowledge of health benefits; education, age and ethnicity of mother; marital status; timing of prenatal care initiation; smoking status; household income; attendance at prenatal breastfeeding classes; maternal comfort with breastfeeding in social settings; maternal, family, peer partner attitudes toward breastfeeding and support of breastfeeding; and confidence of breastfeeding success (breastfeeding self-efficacy) (Nesbitt et al., 2012; Simard et al., 2005; Kehler et al., 2009; Dunn, et al., 2006; Partyka et al., 2010; Léger-Leblanc et al., 2008). Therefore, when creating prenatal educational programs or prenatal breastfeeding curriculum it is important to incorporate these barriers and predictors.

Breastfeeding Duration

There are also a variety of factors that influence breastfeeding duration and often lead to early cessation, such as returning to work or school (Partyka et al., 2010; Dunn et al., 2006). Furthermore, perceptions and attitudes about breastfeeding, lack of knowledge about breastfeeding norms and practices and the lack of practical breastfeeding skills have been linked to short breastfeeding times in women (Simard et al., 2005; Kehler et al., 2009; Dunn, et al., 2006; Partyka et al., 2010). In addition, early cessation is often associated with perceived milk insufficiency, infants' unwillingness to suck at the breast, self-weaning among infants, painful/sore nipples or breasts, and fatigue (Jessri et al., 2013; Nesbitt et al., 2012; Simard et al., 2005; Kehler et al., 2009; Dunn, et al., 2006; Partyka et al., 2010). Pain perception related to breastfeeding, loss of freedom, embarrassment with breastfeeding in public, and perceived difficulty with breastfeeding are other reported reasons for breastfeeding discontinuation among women (Jessri et al, 2013; Hogan et al., 2001; Dunn et al., 2006). Therefore, educational strategies are recommended to target these barriers and predictors of breastfeeding. In order to positively influence women's intentions to breastfeed, education specifically addressing information on breastfeeding and breastfeeding self-efficacy should be a priority in the prenatal period, since breastfeeding intent is a known predictor of breastfeeding rates.

Overall Goals of This Research

This paper reviews the available evidence with regards to primary care interventions and curriculum conducted during the prenatal stage to improve breastfeeding rates in general, which includes initiation and maintenance (duration and exclusivity) of breastfeeding. This research will be used to create breastfeeding curriculum, which will educate and support adolescent mothers with breastfeeding decisions during the prenatal stage, and will be adapted to a primary care setting. This review of the salient literature establishes the need for further research into the effect of prenatal education on breastfeeding rates. Recommendations for best practices for breastfeeding curriculum in a primary care setting are discussed along with details about interventions that have been performed (i.e. what type, number of classes/workshops, repetition, instructors, who attended (mother, father, both), -length, location, topics covered etc.), important aspects of curriculums and unique strategies that have worked.

The purpose of this literature review is to guide the creation of a prenatal breastfeeding curriculum at Queen Square Family Health Team. In addition, it will help gain an understanding of best practices for prenatal breastfeeding education guidelines/recommendations for young adolescent/teen moms.

Methods

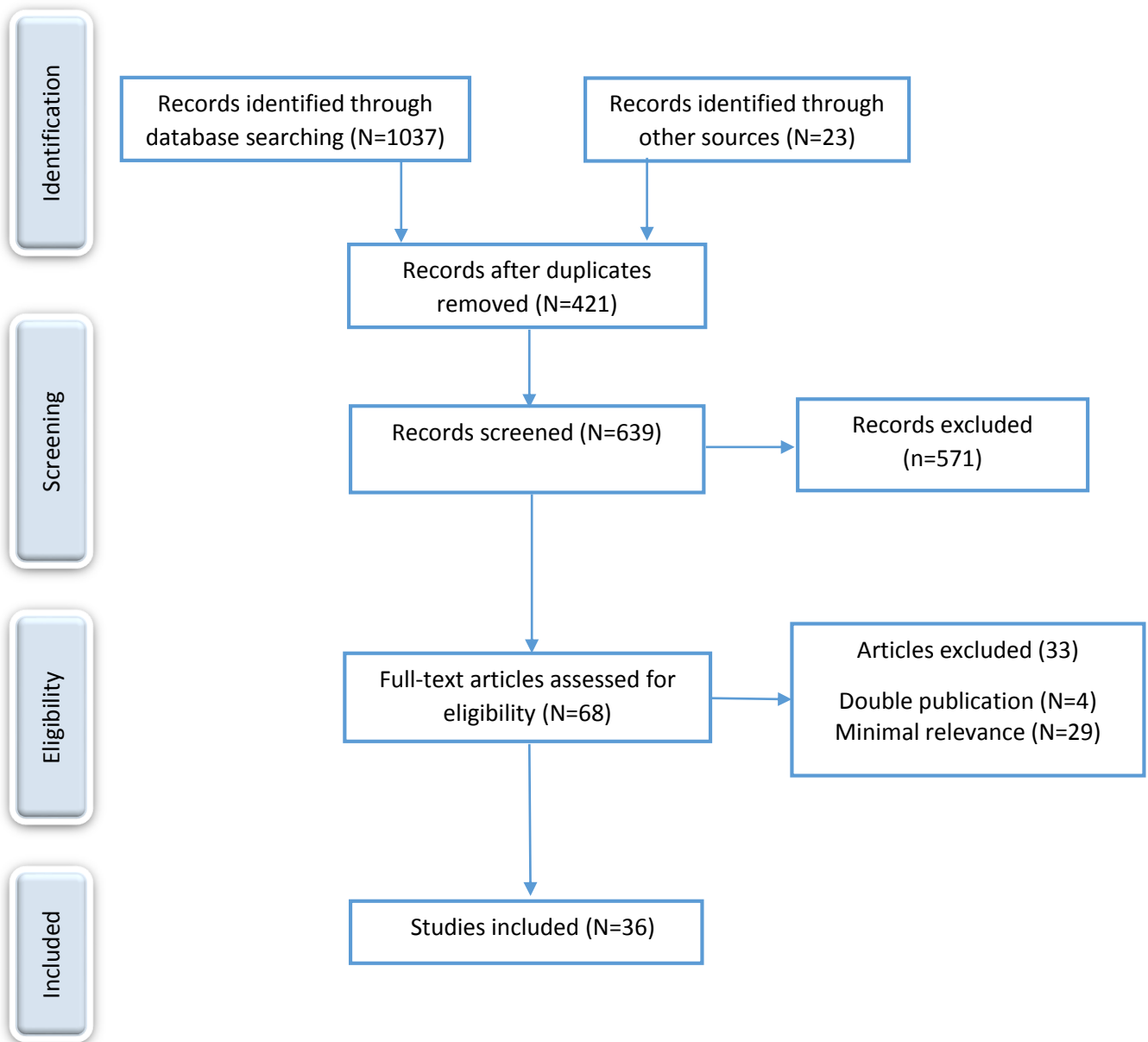
A literature review was conducted to gather pertinent literature and gain knowledge related to breastfeeding curriculum in the prenatal stage for adolescent mothers in a primary care setting. An internet search was conducted using the following electronic databases; Cochrane Reviews, EMBASE, ProQuest, Medline, CINAHL, Ovid, WebofScience, PubMed, and Scopus. The databases were accessed from the University of Toronto Library. The following Booleans and search terms were used in various combinations to conduct the search; *breastfeeding, curriculum, modules, educational material, educational program, lesson, group class, course, workshop, primary care, family practice, interdisciplinary collaboration, interdisciplinary team, prenatal, antenatal, indicator, evaluation, adolescent mothers, young mothers, teen mothers*. The search was initially conducted in Medline and then adapted for all of the other databases. In addition to searching these databases, grey literature was searched, dissertations were obtained through ProQuest, and articles were hand-selected (mostly from citations presented in papers that were being appraised). Lastly, where applicable, further grey literature searches were done using Google to find information and reports about specific breastfeeding curriculum interventions that were presented in the research articles examined.

Figure 1 illustrates the process by which articles were selected, culminating in thirty six articles charted and synthesized. These include one qualitative study (2.8%), ten randomized control trials (27.8%), eight cohort studies (22.2%), two quasi-experimental studies (5.6%), one literature review (2.8%), one meta-analysis (2.8%), three systematic reviews (8.3%), one cross-sectional study (2.8%), and nine descriptive studies (25%). The articles were controlled for double publication. The following selection criteria was used: study design – initially reviews were analyzed to get a general idea of the research in this area. No restrictions were put on type of study. Participants – the focus of this review is adolescent mothers, but the research for this specific population is sparse, so the search was broadened to pregnant women, specifically mothers in the prenatal period before they first breastfeed. Interventions - any type of intervention, workshop, class, module etc. that was specifically designed to promote breastfeeding in the prenatal stage was included. Outcomes - the primary outcome was initiation or duration or exclusivity of breastfeeding or a combination of these three. Secondary outcomes (confidence, self-efficacy, knowledge, attitudes, skills etc.) were also assessed where applicable.

The review was done by appraising journal articles and charting the design, sample, setting/size, focus, methods, interventions (where applicable), topics covered (where applicable), outcomes, results, conclusions and strengths/weaknesses of the selected studies. All English language articles from the years 2005 onwards that had a developed country setting were included, with the exception of a few article from before 2005, since they were directly applicable to the target population (adolescent women). Duplicates were eliminated.

This review is vulnerable to several types of bias. Positive and significant findings are more likely to be (a) published (publication bias), (b) published quickly (time lag bias), (c) published more than once (multiple publication bias), and (d) cited (citation bias) (Cochrane Corporation, 2014). The articles within the review, too, have associated and documented biases. Commentaries, editorials, letters and special articles were not excluded from the search, but very rarely made it to the final review.

Figure 1: Breastfeeding Curriculum for Adolescent Mothers in the Prenatal Stage in Primary Care Settings Flow Chart



Results

Prenatal educational interventions in primary care setting that promote breastfeeding take a variety of different forms. This includes individual or group sessions, telephone support, peer support, home visits, and clinical appointments. Breastfeeding education is usually a formalized, defined, descriptive and goal-oriented programme with a specific purpose and target audience. (Lumbiganon et al., 2011, pp. 4). A thorough literature review was conducted to examine the evidence for prenatal educational interventions in primary care settings that have examined breastfeeding rates (initiation, duration or exclusivity). Various combinations of intervention strategies used to improve breastfeeding outcomes were found. For example, interventions included routine and formal breastfeeding education, printed information, video, individual counseling and group educational sessions. However, many studies did not specifically describe these interventions or the descriptions were extremely vague. Therefore, grey-literature was often searched to find the programs or interventions that were mentioned in the studies, so that more details about the curriculum could be reviewed.

Thirty-six studies with a variety of study designs were included in this review. All articles had pertinent aspects to the research question. Once the data was synthesized and charted into tables major themes were picked out. Evidence from these studies were synthesized according to the type, or mode, of delivery of prenatal education, and according to the specific content (topics) of the prenatal educational intervention. Thus, the results section will outline prenatal interventions, which promote breastfeeding (characteristics of interventions, topics covered, and effectiveness of interventions). In addition, theories and the concept of self-efficacy in relation to prenatal breastfeeding programs will be discussed. Also, strategies that promote breastfeeding success, such as, specific learning styles, activities, goal-setting etc. will be described.

Two tables are included in Appendix A (summary of results); they provide a general overviews of the interventions. Table 1: Summary of Prenatal Breastfeeding Interventions/Topic(s) & Outcomes. Table 2: Summary of Articles by Intervention Type.

Prenatal Interventions to Promote Breastfeeding

Types of Educational Intervention

Prenatal breastfeeding support provided in the prenatal stage through various educational methods has been suggested to be an important predictor of breastfeeding motivation and initiation (Betzold et al., 2007; Couto de Oliveira & Camacho, 2011; Kervin et al., 2010; Robertson & Lieto, 2013; Nichols et al., 2009). Strategies used as prenatal educational methods include visual aids (handouts, videos, presentations etc.), individual counseling (through lactation consultants [LC], peer counselors [PC], healthcare providers (nurses, doctors, nutritionists), a combination of providers, telephone support), and group educational sessions (either a single educational class or a combination of educational sessions).

Visual Techniques

The use of visual techniques was a recurring theme in many of the studies. Common examples of visual aids include: brochures, handouts, posters, slides with image/diagrams, tablet presentation, and audio-visual material; these were used individually or a combination of them were used. Often visual aids were the only methods used in control group in group studies were additional prenatal interventions, such as individual counseling or group educational classes were being incorporated for the intervention group. Only two study were found in the literature that only used visual techniques as a prenatal educational intervention for breastfeeding promotion (Pitts et al., 2015; Nichols et al., 2009). Betzold et al. (2007) also heavily relied on visual aids as the main component of their intervention. However, generally, visual aids were supplementary (handouts were distributed during sessions and/or videos were played during sessions) in nature and were used to reinforce the educational content that was delivered through various other strategies (Mattar et al., 2007; Rosen et al., 2008; Noel-Weiss et al., 2006; Hasanpoor et al., 2012; Beattie-Fairchild, 2010; Kluka, 2004; Kronborg, 2011).

Handouts. In an observational, descriptive pilot study to examine breastfeeding duration, Betzold et al. (2007) distributed educational handouts to 33 pregnant women at each prenatal visit and then at each well baby checkup during the first year or until cessation of breastfeeding. In addition to the handouts, the program had implemented the AAP's (1999) Ten Steps to Support Parents' Choice to Breastfeed Their Baby (Betzold et al., 2007). This program also incorporated a variety of outpatient interventions (face-to-face guidance, employing a lactation consultant, and prenatal followed by postnatal instruction) (Betzold et al., 2007). These interventions were considered to be the main contributing factors to the 200% increase in the duration among the exclusively breastfeeding 4-6 month group and a 160% increase in the 6-12 month duration group, since the United States Preventive Services Task Force (USPSTF) found previously that using handouts and counseling during routine visits is ineffective (Betzold et al., 2007).

The two studies (Pitts et al., 2015 and Nichols et al., 2009) that solely relied on visual aids for their interventions had very different strategies, but both were found to be effective.

Tablet Modules. Pitts et al. (2015) evaluated the use of three breastfeeding modules, which were designed based on the Baby Friendly Hospital Initiative (BFHI) Steps 3–10, on 23 women who were obstetrical patients at clinical office in the northeast of the United States. Each of the modules was short, approximately 5–7 minutes in length, so that the participants could view the module while waiting for the provider in the examination room (Pitts et al., 2015). The modules contained text, references, and images, providing a mixed-methodology education and were programmed onto computer tablets (Pitts et al., 2015). Questionnaires were distributed to seek information about breastfeeding rates in these women. It was found that 95% initiated breastfeeding, 86% were exclusively breastfeeding at 6 weeks postpartum, and 71% of the women planned to exclusively breastfeed for 6 months (Pitts et al., 2015). In addition, 67% reported the modules promoted or affirmed their decision to breastfeed, whereas 5% would have preferred group-based education (Pitts et al., 2015).

Interactive Workbook. Nichols et al., 2009 conducted a randomized control trial and provided participants in the intervention group (n=90) a nine-page interactive workbook focusing on enhancing breastfeeding self-efficacy, whereas the control group received a five page exploratory interactive workbook on parenting issues with no reference to breastfeeding (Nichols et al., 2009). The nine-page workbook contained six sections and was self-contained and did not link other potential support or training received by participants (Nichols et al., 2009). Once results were analyzed it was found that participants in the self-efficacy intervention condition, relative to the control group, scored significantly higher on breastfeeding self-efficacy (Intervention group: mean= 57.31, standard deviation [SD]=10.95 vs control group: mean=53.36, SD=12.68) (Nichols et al., 2009). Then, analytical tests were done to show that women in the self-efficacy intervention condition of the study showed a trend to breastfeed longer (measured in days) (breastfeeding duration for intervention group: mean=27.11, SD= 2.75 vs control mean=25.38, SD=6.31) and to breastfeed more exclusively than women in the control condition (Nichols et al., 2009).

Therefore, even though different visual techniques may have been found to be successful in two cases, recommendations about effective visuals techniques cannot be provided. Also, since visual aids are often preferred to be used as supplementary components in prenatal interventions to increase breastfeeding rates it is hard to determine the effectiveness of this one component on the success of improving breastfeeding rates as a whole.

Individual Counseling

Many research studies examining the effect of breastfeeding education delivered in the prenatal period included individual counseling, in the form of instruction from a health professional (lactation consultants (LC), nutritionist, peer counselor (PC), breastfeeding counselor (BC), pediatrician, or a combination) as a major component of their intervention (Mattar et al., 2007; Rosen et al., 2008; Léger-Leblanc et al., 2008; Graffy et al., 2005; Wambach et al. 2011).

Lactation Consultants. Mattar et al. (2007) conducted a RCT of prenatal patients (N = 401) in which one interventional group (n = 123) received an educational booklet, watched a 16-minute video, and had an individual coaching session with a LC; another interventional group (n = 132) received the educational material but had no contact with the LC; and the control group (n = 146) received routine antenatal care only. Results revealed that when compared to those who received routine antenatal care alone, mothers who received individual counseling and educational material showed an increase in exclusive and predominant breastfeeding at three months (odds ratio [OR] = 2.6, 95% confidence interval [CI] 1.2-5.4) and at six months (OR = 2.4, 95% CI = 1.0-5.7) postpartum (Mattar et al., 2007). Results were not statistically significant for the group that received educational material with no individual counseling when compared to those who received routine antenatal care (Mattar et al., 2007). Based on study findings, Mattar et al. proposed that the provision of audiovisual educational

material alone in the prenatal period is not enough, and that just a single encounter of specific prenatal breastfeeding education through counseling can substantially improve breastfeeding practice even up to three months after delivery (Mattar et al., 2007). Moreover, Bonuck et al., (2009) described lessons learned from their randomized controlled trial (RCT) conducted in two prenatal clinics. One of the strategies was to have education provided by a LC (Bonuck et al., 2009). Three specially trained health professionals with advanced training in counseling, management and support of breastfeeding were used and all women assigned to the LC intervention were scheduled for at least 2 prenatal LC sessions at the site (Bonuck et al., 2009). The study found the importance of building rapport with clients when providing counselling to maximise positive effects (Bonuck et al., 2009). However, details about what the individual counselling sessions included were not discussed in the papers.

Nutritionist. Léger-Leblanc et al. (2008) conducted an evaluation of women (N=25) who participated in an Early childhood Initiative (ECI) program. The intent was to evaluate initiation and duration of breastfeeding and examine factors that affect initiation and early cessation of breastfeeding (Léger-Leblanc et al., 2008). During the intervention women had to meet at least once with a nutritionist. The breastfeeding initiation rate was 62.5%, at one and three months postpartum, exclusive breastfeeding rates were 39% and 4%, respectively and at six months, none of the women were exclusively breastfeeding (Léger-Leblanc et al., 2008). When factors were examined: primiparity, prenatal classes, having been breastfed and intention to breastfeed at 36 weeks' gestation were positively associated with breastfeeding initiation (Léger-Leblanc et al., 2008). Father's education, intention to breastfeed at 36 weeks' gestation, no water or formula given to the infant during hospitalization, higher maternal hemoglobin level at 36 weeks' gestation, and more contact with the nutritionist were positively associated with the duration of breastfeeding (Léger-Leblanc et al., 2008). Therefore, this study concluded that it is important to target modifiable factors known to influence the initiation and duration of breastfeeding with one on one counselling (with a nutritionist or other health professional) or group education (Léger-Leblanc et al., 2008). Again, the contents of the meetings with the nutritionist were not discussed in the paper.

Breastfeeding Counselor. Graffy et al. (2005) conducted a randomized control trial with women (N=720) to see what additional information they would like to receive about breastfeeding in the prenatal stage. The intervention group received additional support from a breastfeeding counselor (Graffy et al., 2005). Although counselors were only one of several sources of help and the analysis focused on the content, rather than source of support; women often commented positively on the support they received from counselors and appreciated that themselves had breastfed and were knowledgeable, reassuring, nonjudgmental, and prepared to listen (Graffy et al., 2005). However, others thought they did not receive the information and support they needed and would have preferred group and peer support (Graffy et al., 2005). The overall results of the study showed that of the 720 women recruited to the trial, 654 began breastfeeding and completed postnatal questionnaires; at 6 weeks, 249 (38%) women were exclusively breastfeeding, 183 (28%) were both breastfeeding and bottle-feeding, whereas 222 (34%) were exclusively bottle-feeding (Graffy et al., 2005). The paper only listed that support was provided by breastfeeding counselors no further details were provided.

In addition, since it was a multi-component intervention it is hard to gauge which parts had an impact on the results.

Combination of LC and PC. Wambach et al. (2011) reported an increase in breastfeeding duration ($p < .001$) within the experimental group as a result of a counseling intervention provided by a LC-PC team to adolescent mothers ($N = 289$). The counseling sessions started in the second trimester of pregnancy and extended through four weeks postpartum and included two prenatal classes, PC telephone calls, and individual counseling by the LC during the prenatal and postpartum periods (Wambach et al., 2011). Although Wambach et al. (2011) did not have significant results on breastfeeding initiation or exclusivity, the results of increased breastfeeding duration are consistent with previous findings in the literature that utilization of a team approach using combinations of education, peer, and professional supportive interventions can contribute to improved breastfeeding outcomes (Artieta-Pinedo et al., 2013; Kervin et al., 2010; Renfrew et al., 2012). Details about the counselling sessions were not provided in the paper.

Telephone support. Two studies in this literature review included telephone support as a component of a prenatal breastfeeding educational intervention (Hasanpoor et al., 2012; Wambach et al., 2011). Although telephone support was not used as the primary educational method for interventions, it was often included as a supplementary mode of delivery for educational information on breastfeeding. Telephone support in both studies was provided as an addition to the main intervention, so no results pertaining specially to telephone support was provided. However, both studies had positive results with regards to breastfeeding rates; thus, the addition of telephone support from a health professional in the prenatal stage and postnatal stage may lead to positive outcomes of increasing breastfeeding duration and exclusivity.

Consequently, individual counselling in the prenatal stage, in general, has had a positive effect on breastfeeding rates; however many of the studies included had multiple components so it is hard to gauge the exact effect of counselling. But, it could still be successful strategy to improve breastfeeding rates, but there is no consensus on how many sessions should occur, with whom, what topics should be covered, how the long the sessions should be etc. Also, participants in a study stated that they would prefer group or peer support instead of individual (Graffy et al., 2005).

Group Educational Sessions

A positive relationship may exist between prenatal class attendance and breastfeeding initiation (Artieta-Pinedo et al., 2013; Kervin et al., 2010; Renfrew et al., 2012). Many studies in the literature that examined the effect of breastfeeding education delivered in the prenatal period included the intervention of group educational sessions. In some studies, the educational group class was offered once, and were often the main intervention used against the control of standard prenatal care (Kluka, 2004; Noel-Weiss et al., 2006; Lin et al., 2008; Olenick, 2010; Kingston, et al., 2012). Other studies used multiple group educational sessions as

an intervention, or included a combination of group classes with additional modes of education delivery (Rosen et al., 2008; Hasanpoor et al., 2012; Volpe & Bear, 2000; Beattie-Fairchild, 2010; Kronborg et al., 2011; Wambach et al., 2011; Damstra et al., 2012)

Single educational class. The following studies evaluated the effectiveness of a single group educational session:

Noel-Weiss et al. (2006) evaluated the effect of a 2.5-hour experimental workshop as the intervention for nulliparous women who were already planning to breastfeed ($n = 101$) and found that there was an increase in maternal breastfeeding self-efficacy. Based on results of the 14-item, 70-point Breastfeeding Self-Efficacy Short-Form (BSES-SF) with possible scores ranging from 14 to 70, Noel-Weiss et al. found that the mothers who attended the educational workshop had higher self-efficacy scores (mean = 58.72, standard deviation [SD] = 8.0), than those who did not attend the class (mean = 52.90, SD = 9.2) at four weeks postpartum, $t(78) = -3.002$, $p = .004$ (2006). Also, women who attended the class were three times more likely to exclusively breastfeed than the non-attender group (OR = 3.2, 95% CI = 1.26-7.94) at eight weeks postpartum (Noel-Weiss et al., 2006).

Kingston et al. (2012) conducted prenatal class evaluation. A two-hour breastfeeding class, conducted by public health nurses who were also certified lactation consultants, was implemented (Kingston et al., 2012). A 162 mothers and a 100 partners participated in the class, which intended to provide new mothers with the knowledge, skills and confidence about breastfeeding during the prenatal stage (Kingston et al., 2012). Mothers and partners demonstrated increased knowledge of breastfeeding (the mean post-class knowledge score (7.7), which significantly higher than the pre-class score (mean = 6.2, $p < .0001$) (Kingston et al., 2012). Also, mothers' confidence in their ability to breastfeed increased (the mean post-class rating (6.7) was, which higher than the mean pre-class rating (6.3), $p < .002$) (Kingston et al., 2012). Partners' and coaches confidence in their ability to support breastfeeding also increased. In addition, at 6 weeks postpartum: among the 43% of class participants who were contacted, 91% reported that they were breastfeeding and more than half (59%) of participants breastfeeding were doing so exclusively (Kingston et al., 2012).

Olenick et al. (2010) reported an increase in exclusive breastfeeding rates after a 2-hour class for mothers with no previous breastfeeding experience at one week ($p = .01$), six weeks ($p < .001$), and twelve weeks ($p = .02$), and increase in exclusive breastfeeding rates for mothers delivered by cesarean section at one week ($p < .01$), six weeks ($p = .001$), and twelve weeks ($p < .01$). Also using the BSES-SF instrument, Olenick et al. found breastfeeding confidence to be associated with increased exclusive breastfeeding rates at one week (mean difference 14.73; $t(158) = -7.09$, $p < .001$), six weeks (mean difference 15.70; $t(160) = -8.06$, $p < .001$), and at twelve weeks (mean difference 14.14; $t(150) = -7.97$, $p < .001$). Additionally, Olenick et al. found that high breastfeeding confidence was associated with longer mean breastfeeding duration (10 weeks) compared to mean breastfeeding duration of those with lower breastfeeding confidence scores (5 weeks) (Kaplan Meier LR 61.57, $p < .0001$). The results of

this RCT (N=182) indicated through the multivariate analysis that breastfeeding confidence was a strong predictor of breastfeeding exclusivity and duration (Olenick et al., 2010).

In contrast, Lin et al. (2008) conducted a quasi-experimental study with 46 women from a prenatal clinic of a medical centre. The intervention had three aspects to breastfeeding education: knowledge, affective and skill aspects (Lin et al., 2008). The program was 90 minutes long and included: 50 minutes for lecture and skill training, 20 minutes for group discussion and skill practicum and the last 20 minutes for a tour of the postpartum ward at the centre (Lin et al., 2008). Satisfaction with the program was high (Lin et al., 2008). In addition, the intervention group had higher scores in breastfeeding knowledge (intervention group: mean = 25.73 vs mean score for control = 20.34, $p=0.001$) and breastfeeding attitude (intervention group mean = 80.21 vs mean for control group = 75.65, $p=0.008$) at three days postpartum (Lin et al., 2008). The intervention group also showed higher breastfeeding satisfaction at three days and one month postpartum (Lin et al., 2008). However, there were no significant differences in experiencing breastfeeding problems and even though, the rate of exclusive breastfeeding was higher for the experimental group at three days and one month postpartum, the differences were not statistically significant (Lin et al., 2008).

Also, Kluka's (2004) RCT found no change in breastfeeding duration as a result of attendance at an educational, interactive prenatal workshop. Using the 33-item BSES, Kluka did find higher breastfeeding confidence ($p = .001$), non-smoking status ($p= .017$), and maternal visit by a community health nurse within two weeks of birth ($p =.023$) all to be significant predictive variables of breastfeeding duration (Kluka, 2004). It is important to consider that the participants in Kluka's study had previously attended a series of prenatal classes.

In general, single group session education classes during the prenatal stage, intended to improve breastfeeding rates, were found to have variable results with regards to breastfeeding duration, initiation and exclusivity. However, they were all able to increase breastfeeding confidence, knowledge or skills (or all three). Therefore, the focus of single group education sessions should be focused on breastfeeding self-efficacy and actions should be taken to increase breastfeeding knowledge, skills, and confidence, which in turn can lead to improved breastfeeding rates, since they are predictive variables for breastfeeding rates. It was also common to use the Breastfeeding Self-Efficacy Short-Form as a tool to evaluate the effect of the interventions. Consensus about length of sessions, activities used, topics covered, who should attend (mothers, mothers & partners etc.), who should teach, location etc. was not found between the studies.

Multiple group educational sessions. The following studies evaluated the effectiveness of multiple group educational sessions:

Hasanpoor et al (2012) conducted a quasi-experimental study with a convenience sample of a 120 pregnant women. In their last month of pregnancy the intervention group received a breastfeeding educational program and the control group only received regular antenatal care (Hasanpoor et al., 2012). The intervention consisted of 2 sessions of

breastfeeding education within 2 days; the sessions lasted 2 hours (Hasanpoor et al., 2012). In these sessions, a handbook of breastfeeding, was also given to the pregnant women (Hasanpoor et al., 2012). The difference between means of exclusive breastfeeding duration between the two groups was statistically significant; mean duration of exclusive breastfeeding was 5.2 months in the intervention group compared to 2.05 months for the control group (Hasanpoor et al., 2012).

Volpe & Bear (2000) conducted a randomized control trial with 91 pregnant adolescents; the intervention group received specific breast feeding education through the Breast feeding Educated and Supported Teen (BEST) Club and the control group was a part of the program, but did not get the breastfeeding specific sessions (Volpe & Bear, 2000). Three, 1 hour comprehensive breastfeeding education sessions were provided, which offered a fun way of teaching pregnant adolescents about the art of breastfeeding (Volpe & Bear, 2000). Of the 48 adolescents who received no specific education, 7 (14.6%) initiated breast feeding and of the 43 adolescents in the education group, 28 (65.1%) initiated breast feeding, which indicates a significant difference between groups with regard to infant feeding choice ($P < .001$) (Volpe & Bear, 2000). Therefore, targeted educational programs designed for the adolescent learner may be successful in improving breastfeeding initiation in this population (Volpe & Bear, 2000).

Beattie-Fairchild (2013) conducted a qualitative case study to gain a better understanding of perceived barriers that prevent exclusive breastfeeding and affect self-efficacy of breastfeeding in older adolescent women. The course was divided into 11 modules consisting of text, graphics, video, and animation (Beattie-Fairchild, 2013). Participants attended all the sessions and the interviews showed that women were successful at overcoming the barriers to maintain their self-efficacy and seven met their breastfeeding goals and three were currently breastfeeding at the time of their interview (Beattie-Fairchild, 2013).

Kronborg et al. (2011) conducted a randomized control trial with 1193 nulliparous women ($n=603$ in the intervention group who received a structured prenatal program and $n=590$ in the control group who received usual prenatal practice). The intervention group received the 'Ready for Child programme,' which comprised of 3 modules, each lasting 3 hours. After the study women in the intervention group reported a higher level of confidence, and 6 weeks after birth they reported to have obtained sufficient knowledge about breast feeding (Kronborg et al., 2011). Supplemental analysis in the intervention group revealed that women with sufficient knowledge and higher self-efficacy scores, breastfed significantly longer than women without sufficient knowledge (Kronborg et al., 2011).

In a retrospective cohort design study, Rosen et al. (2008) compared three different interventional methods between pregnant women ($N = 194$) who already intended to breastfeed and attended breastfeeding education classes at an Army medical center. One intervention used video demonstration and group teaching by a LC; a new mothers' support group with one-on-one teaching prenatally and weekly meetings postpartum that were taught by a LC and a pediatrician; and a control group that was educated at routine prenatal visits only (Rosen et al., 2008). Although there was no significant difference among the different types of

classes women participated in, Rosen et al. reported significantly increased breastfeeding duration rates at six months among women who attended the group class (67.6%, $p = .01$) and women who attended the individual teaching (61.1%, $p = .01$) compared to women who only received education at routine prenatal visits (43.5%) (2011).

In general, multiple group education sessions were found to successfully increase breastfeeding rates. A variety of techniques were used; therefore, no consensus of time of program (which trimester) they should be conducted in, topics to cover, number of session, who should attend etc. was found between the studies. Similar to the single group sessions the notions of self-efficacy was used throughout the studies.

Overall, prenatal classes do significantly impact breastfeeding intentions (Kervin et al., 2010). A systematic review found a statistically significant improvement in breastfeeding initiation following the introduction of a structured breastfeeding program (Beake et al., 2011). A Cochrane review done by Renfrew et al. (2012) found that support offered either by professional or lay/peer supporters, or a combination of both is successful; strategies that rely mainly on face-to face support are more likely to succeed; support that is only offered reactively, in which women are expected to initiate the contact, is unlikely to be effective, so women should be offered ongoing visits on a scheduled basis so they can predict that support will be available; and support should be tailored to the needs of the setting and the population group. Moreover, a literature review found that during prenatal care, group education was the only effective strategy reported and the most effective interventions generally combined face-to-face information, guidance, and support and were long term and intensive (Couto de Oliveira & Camacho, 2011). Some advantages of group education sessions vs individual counselling session are group education sessions allow for interaction between mothers, they are cheaper and use resources wisely, they allow women to make connections with other mothers, so that they can support each other and they allow for a safe space to share ideas and ask questions (Renfrew et al., 2012; Volpe & Bear, 2000; Beattie-Fairchild, 2013). Consequently, group educational sessions conducted during the prenatal stage are an effective strategy to improve breastfeeding rates, but the research on best practices for these strategies and curriculum is not currently available.

Important Aspects of Prenatal Breastfeeding Curriculums

Various components of the prenatal interventions were highlighted in the studies as being very pertinent to improving breastfeeding rates. Graffy et al. (2005) conducted a thematic analysis of women's responses to open questions and identified five components of the support that women wanted: information about breastfeeding and what to expect, practical help with positioning the baby to breastfeed, effective advice and suggestions, acknowledgment of mothers' experiences and feelings, and reassurance and encouragement. Furthermore, overall, educational sessions that review the benefits of breastfeeding, principles of lactation, myths, common problems, solutions, and skills training appear to have the greatest single effect (Choquette, N.D.). These techniques and topics were used in many of the studies included in this review.

Benefits and advantages. Beginning an educational intervention with instruction about the benefits and advantages of breastfeeding is important in order to assess a woman's basic knowledge and to help her begin to better understand the breastfeeding process (Graffy et al., 2005). Many studies reported increased rates of breastfeeding intent in response to a prenatal educational counseling session, in which the topics of breastfeeding advantages and infant nutrition were included (Betzold et al., 2007; Bonuck et al., 2009; Mattar et al., 2007; Lin et al., 2008; Beattie-Fairchild, 2010; Wambach et al., 2011; Graffy et al., 2005; Couto de Oliveira & Camacho, 2011; Shealy et al., 2005; Choquette, N.D; Olenick et al., 2010; Hasanpoor et al., 2012). For example, successful breastfeeding rates were shown in a RCT including an educational intervention which included breastfeeding benefits and advantages as main content in the booklet, video, and educational session (Mattar et al., 2007). The intervention group received this information in the printed and audiovisual material as well as during a one-encounter prenatal education counseling session and demonstrated increased breastfeeding duration at three months and six months postpartum as well as increased exclusive breastfeeding rates (Mattar et al., 2007). Thus, providing all pregnant women with access to complete and objective information regarding maternal and infant benefits of breastfeeding is an important component of prenatal education.

Common concerns. Another aspect of prenatal breastfeeding curriculum that was addressed in many studies was common concerns and dealing with barriers/common concerns (Bonuck et al., 2009; Mattar et al., 2007; Graffy et al., 2005; Beattie-Fairchild, 2010; Noel-Weiss et al., 2006). Teaching women about how to over-come barriers can increase their confidence, which can lead to improved breastfeeding rates (Volpe & Bear, 2000). Examples, include Mattar et al. (2007), who included information on management of common breastfeeding problems, such as positioning and latching, and common concerns such as nipple pain in the combined educational intervention that used a booklet, video, and LC group session. Noel-Weiss et al. (2006) utilized lifelike dolls, videos, and discussion under the framework of self-efficacy theory in order to educate women about specific strategies for addressing common problems in order to achieve successful breastfeeding.

Strategies for breastfeeding success. Many studies incorporated educational content including information on techniques and tips for correct positioning, latch, and attachment for breastfeeding (Shealy et al., 2005. CDC; Kingston et al., 2005; Choquette, N.D. ; Mattar et al., 2007 ; Olenick et al., 2010; Pitts et al., 2015; Lin et al., 2008; Hasanpoor et al., 2012; Betzold et al., 2007; Robertson & Lieto, 2013). All these techniques touch on the concept of strategies for successfully breastfeeding. Teaching women practical skills that are pertinent to them is really important in prenatal education and has been shown to be effective (Renfrew et al., 2012). For example, in the study done by Lin et al. (2008) 50 minutes of the 90 minute session was devoted to skill building, which included demonstration of correct position and effective sucking for breastfeeding. Having dedicated time to practice these skills allowed women to learn hands-on and gain more confidence (Lin et al., 2008). Therefore, placing Emphasis is generally placed on building skills is an important aspect of prenatal breastfeeding education.

Misconceptions and myths. Identification of misconceptions can reveal breastfeeding barriers, and inclusion of educational content addressing common myths and misconceptions related to breastfeeding (such as issues regarding actual contraindications for breastfeeding, perceived insufficient milk supply, dietary requirements, sleep deprivation, and pain) can correct this misinformation (Graffy et al., 2005; Olenick et al., 2010; Choquette, N.D.). Many studies demonstrated that targeting educational efforts at providing accurate information and reducing breastfeeding misconceptions can address barriers and lead to improved outcomes (Graffy et al., 2005; Olenick et al., 2010; Beattie-Fairchild, 2013). For example, Graffy et al. (2005) discussed topics that caused particular confusion for women. They included how long and often mothers should breastfeed, when to switch breasts if trying to give both fore and hind milk, and whether using nipple shields or supplementing with bottle-feeds would undermine breastfeeding (Graffy et al., 2005). It is best to have had learned in advance how to handle difficulties that they might face and have any misconceptions and myths corrected before they start the breastfeeding process; thus, myths and misconceptions is another pertinent section for prenatal breastfeeding curriculum development. Encouraging women to ask questions and express concerns discloses breastfeeding myths and provides opportunity for accurate education (Volpe & Bear, 2000; Beattie-Fairchild, 2013).

Peer, familial, and societal support. Breastfeeding promotion and support should include significant others and family members, especially for young mothers (Wambach et al., 2005). Women are more likely to breastfeed, and to breastfeed longer, when they have the support of their family and significant others, especially their mothers (Graffy et al., 2005). The attitude of support persons toward breastfeeding has a strong influence on a mother's breastfeeding initiation, exclusivity, and duration (Graffy et al., 2005; Beattie-Fairchild, 2013). Thus, prenatal breastfeeding curriculums should look into how to incorporate other people into the sessions.

Unique Strategies/Components

In addition, to important aspects of programs that many studies emphasized, many studies had very unique strategies that were effective at improving breastfeeding rates.

Setting goals. A unique program feature described by Betzold et al. (2007) was that mothers were also asked to set specific breastfeeding goals and then evaluate them at completion of the study, which was said to enhance maternal confidence related to succeeding at their breastfeeding goals. Robertson, & Lieto (2013) also included "setting breastfeeding goals", during the first trimester, as a component of their trimester breastfeeding curriculum. The goal of this curriculum development was to provide a robust educational tool for progressive use during prenatal care that was consistent with known evidence and protocols, including those of the Baby-Friendly Hospital Initiative (Robertson, & Lieto 2013).

Electronic prompts. Bonuck et al., (2009) described lessons learned from their randomized controlled trial (RCT) conducted in two prenatal clinics. One of the interventions was the use of an Electronic Prompt (EP), which was used as a form of standardized provider

support. Using the electronic medical charts, the EPs included a total of five prompts that appeared throughout the pregnancy. Each prompt would contain one or two brief open-ended questions for the provider to address during the patient's visit (Bonuck et al., 2009). Challenges found by Bonuck et al. related to EPs included complaints by providers who had difficulty working with computers, and found the process burdensome. The investigators also found that there was not adequate time for feedback and for the implementation phase pilot testing in order to allow the providers to become more familiar with the educational process. However, the importance of having breastfeeding information reinforced by medical providers is required, since it solidifies ideas and allows for follow-up after the intervention (Kervin et al., 2010 ; Renfrew et al., 2012). Thus, medical staff reinforcement might be an interesting feature of prenatal breastfeeding curriculum.

Follow ups. In addition, to having information relayed during medical appointments other studies followed up with patients via Telephone or in-person during the postnatal period. Kronborg et al. (2012) suggests that prenatal programs should be coupled with postnatal breastfeeding support, since it is not sufficient in itself to increase the duration of breastfeeding or reduce breastfeeding problems just with a few hours of prenatal education. In the study conducted by Bonuck et al. (2009) the LCs attempted to visit every woman at least once during her hospital stay and make weekly phone calls for three months post-partum. Matter et al. (2007) also included access to postnatal breastfeeding support after their intervention. Wambauch et al. (2011) also extended to breastfeeding support to 4 weeks postpartum. Volpe & Bear (2000) integrated weekly school visits from peer counselors to offer continued support for those mothers who chose to breastfeed. In the study by Hasanpoor et al. (2012) the researcher's provided their phone number to the mothers, so that they had access to support whenever required. Lastly, Couto de Oliveira & Camacho, 2011 found that one of the most effective strategies identified were group sessions during the prenatal phase coupled with home visits during the postnatal phase. All of these studies had positive results with respect to breastfeeding rates; thus, having continued support during the postnatal phase after prenatal breastfeeding education maybe effective at increasing breastfeeding rates (duration) and could be a component of breastfeeding curriculum.

Educating staff. Narasimhan et al. (2010) took an indirect approach to increasing breastfeeding rates by educating staff rather than mothers themselves. This was done because it was believed that if staff are knowledgeable about the topic then they will be more likely to relay the information onto patients (Narasimhan et al. 2010). Therefore, 328 staff member given paid time to attend a 15 hour educational program based on the WHO's Ten Steps to Successful Breastfeeding curriculum (Narasimhan et al. 2010). 70% nurses (n=225) were trained over a 1-year period from April 2009; and during this time there was a significant increase in the percent of infants exclusively breastfeeding at the time of discharge from 35% to 50% ($p < 0.001$) while any breastfeeding remained high (96%) throughout this period (Narasimhan et al. 2010). The staff self-assessment tool showed that their knowledge on early initiation/support of breastfeeding improved after participating in the educational program, which indirectly lead to improved breastfeeding rates (Narasimhan et al. 2010). Moreover, in the study done by Lin et al. (2008) the program instructor was an experienced obstetric nurse, but still received 12 hours

of training on breastfeeding and the results of this study were also positive. Also, Kronborg et al., 2011 chose four midwives of varying seniority to instruct the courses and they all attended a 3-day preparation course, 1 day for each module; their results were also positive. Therefore, educating staff can have an impact on breastfeeding results and should be included as a step in breastfeeding curriculum development plans.

Instructors. As discussed above knowledge of staff can affect breastfeeding rates. The effectiveness of the interventions with relation to the kinds of personnel involved was not thoroughly discussed. However, most interventions were conducted by health professionals or health workers, such as midwives, nurses, pediatricians, obstetricians, nutritionists, lactation consultants. There also seemed to be some emphasis on having a lactation consultant present or an instructor having personal experience with breastfeeding (Betzold et al., 2007; Bonuck et al., 2009; Mattar et al., 2007; Rosen et al., 2008; Volpe & Bear, 2000; Kluka, 2004; Wambach et al., 2011; Graffy et al., 2005), which is something to consider when developing prenatal breastfeeding curriculum.

Web-based course. Beattie-Fairchild (2013) implemented an innovative breastfeeding course to assist the older adolescent mother overcome barriers to breastfeeding. The web-based approach was explored because it was more likely to meet the time management needs, answer questions related to how to breastfeed, and empower the older adolescent mothers to overcome the barriers to successfully breastfeeding, be more likely to be better attended due to the flexibility of scheduling, help reluctant family and friends understand breastfeeding, and since Generation Y relies on today's technology from instant messaging to social networking many prefer web-based learning environments (Beattie-Fairchild, 2013). The participants were successfully able to overcome barriers to maintain their self-efficacy and reach their breastfeeding goals (Beattie-Fairchild, 2013). Therefore, a web-based approach may be an effective strategy to consider as an avenue for breastfeeding information, especially for younger moms.

Consequently, new and innovative ways to increase breastfeeding rates may be effective, but more research needs to be done on these before any conclusive recommendations can be made about how to incorporate these into prenatal breastfeeding curriculums.

Self-Efficacy (Confidence) & Adult Learning Principles

Self-efficacy. There is strong evidence that maternal confidence/self-efficacy is positively correlated to breastfeeding duration and that the higher a woman's confidence or the more efficacious a woman feels about breastfeeding, the more likely she is to continue breastfeeding (Noel-Weiss, 2006).

“According to Bandura (1997), self-efficacy is a dynamic cognitive process in which an individual evaluates his or her ability toward the performance of a given task. Individuals with high self-efficacy will more likely initiate behaviors, persevere in the face

of adversity, and succeed in mastering new behaviors. Bandura suggested that four factors determine the level of an individual's self-efficacy in a given realm of life; these factors are (a) personal mastery experiences, (b) vicarious mastery experiences, (c) verbal persuasion, and (d) physiological and affective states. Personal successful mastery experiences lead to the expectation of repeated future good outcomes. Vicarious mastery experiences involving observation of a similar other who is successful can also lead to the expectation of future good outcomes for the self. Verbal persuasion, or the assurance by others that one can achieve a good outcome, bolsters self-efficacy. Finally, physiological and affective states (such as a very high level of arousal or negative mood) can influence perception of efficacy, and reduction or reinterpretation of such states can lead to higher perceived self-efficacy" (Noel-Weiss et al., 2006).

The results of a RCT (N=182) indicated through the multivariate analysis that breastfeeding confidence (breastfeeding self-efficacy) was a strong predictor of breastfeeding exclusivity and duration (Olenick et al., 2010). The notion of self-efficacy was used in many studies to develop and implement their programs and was found to be effective at increasing breastfeeding rates (Noel-Weiss et al., 2006; Olenick et al., 2006; Robertson & Lieto, 2013; Pitts et al., 2015; Nichols, et al., 2009; Beattie-Fairchild, 2010; Kronborg et al., 2011; Couto de Oliveira & Camacho, 2011; Damstra, 2012; Kingston, et al., 2012). Thus, incorporating the concept of Bandura's (1997) self-efficacy theory into prenatal breastfeeding curriculum is an effective strategy. Furthermore, Dennis and Faux (1999) further operationalized self-efficacy theory applied to breastfeeding to produce a psychometrically sound instrument to measure breastfeeding confidence, the Breast-feeding Self-Efficacy Scale (BSES) (Nichols et al., 2009), which was used in many studies included in this review and may be an effective evaluation tool.

Learning principles. Many studies used adult education theories and incorporated in the concepts of adult learning styles and principles into their interventions and curriculum development. Adult education theory takes into account that adults come to a learning situation with prior knowledge and life experience; adults need to be motivated and self-directed, and learning needs to be relevant and goal oriented (Noel-Weiss, 2006). Adult learners are self-directed, so they want new information and skills; therefore, it is important to establish what adult learners know before offering information (Noel-Weiss, 2006). In addition, adult learners want to learn about issues that are meaningful to them; therefore, theories and concepts need practical applications, so that the learners see the relevance to their own situations (Noel-Weiss, 2006). Lastly, adults tend to enter a learning situation with a problem-centered or performance-centered focus, so information is best provided in short, logical segments (Noel-Weiss, 2006). Some strategies that were used by the studies in this review include: providing practical tips or explanations about how to deal with common concerns (Graffy et al., 2005); giving practical advice on feeding techniques etc. (Mattar et al., 2007); increasing skills and attitudes toward breastfeeding (Shealey et al., 2005; Kingston et al., 2005; Lin et al., 2008; Nichols et al., 2009; Volpe & Bear, 2000) and creating goals with participants (Robertson, & Lieto 2013; Betzold et al., 2007). All of these studies positively affected breastfeeding rates; thus, adult learning principles should be integrated into the prenatal breastfeeding curriculum design.

Content of Educational Intervention

Main topics. The main topics that were universally covered in the majority of the studies are: the importance/benefits of breastfeeding, infant feeding cues, how to breastfeed (latching & position, techniques etc.), common concerns about breastfeeding and how to manage them, -breast care/self-care, indications that breastfeeding is effective (signs of adequate milk intake), anatomy/physiology, breastfeeding in public, returning to work or school, and the importance of exclusive breastfeeding during the first six months from birth, and sustained breastfeeding for two years or beyond (plus vitamin D supplementation). There was also a major focus on interactive learning: skills development, increasing knowledge, and confidence building, so these should be incorporated in when creating new curriculum.

Full list. A variety of topics were found in the review of literature for breastfeeding educational interventions. However, many of the studies were vague in their descriptions related to the specific content of the educational interventions; thus, grey-literature searches were done to find more details about interventions and content. The topics of breastfeeding educational content identified in the literature included: health benefits of breastfeeding, infant feeding cues, how to breastfeed, proper techniques, information about latching, how to store breast milk, concerns about breastfeeding, how long to breastfeed your child, when to supplement with other foods, how often to breastfeed, how medications, or any smoking, alcohol, or substance abuse might affect breastfeeding/milk, how to manage common breastfeeding issues, breast care, common concerns women encounter, how to prepare for breastfeeding, indications that breastfeeding is effective (signs of adequate milk intake), advantages of breastfeeding over bottle feeding, potential barriers related to breastfeeding, myth versus truths about breastfeeding, anatomy and physiology of the breast, getting support from others, how your body makes milk, breastfeeding in public, returning to work or school, maintaining lactation (ways to maintain quality and quantity of milk secretion), skin-to-skin contact, avoiding pacifiers, nutrition intake for breastfeeding mothers, management of breast-milk leaking, common misconceptions about breastfeeding, how negative stress can affect breastfeeding, advantages of breastfeeding for child, mother and society, reasons women wean their infants, how to deal with concerns such as breast engorgement, sore nipples, timing of feeds, or how to express milk, breastfeeding on demand, family planning and the lactational amenorrhea method, information about donor milk banking, resources for assistance (community breastfeeding supports and services), breast milk composition, breast changes during pregnancy, Vitamin D supplementation and risk factors for vitamin D deficiency, strategies to promote successful initiation (importance of early skin-to-skin contact, common positions, proper latch, suck and swallow patterns, letdown reflex, collecting and offering colostrum, hand expression to relieve engorgement), factors interfering with successful initiation (difficulty to latch, engorgement, unnecessary supplementation using formula and rubber nipples, flat and inverted nipples), complications due to problematic breastfeeding and milk removal (plugged ducts and mastitis, sore nipples, yeast infections, insufficient breast milk, overactive letdown, difficulties resulting from birth complications and what to do), how to burp your baby, special circumstances (artificial baby milk (formula) may be recommended for medical reasons), cultural and societal barriers (Betzold et al., 2007; Bonuck et al., 2009;

Mattar et al., 2007; Noel-Weiss et al., 2006; Olenick et al., 2006; Robertson & Lieto, 2013; Pitts et al., 2015; Lin et al., 2008; Nichols, et al., 2009; Hasanpoor et al., 2012; Volpe et al., 2000; Beattie-Fairchild, 2010; Kluka, 2004; Kronborg et al., 2011; Wambach et al., 2011; Graffy et al., 2005; Beake et al., 2011; Couto de Oliveira & Camacho, 2011; Best Start Resource Centre & Baby Friendly Initiative Ontario, 2013; Shealy et al., 2005; Kingston, Frontenac and Lennox & Addington Public Health, 2012; Choquette, N.D.).

Summary of Findings

Review of the literature did not reveal one particular type of prenatal educational intervention to be more effective than other interventions at improving breastfeeding outcomes. Out of all the studies that were included in this analysis of literature, there was not a single educational topic or a combination of educational topics related to breastfeeding that was shown to be the most effective in increasing breastfeeding rates. However, the notion of self-efficacy was widely used and was found to be effective at increasing breastfeeding rates. In addition, the use of adult learning principles and including important aspects of prenatal breastfeeding curriculums, as discussed above, may be an effective strategy. However, conclusive evidence on best practices for these strategies and curriculum is not currently available.

Discussion

The major finding of this review is that there are a plethora of inconsistency between studies with regards to interventions and reported outcomes. Thus, it is hard to conclusively state what the most effective topics and mode of delivery for a prenatal educational intervention to increase breastfeeding rates is, based on this literature review. Therefore, it is hard to conclusively provide evidence about the best way to develop a prenatal breastfeeding curriculum to improve breastfeeding rates in adolescent women that can be adapted for a primary care setting. However, it is evident that quality educational interventions are needed to lead to improved breastfeeding rates. Also, since the intent to breastfeed is decided in the first trimester or before pregnancy for most women, it is important to target prenatal educational interventions starting as early as possible (Volpe & Bear, 2000; Couto de Oliveira & Camacho, 2011; Lumbiganon et al., 2011; Renfrew et al., 2012). However, additional research is needed on prenatal interventions alone and their effects on breastfeeding initiation, exclusivity, and duration, including women of multiple populations with varying socioeconomic and cultural backgrounds, so that best practices for these prenatal breastfeeding interventions can be created (Lumbiganon et al., 2011). Nonetheless, this literature provides supportive evidence that a combination of methods and content of prenatal education and support can potentially lead to improved breastfeeding outcomes.

Limitations

There were a variety of limitations to the studies, which ultimately lead to inconclusive results. For example, there were few well designed RCTs and few studies, which controlled for

any potential confounding factors and the impact of bias. There were also a lot of inconsistency between studies, especially with regards to the specifics of the interventions that were used, the mode of delivery, and the specific content of the education (often, this information was either vague or unavailable). Furthermore, some studies that had inclusion criteria of women who were already planning to breastfeed when they entered a study, so there was variation related to breastfeeding intent of participants upon initiation of a study, which could have skewed results. Furthermore, a wide variety of definitions of breastfeeding outcomes/extent of breastfeeding were used and there was inconsistency between studies in terms of outcome measurements which included either a single outcome variable or a combination of the variables of breastfeeding intent, initiation, exclusivity, and duration. Timing of measurements for outcomes were also inconsistent across the studies. There was also a lack of details about training and qualifications of the clinicians involved and who delivered the programs. Also, many of the studies had small sample sizes, and had limited generalizability of findings. Demographic data, such as cultural and socioeconomic status, also varied across studies. This calls into question if structured programmes are more likely to influence breastfeeding outcomes in certain groups of women or are effective at reducing breastfeeding problems associated with early cessation of breastfeeding. Increased breastfeeding initiation and duration, including duration of exclusive breastfeeding, were found in studies that had implemented structured programs. However, many of these structured programs that had multiple steps and stages, but it may be the case that not all the steps are needed to increase breastfeeding initiation and duration. However, at this stage the single importance of any one step is unclear and was not examined in any of the studies. In addition, many studies used various combinations of approaches, such as, audio-visual aids, individual counseling sessions, telephone calls, educational classes, and educational topics, it is hard to identify, which parts were most effective and lead to the results of the study. Thus, the limitations in this review of literature influence the external validity of the findings since divergent interventions may lead to differing outcomes.

Lumbiganon et al. (2011) Cochrane database systematic review, which evaluated the effectiveness of prenatal education for increasing breastfeeding initiation and duration presented similar findings to this literature review. 17 studies, totaling 7,137 women were included in the Lumbiganon et al. systematic review (2011). The main conclusion based on the summary of findings of this review was that even though various combinations of prenatal interventions appear to be successful at improving breastfeeding outcomes (based on findings from single studies), no interventions were found to be significantly more effective than any other interventions at increasing breastfeeding initiation or duration (Lumbiganon et al., 2011).

Recommendations

Even though there were a lot of limitations to the studies and definitive conclusions cannot be made about the best practices for breastfeeding curriculum in the prenatal stage, the research reviewed regarding breastfeeding education does supports the following recommendations. These can be integrated into the research design of the curriculum being

prepared for the Queen Square Family Health Team with discretion (an evaluation tool will be necessary to evaluate the new prenatal breastfeeding curriculum):

- Focus on knowledge, skills, attitudes and confidence with regards to breastfeeding
- Apply adult learning principles and breastfeeding self-efficacy theory
- Have women create breastfeeding goals
- Address barriers, common concerns, myths and misconceptions, and benefits and advantages of breastfeeding (an extensive list of topics that could be addressed during prenatal education are listed in the results)
- Offer breastfeeding information early during pregnancy (in the first trimester) and again at each prenatal visit
- Have health professional reinforce ideas taught in prenatal classes
- Have ongoing professional support to mothers through in-person visits or telephone contact postpartum
- Clearly explain exclusive breastfeeding to all participants
- Train staff about breastfeeding
- Presence of a lactation consultant may be an asset
- Build rapport with participants
- Recurrent education sessions are more effective than single education sessions (group instruction will allow for participant interaction and cost-effective resource use)
- Comprehensive, multifaceted breastfeeding promotion are probably more effective than any stand-alone intervention
- Interactive, flexible education may work better than didactic, “traditional” education models
- Have prompts, games, activities to make the sessions interactive (include print, video, electronic media aspects)
- Have takeaways for participants
- Tailor to the target audience
- Prizes /incentives may be effective to increase attendance

The main recommendation for Queen Square Family Health team is to create prenatal breastfeeding curriculum (with the option of postnatal follows) that is group-based, multi session, the focuses on skills, knowledge, attitudes and has overarching components of adult learning principles and self-efficacy.

Conclusion

It is difficult to identify what type of interventions and which procedures are more likely to effectively promote and support breastfeeding during the prenatal period because of the wide variety of approaches tested. The most frequently used strategies were individual counselling or sessions, group sessions, handouts, e-messages or a combination of 2 or more of these approaches. The effect of the interventions in extending breastfeeding duration varied with the strategies and procedures used, with the timing of the interventions, and with the

context in which they were developed. Also, the kinds of breastfeeding outcomes reported varied widely.

Even though, most studies found a statistically significant improvement in breastfeeding initiation following introduction of a structured breastfeeding program in the prenatal stage, effect sizes (if measured) varied. The impact on the duration of exclusive breastfeeding and duration of any breastfeeding to 6 months was also evident, although not all studies found statistically significant differences. Despite poor overall study quality, structured programs compared with standard care positively influence the initiation and duration of exclusive breastfeeding and any breastfeeding. However, no concrete conclusions about the most effective interventions cannot be made, but generally they combined face-to-face information, guidance, and support and were long term and intensive. Group education sessions during the prenatal phase were the most common strategy. Therefore more research into the effect of prenatal education on breastfeeding is needed to make definitive conclusions.

Appendix A: Results Summary Tables

<i>Table 1: Summary of Prenatal Breastfeeding Interventions/Topic & Outcomes</i>				
<i>Author, Year</i>	<i>Design & Sample Size</i>	<i>Intervention</i>	<i>Topics Covered</i>	<i>Outcome</i>
Betzold et al., 2007	Evaluation, 42	Education handouts provided by LC- followed Ten Steps to Support Parents' Choice to Breastfeed Their Baby at prenatal appointments -12 handouts total	-health benefits of BF -Infant feeding cues -How to BF, techniques, latch, storage	-post intervention 100% of women planned to exclusively BF for some period -Actual: initiation 100%, 3 months 88%, 6 months 73% and 12 months 33%. The in-hospital exclusivity rate was 61%
Bonuck et al., 2009	RCT, 941	-Lactation Consultant (min 2 sessions) & Electronic Prompts (5 prompts on medical charts during checkups) vs standard care	- plans for BF -concerns about BF -how long you should BF -benefits of BF - how medications, or any smoking, alcohol, or substance abuse might affect	-Describe process of implementing. No real results yet
Kervin et al., 2010	<i>Cross-sectional</i> , 164	Retrospective inquires about interventions that women	<i>-No specific topics listed</i>	Antenatal classes, BF help within half an hour of birth and positive health-care team attitudes were

		encountered and perceived as most effective		related to improved BF intentions and behaviours
Mattar et al., 2007	RCT, 401	<ul style="list-style-type: none"> -Group A received BF educational material, video, and individual coaching from a lactation counselor (15 min individual session- to ask questions and have breasts assessed) - Group B received BF educational material and video with no counseling -Group C received routine antenatal care only 	<ul style="list-style-type: none"> - techniques and benefits of BF -Management of common BF issues -16 min video: 14 steps to better BF(correct positioning, latch, breast care, common concerns, 	<ul style="list-style-type: none"> simple one-encounter antenatal education and counseling significantly improve BF practice up to 3 months after delivery -twice as likely to practice exclusive or predominant BF at 3 and 6 months postpartum compared with mothers who did not receive formal antenatal instruction
Narasimhan et al., 2010	Evaluation, 328	-Train staff using 15 hour educational program based on the WHO's Ten Steps to Successful BF curriculum		Significant increase in the percent of infants exclusively BF at the time of discharge from 35% to 50%
Noel-Weiss et al., 2006	RCT, 110	<ul style="list-style-type: none"> -2.5-hour prenatal BF workshop - life-like dolls and handouts provided -two short videos shown 	<ul style="list-style-type: none"> - preparation for BF -baby ' s cues for starting and stopping - positioning for both the mother and baby - indications that BF effective 	<ul style="list-style-type: none"> Women who attended the workshop had higher self-efficacy scores and a higher proportion were exclusively BF compared to women who did not attend the workshop

			-tips for coping	
Olenick et al., 2010	RCT, 182	- 2-hour classes based on BF self-efficacy theory	<ul style="list-style-type: none"> -Advantages of BF over bottle feeding - Potential Barriers to BF- - Myth versus Truths- group sorting exercise - Anatomy & Physiology Mini-lecture (10 minute limit) - Positioning/ latch on - Signs of adequate milk intake - Problem solving- Case Studies - Self care and help - The voice of experience 	<ul style="list-style-type: none"> -BF confidence was associated with higher rates of full BF at weeks 1, 6, and 12 -High BF confidence was associated with longer mean duration of BF (10 weeks) versus lower scores (5 weeks) -full BF rates were higher than those with no class
Robertson & Lieto, 2013	Descriptive	<ul style="list-style-type: none"> -trimester-based curriculum -short lessons for use at each prenatal visit, or at group teaching sessions - Each lesson has key messages with visual content for the patient; the teacher has lesson-specific teaching points and 	<ul style="list-style-type: none"> First Trimester: Starting the conversation . Can I breastfeed? Why breastfeed Setting breastfeeding goals. Support from others during 	<ul style="list-style-type: none"> short evaluation period, staff who implemented the curriculum provided largely positive feedback on content and usefulness

		<p>additional information within the tool</p> <p>-Related handouts are available for patients to take home after in-office discussion.</p>	<p>Second Trimester: How breastfeeding works</p> <p>How your body makes milk</p> <p>What is in your milk?</p> <p>Latching on</p> <p>Popular breastfeeding positions</p> <p>Caring for your breasts.</p> <p>Third Trimester: Getting ready to breastfeed</p> <p>What you need to know about breastfeeding</p> <p>Feeding cues</p> <p>Breastfeeding goal, confidence, and support revisited Overcoming challenges</p> <p>Breastfeeding in public</p> <p>Returning to work or school</p> <p>Other questions</p>	
Pitts et al., 2015	Cohort, 23	<p>-3 BF modules were created based on BFHI (steps 3-10) and offered to women at the 32-, 34-, and 36-week prenatal visit via computer tablets</p>	<p>-latch and positioning, maintaining lactation, infant signs of hunger and satisfaction, feeding frequency, skin-to-skin contact, and confidence building, avoiding pacifiers and supplementation</p>	<p>95% initiated breastfeeding, 86% were exclusively breastfeeding at 6 weeks postpartum, and 71% of the women planned to exclusively breastfeed for 6 months</p>

Artieta - Pinedo, et al., 2013	Cohort, 614	Retrospective inquires about # of antenatal classes women attended		During the first month, the risk of cessation of any breastfeeding was three times as high among non-attendees and twice as high among women who attended 1–4 classes compared with those who attended 5 or more classes
Lin et al., 2008	Q-Exp, 46	Programme duration was 90 minutes, including 50 minutes for lecture and skill training, 20 minutes for group discussion and skill practicum and the last 20 minutes for a tour of the postpartum ward	<p>-benefits and importance of breastfeeding, mechanism of lactation, ways to maintain quality and quantity of milk secretion, ways to tell whether the infant was getting enough, nutrition intake for breastfeeding mothers, management of breast-milk leaking and how to combine work and breastfeeding</p> <p>- motivation enhancement for breastfeeding, dangers associated with bottle use and formula feeding and common misconceptions about breastfeeding</p> <p>-demonstration of correct position and effective sucking for breastfeeding</p>	Rate of exclusive breastfeeding was higher for the experimental group at three days and one month postpartum

Nichols, et al., 2009	RCT, 90	<p>intervention group: 9 page interactive workbook focusing on enhancing BF self-efficacy; control group: 5 page exploratory interactive workbook on parenting issues with no reference to BF</p>	<ul style="list-style-type: none"> -skills needed to BF -experience from other mothers -common BF problems and how to persevere -how negative stress can affect BF -how to keep motivated 	<ul style="list-style-type: none"> -participants in the self efficacy intervention condition, relative to the control group, scored significantly higher on BF self-efficacy - significant relationships between breast-feeding self-efficacy and number of days of breast-feeding at follow-up for women
Rosen et al., 2008	Cohort, 194	<ul style="list-style-type: none"> -one-time 2 hr a class that used video demonstration and group teaching by a LC -2 hour weekly drop-in new mothers' support group with one-on-one teaching prenatally and weekly meetings postpartum, taught by a LC and a pediatrician - a control group educated at prenatal clinical visits only 		<p>Women who attended prenatal breastfeeding classes had significantly increased breastfeeding at 6 months when compared to controls</p>
Renfrew et al., 2012	Review, 67 studies	-Review- specific interventions not listed	-no specific topics listed	-increase in duration of 'any breastfeeding' (includes partial and exclusive breastfeeding)

				- a positive effect on duration of exclusive BF at 6 months
Lumbiganon et al., 2011	Review, 19 studies	-Review- specific interventions not listed	-no specific topics listed	-Peer counselling significantly increased BF initiation - Combined BF educational interventions were not significantly better than a single intervention in initiating or increasing BF duration
Hasanpoo r et al., 2012	Q-Exp, 120	-control group received routine prenatal care -intervention group: 2- 2 hours sessions of BF education within 2 days. Handbook given to all participants during session	-Handbook included: intro about B, advantages of BF for child, mother and society, proper positions, proper sucking and latch	Mean duration of exclusive breastfeeding was 5.2 month in case group compared to 2.05 for control group
Volpe & Bear, 2000	RCT, 91	-LC provided 3 comprehensive BF education sessions called the Breast feeding Educated and Supported Teen (BEST) Club -3-1 hour sessions, which use role playing and games to educate the adolescent learners about the basics of breastfeeding in a	- breast feeding but also other maternal child issues, including nutrition, safety, child development, and preventive health care	Of the 48 adolescents who received no specific education, 7 (14.6%) initiated breast feeding - Of the 43 adolescents in the education group, 28 (65.1%) initiated breast feeding

		nonthreatening, nonjudgmental way		
Léger-Leblanc et al., 2008	Cohort, 25	-meeting with nutritionist at least once during prenatal stage	-no specific topics listed	prenatal classes, having been breastfed and intention to breastfeed at 36 weeks' gestation were positively associated with breastfeeding initiation
Beattie-Fairchild, 2010	Qualitative Case-study,	-innovative BF course divided into 11 modules consisting of text, graphics, video, and animation - theoretical base was Bandera's social learning theory, emphasizing Dennis's breastfeeding self efficacy theory, and Pender's health promotion model	-an introduction, famous mothers who BF, consequences of not BF, benefits of BF, the reality of BF, the how's of BF, overcoming the barriers, just for dad, just for grandma, just for friends, and other resources.	participants were successful by overcoming the barriers to maintain their self-efficacy -7 met goals, 3BF when results collected
Kattapong, 2010	Meta-analysis, 52	No specific interventions listed	-no specific topics listed	-findings indicate that educational breastfeeding interventions are generally quite effective -Educational interventions improve the odds of successfully breastfeeding by between .40 and 2.06 times

Kluka, 2004	RCT, 111	<p>-intervention involved a written pre-workshop guide in booklet form, and attendance at a ninety minute interactive antenatal group workshop led by nurse who was also a LC</p>	<p>focus on strategies intended to prevent or minimize the reasons women give for weaning their infants and to encourage those strategies that have been associated with longer breastfeeding duration</p> <p>on important aspects of breastfeeding and questions for self-reflection about the woman's expectations and coping styles</p>	<p>-no difference between the two groups with respect to the proportion of women who continued to at least mainly breastfeed by 24 weeks after birth</p>
Kronborg et al., 2011	RCT, 1193	<p>- structured antenatal training programme (3 modules for 3 hours each) attended in mid-pregnancy vs usual practice</p> <p>- The BF part was scheduled to approximately 2 hrs, shown a film about BF</p>	<p>- delivery process, pain relief, and coping strategies,</p> <p>-infant care and BF</p> <p>-components of importance for successful BF establishment, conceivable BF problems</p> <p>- the parental role and the relationship between the woman and her partner</p>	<p>-after participation in the course women in the intervention group reported a higher level of confidence</p> <p>- 6 weeks after birth they reported to have obtained sufficient knowledge about BF</p> <p>- women with sufficient knowledge BF significantly longer than women without sufficient knowledge</p>
Wambach et al., 2011	RCT, 289	<p>- theory of planned behavior (TPB), adolescent decision-making theory, and developmental theories</p> <p>-Two prenatal classes (1.5 and 2 hr in length)</p>	<p>-focused on the benefits of BF for mother and baby, decision making, and the "how to" of BF as well as managing BF after return to work and/or school</p>	<p>-significant association between the experimental intervention and breastfeeding initiation and BF duration was significantly longer among those in the</p>

		<p>provided content from the Breastfeeding Educated and Supported Teen Club (BEST) curriculum</p> <p>-Taught by LC</p>		<p>experimental group compared to those in the control groups</p> <p>-no significant difference for exclusive breastfeeding</p>
<p>Graffy et al., 2005</p>	<p>RCT, 720</p>	<p>-Intervention group received additional support from a breastfeeding counselor</p>	<p>-information before their baby was born about</p> <p>what to expect, particularly in terms of discomfort</p> <p>and the time they might spend feeding, and an opportunity to learn how to deal with common feeding</p> <p>ms</p> <p>ts of breastfeeding</p> <p>- how to deal with</p> <p>concerns such as breast engorgement, sore nipples,</p> <p>timing of feeds, or how to express milk</p> <p>-self-care</p> <p>physiology of lactation, and to understand that the baby's feeding would stimulate their milk supply</p>	<p>-women positively commented on the support they received from</p> <p>counselors and appreciated that themselves</p> <p>had breastfed and were knowledgeable, reassuring, nonjudgmental, and prepared to listen</p>

Beake et al., 2011	Systematic Review, 26 articles	No specific interventions listed	Most studies found a statistically significant improvement in breastfeeding initiation following introduction of a structured breastfeeding programme, although effect sizes varied	
Couto de Oliveira et al., 2001	Lit Review, 64 studies	-Variety of interventions included	<p>benefits of BF for mother and baby; early initiation; how breast milk is produced; hazards of bottle-feeding</p> <p>or providing teats to babies; BF on demand;</p> <p>exclusive BF up to 4, 5, or 6 months; prolonged</p> <p>BF for at least 2 years; and family planning and the lactational amenorrhea method.</p> <p>- guidance on positioning and attachment; expression and storage of breast milk; combining</p> <p>BF and work; and overcoming problems such as engorgement, colic, and crying. - Emotional</p>	<p>During prenatal care, group education was the only effective strategy reported</p> <p>- most effective interventions generally combined</p> <p>face-to-face information, guidance, and support and</p> <p>were long term and intensive</p>

			<p>support, encouragement, and reassurance were provided</p> <p>to promote maternal confidence, and mothers were encouraged to share experiences</p>	
<p>Best Start Resource Centre & Baby Friendly Initiative Ontario, 2013</p>	N/A	-Education in the prenatal stage	<p>-Inform pregnant women and their families about</p> <p>the importance and process of breastfeeding</p> <p>-To make an informed decision on infant and toddler feeding, mothers and families need current and factual information</p> <p>-The importance of exclusive breastfeeding during the first six months from birth, and sustained breastfeeding for two years or beyond</p> <p>-The importance of breastfeeding for both mother and baby</p> <p>-Information about donor milk banking.</p> <p>-The risks and costs associated with the use of breastmilk</p> <p>substitutes: for baby and mom; for healthcare/society</p> <p>-Care supportive of establishing and sustaining breastfeeding</p>	

			<p>-The importance of immediate and prolonged skin-to-skin care for all infants (including kangaroo care for premature infants)</p> <p>-Women are more likely to decide to breastfeed and maintain their decision when health care providers' words and actions demonstrate that they value breastfeeding and breastmilk</p> <p>-Infant and toddler nutrition is a public health issue and not merely a lifestyle choice</p>	
Public Health Agency of Canada, 2014	N/A	Create a breastfeeding plan	-no specific topics listed	
Shealy et al., 2005. CDC	N/A	<ul style="list-style-type: none"> - increase BF knowledge and skills, but also to influence their attitudes toward BF - series or freestanding - incorporate multidimensional learning opportunities, such as demonstrations and practice using a doll, videos, observing a 	-guidance for mothers about anticipated situations and signs of effective BF or BF problems; the benefits of BF to mother, baby, and society; appropriate positioning for feeding; facilitating effective latch; specific needs in the early days of BF; and resources for assistance	

		newborn breastfeeding, and work in small groups		
Damstra, 2012	Evaluation, 54	-BFHI program - Ten Steps to Successful Breastfeeding		-statistically significant lower mean scores for overall breastfeeding self-efficacy for those not in intervention
Kingston, Frontenac and Lennox & Addington Public Health, 2012	Evaluation, 162	-two-hour breastfeeding class is conducted by public health nurses who are also certified LCs	-anatomy and physiology of the breast, positioning and latch, BF management, family support, common BF challenges and troubleshooting, and community BF supports and services	-increased knowledge and confidence of breastfeeding. - partners' and coaches confidence in their ability to support BF increased. -at 6 weeks postpartum: 91% reported that they were breastfeeding. -more than half (59%) of participants breastfeeding were doing so exclusively
Choquette, N.D.	N/A	<i>Educational sessions that review the benefits of breastfeeding, principles of lactation, myths, common problems, solutions, and skills training appear to have the greatest single effect</i>	-Research findings of the advantages of breastfeeding vs formula feeding infants. -Decision-making regarding breastfeeding. -How a breast functions, Anatomy & physiology of the breast, Breast milk	

			<p><i>composition, Breast changes during pregnancy,</i></p> <p><i>-Vitamin D supplementation and risk factors for vitamin D deficiency.</i></p> <p><i>-Prenatal preparation for breastfeeding.</i></p> <p><i>-Strategies to promote successful initiation (importance of early skin-to-skin contact, common positions, proper latch, suck and swallow patterns, letdown reflex, collecting and offering colostrum, hand expression to relieve engorgement)</i></p> <p><i>-Factors interfering with successful initiation (difficulty to latch, engorgement, unnecessary supplementation using formula and rubber nipples, flat and inverted nipples)</i></p> <p><i>-Complications due to problematic breastfeeding and milk removal (plugged ducts and mastitis, sore nipples, yeast infections, insufficient breast milk, overactive letdown, difficulties resulting from birth complications and what to do)</i></p> <p><i>- How to burp your baby</i></p> <p><i>- Infant feeding patterns.</i></p> <p><i>-Breast milk is the normal food for babies.</i></p>	
--	--	--	---	--

			<p><i>-In special circumstances artificial baby milk (formula) may be recommended for medical reasons.</i></p> <p><i>-How to tell if baby is removing enough milk.</i></p> <p><i>-Nutrition for the breastfeeding mother.</i></p> <p><i>-Contraception and breastfeeding</i></p> <p><i>-Care of breasts during breastfeeding. Medication, alcohol and food sensitivities during breastfeeding</i></p> <p><i>-How to express and store breast milk, hand expression.</i></p> <p><i>-When, where and why to call for help when experiencing breastfeeding problems</i></p> <p><i>- Lactational amenorrhea</i></p> <p><i>-How long to breastfeed</i></p> <p><i>-Age of introduction of complementary foods.</i></p> <p><i>-Importance and reasons for exclusive breastfeeding to six months. Access to additional breast milk. Increasing your milk supply.</i></p>	
--	--	--	--	--

*RCT = randomized controlled trial, Q-Exp = quasi-experimental, BF= breastfeeding

<i>Table 2: Summary of Articles by Intervention type</i>						
<i>Author, Year</i>	<i>Visual Aids</i>	<i>Individual Counseling</i>	<i>Group Education Sessions</i>		<i>Personnel Involved (LC, PC, health professionals)</i>	<i>Special Features</i>
			<i>Single Session</i>	<i>Multiple Sessions</i>		
Betzold et al., 2007	-Handouts at each prenatal and well-child visit (up to one year) until BF stopped			-No specifics about # of sessions for goal setting	-LC	-Goal setting - mother's physician was instructed to emphasize certain key points during each clinical visit - incorporated a variety of outpatient interventions (face-to-face guidance, employing a lactation consultant, and prenatal followed by postnatal instruction)
Bonuck et al., 2009		-Min 2 sessions			-LC	-Electronic Prompts
Kervin et al., 2010						-No intervention defined (retrospective)
Mattar et al., 2007	-Information booklet -16-minute educational video entitled "14 Steps to Better Breastfeeding"	one 15-minute session with LC			-LC	
Narasimhan et al., 2010						Implementation of an intense breastfeeding educational program for all nurses

Noel-Weiss et al., 2006	<ul style="list-style-type: none"> -handouts -PowerPoint Presentation -2 videos 		One 2.5 hour session			<ul style="list-style-type: none"> -life-like dolls - workshop based on adult learning principles and self-efficacy theory -partners welcome
Olenick et al., 2006			One 2-hour			based on breastfeeding self-efficacy theory
Robertson & Lieto, 2013						<ul style="list-style-type: none"> -Description of curriculum -Trimester program -can be used for group or individual -includes activities and handouts
Pitts et al., 2015	<ul style="list-style-type: none"> -3 modules (5-7 mins in length) - magnetic resource card containing breastfeeding support resources given to participants to reinforcement info provided via tablets 					Modules were programmed onto computer tablets

Artieta - Pinedo, et al., 2013						- No actual intervention -Retrospective
Lin et al., 2008			One- 90 minute program		obstetric nurse	50 minutes for lecture and skill training, 20 minutes for group discussion and skill practicum and the last 20 minutes for a tour of the postpartum ward - knowledge, affective and skill aspects were considered
Nichols, et al., 2009	-nine-page interactive workbook					- enhancing breast-feeding self-efficacy
Rosen et al., 2008	-Video demo	-2 hour drop-in support group with one-on-one	-One- two hour group session		-LC & pediatrician	
Renfrew et al., 2012						-Review- specific interventions not listed
Lumbiganon et al., 2011						-Review- specific interventions not listed
Hasanpoor et al., 2012	-handbook			-2 sessions, that were 2 hours and presented 2 days of each other		-telephone support one month postpartum -phone number of researchers given as an extra support
Volpe & Bear, 2000				- 3 weekly 1 hour sessions	-LC	- fun way of teaching pregnant adolescents about the art of breastfeeding

						<ul style="list-style-type: none"> -used role playing and games to educate the adolescent learner about the basics of breastfeeding in a nonthreatening, nonjudgmental way - game playing as an education tool and rewards winners for positive decisions and outcomes - Anticipation of the weekly prize is used to encourage attendance and participation
Léger- Leblanc et al., 2008		-meeting at least once			Nutritionist	
Beattie- Fairchild, 2010	-graphics, video, and animation			-11 modules		<ul style="list-style-type: none"> -overcome barriers to breastfeeding -theoretical base was Bandera's social learning theory, emphasizing Dennis's breastfeeding self efficacy theory, and Pender's health promotion mode;
Kattapong, 2010			-One group session			No specific interventions listed
Kluka, 2004	written pre- workshop guide in booklet form (guide was designed as a workbook) - slide presentation was used to				perinatal nurse who was also a lactation consultant	<ul style="list-style-type: none"> - focus on strategies intended to prevent or minimize the reasons women give for weaning their infants and to encourage those strategies that have been associated with longer breastfeeding duration

	highlight content					
Kronborg et al., 2011	-Video about BF			3- 3 hour sessions	Midwives	- partners invited to participate -dolls
Wambach et al., 2011				2 prenatal classes (1.5 and 2 hr in length)	-Co-taught: lactation consultant and peer counselor	theory of planned behavior (TPB), adolescent decision-making theory, and developmental theories - encouraged to bring a support person of their choice -telephone support -Used same program as Volpe & Bear
Graffy et al., 2005		-One on one support			breastfeeding counselor	-patients appreciated that the breastfeeding counselors had breastfed themselves
Beake et al., 2011						-No specific interventions listed - structured breastfeeding programs better than unstructured
Couto de Oliveira et al., 2001						-No interventions listed - During prenatal care, group education was the only effective strategy reported
Best Start Resource Centre & Baby Friendly Initiative Ontario, 2013						-No interventions listed

Public Health Agency of Canada, 2014						-No interventions listed
Shealy et al., 2005. CDC						-The goal of educating mothers is not only to increase their breastfeeding knowledge and skills, but also to influence their attitudes toward breastfeeding.
Damstra, 2012				BFHI program		assess breastfeeding selfefficacy -no specifics given
Kingston, Frontenac and Lennox & Addington Public Health, 2012			two-hour breastfeeding class			-prepare partners and coaches to support the breastfeeding mother
Choquette, N.D.						<i>-No interventions listed</i> <i>- Educational sessions that review the benefits of breastfeeding, principles of lactation, myths, common problems, solutions, and skills training appear to have the greatest single effect</i>

References

- American Academy of Pediatrics Task Force on Breastfeeding: Ten steps to support parents' choice to breastfeed their baby. Retrieved from: <http://www.aap.org/breastfeeding/tenSteps.pdf>
- Artieta-Pinedo, I., Paz-Pascual, C., Grandes, G., Bacigalupe, A., Payo, J., & Montoya, I. (2013). Antenatal education and breastfeeding in a cohort of primiparas. *Journal of Advanced Nursing*, 69(7), 1607-1617. doi:10.1111/jan.12022
- Betzold CM, Laughlin KM, & Shi C. (2007). A family practice breastfeeding education pilot program: An observational, descriptive study. *International Breastfeeding Journal*, 2, 4.
- Beake, S., Pellowe, C., Dykes, F., Schmied, V., & Bick, D. (2011). A systematic review of structured compared with non-structured breastfeeding programmes to support the initiation and duration of exclusive and any breastfeeding in acute and primary health care settings. 8(2), 141-161. doi:DOI: 10.1111/j.1740-8709.2011.00381.x
- Beattie-Fairchild, C. (2013). Overcoming barriers to improve breastfeeding self-efficacy in older adolescent mothers. (Ed.D., Walden University). ProQuest Dissertations and Theses, . (1317602638).
- Best Start Resource Centre & Baby-Friendly Initiative Ontario (2013). *The Baby-Friendly Initiative: Evidence-informed key messages and resources*. Toronto, Ontario, Canada: authors.
- Bonuck KA, Lischewski J, & Brittner M. (2009). Clinical translational research hits the road: RCT of breastfeeding promotion interventions in routine prenatal care. *Contemporary Clinical Trials*, 30(5), 419-426.
- Couto de Oliveira MI, Camacho LA, Tedstone AE: Extending breastfeeding duration through primary care: a systematic review of prenatal and postnatal interventions. *J Hum Lact* 2001, 17:326-343.
- Dunn, S., Davies, B., McCleary, L., Edwards, N., & Gaboury, I. (2006). The relationship between vulnerability factors and breastfeeding outcome. *JOGNN - Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(1), 87-97.
- Damstra, Kelli Marie, "Improving Breastfeeding Knowledge, Self-Efficacy and Intent through a Prenatal Education Program" (2012). Doctoral Dissertations. Paper 4.
- Graffy J, Taylor J. What information, advice and support do women want with breastfeeding?. *Birth* 2005;32(3):179-86.

- Hasanpoor, S., Ansari, S., Bani, S., & Ebrahimi, H. (2012). The effect of breastfeeding educational program on breastfeeding condition. *Life Science Journal*, 9(4), 3188-3192.
- Hogan, S. E. (2001). Overcoming barriers to breastfeeding: Suggested breastfeeding promotion programs for communities in eastern Nova Scotia. *Canadian Journal of Public Health*, 92(2), 105-108.
- Jessri, M., Farmer, A. P., Maximova, K., Willows, N. D., & Bell, R. C. (2013). Predictors of exclusive breastfeeding: Observations from the alberta pregnancy outcomes and nutrition (APrON) study. *BMC Pediatrics*, 13(1)
- Kattapong, K. R. (2007). A meta-analysis of education based breastfeeding interventions: Impact of social marketing techniques, number of intervention components used, and methodological quality. (Ph.D., Loyola University Chicago). ProQuest Dissertations and Theses, . (304847995).
- Kehler, H. L., Chaput, K. H., & Tough, S. C. (2009). Risk factors for cessation of breastfeeding prior to six months postpartum among a community sample of women in Calgary, Alberta. *Canadian Journal of Public Health*, 100(5), 376-380.
- Kervin BE, Kemp L, & Pulver LJ. (2010). Types and timing of breastfeeding support and its impact on mothers' behaviours. *Journal of Paediatrics & Child Health*, 46(3), 85-91.
- Kluka, S. M. (2004). A randomized controlled trial to test the effect of an antenatal educational intervention on breastfeeding duration among primiparous women. (Ph.D., The University of British Columbia (Canada)). ProQuest Dissertations and Theses, . (305055930).
- Kronborg H, Maimburg RD, Væth M. Antenatal training to improve breast feeding: a randomised trial. *Midwifery*. 2011 Oct 19. [Epub ahead of print].
- Lin, S., Chien, L., Tai, C., & Lee, C. (2008). Effectiveness of a prenatal education programme on breastfeeding outcomes in taiwan. *Journal of Clinical Nursing*, 17(3), 296-303.
- Léger-Leblanc, Gisèle, MS, RD,LDN, CNSD, & Rioux, F. M., PhD. (2008). Effect of a prenatal nutritional intervention program: On initiation and duration of breastfeeding. *Canadian Journal of Dietetic Practice and Research*, 69(2), 101-5.
- Lumbiganon, P., Martis, R., Laopaiboon, M., Festin, M. R., Ho, J. J., & Hakimi, M. (2011). Antenatal breastfeeding education for increasing breastfeeding duration. *The Cochrane Database of Systematic Reviews*, (11), CD006425. doi:10.1002/14651858.CD006425.pub2
- Mattar CN, Chong YS, Chan YS, Chew A, Tan P, Chan YH, & Rauff MH. (2007). Simple antenatal preparation to improve breastfeeding practice: A randomized controlled trial. *Obstetrics & Gynecology*, 109(1), 73-80.

- Narasimhan, S. R., Kifle, A., Celsi, M., McCormick, M., Curry, J., Powers, M., . . . Jegatheesan, P. (2010.). Implementation of WHO's ten steps to successful breastfeeding to improve exclusive breastfeeding. *Breastfeeding Medicine*, 5(6), 327-328.
- Nesbitt, S. A., Campbell, K. A., Jack, S. M., Robinson, H., Piehl, K., & Bogdan, J. C. (2012). Canadian adolescent mothers' perceptions of influences on breastfeeding decisions: A qualitative descriptive study. *BMC Pregnancy and Childbirth*, 12
- Nichols, J., Schutte, N. S., Brown, R. F., Dennis, C., & Price, I. (2009). The impact of a self-efficacy intervention on short-term breast-feeding outcomes. *Health Education & Behavior*, 36(2), 250-258. doi:10.1177/1090198107303362
- Noel-Weiss J, Bassett V, & Cragg B. (2006). Developing a prenatal breastfeeding workshop to support maternal breastfeeding self-efficacy. *JOGNN - Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 35(3), 349-357.
- Noel-Weiss J, Rupp A, Cragg B, Bassett V, & Woodend AK. (2006). Randomized controlled trial to determine effects of prenatal breastfeeding workshop on maternal breastfeeding self-efficacy and breastfeeding duration. *JOGNN - Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 35(5), 616-624.
- Olenick, P., & Berens, P. (2010.). The effect of structured group prenatal education on breastfeeding confidence, duration, and exclusivity to 12 weeks postpartum. *Breastfeeding Medicine*, 5(6), 334.
- Olenick, P. L. (2006). The effect of structured group prenatal education on breastfeeding confidence, duration and exclusivity to twelve weeks postpartum. (Ph.D., Touro University International). ProQuest Dissertations and Theses, . (304911709).
- Partyka, B., Whiting, S., Grunerud, D., Archibald, K., & Quennell, K. (2010). Infant nutrition in Saskatoon: Barriers to infant food security. *Canadian Journal of Dietetic Practice and Research*, 71(2), 79-84.
- Pitts A, Faucher MA, Spencer R. Incorporating Breastfeeding Education into Prenatal Care. *Breastfeed Med*. 2015 Jan 7. [Epub ahead of print] PubMed PMID: 25565242.
- Public Health Agency of Canada. (2014). Protecting, promotion and supporting breastfeeding- a practical workbook for community-based programs.
- Renfrew, M. J., McCormick, F. M., Wade, A., Quinn, B., & Dowswell, T. (2012). Support for healthy breastfeeding mothers with healthy term babies. *The Cochrane Database of Systematic Reviews*, 5, CD001141. doi:10.1002/14651858.CD001141.pub4

Research and Evaluation Division of Kingston, Frontenac and Lennox & Addington Public Health.
Prenatal Breastfeeding Class Evaluation. Kingston: Author; 2012

Robertson, V., & Lieto, L. (2013.). Development of a trimester-based prenatal breastfeeding education curriculum in new york city. *Breastfeeding Medicine*, 8, S-11.

Rosen, I. M., Krueger, M. V., Carney, L. M., & Graham, J. A. (2008). Prenatal breastfeeding education and breastfeeding outcomes. *MCN: The American Journal of Maternal Child Nursing*, 33(5), 315-319.

Shealy KR, Li R, Benton-Davis S, Grummer-Strawn LM. The CDC Guide to Breastfeeding Interventions. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.

Simard, I., O'Brien, H. T., Beaudoin, A., Turcotte, D., Damant, D., Ferland, S., et al. (2005). Factors influencing the initiation and duration of breastfeeding among low-income women followed by the Canada prenatal nutrition program in 4 regions of Quebec. *Journal of Human Lactation*, 21(3), 327-337.

Volpe, E. M., & Bear, M. (2000). Enhancing breastfeeding initiation in adolescent mothers through the breastfeeding educated and supported teen (BEST) club. *Journal of Human Lactation*, 16(3), 196-200.

Wambach KA, Aaronson L, Breedlove G, Domian EW, Rojjanasrirat W, Yeh HW. A randomized controlled trial of breastfeeding support and education for adolescent mothers. *Western Journal of Nursing Research* 2011;33(4):486–505.

World Health Organization (WHOa). (2013). *Health Topics: Breastfeeding*. Retrieved from: <http://www.who.int/topics/breastfeeding/en/>

World Health Organization (WHOb). (2013). *Breastfeeding - Exclusive Breastfeeding*. Retrieved from: http://www.who.int/elena/titles/exclusive_breastfeeding/en/

World Health organization (WHOc). (2013). *10 facts on breastfeeding*. Retrieved from: <http://www.who.int/features/factfiles/breastfeeding/en/>

Grey Lit about: trimester-based prenatal breastfeeding education curriculum

Louise Choquette, Best Start Resource Centre. Prenatal Education in Ontario – Better Practices