A Midwife-led antenatal breastfeeding education intervention for primiparous women to increase predominant breastfeeding rates at one, three and six months after birth in Thailand:
A pilot randomised controlled trial

by

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Declaration

I declare that this thesis, which I submit to The University of Newcastle for examination in consideration of the award of a higher degree, PhD (Midwifery) is my own personal effort. The thesis contains no material, which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief. The thesis contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository.

Signed

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Date 31 August 2014

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Synopsis

This thesis reports a study that was conducted to determine whether a midwife-led antenatal breastfeeding education program (an intervention) could improve breastfeeding rates for primiparous women compared with breastfeeding rates for women who received standard antenatal care.

A pilot randomised controlled trial (pilot RCT) was conducted in two hospitals in Chiang Mai Province, Northern Thailand: 1) A tertiary care hospital, Maharaj Nakorn Chiang Mai; and 2) A secondary care hospital, Nakornping hospital.

Sixty-three primiparous women between 24 and 29 weeks gestation were recruited to participate in this study. The intervention consisted of a midwife-led antenatal breastfeeding educational program. The program design and components were based on current knowledge about the importance of breastfeeding and evidence based literature about successful midwife-led antenatal breastfeeding education programs. Participants were randomly allocated to the intervention and control groups. Participants in the intervention group were invited to attend three antenatal classes about breastfeeding (the intervention) provided by the researcher. Participants in the control group received standard antenatal care at the study sites.

The primary outcome measured in this study was predominant breastfeeding at one, three, and six months after birth. In addition, the following secondary outcomes were also measured: 1) Breastfeeding initiation, 2) Perceived breastfeeding self-efficacy, 3) Perceived breastfeeding support, 4) Breastfeeding intention and 5) Evaluation of the breastfeeding program (the intervention).

All women who attended the breastfeeding educational program were satisfied with it, and considered that it was beneficial. Women in the intervention group had a very high breastfeeding initiation rate (95%), and sustained a higher rate at three months than the initial breastfeeding rate in the control group (77%); however, this diminished rapidly between three (81%) and six months (41%). In contrast, women in the control group had a lower breastfeeding initiation rate that diminished rapidly in the first three months, and then more slowly between three (54%) and six months (46%). The difference between the intervention and control groups was significant at three months ($p = 0.0204$).

In this pilot study, the study aim was achieved and the null hypothesis was rejected. Strengths of the study included use of a randomised controlled trial study design, high follow-up rate, and a skilled midwife who conducted the antenatal breastfeeding intervention. Although it proved difficult to recruit women to participate in this study due to time limitations and cultural factors, the results indicate that such a study is useful in this context, and there is potential to use these results to inform the design of a major trial. However in designing subsequent studies, cultural factors would require further consideration.

Key words: Antenatal, education, breastfeeding, midwife-led.

CHAPTER 1 INTRODUCTION

During the last 50 years, there has been a growing concern about the promotion of breastfeeding worldwide. Even though the rate of breastfeeding is increasing in some areas of the world, the overall rate of breastfeeding is not yet at the desired rate in many countries (UNICEF, WHO et al. 2010). In some countries breastfeeding is more common and of longer duration among rural women with low levels of education. However, the greatest decline in breastfeeding duration has been reported among the urban populations of developing countries (UNICEF, WHO et al. 2010). The reasons for individual populations of women not breastfeeding are difficult to determine. It is thought that one of the reasons why some women do not breastfeed is their lack of knowledge and lack of effective antenatal education (Chatman, Salihu et al. 2004, Kong and Lee 2004, Lewallen, Dick et al. 2006). Formalised education strategies have not had a positive effect on breastfeeding outcomes (The United Nations Children's Fund 2003). Some studies have found that antenatal education was beneficial for informing first time mothers of the practical skills required to positively initiate breastfeeding (The United Nations Children's Fund 2003). However, it has been reported that antenatal education has not had a significant effect on reducing women’s anxiety and women’s sense of self-confidence in their ability to breastfeed (Heather and Dietsch 2010).

The factors that contribute to increased rates of breastfeeding in any population are also difficult to determine. The situation in Thailand is generally similar to populations in other developing countries. Thailand is a developing country, where breastfeeding rates are not at a satisfactory level and effective education about breastfeeding is lacking. Education is available but the methods of delivery may not provide adequate support and access to programs for women in this developing country (Ministry of Public Health; Thailand 2010).

1.1 PURPOSE OF THE STUDY

This study focuses on the antenatal period as an appropriate time to provide education about breastfeeding in order to improve breastfeeding success. The study is designed to provide antenatal breastfeeding education to assist women to increase the rates of breastfeeding after birth. The purpose of this study is to develop evidence based educational strategies that can improve breastfeeding rates for use by midwives. A pilot

randomised controlled trial (pilot RCT) was undertaken in two public hospitals in Chiang Mai Province, in the northern region of Thailand, to test the study hypothesis.

1.2 STUDY AIM

This study aimed to determine whether a midwife-led antenatal breastfeeding education program can improve postnatal breastfeeding rates for primiparous women compared with breastfeeding rates for women who received standard antenatal care.

1.3 OPERATIONAL DEFINITIONS

1.3.1 Antenatal

Antenatal is the period before birth or occurring or existing before birth referring to both the care of the woman during pregnancy and growth and development of the fetus. It is also called prenatal (Fraser and Cooper 2009, Macdonald and Magill-Cuerden 2011).

1.3.2 Breastfeeding

Breastfeeding practices described in this article were classified according to the WHO's definitions.

Breastfeeding

Breastfeeding means that the infant/child has been or is nourished by breast milk directly from the breast or expressed. For the purposes of this study, breastfeeding includes predominant breastfeeding, not only exclusive breastfeeding (World Health Organisation, Kramer S. Michael et al. 2001).

Exclusive breastfeeding

The infant has received only breast milk from the mother or a wet nurse, or expressed breast milk, and no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines.

Predominant breastfeeding

The infant's predominant source of nourishment has been breast milk. However, the infant may also have received water and water-based drinks (sweetened and flavoured water, teas, infusions, etc.), fruit juice; oral rehydration salts solution (ORS), drop and syrup forms of vitamins, minerals and medicines, and ritual fluids (in limited quantities). With the exception of fruit juice and sugar water, no food-based fluid is allowed under this definition. It is also called "any" breastfeeding.

1.3.3 Education

Education means the process of teaching and/or learning knowledge, attitudes and skills. For the purpose of this study education will mean group-based, interactive teaching and learning processes aimed at participants developing enhanced knowledge, attitudes and skills in relation to breastfeeding (Cambridge University 2008).

1.4 SIGNIFICANCE OF THE STUDY

This study contributes to the creation of an evidence-based midwifery antenatal breastfeeding intervention that can be used by midwives in Thailand. It is hoped that midwives in Thailand will benefit from this study in bringing about positive evidence-based modifications for increasing the rate of breastfeeding after birth. There are three domains that will benefit from this study as described below.

1.4.1 Midwifery practice

The study will provide a way for midwives to approach pregnant women with the best practice of breastfeeding, resulting in increasing the rate of breastfeeding among women and their babies. It will also advance midwifery practice so that midwives will become more aware of their own skills and their responsibilities for educating women to breastfeed effectively. Ultimately breastfeeding rates may be increased, which will benefit the health of the baby and the woman's health.

1.4.2 Midwifery research

This study will provide a model for midwifery breastfeeding promotion based on evidence about factors that promote women's breastfeeding practice. The results may be

used in midwifery education and as the basis for future research. It is expected that the study will provide evidence for the midwife-led model of antenatal breastfeeding education programs effectiveness in increasing breastfeeding rates in the postpartum period.

1.5 BACKGROUND TO THE STUDY

This section is organised into three parts: 1) International breastfeeding initiatives: the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommendations about breastfeeding; 2) breastfeeding rates worldwide; and 3) the breastfeeding rates in Thailand. These aspects of the background to the study are discussed below.

1.5.1 World Health Organization and United Nations Children's Fund: Breastfeeding promotion

Before 1900, most women worldwide breastfed their babies, so the breastfeeding rate was high at that time (WHO, 2001). However, after 1920, the rate of breastfeeding declined sharply, as evaporated formula became widely available (WHO, 2001). WHO and UNICEF have provided numerous strategies, such as the Baby Friendly Hospital Initiative (BREASTFEEDING HI) in the early 1990s and World Breastfeeding Week (WBW) formed in 1991, to promote and support breastfeeding worldwide. Both strategies were long term and effective, and were able to increase the breastfeeding rates again between the late 1950s and early 1960s (WHO, 2001). In 1996, WHO/UNICEF declared that Thailand was the second most successful country of Asia after China in establishing the Baby Friendly Hospital Program (Thailand Ministry of Public Health, 1999). In order to increase the rate of breastfeeding, the World Health Organisation has encouraged breastfeeding education from the prenatal to the postnatal period so that this education can become more effective, resulting in increased breastfeeding rates. In summary, antenatal education, particularly focused on breastfeeding, is one of the important strategies for building women’s positive attitudes towards breastfeeding which will lead them to exhibit higher rates of breastfeeding (WHO, 2010; UNICEF, 2010).

1.5.2 Breastfeeding rates worldwide

The global rates of breastfeeding are still low despite the worldwide trend to improve breastfeeding education following WHO and UNICEF recommendations (UNICEF, 2010). Based on information from UNICEF 2005, 39% of infants worldwide were initially breastfed; similarly, 35% of infants were exclusively breastfed to six months old. Between 1996 and 2008, the number of infants exclusively breastfed up to six months of age increased in most regions of the world. In the developing world, the rate has risen from 33 to 37%; the rate has increased more in Asia, from 38 to 42%, while in Africa it has risen from 26 to 32%. The exclusive breastfeeding rate at six months in the United States and Canada was only 33 and 31%, respectively. A rate of approximately 47% has been reported for Australia. The exclusive breastfeeding rate is also low in many European countries, especially France, Italy, Switzerland, and the United Kingdom. Rates are very low in South Africa, with only eight percent of children four to six months of age being exclusively breastfed (UNICEF, 2010). WHO has continued to provide well-designed breastfeeding promotion programs and education in order to increase the rates of breastfeeding worldwide in response to these unsatisfactory breastfeeding rates (WHO, 2010).

In 2012, the 65th United Nations General Assembly announced a target for 2022 of a 50% exclusive breastfeeding rate for babies under six months of age. However, a current global average exclusive breastfeeding rate is 36% (based on 2005 – 2008 data) (Department of Public Information. United Nations 2012).

1.5.3 Breastfeeding rate in Thailand

In Thailand, the national exclusive breastfeeding rate at six months of age has not yet achieved the national target of 30% even though the Thailand government has been implementing predominant breastfeeding promotion programs (Ministry of Public Health; Thailand 2010). Even though the rate of exclusive breastfeeding at six months in Thailand has achieved a national target of 30%, the rate is still lower than the current global exclusive breastfeeding rate of 36%.

1.5.4 Author's personal background and breastfeeding experience

Registered Nurse and Midwife in the labour room

In March 1991, I graduated with a Bachelor Degree in Nursing and Midwifery. I worked as a midwife in the delivery room at one of the public hospitals in Thailand for seven years while I studied for a Master Degree of Science, majoring in Public Health Administration. When I started working full-time I was under the supervision of senior midwives for one month before I could operate independently with full responsibility. In 1993, public hospitals adopted the WHO policy of the Breastfeeding Health Initiative (BHI). One of these policies stated that when a baby is born, it is encouraged to have skin-to-skin contact with the mother and should be breastfed immediately or within the first 30 minutes after birth. This policy is important, as it begins the bonding process (World Health Organisation (WHO) 2010). This is consistent with midwifery philosophy about bonding and initiating breastfeeding.

Registered nurse and midwife in postpartum ward

I worked as a midwife in the postpartum ward for three years in other public hospitals. My time there assisted me to learn how to care for women during the postpartum period, with emphasis on issues related to breastfeeding. I acquired knowledge about exclusive breastfeeding until the baby reaches six months of age. It is my usual practice to follow the WHO breastfeeding policy for supporting exclusive breastfeeding for babies.

Midwifery lecturer at the Faculty of Nursing

I have been working as a midwifery lecturer in the Department of Obstetrics and Gynaecological Nursing, Faculty of Nursing in Chiang Mai, Thailand, since 2001. My job involves teaching third and fourth year student nurses and midwives, either in the hospital or in the classroom, about how to care for women appropriately during their maternity period. I continue to gain more knowledge and develop more appropriate practices as a midwife and a lecturer in midwifery.

Breastfeeding experience

I had my own birthing experience in December 2001, when I gave birth to my first child without any complications. She weighed 3,520 grams with a healthy APGAR (Appearance, Pulse, Grimace, Activity, and Respiratory) score of nine to ten. Contrary to my training as a midwife, my daughter was wrapped in a two-ply towel and put on my breasts for breastfeeding. Although my baby was close to me, and I breastfed, I was disappointed that my baby did not have skin-to-skin contact. Even though I knew this was not the recommended technique, I accepted the practice of breastfeeding with the baby wrapped after birth. I fed my daughter with breast milk exclusively for the first six months. At six months, in addition to breast milk, I introduced complementary food to her and continued until she was nine months old, when my breast milk supply was decreasing and I complemented my breast milk with formula. My breast milk supply decreased due to a lack of breast stimulation as a result of inadequate facilities for feeding or expressing. I was disappointed that I could not continue breastfeeding my first child, as I had intended to follow the WHO recommended period of breastfeeding of up to two years or more.

In 2005, I was very glad to have a more successful breastfeeding experience with the birth of my second child. Immediately after the birth of my son, he was brought immediately to my breasts, skin-to-skin, and I was able to breastfeed him exclusively for the first six months. Once he was three months old, I needed to return to work and was able to supply breast milk for bottle feeding at child care during the weekdays. I was able to breastfeed him in my lunch break. In addition to breast milk, he was given complementary feeding at six months until he was two years old. At that age, although I was expressing breast milk for him to drink while he was in childcare, my breast milk supply diminished and I needed to add UHT milk. I did this until he was three years old.

When I compared my two different breastfeeding experiences, I was impressed that I could breastfeed my first child during the first six months exclusively and continue for almost a year without formula. However, I felt that my second child was such a lucky child, as he experienced the breastfeeding stage for three years, which was longer than my first child by two years. I could not follow the WHO recommendation to breastfeed to two years or more. I therefore had learned that in 2001, breastfeeding education and support was not widely available: however, most women are now better informed. Breastfeeding policy and breastfeeding practices in many areas of Thailand improved during that time and continue to do so.

1.6 MIDWIFERY PHILOSOPHY

The philosophy that underpins antenatal breastfeeding education for this study is based on The Australian College of Midwives' philosophy of midwifery (The Australian College of Midwives 2011).

The Australian College of Midwives (2011) considers that midwives being with women throughout during pregnancy, childbirth, and early parenting to be healthy processes, which are profound and precious events in each woman's life. The Australian College of Midwives also believes it is the right of every pregnant woman to have access to continuity of care by a known midwife for her pregnancy, labour and early postnatal period. Midwives are the most appropriate primary care providers for healthy mothers and newborn babies and are able to refer to specialist medical care if the need arises (The Australian College of Midwives 2011). Midwifery is founded on respect for women and on a strong belief in the value of women's work in bearing and rearing each generation. Midwifery is holistic in its approach and recognises each woman's social, emotional, physical, spiritual, and cultural needs, as the midwife works with the woman to optimise her psychophysiology during childbearing (The Australian College of Midwives 2011).

The midwifery philosophy can be explained together with optimising psychology. Optimising psychology is the disciplinary field that studies mind-body interactions, the impact of environment, social and cultural influences on physiological response and behaviour (Berntson and Cacioppo 2007). For a midwife, optimising psychophysiology means creating contextual conditions and coaching the woman so that her body, mind, and spirit function in a holistic and integrated way. Only when a woman's body, mind, and spirit function optimally is her baby able to develop optimally.

In brief, it can be seen that midwifery is a partnership between a midwife and a woman, and her family and her community, which is based on common values. Midwifery is also the sharing of information regarding empowerment, supportive behaviour, and respect for the rights of women and their families to determine their own care throughout pregnancy, labour, birth, and the postnatal period. This study applies midwifery philosophy which can add to midwifery knowledge and skill so that the midwifery-led model, developed in this study, could be effectively used to encourage women to breastfeed.

1.7 OVERVIEW OF DISSERTATION

This dissertation consists of seven chapters.

In chapter two, the importance of breastfeeding is described.

In chapter three, the literature on antenatal breastfeeding education and the literature directly relevant to the research question are reviewed. There is a comprehensive description of the search strategy and a critical review of the research literature to determine factors that contribute to a midwife-led evidence based antenatal breastfeeding education intervention.

In chapter four, the study design is described. This includes describing the elements of the pilot randomised controlled trial. The data collection methods, including analyses, are then described and finally the ethical issues of the study.

Chapter five, the design for the breastfeeding education program is described. The implementation of the breastfeeding education intervention is also described.

In chapter six of the dissertation, the results and statistical analyses are presented. This chapter also presents the descriptive characteristics of participants in the study. The consort guidelines are used in the reporting of the data in this study.

Chapter seven reviews the whole dissertation. The chapter outlines the findings and discussion. This chapter describes limitations, recommendations and conclusions.

CHAPTER 2 BACKGROUND: THE IMPORTANCE OF BREASTFEEDING EDUCATION

The purpose of this chapter is to describe previous research and international breastfeeding initiatives that are related to antenatal breastfeeding education. This chapter contributes information that is relevant for effective antenatal breastfeeding education.

2.1 INTRODUCTION AND INTERNATIONAL BREASTFEEDING INITIATIVES

The World Health Organisation; WHO, and United Nations Children's Fund; UNICEF, (WHO | Exclusive breastfeeding) recommend exclusive breastfeeding for the first six months of life. Thereafter, infants should receive complementary feeding with continued breastfeeding up to two years of age or beyond, as long as the woman still has breast milk (World Health Organisation 2012).

It is important to encourage and empower women to breastfeed in the antenatal period as breastfeeding has been recognised as a unique contributory factor for improving health. Breastfeeding not only improves infants' but also women's health (World Health Organisation 2012). In early childhood, breastfeeding is an important factor as it contains all the nutrients, antibodies, hormones and antioxidants that babies need to prevent illnesses. Breast milk is the most important factor for at least the first six months of life to achieve optimal growth, development and health encompassing physical, mental and emotional attributes. Breast milk provides immune protection for the baby (Heather and Dietsch 2010, World Health Organisation 2012). When the baby is in the womb, it is being protected from pathogens. A newborn's immune system is not nearly as effective as an adult's or even an older child's. A newborn's immune system could take many months before a baby can adequately defend itself from pathogens. Breast milk is the most important part of babies' diet throughout the first year of life, until the child initiates weaning (Pollard 2012, World Health Organisation 2012). Moreover, breastfeeding can reduce the risk of breast and ovarian cancer, assist in losing weight, lower rates of diabetes and prevent osteoporosis in women (World

Health Organisation 2012). Breastfeeding also nurtures maternal-infant attachment (World Health Organisation and United Nations Children's Fund 1989).

Globally, exclusive breastfeeding rates are still lower than the target of the WHO/UNICEF recommended period of six months postnatally, even though many countries have developed numerous interventions and strategies to improve them (UNICEF, WHO et al. 2010). In many parts of the world, especially in Asia, the major breastfeeding problems are societal and associated with commercial pressures to stop breastfeeding. This includes massive marketing and promotion by formula companies (The United Nations Children's Fund 2003, The United Nations Children's Fund; Thailand 2012). Inaccurate advice from some health professionals who are not skilled and trained in breastfeeding is also considered to be of concern (World Health Organisation (WHO) 2010, Thailand Breastfeeding Organisation 2011, The United Nations Children's Fund; Thailand 2012, World Health Organisation (WHO) 2012). In Thailand, many women have to return to work soon after birthing, and they face a number of challenges and pressures which often lead them to cease exclusive breastfeeding.

2.2 THAI CULTURAL ASPECTS INFLUENCING BREASTFEEDING

The culture and society of Thailand

Thailand is a developing country located in Southeast Asia and it is mostly an agricultural area. There are 76 provinces with a population of approximately 67,500,000. The family is the cornerstone of Thai community. Family life is often more closely attached than in western cultures. Families are often extended, although nuclear families are becoming more common. Thai family structure is a form of hierarchy with the parents at the top. Children are respectfully taught to honour their parents. The respect of the younger towards the elder generation is a basic value in Thailand. The Buddhist religion, the monarchy and the military have also helped to shape its society and politics.

Thailand is one of the most ethnically diverse countries in the world that hosts more than 30 ethnic groups varying in history, language, religion, appearance, and pattern of

lifestyle. The large majority of this population is “Thai (about 50%)” and includes numerous “Hill-tribes” living primarily in the mountains of the North. There are also ethnic communities such as the Chinese (about 40%), the Malay (about 5%) or the Khmer. Each group has its own customs and traditions (Tourism Authority of Thailand 2012).

Thailand and breastfeeding practices

The substandard rates of breastfeeding in Thailand as previously described in chapter 1 could be influenced by various groups’ breastfeeding traditions and beliefs. In addition, formula distribution and hospital practices, cultural factors, work policies, and lack of breastfeeding support for women (Ministry of Public Health; Thailand 2012) also affect breastfeeding practices. The low rates of breastfeeding could be influenced by the factors below.

2.2.1 Cultural factors

There are many ethnic groups living in Thailand and they have their own customs including beliefs about breastfeeding, so these could affect successful exclusive breastfeeding at six months of age. For example, newborns may be breastfed as well as initiating feeding with rice-milk. The usual breastfeeding practice of Thai ancestors was that babies were exclusively breastfed for one month and then commenced on solid foods. However, those babies were still breastfed and they were most likely to have been breastfeeding for two or three years of age up to ten years of age (Ministry of Public Health; Thailand 2010, Ministry of Public Health; Thailand 2012).

2.2.2 Governmental promotion of breastfeeding education

The Thai government has adopted “The Baby-Friendly Hospital Initiative” policy. The national breastfeeding promotion project in Thailand commenced in 1989 and promoted the Baby-Friendly Hospital Initiative (Ministry of Public Health; Thailand 2010). In 1991, the “Ten Steps to Successful Breastfeeding” practice and the “Baby-friendly Hospital Initiative” program were launched and promoted exclusive breastfeeding over the last two decades. In addition, the Baby-Friendly Hospital Initiative (BFHI) World

Breastfeeding Week (WBW), including the “Sai Yai Ruck” project invented by princess Srirat, the 9th King’s daughter-in law, has been implemented in many areas of Thailand. These projects significantly increased exclusive breastfeeding rates to about 29.6% (Ministry of Public Health; Thailand 2010).

Following these initiatives, the Thai government has been attempting to educate women to breastfeed longer, but many women are still breastfeeding for shorter periods than suggested. Most new mothers in Thailand attempt to breastfeed, but many of those women do not continue to exclusively breastfeed for the recommended period of six months, so the education provided has not yet resulted in an improvement in the exclusive breastfeeding rate target at six months of age of 50% (Department of Public Information. United Nations 2012).

2.2.3 Availability of formula

The availability of formula is a factor that has resulted in decreased breastfeeding rates. An additional concern is that many companies actively promote the use of formula. The companies promote the idea that formula nutrients are as good as those in breast milk and formula is preferable both for babies and mothers. Formula is advertised freely on television, websites and at shopping centres. Recently, many public hospitals and health services have not authorised companies to promote formula in their facilities (Thailand Breastfeeding Organisation 2011). However, there are many health services and private hospitals that allow these companies to promote their formula to pregnant women including postpartum mothers when still in hospital, as mothers are required to stay in hospital for a few days after birth to ensure both mother and baby are in optimal health. The availability of formula increases the impact on declining breastfeeding rates. During the postpartum period, breast milk supply may be sporadic. As a result; breastfeeding mothers tend to believe that their breast milk supply is inadequate, and this may influence a woman’s decision to give her baby formula. This requires midwifery support and education to influence and increase breastfeeding rates.

Some formula companies are implementing new marketing strategies aggressively promoting their product to many pregnant women at their home including those who work in factories/industries because they are not permitted to do so in public hospitals / health services (Thailand Breastfeeding Organisation 2011).

2.2.4 Family support and influence

Thailand's social influence on breastfeeding practice is considered in the context of support, obedience and respect. Women's parents, who may not have adequate knowledge and skill about breastfeeding, could influence the women who may be undecided about breastfeeding.

Most new Thai parents do not have correct information about breastfeeding, and many of them find it difficult to rely on their family for accurate information and appropriate assistance about breastfeeding. For instance, some women's parents and their in-laws might think that feeding baby with frozen breast milk is quite unusual, and of poor quality. In addition, some women's parents believe that formula assists babies' growth and development. Advertising often supports this, so they indirectly encourage the mothers to give the babies formula as advertised. Previous practices of introducing solid food to baby earlier than in modern Thai society are also emphasized influencing women to give solid food to babies who are between one and three months. This is contrary to current breastfeeding advice recommended by WHO and UNICEF.

2.2.5 Work policies

Work policies are such that maternity leave is optional of short duration. These policies provide up to 90 days with paid maternity leave. Thai women's labour has contributed to the rapid economic growth of the country. Maternity leave is for 90 days after delivery for government officials and private sector workers. However, some individual businesses provide the women with 30 to 45 days of maternity leave. The days of maternity leave include holidays that occur during the period of leave. The employees are entitled to be paid for the first 45 days of the leave, but the remaining leave days can be either unpaid or paid depending upon the employers policies.

Consequently, many women who need wages try to stop breastfeeding before returning to work. Some women believe that storing breast milk at home is difficult when they return to work. Most women are also uncomfortable about expressing breast milk at their workplace even though many workplaces have a private area for breast pumping. Likewise, women are often reluctant to feed their babies outside their home. Many Thai

people think that breasts are culturally associated with sex, so it is considered embarrassing to breastfeed babies in public.

The Thai government's policy of paternity leave for working fathers was legislated on 24 January 2012. The Thai government is attempting to improve the breastfeeding rates by providing an additional incentive of 15 days paid paternity leave for fathers to provide support for their wives who have birthed. This incentive will ensure that women are relaxed and rested in order to increase breast milk production. (Thailand Breastfeeding Organisation 2011).

2.2.6 Breastfeeding information

Inaccurate breastfeeding information provided to women has also been a significant concern. The information provided about breastfeeding might not have been presented accurately by the women's family/society. Moreover, many new parents do not possess basic information and knowledge, although they may have a general understanding of the benefits of breastfeeding (WorldVision 2009, Ministry of Public Health; Thailand 2010, Ministry of Public Health; Thailand 2010, Thailand Breastfeeding Organisation 2011).

2.2.7 Skilled breastfeeding providers

The current concern is that some healthcare providers are not aware of current breastfeeding information. Some providers advise women to stop breastfeeding earlier than the recommended period by WHO and UNICEF as they think breast milk has less nutrients over time. This contributes to women's inadequate breastfeeding knowledge (Thailand Breastfeeding Organisation 2011). Some healthcare providers are not specialists in breastfeeding, so they may provide incomplete breastfeeding information to women. Although many women have a general understanding about breastfeeding, they may lack specific breastfeeding knowledge and information available from skilled midwives and lactation consultants.

2.3 MIDWIFE DELIVERY OF ANTENATAL BREASTFEEDING EDUCATION

There is a great need for midwives in developing countries to contribute to increasing breastfeeding rates which could improve infant health and reduce the incidence of neonatal deaths (WorldVision 2009). In Thai society, skilled and knowledgeable midwives are in demand. The midwives' role in breastfeeding education is to improve, protect, and support breastfeeding (Fraser and Cooper 2009, Marshall and Raynor 2010). It is important that skilled midwives provide education about breastfeeding that is based on evidence based practice (World Health Organisation and United Nations Children's Fund 1989) so that breastfeeding rates can be improved. Midwives have the best opportunity to provide breastfeeding education during antenatal birthing classes.

2.4 BREASTFEEDING EDUCATION

World Health Organisation and United Nations Children's Fund has determined that antenatal breastfeeding education is critical to successful breastfeeding (World Health Organisation and United Nations Children's Fund 1989). Breastfeeding education should include teaching the benefits of breastfeeding to the mother, the baby, and society; appropriate positioning for feeding and latching; and breastfeeding resources (Pollard 2012). In addition, antenatal breastfeeding education content should include breastfeeding classes and workshops to increase breastfeeding rates. However, it has been reported that many hospital-based antenatal breastfeeding education classes do not provide sufficient breastfeeding content (Pollard 2012).

Breastfeeding education content should be based on the WHO and UNICEF recommendations. It is necessary that women are advised about essential breastfeeding information, knowledge and skills so that they can breastfeed successfully. The recommended breastfeeding education content is organised into three headings: 1) "Ten Steps to Successful Breastfeeding" recommended by WHO; 2) Breastfeeding education in the antenatal and post-partum period; and 3) Breastfeeding problems and solutions.

2.4.1 "Ten Steps to Successful Breastfeeding" recommended by WHO

WHO Breastfeeding policy

Exclusive breastfeeding is recommended up to six months of age, with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond (World Health Organisation 2012).

Key factors for successful breastfeeding "Ten Steps"

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in - that is, allows mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

2.4.2 Breastfeeding education and practices for women in antenatal and post-partum periods

Providing breastfeeding education at crucial periods of time during pregnancy is considered very important as psychological changes occur that can motivate women to

breastfeed at specific points in the pregnancy (Fraser and Cooper 2009). In the first trimester of pregnancy, general breastfeeding guidelines may be provided for pregnant women and their families. Breastfeeding education and practice opportunities can then be provided to the women in their second and third trimesters (Fraser and Cooper 2009, Marshall and Raynor 2010, Macdonald and Magill-Cuerden 2011).

Breastfeeding education in the antenatal period

In the antenatal period, breastfeeding education content should mainly focus on "The importance of breastfeeding", "Breast milk production during pregnancy", and "Breast care".

The importance of breastfeeding

Women should be informed about the benefits of breastfeeding as early as possible. They should be encouraged to discuss the importance of breastfeeding with their families.

Breast milk production

During pregnancy, women can be introduced to knowledge about the anatomy of the female breast and breast milk production. The structure of the external female breast includes the nipple, areola, and Montgomery glands and the internal breast structure includes the ductal system; lactiferous ducts, milk ducts, and alveoli (Pollard 2012).

There are three major phases of growth of the female breast that impact on lactation: 1) embryological and infancy; 2) puberty, and 3) pregnancy and lactogenesis (Pollard 2012). The pregnancy and lactogenesis stage is pertinent to improve successful breastfeeding.

The nipple is located in the centre of the areola and contains a number of milk ducts. The areola surrounds the nipple and is important for the baby to take the majority of the areola into its mouth. Breast size increases for most women during pregnancy. The breast begins to function as a milk producing gland during the first trimester of pregnancy. Breast function is linked with increasing levels of prolactin, which is produced from the anterior pituitary gland. In the second trimester at about 12-16 weeks gestation, the milk glands begin to develop thin yellow fluid known as "colostrum".

Women may experience leaky colostrum as the milk ducts are preparing for breastfeeding, but breast milk is not ejected until following birth.

Breast milk is produced during pregnancy. A neuro-hormonal reflex that causes the milk ejection reflex controls breast milk production. In the antenatal period, the milk ejection reflex is initiated. Milk travels down the milk ducts. Myoepithelial cells surrounding the glandular tissue causes milk ejection. (Olds 2000, Coad and Dunstall 2011, Macdonald and Magill-Cuerden 2011, Pollard 2012).

Breast care

In the antenatal period, breast care involves little preparation for successful breastfeeding. The preparation for breastfeeding in this period is only to ensure that the breasts and nipples are as comfortable as usual. The preparation may focus on earlier detection of women's nipple problems that could affect breastfeeding such as short, inverted, and flat nipples.

Women who have the nipple problems mentioned above are encouraged to pull or pinch the sides of the nipple every day so that the nipple can be extracted. These problems can sometimes make it more difficult to breastfeed because the baby may be unable to latch on well. However, it depends on the degree of the problems as well as the baby itself. If the baby is a strong, healthy and vigorous nurser, the baby may be able to latch on the nipple (Smith 2013, Office on Women's Health 2014). Moreover, some breastfeeding experts recommend not being concerned about nipple problems in this period. Discussion about these problems may lead to anxiety, feeling inadequate and foreseeing breastfeeding difficulties. Once the baby is able to draw the nipple into his/her mouth, his/her lips will then be naturally placed on the areola, so the shape of the nipple is not such a big concern (Macdonald and Magill-Cuerden 2011, Smith 2013).

In addition, in the second half of pregnancy, some maternity health care professionals recommend that gently massaging the breasts after 38 weeks gestation is beneficial because the women will become more familiar and comfortable handling their breasts for breastfeeding after birth (Fraser and Cooper 2009, Macdonald and Magill-Cuerden 2011). Nipple stimulation may also be beneficial for the woman who has not birthed by the due date which stimulates the production of oxytocin and encourages normal

progression of uterine contractions, increasing the chances of normal labour (Fraser and Cooper 2009, Macdonald and Magill-Cuerden 2011, Pollard 2012).

Breastfeeding education and practices in post-partum period

Breastfeeding education content in the postpartum period is mainly focused on skin-to skin contact and early suckling. Advice about breast milk production during the post-partum period, breast care, rooming-in, latching and positioning, hand expressing / breast pumping, storing breast milk, returning to work, and recommendations for increasing breast milk supply are also helpful topics for inclusion in breastfeeding education in this period.

Skin-to skin contact and early suckling

Following birth, the most important factor is “skin-to-skin” contact between the mother and baby. This technique can encourage bonding and release hormones that assist breastfeeding. Early suckling or “baby-led attachment” within 30 -60 minutes after birth, is the active period of attachment, and can be initiated if the baby is placed skin-to-skin on the woman’s chest, thereby increasing the chance of the baby making its own way towards the nipple to facilitate suckling or licking at the breast (Olds 2000, Pillitteri 2003, Macdonald and Magill-Cuerden 2011, Pollard 2012). Not all babies are able to feed promptly after birth. The best way for a mother and baby to learn to breastfeed is to let the baby follow their natural instincts. Many babies are born able to search for the breast without any assistance. A mother’s role is mainly to support and encourage a newborn (Olds 2000, Pillitteri 2003, Macdonald and Magill-Cuerden 2011, Pollard 2012).

Breast milk production

The milk ejection reflex is initiated in the following sequence; 1) physically by the stimulation of the nipple and areola; 2) the nerve impulse stimulates the hypothalamus in the brain to release the hormone called “Oxytocin” (stimulates milk ejection) and “Prolactin” (produces milk).; 3) oxytocin is produced and forces milk into the milk ducts and toward the nipples (Olds 2000, Pillitteri 2003, Macdonald and Magill-Cuerden 2011, Pollard 2012).

Motivating a baby to latch onto the mother's breast and suck properly is suggested as the first important step to successfully breastfeed by maintaining breast milk production and increasing breast milk supply. The "let-down" milk release from the breast is essential to establishing and maintaining milk supply (Pollard 2012, World Health Organisation (WHO) 2012, Smith 2013).

Breast care

In the postnatal period, breast care is most important as mothers can experience breast engorgement including cracked nipples if the baby is not attaching well. Mothers should be taught to effectively empty one breast at each feed in order to prevent mastitis and allow the baby to obtain the thick caloric hind-milk, that is the "let-down reflex" that mothers experience.

Rooming in

Rooming-in in this period is an important step for successful breastfeeding in term of first establishing breast milk supply. It is a great time for giving the baby an opportunity to get used to the mother's breast. During the hospital stay, mothers' breastfeeding experiences should be supervised closely by midwives. New mothers may experience predominant breastfeeding problems.

If both mother and baby are well, they should remain together 24 hours a day whilst establishing breastfeeding. This allows unrestricted breastfeeding and helps mother and baby learn about each other's behaviour and smells, especially the baby's feeding behaviour patterns (World Health Organisation and United Nations Children's Fund 2009).

Latching and positioning

Correct and effective latching and positioning should also be taught to the mother. Appropriate positioning can prevent breastfeeding problems such as cracked, sore nipples and mastitis. The mother can be taught that the baby's tongue remains under the areola and that the majority of the areola is taken into the baby's mouth. The baby's mouth should be at the level of the nipple. Correct positioning and sucking also facilitates emptying of the breast and let-down of hind-milk, thus allowing for further nourishment and settling of the baby.

Hand expressing / breast pumping

Hand expressing is also suggested to the mother in order to stimulate breast milk production. Effective hand expression can also be effective if the breasts are so full that the baby is unable to latch onto the breast effectively. A few minutes of hand expression may facilitate softening the areola so that the baby may then be able to latch onto the breast. If the breast is too full and engorged, the baby may often latch and slip off, causing further nipple damage and trauma, further reducing the chance of successful breastfeeding .

Storing breast milk

Storing breast milk provides a baby with exclusive breast milk feeds at times when the mother may not be able to breastfeed the baby. Storage of breast milk is recommended not only to all mothers who are planning to return to work but also to the full-time mothers who are sometimes separated from their baby. Pregnant women should be encouraged to practice hand expression including breast pumping with a breast model. Storage of breast milk is easily accomplished and can be stored in a refrigerator for three to five days so that babies can breastfeed as long as possible. Frozen breast milk is becoming a trend worldwide. Breast milk can be stored in the single-door refrigerator with a freezer compartment for two weeks, and six to twelve months in a deep freeze (Abbott, Renfrew et al. 2006, Thailand Breastfeeding Organisation 2011, World Health Organisation 2012, World Health Organisation (WHO) 2012).

Returning to work

Mothers who return to work can be encouraged to be well-prepared for successful breastfeeding. They are advised to store frozen breast milk step by step as early as possible. The women may then have sufficient breast milk stored to be able to feed their baby when at work. When the mothers return to work, there are several ways to feed the baby breast milk; 1) breastfeeding; 2) bottle feeding; and 3) cup feeding. The women are advised to select the best method that is suitable for them. If the mother chooses bottle feeding, the baby will be introduced suckling the teat at one month of age. This recommendation is to prevent nipple confusion. If the teat was introduced before one month of age, the baby is more likely to prefer a teat rather than the mother’s nipple.

The baby may not be suckling at the mother's breast which may contribute to insufficient breast milk supply. Cup feeding can be introduced to the baby at any time as it does not pose any nipple confusion problems (Fraser and Cooper 2009, Thailand Breastfeeding Organisation 2011, Pollard 2012).

Recommendations to increase breast milk supply

Primarily giving the baby exclusive breast milk without water or complementary feeds of formula is an exceptional method to increase breast milk supply. Baby suckling, and the woman's nutrition, rest, and emotional health are the major factors that ensure adequate breast milk supply as described below (Li, Fein et al. 2008, Macdonald and Magill-Cuerden 2011, Thailand Breastfeeding Organisation 2011, Australian Breastfeeding Association 2012, World Health Organisation 2012).

a) Baby suckling: To stimulate constant prolactin hormone production and to reduce blocked ducts or mastitis, allowing a baby to suck as often as it likes.

b) Women's nutrition: Having sufficient nutrients in food and fluid (especially water) is most important to improve breast milk supply.

c) Women's rest and sleeping: Breast milk will be produced smoothly and consistently if women gain adequate periods of rest and sleep.

d) Women's emotional health: Breastfeeding mothers are encouraged be relaxed to enhance the let-down reflex and subsequent production of hind-milk. The breast milk production hormone, prolactin, can be inhibited by stress, resulting in decreased breast milk supply.

2.4.3 Breastfeeding problems and solutions

Breast engorgement, blocked ducts, mastitis, short / inverted / flat nipples, nipple pain or trauma, and insufficient breast milk supply can affect women during the breastfeeding initiation period. Structural and functional disorders in the newborn can also affect successful breastfeeding.

Breast engorgement:

Within a few days after birth, breast milk becomes available to a baby. The breasts can become swollen and engorged. The most effective means of preventing breast engorgement is ensuring that the newborn has unrestricted access to the breast, feeds for long periods of time and feeds frequently in a 24 hour period. Latching on well can prevent breast engorgement and enable the breasts to empty effectively (Pollard 2012, World Health Organisation (WHO) 2012, Smith 2013).

Blocked ducts:

Blocked ducts are caused by milk stasis and inefficient latching and suckling; and mastitis can develop due to blocked ducts when a baby does not empty the breast effectively. This problem often occurs in the first week after birth. Teaching the baby to latch on well and allowing the baby to empty the breast is important so that blocked ducts and mastitis do not occur (Pollard 2012, World Health Organisation (WHO) 2012, Smith 2013).

Mastitis:

Breasts may become swollen and engorged in the first few weeks after birth and swollen and inflamed breasts can lead to mastitis. Mastitis is due to an infection and it is often caused by milk stasis and ineffective emptying of the breasts due to ineffective latching. If a baby only feeds for a short while on both breasts, this poses a risk for ineffective emptying of the hindmilk in the breasts resulting in engorged, painful breasts. Mastitis may develop and the baby may become unsettled because only foremilk is ingested, without the important thick caloric hind-milk that assists the baby to sleep. Primiparous mothers are more likely to develop mastitis. Mastitis is painful and usually exhibits as flu like symptoms. The most important factor is to continue breastfeeding to facilitate effective emptying of the breasts as well as antibiotics and analgesia. Information about preventing mastitis is also important to be able to increase breastfeeding rates (Pollard 2012, World Health Organisation (WHO) 2012, Smith 2013).

Short / Inverted / Flat nipples:

All women exhibit different nipple sizes. Some women find it is more difficult to breastfeed if they have short, flat, or inverted nipples. One of the main factors contributing to components of successful breastfeeding is recognising when the mother needs assistance from a health professional who is supportive of breastfeeding, or from a friend or family member with breastfeeding experience. Encouraging a baby to suckle is the first thing that mothers can learn. Using a nipple shield can assist the baby to latch onto the breast when the mother has flat nipples and requires supervision by midwives (Olds 2000, Pillitteri 2003, Macdonald and Magill-Cuerden 2011, Thailand Breastfeeding Organisation 2011, Australian Breastfeeding Association 2012, Pollard 2012).

Nipple pain or trauma

A baby who is not attaching well to the breast may cause nipple pain and trauma and teaching the baby to latch on well to the breast can solve this problem. Better attachment can also be assisted by using a nipple shield (Pollard 2012, Smith 2013).

Insufficient breast milk supply

A common concern for breastfeeding mothers is whether they have an adequate breast milk supply and whether their babies are getting enough milk (Australian Breastfeeding Association 2012). Insufficient milk supply is also the most common reason mothers give for discontinuing their efforts to breastfeed during the first year (Li, Fein et al. 2008). The common causes of insufficient breast milk supply are; 1) a baby not attaching well to the breast; and 2) a baby does not feed often enough. Frequently breastfeeding the baby is the most important factor in increasing the breast milk supply (Macdonald and Magill-Cuerden 2011, Thailand Breastfeeding Organisation 2011, Australian Breastfeeding Association 2012, Pollard 2012).

Structural and functional disorders that affect breastfeeding

Breastfeeding is recognised as the most natural thing in the world. The baby's structural and functional disorders that can affect breastfeeding are tongue-ties (short tongue or short frenulum), hare-lips and cleft palates. Many babies with these problems can be breastfed successfully. A tight lingual frenulum and associated feeding problems can be

alleviated by snipping the tongue-tie without anesthetic (Olds 2000, Macdonald and Magill-Cuerden 2011, Pollard 2012).

2.5 FACTORS FOR CONSIDERATION IN EDUCATIONAL STRATEGIES DESIGNED TO ENCOURAGE WOMEN TO BREASTFEED

This section describes the appropriate factors for consideration in educational strategies designed to encourage women to breastfeed. Two factors have been recommended by the previous studies and are described below: 1) women's gravidity; and 2) women's trimester.

2.5.1 Women's gravidity

Becoming a new parent is a challenging and special time. First-time motherhood can be overwhelming and magical at the same time. The World Health Organisation promotes childbirth preparation classes in all health care services. In particular, new parents are encouraged to attend child birth preparation classes including breastfeeding education so that they can be well-prepared for their birth and successful breastfeeding (Ministry of Public Health; Thailand 2010).

2.5.2 Women's gestational age / trimester

WHO and UNICEF recommend that breastfeeding education is important for parents; especially new parents (World Health Organisation 2012). However, breastfeeding promotion should be provided based on the pregnant woman's psychological interest and changes during pregnancy (Olds 2000, Pillitteri 2003). Olds (2000) and Pillitteri (2003) stated that in the first trimester, women were mostly interested in body image and minor discomforts such as morning sickness. In the second trimester, women started becoming interested in their baby, sensing the baby's quickening (or fetal movement). In the last trimester, the women were preparing and anticipating childbirth including preparation for breastfeeding (Pillitteri 2003, Macdonald and Magill-Cuerden 2011). This suggests that learning about breastfeeding is most relevant in the third trimester.

In addition, providing sufficient time for women to feel relaxed and comfortable before learning, is an important consideration. Understanding women's needs and enabling them to get to know each other is viewed as supportive (The United Nations Children's Fund 2003, Furber and Thomson 2008).

2.6 PREVIOUS LITERATURE REVIEWS

A recent literature review reported that effective breastfeeding education should be focused on the three key factors that are positively associated with breastfeeding duration. These are woman's breastfeeding intention, woman's perception of her breastfeeding self-efficacy and woman's social support (Meedya, Fahy et al. 2010). These factors are described in detail below.

2.6.1 Breastfeeding intention

Intention to breastfeed is an important factor for successful breastfeeding. Some previous studies have found that pregnant women's breastfeeding intentions are a good predictor of actual breastfeeding practice. Antenatal intention to breastfeed was reported to have an influence on initiation and duration of breastfeeding (Donath and Amir 2003, Blyth, Creedy et al. 2004, Forster, McLachlan et al. 2006). Donath and Amir's (2003) study reported at six months postpartum that the mean duration of breastfeeding for women intending to breastfeed for at least five months was 4.4 months (95% CI 4.3-4.4), compared with 2.5 months (95% CI 2.4-2.6) for the women with an antenatal intention to breastfeed for only one month. The author concluded that maternal intention was a stronger predictor than the standard demographic factors combined (Donath and Amir 2003). Blyth et al who conducted a longitudinal study of 300 Australian women, also reported that women who intended to breastfeed for longer than 12 months were 2.4 times more likely to continue breastfeeding until four months compared with the women who intended to breastfeed for less than six months (87.5% VS 35.7%, $P < 0.001$) (Blyth, Creedy et al. 2004). Likewise, Forster et al. (2006) reported that women with a very strong desire to breastfeed was one of the significant factors associated with successful breastfeeding at six months. The results of the Forster et al. (2006) study indicated that the women who had no intention to exclusively breastfeed at six months

of age, were more likely to be predominantly breastfeeding at six months instead (OR 0.47, 95% CI 0.30, 0.62) (Forster, McLachlan et al. 2006).

2.6.2 Self-efficacy

Self-efficacy is a person's belief in his / her own competency. They believe that they are capable in performing a certain behaviour to achieve a certain target. (Bandura 1969, Bandura 1994, Bandura 1997). Bandura's basic principle is that *people are likely to engage in activities to the extent that they perceive themselves to be competent at those activities.* The theory of self-efficacy suggests that human accomplishments and positive well-being require an optimistic sense of personal efficacy. Bandura attempted to explain people's ability and it is an individual's confidence in their perceived ability to be able to perform a specific behavior. The most effective way of creating a strong sense of self-efficacy is through gaining experience with the skills to be learned.

According to Bandura's (1994, 1997), theory of self-efficacy described above, a woman's ability to breastfeed can be largely predicted by the woman's belief in her ability to breastfeed. The theory discusses that if one feels confident to be able to perform a skill well then one is naturally more motivated to perform that skill in the future. Self-efficacy theory therefore applied to this study was emphasised on skill accomplishment and future breastfeeding problem solving (Bandura 1994, Bandura 1997).

Self-efficacy strategies

Self-efficacy strategies are described as: 1) vicarious learning/experiences (modelling); 2) verbal persuasion; 3) physiological and psychological factors, and 4) mastery experiences (Bandura 1994). These four strategies were relevant to the antenatal breastfeeding intervention education program in this study as described below.

1) Vicarious learning/experience (modelling)

These experiences are based on observation of social modelling.

Concept: "Seeing someone who is similar to us assists people to achieve their goals"

The applicable tools for this learning experience include *models of dolls and breasts*. Women can also be encouraged to ask friends or colleagues who experienced successful breastfeeding.

2) Verbal persuasion

Verbal persuasion consists of verbally influencing people about capabilities they possess to realise certain activities. Skilled and capable people are more likely to be more motivated.

Concept: "People's beliefs about their ability to master a situation are influenced by their teachers, parents, coaches and friends

The applicable tools for this approach include *participants* that comprise *partners* and *women's family/friends and the midwife who provides information and support in the antenatal sessions.*

3) Physiological and psychological factors

Self-efficacy is also related to physiological and emotional status. People can interpret stress and tension as signs of susceptibility to poor performance.

Concept: "Physiologically and psychologically healthy people perceived that they can function more effectively than those who are less healthy"

The applicable tools for this approach include the *woman's belief* that she will have the necessary physiological and physiological responses to be able to breastfeed successfully. This belief can be reinforced by the support of the midwife during antenatal sessions.

4) Mastery experience

These experiences produce strong and more generalised resolutions of self-efficacy.

Concept: "When people attribute successes to internal, stable and global factors, they will experience a sense of mastery and this will reinforce their self-efficacy"

The applicable tools for this approach include *the midwife's support during practical skills sessions and follow up phone calls to provide breastfeeding support if required.*

There have been a number of studies that supported the connection between women's success with breastfeeding and their self-efficacy score. Women, who have reported high breastfeeding self-efficacy, are also more likely to breastfeed successfully. Mothers with high breastfeeding self-efficacy scores are also more likely to have longer breastfeeding duration (Dennis 2006, Baghurst, Pincombe et al. 2007, McCarter-Spaulding and Gore 2009). Dennis (2006) reported evidence that breastfeeding self-efficacy is an important variable that significantly influences initiation and duration rates (54 % of variance in Breastfeeding Self Efficacy Scale (BSES) scores at 1-week postpartum) (Dennis 2006). Likewise, Baghurst, Pincombe et al. (2007) assessed the ability of a Breastfeeding Self-Efficacy Scale (BSES) measured at one week postpartum to predict the duration of breastfeeding in first-time mothers. In their study the score at one week postpartum was a strong predictor of the duration of breastfeeding in those mothers (Baghurst, Pincombe et al. 2007). Similarly, McCarter-Spaulding & Gore, (2009) determined whether breastfeeding self-efficacy scores predicted the duration and pattern of breastfeeding in a sample of black women of African descent. They found that higher levels of breastfeeding self-efficacy predicted longer duration and a more exclusive pattern of breastfeeding at one and six months postpartum ($p < 0.01$) (McCarter-Spaulding and Gore 2009). Furthermore, the effectiveness for increased self-efficacy on preventing and managing breastfeeding problems has also been established. Otsuka, Dennis et al. (2008) examined the relationship between maternal perceptions of insufficient milk and breastfeeding confidence using the Breastfeeding Self-Efficacy Scale (BSES). Mothers' perception of insufficient milk at four weeks postpartum were significantly related to low breastfeeding self-efficacy as measured in hospital in the immediate postpartum period ($p < 0.001$) (Otsuka, Dennis et al. 2008).

2.6.3 Breastfeeding support

Breastfeeding support is one of the key factors for successful breastfeeding. The support from a woman's family and community can encourage women to continue breastfeeding; especially, the mothers who need to return to work. Professional support is also important to be able to support a woman to breastfeed for a longer period of time. Women who are supported and encouraged are more likely to feel confident about

their ability to breastfeed. (Alexander, Anderson et al. 2003, Blyth, Creedy et al. 2004, De Oliveira, Justo Giugliani et al. 2006).

Chapman, Damio et al (2004) reported that peer counsellors can significantly improve breastfeeding initiation rates and have an impact on breastfeeding rates at one and three months postpartum. The study results showed that the proportion not initiating breastfeeding was significantly lower in the intervention group than among controls (8/90 [9%] versus 17/75 [23%]; RR, 0.39; 95% CI, 0.18-0.86). The probability of ceasing breastfeeding also tended to be lower in the intervention group at both one (36% versus 49%; RR, 0.72; 95% CI, 0.50-1.05) and three months (56% versus 71%; RR, 0.78; 95% CI, 0.61-1.00). Likewise, a study by Alexander, Anderson et al. (2003) reported that well-structured, intensive breastfeeding support provided by hospital and community-based peer counsellors is effective in improving exclusive breastfeeding rates among low-income, inner-city women in the United States (Alexander, Anderson et al. 2003).

Cochrane systematic review

A Cochrane systematic review (2005) concerning the effectiveness of antenatal education on the initiation of breastfeeding was published by Dyson, McCormick et al. (Dyson, McCormick et al. 2005). The review included 11 randomised controlled trials. Statistical analyses were conducted on data from eight trials (1553 women). The eight studies were classified and analysed under four types of breastfeeding intervention: 1) health education intervention (five trials) (Hill 1987, Brent, Redd et al. 1995, Serwint, Wilson et al. 1996, Coombs, Reynolds et al. 1998, Ryser 2004); 2) peer support (one trial) (Chapman, Damio et al. 2004); 3) breastfeeding promotion packs (one trial) (Howard, Howard et al. 2000); and 4) early mother-infant contact (one trial) (Lindenberg, Cabrera et al. 1990).

All forms of **health education** included in this review seemed to have increased breastfeeding rates. Five trials (n = 582) that recruited low income women in the USA were meta-analysed. When all studies were combined for meta-analysis, a statistically significant increase in the number of women starting to breastfeed was demonstrated as a result of the health education interventions (RR 1.57, 95% CI 1.15 to 2.15) (Hill 1987, Brent, Redd et al. 1995, Serwint, Wilson et al. 1996, Coombs, Reynolds et al. 1998,

Ryser 2004). A single study (n = 165) evaluating the effect of prenatal and postnatal **peer support** was shown to be effective at increasing initiation rates between predominantly Latina women who were considering breastfeeding in the USA (RR 4.02, 95% CI 2.63 - 6.14, p < 0.00001). The review identified that health education and peer support interventions can result in some improvements in the number of women beginning to breastfeed, but the review did not include the effect of the support from partner and family support (Chapman, Damio et al. 2004). An evaluation of hospital **breastfeeding promotion packs** compared to formula company produced materials about infant feeding in a study of 547 women reported this intervention to be ineffective at increasing initiation rates of breastfeeding (RR 0.93, 95% CI 0.80 - 1.08, P = 0.34).The authors also reported no effect on rates of ceasing breastfeeding up to two weeks (RR 1.58, 95% CI 0.97 - 2.56) (Howard, Howard et al. 2000). A study of **early mother-infant contact** (n = 259; women and their babies) reported the outcome of initiation of breastfeeding followed by complete separation until hospital discharge was not effective (RR 1.05, 95% CI 0.94 - 1.17, P = 0.39) when targeting women with high breastfeeding rates living in poor urban areas in Nicaragua. In addition, this review found that approximately 40% of the women in both intervention and control groups reported the receipt of formula products from other sources than obstetric providers (Lindenberg, Cabrera et al. 1990).

The findings from these studies also suggested that increased rates of breastfeeding are likely to result from informal antenatal education sessions rather than formal sessions. The authors suggested that the interventions included in this review were shown to improve initiation rates among low-income women in the USA. Breastfeeding promotion packs, in contexts where formula feeding packs are very widely distributed, may be an inappropriate use of valuable breastfeeding promotion resources that could be more effectively used for population-appropriate breastfeeding education (Dyson, McCormick et al. 2005).

In summary, this review provides evidence that health education interventions were effective in increasing breastfeeding initiation rates for women on low incomes in the USA, however there was limited information about breastfeeding duration rates.

2.7 SUMMARY OF KEY ELEMENTS IN SUCCESSFUL BREASTFEEDING

In summary, this discussion identifies useful information and concepts for successful breastfeeding that can be considered as key elements. In Thailand, breastfeeding rates have not yet achieved the global target rate recommended by International and Thailand breastfeeding initiatives. In addition, the return to work policies may influence breastfeeding behavior in Thai society.

The WHO recommended breastfeeding (Ten Steps of Successful Breastfeeding) guidelines can be used for educational purposes. In addition, midwives are good sources of breastfeeding information for women who want to be successful at breastfeeding. Breastfeeding is more beneficial for baby and mother and it is possible to succeed with family support. The following elements are recommended for consideration for successful breastfeeding education: 1) breastfeeding initiation and maintenance of breastfeeding for extended duration; 2) timing of breastfeeding education; 3) breastfeeding problems and solutions; 4) breastfeeding education session content; 5) breastfeeding intention; and 6) breastfeeding self-efficacy.

CHAPTER 3 LITERATURE REVIEW

3.1 INTRODUCTION

This section reviews the research and evidence-based practices that are related to midwife-led antenatal education. This review is guided by the question: What types of midwife-led antenatal breastfeeding educational programs are effective in increasing the rate of breastfeeding (breast milk and addition of water only) to a minimum of one month after birth? This review used structured guidelines (Kable, Pich et al. 2012).

3.2 PURPOSE STATEMENT

The purpose of this review was to locate and review research literature about effective midwife-led antenatal breast feeding education programs that increased the rate of breastfeeding (breast milk and addition of water only) to a minimum of one month after birth.

3.3 SEARCH ENGINES

The following databases in Figure 1 were searched: Medline, PubMed, CINAHL, Cochrane and Scopus. A Google scholar search was also conducted to locate relevant theses or research reports. To identify additional possible relevant studies, a manual search of reference lists was also conducted on all retrieved documents. This search identified no additional articles.

3.4 SEARCH LIMITS

The search was limited to locating papers that reported human studies, and that were written in English or Thai during the years 1999 to 2009.

3.5 INCLUSION CRITERIA AND EXCLUSION CRITERIA

Inclusion criteria for this review were primary studies that investigated: 1) the effectiveness of antenatal breastfeeding education on breastfeeding duration; 2) the duration of breastfeeding; 3) Randomised Controlled Trial or Cohort studies or Quasi-experimental study designs.

This review excluded papers that were not written in English or Thai. Literature reviews and systematic reviews were also excluded because these publications were not primary research (however they are included in the discussion in chapter 2).

3.6 SEARCH TERMS

The purpose statement for this review was used to derive key words used in the search of the databases. In addition to the terms (prenatal, education and breastfeeding), the key words, ‘Randomised controlled trials’ (RCT) and ‘Cohort’ were used (Table 1).

3.7 SEARCH PROCESS

The search was conducted by using the search engines (Figure 1) and search terms and synonyms in Table 1 (see also Appendix U). The search results are presented in Figure 1. A total of 417 articles were located using the search terms.

3.8 ASSESSMENT OF RETRIEVED ARTICLES FOR RELEVANCE

Each of the articles retrieved was assessed for relevance by reading the abstract and the entire paper if necessary. The exclusion and inclusion criteria for selecting the papers were used to identify relevant papers. A Cochrane review (Dyson, McCormick et al. 2005), concerning the effect of antenatal education on the initiation of breastfeeding was located but was excluded. The review was not directly relevant to the purpose of this review because it only studied the initiation of breastfeeding (which was improved by antenatal education) and it did not study the effectiveness of antenatal education on the rate of breastfeeding at one month postpartum. Secondly, this review did not

distinguish between the quality and types of antenatal education which are a critical part of the purpose of this literature review.

3.9 SUMMARY TABLE OF INCLUDED ARTICLES

Articles that met the inclusion criteria are summarised in Table 2. Each selected article was also manually entered into a reference management program (Endnote version 4).

3.10 STATEMENT SPECIFYING THE NUMBER OF RETRIEVED ARTICLES

The search of the selected databases, Google and manual search yielded 416, one and no articles respectively. Following the application of inclusion and exclusion criteria there were 24 articles remaining (Figure 1, see also Appendix V).

3.11 QUALITY APPRAISAL OF RETRIEVED LITERATURE

Quality appraisal of the retrieved literature was conducted. The McMaster University Critical Review Form for Quantitative Studies was used (Law, Stewart et al. 1998). The results of quality appraisal are summarised in Table 2.

A total of eight directly related articles remained after quality appraisal was conducted however in 2009, one Canadian Ph.D. dissertation (Kluka 2004) could not be obtained at the time, so was excluded. Finally, six full text articles and one full text dissertation were included in the literature review (Figure 1).

3.12 CRITICAL REVIEW OF THE LITERATURE

This chapter critically reviews breastfeeding education in the antenatal period and provides an overview of some important factors to enhance breastfeeding rates, specifically to increase breastfeeding initiation rates and duration of breastfeeding.

Four randomised control trials (RCT) (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Noel-Weiss, Rupp et al. 2006, Su, Chong et al. 2007), and three non-

randomised intervention studies were reviewed. (Buakhum 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007). A number of these researchers have studied the effects of group-based educational interventions on breastfeeding (plus or minus other breastfeeding support). Only one of those studies was conducted in Thailand (Buakhum 2006). The antenatal education strategies which have been reported are critiqued and the quality of the evidence for each strategy is evaluated in Table 2.

This critical review is focused on two essential factors identified in the literature: 1) The role of the midwife; and 2) Factors affecting women's breastfeeding experiences.

3.12.1 The role of the midwife

Previous studies have documented the importance of midwives' influence on successful breastfeeding rates (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

Antenatal breastfeeding education sessions impact on duration of breastfeeding

Previous studies have claimed that skilled midwives are important in the delivery of antenatal breastfeeding education as discussed below with various breastfeeding rates reported (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

A study (n = 60) in Thailand reported successful breastfeeding at four months after birth following one antenatal breastfeeding education session delivered by a midwife. This breastfeeding education study was conducted in Thailand by Buakhum, (2006) who was a registered nurse and midwife. The researcher had been supervised by expert midwives assisting women to breastfeed for the first time prior to providing breastfeeding education. This study demonstrated that midwives who provide breastfeeding education, have adequate skills and knowledge to educate women about accurate breastfeeding , and this can result in higher breastfeeding rates (46.67 % vs. 0 %) and longer breastfeeding duration (104.10 days vs. 19.66 days). Baukhum's (2006) study found that women having antenatal breastfeeding education had a longer duration (of four months) of exclusive breastfeeding ($p < 0.001$) (Buakhum 2006).

Another study (n = 450) found that lactation consultants/midwives who had been involved in antenatal breastfeeding education sessions reported that the women receiving the education were more likely to breast feed exclusively at six weeks (*P* = 0.036), three months (*P* = 0.030), and six months (*P* = 0.036) after birth (Su, Chong et al. 2007). Likewise, another study (n = 182) in which a lactation consultant/midwife, provided antenatal breastfeeding education reported that the women in the education group had twice the odds (OR 2.31, 95% CI 1.10 – 4.96) of initiating breastfeeding and twice the odds (OR 2.66, 95% CI 1.84 - 3.15) of continuing to breastfeed for six months. The education group had only half the odds (OR .515, 95% CI .50 - .54) of quitting compared with the control group (Gill, Reifsnider et al. 2007). Gill, Reifsnider et al., (2007) suggested that the results may have been influenced by the women not being randomly allocated into study groups. Similarly, Noel-Weiss's study (n = 92) that delivered an antenatal breastfeeding workshop conducted by obstetric nurses reported higher breastfeeding rates (*P* = 0.004) for the women who attended the workshop (Noel-Weiss, Rupp et al. 2006).

In contrast, a study in Taiwan (n= 92) reported that experienced obstetric nurses who received 12 hours of intensive training about breastfeeding were also able to promote antenatal breastfeeding knowledge and techniques. Exclusive breastfeeding rates were higher for the experimental group at three days after birth (41% increased to 56%, *P* = 0.14) and one month postpartum (32% increased to 52%, *P* = 0.06) compared with the control group; however, significant differences were not found. The authors suggested that the results may have been affected by lack of randomisation. In addition, data were collected from one medical centre, thus the generalisability to the population at large was a concern. Compared with the Taiwanese national data of women at reproductive age, participants in this study appeared to be older and had a higher educational level (Lin, Chien et al. 2007).

Likewise, another study (n = 981) involved midwives facilitating three antenatal breastfeeding education sessions. A number of midwives who conducted the sessions were partnered with a community health educator with specific training in childbirth education. This study reported that there were no differences between breastfeeding initiation rates (practice group: *P* = 0.93, attitude group: *P* = 0.89) and six months after the birth (practice group: *P* = 0.53, attitude group: P = 0.60). The authors suggested that

this result may be due to the impact of the difficulty of sustaining education over time. They also reported that breastfeeding initiation rates were already high (82%) prior to their study (Forster, McLachlan et al. 2004). Another study (n = 1,321) reported that antenatal breastfeeding education delivered by a lactation consultant and multiple midwives did not result in differences in breastfeeding rates between the groups on discharge (OR 1.2; 95% CI 0.8 – 1.7, P = 0.3) or exclusive breastfeeding at four months (OR 1.1; 95% CI 0.6 – 1.8, P = 0.8). There were no differences in breastfeeding duration rates between the women (OR 1.2; 95% CI 0.89–1.6, P = 0.2). The authors reported that concurrent antenatal breastfeeding education initiatives could have affected this result (Lavender, Baker et al. 2005).

In summary, the evidence is inconsistent regarding the role of the midwife in providing antenatal breastfeeding education to increase initiation rates and duration of breastfeeding in pregnant women. However, midwives and lactation consultants have an appropriate educational background for teaching women about breastfeeding. The studies in Thailand and Singapore reported increased breastfeeding duration rates associated with antenatal education by midwives.

Number of antenatal breastfeeding education sessions

One to three antenatal breastfeeding education sessions have been reported as suitable for teaching women to successfully breastfeed. Previous studies that conducted one to three antenatal sessions reported various results as described below (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

Previous studies that have provided one antenatal breastfeeding education session reported similar results (Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Su, Chong et al. 2007). A study (n = 60) that provided one antenatal class reported that women who participated in the classes were breastfeeding successfully at four months ($p < 0.001$) (Buakhum 2006). Likewise, a study (n = 450) that conducted one antenatal breastfeeding education session by video presentation and provided the opportunity to speak with a lactation consultant for 15 minutes, reported that women receiving antenatal education were more likely to breast feed exclusively at six weeks (P = 0.036), three months (P = 0.030), and six months (P = 0.036) (Su, Chong et al. 2007). Another study (n = 92) that provided a 2.5 hour breastfeeding workshop reported higher rates of

exclusive breastfeeding (P = 0.004) when the women attended the workshop (Noel-Weiss, Rupp et al. 2006).

A study that provided two antenatal breastfeeding classes reported similar results (Gill, Reifsnider et al. 2007). Gill's study (n = 182) reported that pregnant women who individually received two antenatal breastfeeding discussion sessions had a longer breastfeeding duration rate than the control group (122.1 days versus 48.8 days, posterior probability 0.99) (Gill, Reifsnider et al. 2007).

In contrast, a study (n = 981) that provided three sessions in two components of antenatal breastfeeding education; one class for breastfeeding practical skills, and two classes for attitudes toward breastfeeding , reported that there were no statistically significant differences occurring between the study groups in breastfeeding initiation and duration rates (p > 0.05). The results in this study may have been affected by high breastfeeding initiation rates (82%) in the setting prior to the study (Forster, McLachlan et al. 2004). Another study (n =1,321) that provided a single antenatal breastfeeding session did not find any differences in breastfeeding rates between groups (OR 1.2; 95% CI 0.8 – 1.7, P = 0.3. and OR 1.1; 95% CI 0.6 – 1.8, P = 0.8). As there were no differences between the groups, the authors suggested that the results of this study could have been affected by the women only attending one class in the third trimester, so this may not have been sufficient time to inform and encourage women about breastfeeding knowledge and practice (Lavender, Baker et al. 2005). Likewise, Lin, Chien et al.'s (2007) study (n = 92) that provided three antenatal breastfeeding education sessions reported that the women who participated in the sessions had higher exclusive breastfeeding rates at three days (41% increased to 56%, P = 0.14) and one month postpartum (32% increased to 52%, P = 0.06); however, the difference was not significant. Participants were not randomised in this study (Lin, Chien et al. 2007).

In summary, there is inconsistent evidence to determine the optimal number of breastfeeding education sessions in the antenatal period.

Supporting mothers to initiate breastfeeding

Supporting mothers to initiate breastfeeding is an important factor to increase breastfeeding rates and duration of breastfeeding. Previous studies have reported

various results of initiating breastfeeding (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

Skin-to-skin contact begins immediately after birth by placing the naked newborn prone on the mother's bare chest. Skin-to-skin contact at birth is a very important factor for successful breastfeeding. Midwives have a critical role in the initiation of skin to skin contact and early suckling. Without their support, many mothers may have difficulty in establishing breastfeeding successfully (World Health Organisation and United Nations Children's Fund 2009).

A study in Thailand (n = 60) implemented early skin-to-skin contact and rooming-in for mothers and babies. The study included "Skin-to-skin contact", "Early suckling", and the "Ten Steps for Successful Breastfeeding" as recommended by WHO and UNICEF. The study protocol recommended that the women should receive midwives support for breastfeeding within one hour following the birth of the baby. Of the women who were initially supported to breastfeed within one hour after birth, 46.6% exclusively breastfed for four months; compared with none of the women who had not implemented this skin to skin contact ($p < 0.001$) (Buakhum 2006). Another study (Gill, Reifsnider et al. 2007) (n = 182) that included lactation consultants who delivered antenatal breastfeeding education was also successful in initiating breastfeeding (OR 2.31, 95% CI 1.10 – 4.96) (Gill, Reifsnider et al. 2007).

Some studies reported unsuccessful initiation of breastfeeding results (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Lin, Chien et al. 2007, Su, Chong et al. 2007). Forster, McLachlan et al. (2004) did not report any significant differences in breastfeeding initiation rates (practice group: P = 0.93, attitude group: P = 0.80) as the rates (82%) were already high in this population (Forster, McLachlan et al. 2004). Lavender, Baker et al.'s (2005) study also reported no significant differences in breastfeeding initiation rates (OR 1.2; 95% CI 0.8 – 1.7, P = 0.3) even though the baseline breastfeeding initiation rates in this U.K. population was already low at 56%. The results could have been due to insufficient time (three and a half hour class) to inform and encourage women about breastfeeding knowledge and practice. (Lavender, Baker et al. 2005). Likewise, Lin, Chien et al.'s (2007) study reported higher exclusive breastfeeding rates at three days after birth between groups, but significant differences

were not found (41% increased to 56%, P = 0.14). The authors suggested that the results may have been affected by lack of randomisation (Lin, Chien et al. 2007). Su, Chong et al.'s (2007) study also included lactation consultants providing antenatal breastfeeding education individually, but reported unsuccessful breastfeeding initiation rates (P = 0.782). The authors suggested that the study may have been conducted in settings where baseline breastfeeding practice rates were better prior to the study (Su, Chong et al. 2007). One study did not implement or report breastfeeding initiation practices (Noel-Weiss, Rupp et al. 2006).

In summary, this evidence provides some support for the role of midwives in encouraging mothers to successfully initiate breastfeeding.

Postnatal midwifery support

Some studies included provision of postnatal breastfeeding support by midwives (Buakhum 2006, Gill, Reifsnider et al. 2007, Su, Chong et al. 2007). One of these studies (n = 450) conducted two postnatal support sessions by a lactation consultant/midwife and found that breastfeeding at six weeks after delivery was higher in the postnatal support group compared with women who received routine care (P = 0.008). In addition, the women in the postnatal support group were more likely to breastfeed exclusively, at two weeks, six weeks, three months, and six months postnatally (P = 0.012, 0.019, 0.040, and 0.042 respectively) (Su, Chong et al. 2007). Similarly, another study (n = 60) reported that the mothers who received postnatal breastfeeding support were more likely to breastfeed exclusively at four months compared with the mothers who had not received postnatal breastfeeding support (p < 0.001) (Buakhum 2006). Another study (n = 182) reported that postnatal support by a lactation consultant/midwife was useful to increase breastfeeding rates. This postnatal support included frequent telephone calls and home visits. The results in this study indicated that the intervention group had twice the odds (OR 2.31, 95% CI 1.10 – 4.96) of initiating breastfeeding and twice the odds (OR 2.66, 95% CI 1.84 - 3.15) of continuing to breastfeed for six months. The intervention group had only half the odds (OR 0.515, 95% CI 0.50 - 0.54) of quitting compared with the control group (Gill, Reifsnider et al. 2007). The authors suggested that the results in this study could have been affected by the participants not being randomly allocated.

This evidence from these studies confirms the important role of the midwife in providing postnatal breastfeeding support and follow-up to mothers during the first few months of breastfeeding. Other studies did not provide any postnatal breastfeeding support (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Noel-Weiss, Rupp et al. 2006, Lin, Chien et al. 2007).

3.12.2 Factors affecting women's breastfeeding experiences

Women's self-efficacy and successful breastfeeding

Previous studies have reported that perceived self-efficacy increased successful breastfeeding rates (Buakhum 2006, Noel-Weiss, Rupp et al. 2006). People are more likely to engage in certain behaviours when they believe they can perform them well.

One of these studies (n = 92) reported that breastfeeding self-efficacy scores at four weeks postpartum were significantly higher in the intervention group ($p = 0.023$) and women who attended a breastfeeding self-efficacy workshop had higher rates of exclusive breastfeeding ($p = 0.004$). All infant feeding outcomes at eight weeks were significantly positively related to workshop attendance ($p = 0.005$). However, following analysis by intention to treat, the differences were not statistically significant. This could mean that women who were motivated to attend the workshop were also motivated to breastfeed and does not necessarily mean that the workshop was effective. The low number of women enrolled in the study may indicate that there was inadequate power in the study design to detect a real difference for women who were allocated to the intervention group (Noel-Weiss, Rupp et al. 2006). Likewise, a study (n = 60) that applied self-efficacy in multiple breastfeeding education sessions, reported that women who received education demonstrated higher exclusive breastfeeding rates and longer exclusive breastfeeding duration rates ($p < 0.001$) (Buakhum 2006).

The results of these studies suggest that self-efficacy is a positive attribute that enables and encourages women to breastfeed successfully. Other studies did not identify perceived self-efficacy as an important factor to increase successful breastfeeding rates. (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

Women's gestational age

Some studies reported significantly improved breastfeeding rates by recruiting pregnant women in their second trimester at 14 – 28 weeks gestation and educating them in their third trimester at 28 - 42 weeks gestation (Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

The result of the study by Buakhum (n = 60) reported significantly improved breastfeeding results ($p < 0.001$). The study recruited primiparous women and provided antenatal breastfeeding education in the third trimester at about 36 weeks gestation (Buakhum 2006). Likewise, a study (n = 92) that recruited and educated primiparous women in their third trimester at 36-42 weeks gestation, also reported that the women had significantly higher exclusive breastfeeding rates ($p = 0.004$) (Noel-Weiss, Rupp et al. 2006).

Another study that recruited and educated 450 both primiparous and multiparous women who were more than 34 weeks gestation, reported that the women who received antenatal education were more likely to breastfeed exclusively at six weeks ($p = 0.036$), three months ($p = 0.030$), and six months ($p = 0.036$) after birth (Su, Chong et al. 2007). Similarly, a study (n = 182) that recruited both primiparous and multiparous women in the second trimester and provided antenatal education in the third trimester, also reported positive results (OR 2.31, 95% CI 1.10 – 4.96) of initiating breastfeeding and (OR 2.66, 95% CI 1.84 - 3.15) continuing to breastfeed for six months (Gill, Reifsnider et al. 2007). However, the study (n = 1,321) by Lavender that also provided a single session of antenatal breastfeeding education delivered by a lactation consultant/midwife to pregnant women in their third trimester, did not find any differences in breastfeeding rates (breastfeeding on discharge, OR 1.2; 95% CI 0.8 – 1.7, $p = 0.3$ and exclusive breastfeeding at four months, OR 1.1; 95% CI 0.6 – 1.8, $p = 0.8$). The authors suggested that the results may be due to the difficulty of supporting education over an extended period of time (educated at the third trimester and followed up after discharge for four months after birth) (Lavender, Baker et al. 2005).

In contrast, another study (n = 92) that recruited and educated primiparous women at 20-36 weeks gestation, reported higher exclusive breastfeeding at three days (41%

increased to 56%, p = 0.14) and one month postpartum (32% increased to 52%, p = 0.06); but no significant differences were found (Lin, Chien et al. 2007). Another study (Forster et al. 2004) that recruited 981 primiparous women between 20 and 25 weeks gestation demonstrated that the breastfeeding interventions which were implemented were unsuccessful. The results showed no significant differences in breastfeeding initiation (practice group: p = 0.93, attitude group: p = 0.89) or breastfeeding duration at six months (practice group: p = 0.53, attitude group: p = 0.60). This study concluded that breastfeeding education provided during mid-pregnancy did not increase the duration of breastfeeding in an Australian sample where initiation rates of breastfeeding (82%) and six-month rates of breastfeeding (45%) had already been high prior to the study. Thus, the early gestational age (20-25 weeks) of the women at the time the education began, possibly reduced the effectiveness of the breastfeeding intervention. The women would then have to wait four to five months to apply their learned breastfeeding practices after birth. This delay might explain why no increase in breastfeeding rates was found (Forster, McLachlan et al. 2004).

In summary, previous studies have recommended conducting antenatal breastfeeding education in the third trimester.

Women's partner and family support

Family support in the antenatal and postnatal periods is an important factor for encouraging women to continue breastfeeding.

Some previous studies have included women's family/partners support in the antenatal (Forster, McLachlan et al. 2004, Noel-Weiss, Rupp et al. 2006), and postnatal periods (Buakhum 2006).

One study (n = 92) that included the women's partners in the antenatal breastfeeding workshop, encouraged women to seek breastfeeding support from their family and community reported that women who attended the antenatal breastfeeding workshop had higher rates of exclusive breastfeeding (p = 0.004). All infant feeding outcomes at eight weeks were significantly positively related to the workshop attendance (p = 0.005) (Noel-Weiss, Rupp et al. 2006). Another study (n = 60) included family/partners by encouraging them to participate and support the women within 24-48 hours in the postnatal period. The study reported that the women who were supported to breastfeed

by their family and/or husband/partner had higher and longer rates of exclusive breastfeeding ($p < 0.001$) (Buakhum 2006). Another study (n = 981) delivered two antenatal sessions. The first session (practical skills) of 1.5 hours that focused on practical breastfeeding skills, using teaching aids, did not include partners in the class. However, for the second session (attitude), each woman was encouraged to bring her partner or other family member to participate in the class, and the women were also encouraged to interview their own mother and their partner's mother about how they fed them as babies, and about their mother's current attitudes to breastfeeding. This study reported no differences in breastfeeding initiation between the groups (practice group: $p = 0.93$, attitude group: $p = 0.89$) and six months after the birth (practice group: $p = 0.53$, attitude group: $p = 0.60$); however as previously stated breastfeeding rates were higher (82 %) prior to the conduct of this study (Forster, McLachlan et al. 2004). These results suggest that there is some evidence that breastfeeding may be successful if partners and other family members are included in antenatal breastfeeding education. The antenatal breastfeeding education encourages partners and other family members to support women to breastfeed in the postnatal period.

This evidence indicates that it is valuable to include partners and families in breastfeeding education in the antenatal and postnatal periods to increase breastfeeding rates. There were some studies that did not include the women's partner and other family members in breastfeeding education (Lavender, Baker et al. 2005, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

3.12.3 Educational approaches and practical skills

There are many educational methods that are suitable for breastfeeding education of women. Previous studies recommended that ***educational approaches*** such as demonstration, video presentation, handbooks, educational and individual consultation were useful methods for successful breastfeeding education. ***Group education sessions*** were also important to consider. ***Practical skills*** such as multi-sense learning, including written, visual, oral and tactile learning modes; and hands on skills were suggested as key factors for successful breastfeeding education (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

Educational approaches and practical skills

Previous studies have reported that women who have been provided with recommended educational approaches and/or practical skills have better breastfeeding rates than those who have not (Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

A study (n = 60) that used group discussions, demonstrations, skill training about breastfeeding posture, a handbook, and breastfeeding posters to be posted at home, reported that 46.6 % of women who were provided with strategies and practical skills had breastfed exclusively for four months ($p < .001$); compared with no breastfeeding in the control group ($p < 0.001$) (Buakhum 2006). Likewise, another study (n = 450), where women received one session of antenatal DVD breastfeeding education and two postnatal sessions followed up by a lactation consultant / midwife visit before discharge, were more likely to breastfeed exclusively compared with the women who received routine care (antenatal education group [n = 150] vs. control group [n = 151]; at six weeks, $p = 0.036$; at three months, $p = 0.030$; and at six months, $p = 0.036$ and postnatal support group [n = 149] vs. control group [n = 151]; at two weeks, $p = 0.012$; at six weeks, $p = 0.019$; at three months, $p = 0.040$; and at six months, $p = 0.042$) (Su, Chong et al. 2007). Similarly, another study (n = 92) that provided a workshop with group discussion and practical skills by using lifelike dolls, videos, and discussions, reported that the women who participated in the workshop had significantly higher exclusive breastfeeding rates ($p = 0.004$) and all infant feeding outcomes at eight weeks were significantly positively related to the workshop attendance ($p = 0.005$) (Noel-Weiss, Rupp et al. 2006). Gill, Reifsnider et al., (2007) (n = 182) also found increased rates (OR 2.31, 95% CI 1.10 – 4.96) of initiating breastfeeding; (OR 2.66, 95% CI 1.84 - 3.15) and continuing to breastfeed for six months; and reduced odds (OR 0.515, 95% CI 0.50 - 0.54) of quitting compared with the control group with the use of breastfeeding dolls and breast models in the antenatal sessions (Gill, Reifsnider et al. 2007). These results support educational strategies and practical skills for antenatal breastfeeding education sessions to increase breastfeeding rates and breastfeeding duration.

One of these studies (n = 92) that provided a lecture and skills training practice including group discussions, reported that exclusive breastfeeding rates were higher for the experimental group at three days (41% increased to 56%, $p = 0.14$) and one month

postpartum (32% increased to 52%, P = 0.06); however, significant differences were not found at one month. This result could have been affected by small numbers of participants in the study and the lack of randomisation (Lin, Chien et al. 2007). Likewise, a study (n = 1,321) that provided a single session of antenatal breastfeeding education delivered by a lactation consultant/midwife and used practical skills such as positioning and attachment, reported no differences between groups (in breastfeeding on discharge, OR 1.2; 95% CI 0.8–1.7, $p = 0.3$ and exclusive breastfeeding at four months, OR 1.1; 95% CI 0.6–1.8, $p = 0.8$). The results may have been affected by the difficulty of supporting education over an extended period of time (educated at the third trimester and followed up after discharge for four months after birth) and a single session may not have been sufficient time to inform and encourage women about breastfeeding knowledge and practice (Lavender, Baker et al. 2005). Another study (n = 981) that also provided practical skills and group discussion by using life dolls and breast models, reported similar results. This study found no significant differences in breastfeeding initiation rates amongst the groups as measured by breastfeeding status at interview two to four days after the birth (practice group: $p = 0.93$, attitude group: $p = 0.80$) and six months after the birth (practice group: $p = 0.53$, attitude group: $p = 0.60$). The authors suggested that the results could have been affected by the pre-existing high breastfeeding initiation rates (82%) (Forster, McLachlan et al. 2004).

These studies consistently used demonstrations of positioning, latching baby to the breast, expressing and storing breast milk to assist the woman to breastfeed successfully in breastfeeding education classes. Group discussion was also a useful and supportive approach for women to share their own breastfeeding experiences to successfully breastfeed. In addition, the provision of postnatal support was reported to be one of the major factors influencing successful breastfeeding especially for mothers who encounter breastfeeding problems such as short/flat/inverted nipples, sore nipples, and poor latching on.

Group education sessions

Most previous studies reported improved breastfeeding rates following group-based education sessions (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005,

Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007).

One study conducted in Thailand reported that the women who participated in group-based antenatal breastfeeding education had significantly improved breastfeeding rates; 104.1 days compared with 19.6 days for those who did not experience the group-based antenatal breastfeeding education (n = 60) ($p < 0.001$). The study recruited and educated primiparous women, at 37 weeks gestation and reported that 46.6% of women from the intervention group were exclusively breastfeeding at four months compared with none from the control group ($p < 0.001$) (Buakhum 2006). Likewise, another study (n = 182) in the United States that delivered breastfeeding focus groups antenatally by a lactation consultant/midwife discussed the benefits of breastfeeding and reported that the women in the focus groups had longer breastfeeding duration rates than the women who did not (122.1 days versus 48.8 days) (Gill, Reifsnider et al. 2007). Other studies that designed group discussion sessions for breastfeeding education also reported positive results (Noel-Weiss, Rupp et al. 2006, Lin, Chien et al. 2007). Noel-Weiss, et al. (2006) (n = 92) reported significantly higher rates of exclusive breastfeeding in women who had experienced the group discussion in the antenatal breastfeeding workshop ($p = 0.004$) (Noel-Weiss, Rupp et al. 2006). One study (n = 450) that provided a group education session and included individual consultation provided by lactation consultant, also reported positive results. This study conducted in Singapore provided one individual consultation as part of their antenatal breastfeeding education. This study reported that women receiving the antenatal education intervention were more likely to breastfeed exclusively at six weeks ($p = 0.036$), three months ($p = 0.030$), and six months ($p = 0.036$) after birth (Su, Chong et al. 2007).

In contrast, another study in Taiwan (n = 92) also provided group discussion sessions found that women who participated in the group had higher exclusive breastfeeding rates at three days (41% increased to 56%, $p = 0.14$) and one month postpartum (32% increased to 52%, $p = 0.06$); however, significant differences were not found, possibly due to small numbers of participants and the lack of randomisation (Lin, Chien et al. 2007) A study in England (n=1,321) also provided an antenatal group education session delivered by a lactation consultant/midwife to both the women and midwives, reported no differences between groups for breastfeeding on discharge (OR 1.2; 95% CI 0.8–1.7, $p = 0.3$) and exclusive breastfeeding at four months (OR 1.1; 95% CI 0.6–1.8, $p = 0.8$).

The authors acknowledged that the results may have been affected by inconsistent advice or unrealistic information presented by various health professionals (Lavender, Baker et al. 2005). Another study (n = 981) which also provided group education discussions in the antenatal period, found no differences in breastfeeding initiation rates between the groups. This was measured by breastfeeding status at interview two to four days after the birth (practice group: $p = 0.93$, attitude group: $p = 0.80$) and six months after the birth (practice group: $p = 0.53$, attitude group: $p = 0.60$) (Forster, McLachlan et al. 2004).

These studies provide substantial evidence for the effectiveness of group antenatal breastfeeding education sessions.

3.12.4 Limitation of previous studies

Some of the previous studies' results may have been affected by the following limitations.

- A small number of participants in some studies may have prevented achievement of significant results (Lin, Chien et al. 2007)
- An early gestational period for delivery of the intervention; 20-25 weeks gestation (Forster, McLachlan et al. 2004) and 20-36 weeks gestation (Lin, Chien et al. 2007)
- An extended period between delivery of the intervention and follow up; between second trimester and six months after birth (Forster, McLachlan et al. 2004) and from the third trimester to four months after birth (Lavender, Baker et al. 2005)
- Pre-existing high rates of breastfeeding initiation (82%) in the study setting (Forster, McLachlan et al. 2004)
- Not randomising participants (Lin, Chien et al. 2007)
- The education did not incorporate enhancing women's perceived self-efficacy to breastfeed (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Lin, Chien et al. 2007, Su, Chong et al. 2007)
- Cultural factors could influence some studies' results conducted in Westernised countries (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005)

3.13 SUMMARY OF COMPONENTS OF EFFECTIVE BREASTFEEDING EDUCATION INTERVENTIONS

This literature review examined research about interventions provided by midwives that improved breastfeeding rates and duration of breastfeeding. The review identified evidence based practices for midwife-led care that can be used to inform the design of an intervention.

In summary, the following factors have been identified in this review of literature that may contribute to a successful intervention design to improve breastfeeding rates.

3.13.1 Midwives are appropriate healthcare professionals to deliver breastfeeding education and support women to initiate breastfeeding.

3.13.2 Interventions should include an antenatal breastfeeding education component.

3.13.3 The number of antenatal classes required is unknown but previous studies have used one to three sessions.

3.13.4 The content of antenatal classes should include “Skin to skin contact”, “Early suckling”, and the Ten Steps for successful breastfeeding”.

3.13.5 Midwives follow up in the postnatal period is important.

3.13.6 There is some evidence that self-efficacy is considered to be an important element in breastfeeding education programs.

3.13.7 It may be most appropriate to recruit mothers during the second trimester and provide breastfeeding education in the third trimester to minimise the time between learning and the application of breastfeeding skills and knowledge.

3.13.8 It is important that partners/families are involved in breastfeeding education so that they can provide critical support in the postnatal period.

3.13.9 A variety of educational strategies and skill training can be used in antenatal breastfeeding education sessions.

3.13.10 Group-based education appears to be an effective teaching approach.

These elements may be combined with the elements identified in chapter two to design a midwife-led intervention to extend the duration of breastfeeding rates in a community in Thailand.

3.14 JUSTIFICATION OF THE STUDY

The literature review identified that a lack of antenatal breastfeeding education affects breastfeeding outcomes and that the most effective means of delivering a breastfeeding intervention was by group-based education. To improve breastfeeding outcomes, it was therefore appropriate to conduct more research focused on antenatal breastfeeding interventions. This intervention was a program that could be used by midwives in Thailand. It was developed, based on previous successful midwife-led antenatal breastfeeding interventions and relevant international breastfeeding initiatives. Educating pregnant women, especially primiparous women about breastfeeding is particularly challenging because the primiparous women have yet to experience breastfeeding. A midwifery breastfeeding education program could be developed and tested to improve women's rate of exclusive breastfeeding at one month following birth in a community setting in Thailand.

Table 1 Additional keywords and synonyms used for searching

Keywords and synonyms
Medline: antenatal, prenatal, patient education as topic/, health education/, parenting education, health promotion/, preparation, intervention, breast feeding/, randomized controlled trial/, and cohort studies.
CINAHL: antenatal, prenatal, patient education/, health education/, parenting education/, health promotion/, preparation, intervention or nursing intervention/, breast feeding/, clinical trials, and prospective studies.
Pub Med: prenatal care/, patient education as topic/, health education/, health promotion/, nursing process/, breast feeding/, randomized controlled trial [Publication Type], randomized controlled trial as topic/, and cohort studies.
Cochrane: antenatal, prenatal, patient education, health education/, parenting education, health promotion/, preparation, intervention, breast feeding/, randomized controlled trial, and cohort studies.
Scopus: antenatal, prenatal, patient education, health education, parenting education, health promotion, preparation, intervention, breast feeding, randomized controlled trial, and cohort studies. (Note: / = MeSH term)

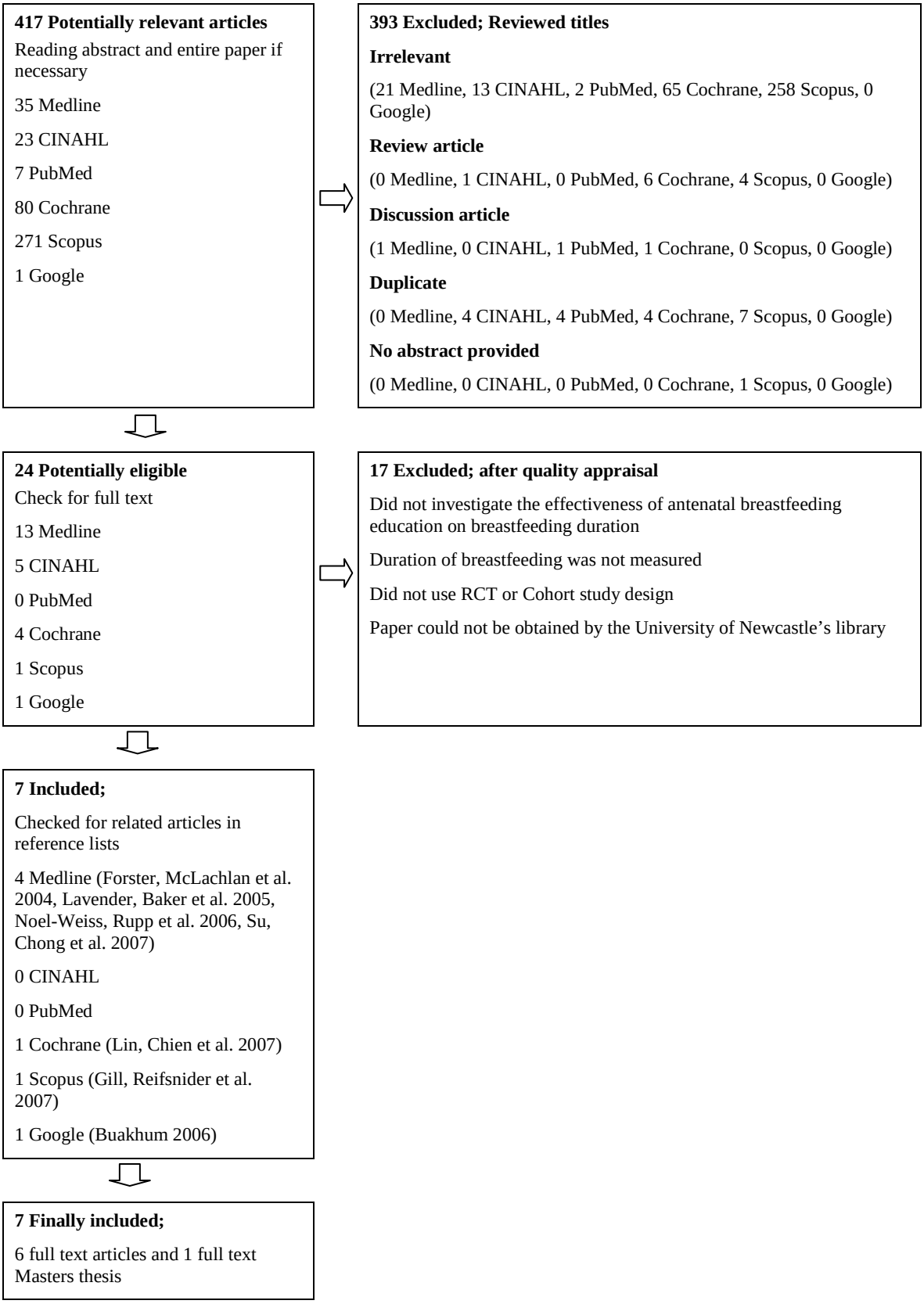

Figure 1 Search results for antenatal breastfeeding education quantitative studies

Table 2 Summary of included studies

1. Two mid-pregnancy interventions to increase the initiation and duration of breastfeeding : a randomized controlled trial								
Authors	**Design** **Participants** **Theory, Model**	**Aims Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection** **Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Forster et al., 2004 (Australia)	***Design*** RCT with ITT only ***Participants*** 981 primiparous women from a public, tertiary women's hospital in Melbourne, Australia (Intervention: Practical Skills group = 327 Attitude group = 327 Control: Standard care = 327) ***Recruitment & Intervention*** 2nd trimester ***Theory, model*** None applied	***Aim*** To compare two strategies for increasing the initiation and duration of breastfeeding ***Intervention*** (3 sessions) 1. One antenatal breastfeeding class of 1.5 hour; practical aspects of breastfeeding using a previously tested tool 2. Two, one hour antenatal breastfeeding classes, exploring family and community attitudes toward experiences of breastfeeding ***Follow up*** Two-four days and six months after birth	***Component 1*** "Practical skills group" 1.5 hours antenatal group ***Component 2*** "Attitudes group" One hour antenatal class (Two) sessions	Number of midwives not specified but multiple midwives were involved. No specific training for the midwives. In addition there was a community educator with specific training in childbirth education	Breastfeeding initiation Breastfeeding duration	1. Questionnaire of demographic data and women's breastfeeding intentions 2. Interview in hospital after birth 3. Telephone interview at six months postnatally	There were no statistically significant differences between groups in breastfeeding initiation and duration 1. No statistically significant differences occurred between groups in breastfeeding initiation, as measured by breastfeeding status at interview two to four days after the birth (Practice group: p = 0.93, Attitude group: p = 0.80). 2. No statistically significant differences in breastfeeding duration occurred between groups at the 6-month interview (Practice group: p = 0.53, Attitude group: p = 0.60).	***Strengths*** RCT Adequate power ***Concerns*** The setting where breastfeeding initiation is already high at 82%, may make it difficult to improve the breastfeeding rate The outcome at 2-3 days post-birth may be too early to detect a difference Participants were disadvantaged with low income and culturally diverse backgrounds Self-efficacy was not considered

Table 2 Summary of included studies (continued)

2. Breastfeeding expectations versus reality: a cluster randomised controlled trial								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Lavender et al., 2005 (England)	***Design*** Cluster RCT with ITT only ***Participants*** 1,312 pregnant women from eight Primary Health Care Units, and a Teaching Hospital in North West England (Intervention = 4 units, Control = 4 units): randomised women 1,312 pregnant women who wanted to breastfeed; intervention group = 679, control group = 633) ***Recruitment & Intervention*** 3rd trimester ***Theory, model*** None applied	***Aim*** To assess the effect of an antenatal breastfeeding education intervention delivered by a lactation consultant to pregnant women and their attendant midwife, which attempted to enable woman to achieve their own target for breastfeeding duration. ***Intervention*** (A single antenatal educational support session) 3.30 hours of antenatal breastfeeding education supervised by a lactation specialist and attended by the women's community midwives	***Component 1*** A single antenatal breastfeeding education class; 3.30 hours arranged for women and the midwives who supported the mothers in the class	Number of community midwives not specified but multiple midwives were involved (The community midwives, who had delivered a single antenatal class for 3.30 hours for the morning session, also attended the afternoon session with women to educate the women in the session about effective breastfeeding technique)	1. The proportion of women who fulfilled their expectation of breastfeeding 2. The number of women breastfeeding on discharge and at four months	1. Questionnaire demographic data 2. Questionnaire initial breastfeeding, breastfeeding at two, four and six weeks, breastfeeding at four, six and 12 months 3. Semi-structured diary about women's breastfeeding experience at four months 4. questionnaire to identify the reasons why women stop breastfeeding and their perception of the support they received from antenatal classes	There was no difference between the groups in the proportion of women who attained their expected duration of breastfeeding (OR 1.2; 95% CI 0.89–1.6, p = 0.2). There were no differences between the groups in the uptake of breastfeeding on discharge (OR 1.2; 95% CI 0.8–1.7, p = 0.3) or exclusively at four months (OR 1.1; 95% CI 0.6–1.8, p = 0.8).	***Strengths*** RCT Adequate power ***Concerns*** No theory to guide the intervention Intervention did not address social pressure The lack of well-educated midwives The effect of physical and emotional factors from family and peers Recruited women who wanted to breastfeed

Table 2 Summary of included studies (continued)

2. Breastfeeding expectations versus reality: a cluster randomised controlled trial (continued)								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Lavender et al., 2005 (England)		***Follow up*** Two, four, and six weeks and four, six and 12 months postpartum					(In the UK, breastfeeding rate was lower than most other European countries. In the study setting, only 56% of women initiated breastfeeding of whom, only 1/8 were still breastfeeding 12 weeks later.)	

Table 2 Summary of included studies (continued)

3. Effectiveness of breastfeeding program in Thailand								
Authors	**Design** **Participants** **Theory, Model**	**Aims Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection** **Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Buakhum, 2006 (Thailand)	***Design*** Non-randomised intervention study ***Participant*** 60 primiparous women in two groups of 30 from North-East Region, Thailand (Experimental group = 30, control group = 30) ***Recruitment & Intervention*** 3rd trimester ***Theory, model*** Self-efficacy	***Aim*** To investigate the effect of a breastfeeding - promoting program on the rate of four-month exclusive breastfeeding in first time mothers ***Intervention*** (6 sessions) One session of prenatal breastfeeding promoting program Five sessions of postnatal breastfeeding education ***Follow up*** At one, two, three, and four months postpartum	***Component 1*** 50 minutes of single antenatal group ***Component 2*** Skin-to-skin contact and early suckling within one hour of birth ***Component 3*** Four postnatal education groups ***Component 4*** Postnatal telephone counselling (Phone at one and three months and face-to-face at hospital at two and four months)	One midwife who is a researcher (Before delivering breastfeeding education, the researcher had been supervised by expert midwives for assisting first-time women to breastfeed.)	The rate of exclusive breastfeeding at four months	1. Questionnaire Delivery and breastfeeding records 2. Breastfeeding effectiveness assessment; LATCH assessment 3. Breastfeeding interview form	Women in the experimental group demonstrated a higher rate of exclusive breastfeeding than in the control group (46.46 % vs. 0 %) at a statistically significant level ($p < 0.001$) Women in the experimental group had longer average duration (104.10 days) rates of exclusive breastfeeding than women in the control group (19.66 days) at a statistically significant level ($p < 0.001$)	***Strengths*** Appropriate intervention ***Concerns*** Participants not randomly recruited to the intervention group Small numbers of participants

Table 2 Summary of included studies (continued)

4. Randomized Controlled Trial to Determine Effects of Prenatal Breastfeeding Workshop on Maternal Breastfeeding Self-Efficacy and Breastfeeding Duration								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Noel-Weiss et al., 2006 (Canada)	***Design*** RCT with ITT and Actual Attendance Analysis ***Participants*** 92 primiparous women from Eastern and South Eastern Ontario (Intervention group = 46, control group = 46) ***Recruitment & Intervention*** 3rd trimester ***Theory, model*** Self-efficacy theory	***Aim*** Effect of a breastfeeding workshop on Breastfeeding Self-efficacy Scores (BSES*) and breastfeeding duration ***Intervention*** (One session antenatal breastfeeding workshop) A 2.5-hour theory-based prenatal breastfeeding workshop delivered by obstetric nurses (Using lifelike dolls, videos, and discussions. Adult learning, self-directed and self-motivated principles) ***Follow up*** Four and eight weeks postpartum	***Component 1*** One antenatal workshop	No number of midwives specified	1. Maternal breastfeeding self-efficacy scores 2. The number of days and amount of breastfeeding	1. Survey of demographic data 2. BSES pre and post birth 3. Breastfeeding amount and duration at four and eight weeks	1. ITT, BSES* at 4 weeks postpartum were significantly higher in the intervention group, p = 0.023 2. Women who actually attended BSES* had higher rates of exclusive breastfeeding , p = 0.004 Non-attendance at the workshop resulted in more formula given in hospital p = 0.015 3. All infant feeding outcomes at eight weeks were significantly positively related to workshop attendance analysis, p = 0.005. However, if analysed by ITT the differences were not statistically significant, p = 0.135	***Strengths*** RCT ITT and actual attendance analysis ***Concerns*** Small number of participants

*BSES = Breastfeeding Self-efficacy Scores

Table 2 Summary of included studies (continued)

5. Effects of support on the initiation and duration of breastfeeding								
Authors	**Design** **Participants** **Theory, Model**	**Aims Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Gill et al, 2007 (United States)	***Design*** Non-randomised intervention study ***Participants*** 182 Hispanic immigrant pregnant women from South-Western United States (Experimental group = 94, control group = 88) ***Recruitment*** 2nd trimester ***Intervention*** 3rd trimester ***Theory, model*** No theory or model applied	***Aim*** To increase the initiation of breastfeeding and its duration to 6 months ***Intervention*** (4 sessions) 1. Prenatal breastfeeding education given by lactation consultants: Two times for individual discussion with lactation consultant: 1) during prenatal visit; and 2) at 36 weeks 2. Postnatal support: Two times: 1) telephone call; and 2) at least one home visit ***Follow up*** Nine telephone calls: at four days, two, three, four, six weeks, and three, four, five, and six months after birth	***Component 1*** Antenatal education: two individual discussions ***Component 2*** Postnatal telephone call and home visit at least once	The research team: Two lactation consultants Three certified lactation educators	1. Initiation of breastfeeding 2. Duration of breastfeeding	1. Questionnaire of demographic data 2. Nine postpartum telephone calls and home visits using assessment tool designed by researcher	The intervention group had twice the Odds (OR 2.31, 95% CI 1.10 – 4.96) of starting to breastfeed and twice the Odds (OR 2.66, 95% CI 1.84 - 3.15) of continuing to breastfeed for six months The intervention group had only half the Odds (OR 0.515, 95% CI 0.50 - 0.54) of quitting compared with the control group. ***Note:*** - The median duration time for the intervention group was 122.1 days versus 48.8 days for the control group. - During the first 30 days, relative probability of those breastfeeding in the intervention group was 1.19 times that of the control, and the Odds of breastfeeding in the intervention group were 1.84 times those in the control	***Strengths*** Follow up intervals ***Concerns*** Did not randomly recruit participants to the study

Table 2 Summary of included studies (continued)

6. Effectiveness of a prenatal education program on breastfeeding outcomes in Taiwan								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection** **Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Lin, Chien et al., 2007 (Taiwan)	***Design*** Non-randomised intervention study ***Participants*** 92 nulliparous women between 20-36 weeks of pregnancy from Medical Centre, Taipei City, Taiwan (Experimental group = 46, Control group = 46) ***Recruitment & Intervention*** 2^{nd} - 3^{rd} trimester ***Theory, model*** "Training Evaluation Model", (Kirkpatrick, 1960s)	***Aim*** To design a structured prenatal education program on breastfeeding and to evaluate the effectiveness of the program ***Intervention*** (3 antenatal breastfeeding education sessions) 90-minute group educational breastfeeding program that separated three sessions: 1) 50 minutes for lecture and skill; 2) 20 minutes for group discussion; and 3) 20 minutes for a tour of the postpartum ward ***Follow up*** Three days and one month after birth	***Component 1*** Antenatal group lecture (50 minutes for knowledge aspect and skill aspect) ***Component 2*** Antenatal group discussion (attitude / affective aspect) ***Component 3*** Antenatal group tour postpartum ward for 20 minutes	An experienced obstetric nurse who received 12 hours of training on breastfeeding for health professionals provided by the Bureau of Health of Taipei, Taiwan	1. Breastfeeding knowledge 2. Breastfeeding attitude 3. Breastfeeding problems 4. Satisfaction with breastfeeding 5. The rate of exclusive breastfeeding	1. Survey of demographic data 2. Questionnaire of breastfeeding knowledge and attitude 3. Measurement Scales of breastfeeding knowledge, attitude, problem and satisfaction	The rate of exclusive breastfeeding was higher for the experimental group at three days (41% increased to 56%, p = 0.14) and one month postpartum (32% increased to 52%, p = 0.06); however, the differences only reached borderline significance at one month postpartum.	***Strengths*** Structured prenatal breastfeeding educational program The importance of lactation consultation; especially during a few days after birth ***Concerns*** Small number of participants Adequate duration of the intervention The short period of follow-up

Table 2 Summary of included studies (continued)

7. Antenatal education and postnatal support strategies for improving rates of exclusive breast feeding: randomised controlled trial								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection** **Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Su, Chong et al., 2007 (Singapore)	***Design*** RCT with ITT only ***Participants*** 450 primiparous women, National University Hospital, a tertiary hospital, Singapore (Control: Group 1= 151; standard care Intervention: Group 2 = 150; antenatal breastfeeding education; Group 3 = 149; postnatal lactation support) ***Recruitment & Intervention*** 3rd trimester ***Theory, model*** VDO model "14 Steps to Better Breastfeeding " (InJoy Videos, Boulder, CO)	***Aim*** To investigate whether antenatal breast feeding education alone or postnatal lactation support alone improves rates of exclusive breastfeeding compared with routine care ***Intervention*** (3 sessions) 1. One session: antenatal education; VDO 16 minutes and the opportunity to talk with a lactation consultant 15 minutes	***Component 1*** Group 2: One session of antenatal breastfeeding VDO education Group 3: Two postnatal approaches by a lactation consultant	No number of lactation consults but multiple lactation consultants were involved.	1. The rates of exclusive breast feeding 2. The rates of any breast feeding	1. Questionnaire of demographic data 2. Postnatal home visit; interview and questionnaire	1. There were no any significant differences in breastfeeding initiation rates of any groups in this study. 2. Compared with the women who received routine care: - Women receiving antenatal education were more likely to breastfeed exclusively at six weeks (29% in the intervention group vs. 17% in the control group, p = 0.036), three months (24% in the intervention group vs. 13% in the control group, p = 0.030), and six months (19% in the intervention group vs. 9% in the control group, p = 0.036) after birth. - Women receiving postnatal support were more likely to breastfeed exclusively at two weeks (38% in the intervention group vs. 21% in the control group, p = 0.012), six weeks (31% in the intervention group vs.	***Strengths*** RCT Adequate power The importance of postnatal support in improving breastfeeding practice

Table 2 Summary of included studies (continued)

7. Antenatal education and postnatal support strategies for improving rates of exclusive breast feeding: randomised controlled trial (continued)								
Authors	**Design** **Participants** **Theory, Model**	**Aims** **Intervention** **Follow up**	**Component of intervention**	**Number and Skill, Experience or Training of Providers**	**Key outcome measures**	**Data Collection** **Methods**	**Key Significant Findings**	**Strengths and Concerns of the study**
Su, Chong et al., 2007 (Singapore)		2. Two sessions postnatal support; visited by a lactation consultant: 1) before discharge; and 2) 1-2 weeks after birth ***Follow up*** Two and six weeks, three and six months postpartum					17% in the control group, p = 0.019), three months (24% in the intervention group vs. 13% in the control group, p = 0.040), and six months (19% in the intervention group vs. 9% in the control group, p = 0.042) after birth. 3. Women in postnatal support group were more likely to breastfeed exclusively compared with women who received antenatal education at two week, six weeks, three months, and six months (p = 0.139, 0.777, 0.918, and 0.948 respectively), but there were no significant difference 4. The rate of breastfeeding at all at six weeks was also higher in postnatal support group compared with women who received routine care (84% vs. 71%, p = 0.008)	

CHAPTER 4 STUDY DESIGN

4.1 INTRODUCTION

This chapter describes the study hypothesis, study design, setting, estimation of sample size, and participants. Data collection instruments, study outcome measures and key elements, data analysis and ethical considerations are also described.

The purpose of this research was to test whether a midwife-led antenatal breastfeeding education program assisted mothers to commence breastfeeding and continue to breastfeed during the first month after birth successfully. Participants were provided with breastfeeding knowledge and skills and were encouraged to commence breastfeeding and to continue to breastfeed exclusively for a minimum of one to six months after birth.

4.2 STUDY HYPOTHESIS

The null hypothesis of the study was: There would be no difference in breastfeeding rates during one, three, and six months postpartum for primiparous women who attended breastfeeding classes compared with women who had standard antenatal care.

4.3 STUDY DESIGN

The selection of the study design was determined by the aim of the research which was to design and test the effectiveness of a midwife-led antenatal breastfeeding education program in increasing the rate of predominant breastfeeding at one, three, and six months after the birth of the baby.

There are a number of experimental research designs. A randomised controlled trial is considered to be the simplest and most powerful tool in experimental research. A randomised controlled trial was selected as an appropriate design for this study. The design seeks to measure and compare the outcomes after the participants have received an intervention (Consolidated Standards of Reporting Trials (CONSORT) Group 2010). In this study, participants were recruited and randomized to an experimental group (for

participation in an educational intervention) or a control group (for standard care). The CONSORT guidelines were used to design the intervention trial in this study and the randomised controlled trial registration was submitted on 15 November 2010, and assigned on 23 March 2011 and last edited on 22 September 2011. The reference number is ISRCTN32962146. The ISRCTN application was completed online through the Current Controlled Trials website which was developed by Current Controlled Trials Ltd (see http://www.controlled-trials.com/ISRCTN32962146).

4.4 ETHICAL APPROVAL

“Letters of agreement” were sent to the directors of two study sites seeking for the approval for the research to be conducted. Permission was obtained from the directors to conduct the study (Appendix N).

Ethics approval was granted by: 1) The University of Newcastle, by the University’s Human Research Ethics Committee (HREC), Australia; approval reference number H-2011-0010; and 2) Faculty of Medicine, Chiang Mai University, Thailand; approval reference number NUR FAC-11-02-16A-13-X. A letter requesting permission to contact a midwife representative to act as a contact and facilitator for the study in the antenatal clinics where the women were recruited (Appendix E and F), a letter requesting permission for research assistants (Associate Researchers, see Appendix O) to undertake recruitment (Appendix G) using the required selection criteria (Appendix D) and a letter requesting access to medical records (Appendix C) were also approved by the ethics committee for this study.

4.5 SETTING

The study settings were located in Chiang Mai Province which is the largest and most culturally significant city in Northern Thailand. Chiang Mai has specific distinctive culture, arts, festivals, and traditions in combination with an exciting mix of local and ethnic as well as expatriate communities from all over the world. The breastfeeding experiences of women and their family may have been affected by the various cultures. Northern ethnic groups have their own beliefs about breastfeeding which differ from the recommendation of WHO and UNICEF. For instance, some families in this region

believe that spirits or ghosts cause babies to cry and that poor quality of breast milk causes distressed babies, so that mothers are often encouraged to stop breastfeeding. In addition, for the first month after birth, the mothers are encouraged to always keep warm even when the weather is hot. The resultant overheating sometimes causes increased stress for the mothers who then have difficulty with breast milk supply (Olds 2000, Marshall and Raynor 2010, Macdonald and Magill-Cuerden 2011, Pollard 2012). Newborns are also fed with water and at one month introduced to crushed rice and banana mince because they believe that the baby must be hungry and need baby food as soon as possible. Current knowledge about breastfeeding contradicts these beliefs. It is therefore important to promote breastfeeding and provide current breastfeeding information to women and their families in Chiang Mai Province (Tourism Authority of Thailand 2012).

4.6 STUDY SITES

Two hospital sites were selected for this study and they are described below.

4.6.1 Maharaj Nakorn Chiang Mai Hospital

This hospital is located at 110/392 Intawaroros Road, Sripoom Sub-district, Muang District, Chiang Mai Province, Northern Region, 50200, Thailand. It is the biggest public hospital in Chiang Mai and also in the North of Thailand. The hospital is a tertiary care hospital with about 1,850 beds including almost 60 beds in the maternity unit. It manages approximately 23,000 confinements of pregnant women per year (Maharaj Nakorn Chiang Mai Hospital 2009-2010).

Maharaj Nakorn Chiang Mai Hospital has been selected as the study setting because it is the biggest hospital in Northern Thailand comprising of a large population of women and some ethnic groups of women booking into antenatal clinics. The modern trend for Thai women including the women in northern Thailand is to return to work as soon as possible following the birth of their baby. This may contribute to early cessation of breastfeeding. The rate of exclusive breastfeeding at six months has been decreasing (2007 data; 32.26 % at six months after birth) compared with the initial breastfeeding rate (2006 data; 70.2 %) (Private ward 5; Maharaj Nakorn Chiang Mai Hospital 2004-2007).

4.6.2 Nakornping Hospital

This hospital is located at 159 Chotana Road, Local number 10, Donkaew Sub-district, Maerim District, Chiang Mai Province, Northern Region, 50180, Thailand. The hospital is a secondary care hospital with about 520 beds that provides a 58 bed (41 mother beds, 17 baby beds) maternity unit. It manages approximately 1,000 confinements of pregnant women per year.

Nakornping Hospital has been selected as a study site because it is a secondary level hospital of Northern Thailand comprising of a large population of women and many ethnic groups of women booking into the antenatal clinic to birth. At this site, the rate of exclusive breastfeeding has also been decreasing (84.0 %, 78.58 % and 74.38 % at two, four and six months respectively) compared with the initial breastfeeding rate (90.38 %) which is already high (Nakornping Hospital 2012).

The study was approved by directors of the study sites.

4.7 ESTIMATION OF SAMPLE SIZE

A power calculation was done to determine the number of participants for the study. The assumption of the sample size was based on the estimated rate of exclusive breastfeeding and predominant breastfeeding ; at about 40% (The National Statistical Office (NSO) of Thailand 2010). The estimated rate for improvement of the breastfeeding rates was 25% increasing to 65%, so the study needed to recruit a minimum of 69 experimental subjects and 69 control subjects to be able to reject the null hypothesis that the failure rates for experimental and control subjects are equal with probability (power) 0.8. The Type I error probability associated with this test of this null hypothesis was 0.05. Total required sample size was a minimum of 138. In addition, to account for a 20% attrition rate, it was decided to sample women over two groups up to 166 women that would recruit a minimum of 83 pregnant women in each group (Appendix Q). If the researcher was unable to recruit an adequate number of participants to achieve the required sample size, then the study would become a pilot study to inform the feasibility of an RCT in the future.

4.8 PARTICIPANTS

Inclusion criteria of the participants

All pregnant women who met all these criteria were eligible to participate:

- Minimum 13 years of age
- Gestational ages between 24 and 29 weeks (the latest was 30 weeks gestation)
- Primiparous women
- Ability to speak Thai language
- Neither intellectually nor mentally impaired in ways that precluded effective group interaction

4.9 INTRODUCTION TO THE RESEARCH

After the approval was granted for the study to be conducted at the study sites, the researcher briefed and informed the midwives at the antenatal clinics who were field consultants and facilitators for the study. The researcher also trained research assistants about the recruitment and randomization processes.

4.10 RESEARCH ASSISTANTS

Research assistants were necessary in this study to assist with recruitment of participants for the study. In this study, research assistants were located at each of the study sites. They were trained by the researcher prior to undertaking recruitment for the study. These research assistants had some previous experience and training in research. Their backgrounds are detailed in an Appendix O. They were responsible for inviting potential participants (who met the inclusion criteria for the study) to read the information statement about the study and consider whether they would like to be involved in the study. For women who chose to participate, the research assistants provided consent forms for them to sign, and then added their names to the participant list. Then they asked participants to complete a baseline survey.

4.11 RECRUITMENT

In this study, all primiparous pregnant women of 24-29 weeks or in their second trimester of pregnancy who met the inclusion criteria above were recruited from antenatal clinics at both of the study sites; Maharaj Nakorn Chiang Mai Hospital and Nakornping Hospital. The women's partners were also invited to participate if they desired.

Research assistants provided the women with the study information that included an information sheet (Appendix A), consent form (Appendix B) and a pre-paid reply envelope. The women who could read and understand the information sheet had an opportunity to ask questions at the clinics. For the women who were illiterate, their husband / partner / relative / friend or research assistants read the study information for them. Women who wished to participate were invited to complete and return the consent form. Participation was voluntary (see also Appendix S: Flowchart for Participants and Appendix T).

The illiterate women took a thumbprint as opposed to a signature as evidence of agreeing to participate in the research. The thumb print is an accepted standard practice by law in Thailand. Then participants returned the forms by placing them in a "Breastfeeding Study" box located outside the booking desk at the antenatal clinics. Research assistants then collected the consent forms for the researcher. At this stage, the research assistants asked consenting participants to complete the survey of demographic data and measurement of women's breastfeeding intention, perceived breastfeeding support, and self-efficacy. The participants completed the demographic survey form while they were waiting for the service. Some participants completed the forms later at home and posted them to the researcher in the pre-paid envelope provided. The recruitment process took approximately 15 minutes; including the completion of the demographic data form for the women who wished to participate in the study. For the women who did not want to participate in the study, recruitment time was minimal.

4.12 RANDOMISATION

Following receipt of the consent forms at the antenatal clinics and by post, the consenting women were allocated by a research assistant into two groups, being the experimental and control groups. Consenting women's study numbers were provided to another research assistant who conducted the randomisation process. The other research assistant randomly assigned the consenting participants into two groups by using a randomisation schedule generated using the Excel program (Appendix M) by a biostatistician. The women were allocated to two groups: 1) an experimental group that would receive the educational breastfeeding intervention; and 2) a control group that would receive standard antenatal care and advice about breastfeeding.

A completed randomisation table was provided to the researcher listing participant identification numbers in each group. Within two weeks approximately, allocated participants were contacted by the researcher to advise the groups to which they were allocated. The researcher phoned to confirm the date for the first breastfeeding class for the participants who were in the experimental group. Participants allocated to the control group were not contacted by the researcher during the antenatal period.

4.13 INTERVENTION

The women who were allocated to the control group participated in routine breastfeeding education provided by the study sites (Standard care). The women who were randomised to the breastfeeding education intervention group not only attended the routine breastfeeding education delivered by the study sites, but also participated in three sessions of antenatal breastfeeding education for 90 minutes each. The first antenatal breastfeeding education session was the woman's next booked antenatal appointment. Two weeks later, the second session was conducted. At the end of each session, the researcher always reminded participants about the next appointment. However, phone reminders for the next session were sometimes required. At one, three, and six months after birth, the researcher contacted all of the participants in both groups by telephone to collect data about their predominant breastfeeding experiences.

The researcher provided the intervention as planned (see heading 5.2.1) and conducted the classes with an emphasis on group interaction and practical skills to assist women to

feel at ease. A limitation of this research is the researcher providing the intervention that could have biased the session evaluations due to cultural norms of expectations of compliance with desired behaviours.

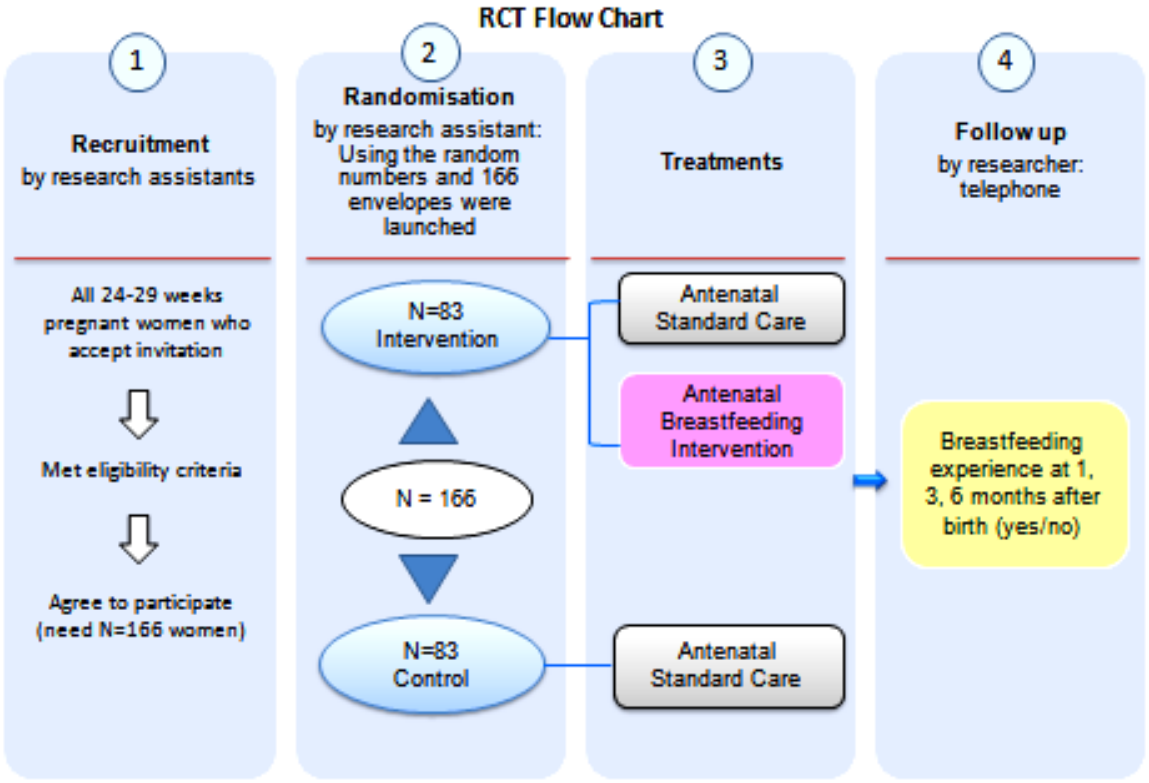

Figure 2 Flowchart: Pilot Randomised Controlled Trial

4.14 STUDY OUTCOME MEASURES

Primary outcome:

- Predominant breastfeeding at one, three, and six months after birth for both intervention and control groups, by telephone interviews.

Secondary outcomes:

- Breastfeeding initiation measured for both intervention and control groups by self-report during the telephone interview at 1 month.
- Perceived breastfeeding self-efficacy measured at recruitment, before birth (both groups), following the intervention (intervention group only) and one, three, and six months after birth for both intervention and control groups. This was

measured by the demographic survey at recruitment, the breastfeeding class and program evaluation instruments and the telephone interviews at one, three and six months. NB. For post-natal self-efficacy, ONE concept was measured: Reasons why women ceased breastfeeding. These reasons are reported in subcategories of vicarious learning, physiological and mastery and include data about verbal persuasion.

- Perceived breastfeeding support measured at recruitment, before birth (both groups), following the intervention (intervention group only) and one, three, and six months after birth for both intervention and control groups. This was measured by the demographic survey at recruitment, the breastfeeding class and program evaluation instruments and the telephone interviews at one, three and six months.
- Breastfeeding intention (for subsequent births) at recruitment, before birth (both groups) and post intervention (intervention group only) and at one, three and six months after birth (for the next child), for both intervention and control groups. This was measured by the demographic survey at recruitment, the breastfeeding class and program evaluation instruments and the telephone interviews at one, three and six months.
- Evaluation of the breastfeeding program (intervention group only). This was measured by the breastfeeding class and program evaluation instruments.

4.15 DATA COLLECTION INSTRUMENTS

There were four data collection instruments used in the study (Figure 3). These instruments were developed to measure the key data elements in the study and translated into Thai. The researcher was fluent in English and Thai languages, verbally and writing and reading written documentation.

4.15.1 Demographic data survey

The survey was provided to all participants by research assistants following recruitment. Prenatal data about pregnant women’s demographic details including participants’

breastfeeding intention, self-efficacy, and perceived breastfeeding support prior to the intervention were collected using a checklist (Appendix H).

4.15.2 Antenatal breastfeeding class evaluations

Participants in the intervention group attended three antenatal breastfeeding classes. Each session was evaluated using an evaluation form (Appendix I) provided by the researcher at the end of each class. Teaching content, tools, and techniques were assessed in the questionnaire. The form was designed by using the check list items derived from class components that was suitable for all participants.

4.15.3 Antenatal breastfeeding program evaluation

One program evaluation form was given to participants by the researcher at the last class (class 3). Teaching content, tools, and technique were assessed in the questionnaire. In addition, the form assessed the participants' breastfeeding intention, self-efficacy and perceived breastfeeding support prior to the babies' birth (Appendix J).

4.15.4 Semi-structured follow up telephone survey

The semi-structured follow up telephone survey measured predominant breastfeeding experiences of all participants in the study after discharge. The survey was conducted at one, three, and six months after discharge by the researcher.

To avoid contacting mothers who experienced poor birth outcomes, (for example a still-birth), midwifery data such as confinement date, date of birth, type of birth and birth outcome were extracted from the hospital information record system and checked prior to the telephone call. The questionnaire was designed specifically for a post discharge phone survey, and questions on breastfeeding behaviours and support were included. Postnatal data on women's breastfeeding initiation, reasons women ceased breastfeeding (self-efficacy), intention and support were also included in the survey to measure these outcomes in the post discharge period (Appendix K and L).

However, there was potential for bias in the responses of participants in the intervention groups in the postnatal interviews because the researcher who delivered the intervention

was also conducting these telephone interviews. The researcher used carefully designed questions that did not emphasise any form of infant feeding as preferable, so that the participants did not feel any pressure to provide answers that were in favour of breastfeeding. The participants could also decide to not participate in the interview without providing any reason.

4.16 KEY ELEMENTS MEASURED IN DATA COLLECTION INSTRUMENTS

There were six key elements measured: 1) Predominant breastfeeding at one, three, and six months after birth (Primary Outcome); and Secondary Outcomes: 2) Breastfeeding initiation; 3) Perceived self-efficacy; 4) Perceived breastfeeding support; 5) Breastfeeding intention and 6) Evaluation of the intervention; (Figure 3).

These elements were measured in the: 1) demographic survey (Appendix H), 2) class evaluation (Appendix I), 3) program evaluation (Appendix J), and 4) follow up telephone survey (Appendix K and L). The answers from the instruments were recorded in Thai. The researcher entered the data into a database and the data were then translated into English.

Key Elements Measured	Data Collection Instruments					
	1) Demographic survey (Both groups)	2) Class evaluation (Experimental group)			3) Program evaluation (Experimental group)	4) Telephone follow up (Both groups)
		Class 1	Class 2	Class 3		
Pre-intervention						
1. Self-efficacy **(element 3)**						
Vicarious learning	√					
Physiologic responses	√					
Skills practice	√					
2. Perceived breastfeeding support (element 4)	√					
3. Breastfeeding intention **(element 5)**	√					
Intervention						
1. Self-efficacy **(element 3)**						
Vicarious learning					√	
Physiologic responses					√	
Skills practice					√	
2. Perceived breastfeeding support **(element 4)**					√	
3. Breastfeeding intention **(element 5)**					√	
4. Antenatal evaluation of breastfeeding education intervention average score **(element 6)**						
Teaching content		√	√	√	√	
Teaching tools		√	√	√	√	
Teaching technique		√	√	√	√	

Figure 3 Data collection instruments and the key elements measured

Key Elements Measured	Data Collection Instruments					
	1) Demographic survey (Both groups)	2) Class evaluation (Experimental group)			3) Program evaluation (Experimental group)	4) Telephone follow up (Both groups)
		Class 1	Class 2	Class 3		
Post- intervention						
1. Predominant breastfeeding at one, three, and six months **(element 1)**						√
2. Breastfeeding initiation **(element 2)**						√
3. Self-efficacy: Reasons women ceased breastfeeding **(element 3)** at one, three, and six months						
Vicarious learning						√
Physiologic responses						√
Skills practice						√
4. Perceived breastfeeding support **(element 4)** at one, three, and six months						√
5. Breastfeeding intention **(element 5)** at one, three, and six months						√

Figure 3 Data collection instruments and the key elements measured (continued)

4.17 DATA ANALYSIS

The data analysis was conducted to evaluate the effect of an evidence based intervention on primiparous women's predominant breastfeeding rates at one, three, and six months after birth in the study sites in Chiang Mai, Thailand.

Intention-to-treat (ITT) analysis was conducted initially. ITT analysis was considered most suitable for this study. It is a method of analysis for randomised controlled trials in which all women randomly assigned to one of the treatments are analysed together whether or not they completed or received that treatment. ITT analysis avoids bias associated with non-random loss of participants (Consolidated Standards of Reporting Trials (CONSORT) Group 2010). The number of participants in each group is an essential element of the analyses, so the number of participants per group should be given for all analyses (Consolidated Standards of Reporting Trials (CONSORT) Group 2010).

Descriptive statistics and inferential statistics are reported. The data obtained from this study were analysed using the SPSS (Statistical Package for Social Sciences) for window version 21, and the SAS statistical package.

Descriptive statistics:
Means (SD), medians and percentages were reported for the demographic profile for each group and overall.

Inferential statistics:

Chi square analysis, GEE and Mc Nemar's tests were used to compare outcomes measured from both groups and to determine statistically significant differences between groups at specific time points including at recruitment, before birth, post intervention and at one, three, and six months after birth. A detailed presentation of data analysed are reported in chapter 6; Results.

4.18 ETHICAL CONSIDERATIONS

This study involved human subjects and required appropriate recognition of ethical issues before the research could commence.

The approved information sheet (Appendix A) was provided to potential participants by research assistants and informed consent (Appendix B) was obtained from each of the participants who voluntarily consented. All consenting participants had the right to withdraw their involvement once the study had commenced without providing any reason.

4.18.1 Beneficence, justice, respect and integrity

Participation in the study was entirely voluntary. Potential participants were able to give or refuse to give free informed consent. No coercion or persuasion of any kind was used. Participants were fully informed about their right to withdraw at any time they wished without the need to give a reason and no penalty or embarrassment would ensue. Their decision to withdraw was also not likely to disadvantage them. The participants also had the option of withdrawing any data which identified them.

The participants in the control group obtained no benefits from the study, but they were provided with standard antenatal breastfeeding education by attending their routine antenatal clinics. Agreeing to participate in the study and not being randomised to the control group may have created disappointment for the control group participants. The participants in the experimental group benefited by being provided with more information about breastfeeding and related practices; so they would have a better awareness of how to breastfeed their infants following birth, compared to the control group. The participants would also benefit from sharing their own experiences with other interested participants. Their children and families were expected to enjoy the benefits of breastfeeding which included bonding and increasing self-esteem. In addition, better support networks were established so that the women felt that participating in the study was useful. Thus being randomised to the intervention group should be a benefit. Some consenting participants were not able to continue to attend

intervention classes as they could have experienced personal difficulties. These participants were included in the analysis but they were lost to follow up.

There were no risks to participants' and their babies' physical health. If any clinical issues were identified during the intervention the participants would be referred to the appropriate health services. Some women could have experienced a traumatic birth or a poor outcome for the baby. Therefore, women's medical records were checked prior to follow up. In the intervention group, participants may have felt guilty if they could not breastfeed or stopped breastfeeding earlier than expected. To limit potential emotional stress to women who stopped breastfeeding early, when contacted by telephone, the conversation began with an introduction and then prepared questions were asked respectfully. The follow up questions concerning breastfeeding were attended with the utmost respect. If the woman replied that she had stopped breastfeeding, the researcher was supportive without being judgemental.

The results of the study will be used to evaluate the effect of the educational intervention and whether it leads to an increased rate of predominant breastfeeding between one and six months for those women who experienced the intervention. Journal articles will be submitted for publication in national and international journals. No identifying data will be presented that is published from this study. A summary of results will be made available to participants on request at the completion of the study.

4.18.2 Researcher role and participants' role

The researcher was not involved in recruitment and randomisation; instead research assistants who were trained by the researcher conducted those activities. The researcher had no clinical responsibility and only provided antenatal breastfeeding education and interviewed all participants about their breastfeeding experiences at one, three and six months after birth by using the semi-structured telephone interview.

Participants in the intervention group were asked to participate in three antenatal breastfeeding classes. They were also encouraged by the researcher to share their breastfeeding experiences while they were participating in the classes. Participants in the control group were only provided routine antenatal breastfeeding education delivered by the antenatal clinics at the study sites.

The researcher's role was to provide breastfeeding education in the classes and to interview women about their breastfeeding experiences after birth. The researcher did not have any private relationships with the women and their family and did not accept /receive any rewards / gifts from participants (this is a widespread practice in Thai culture).

4.18.3 Data management, security, and disposal

Only the student-researcher had access to participants' names and contact details. All data provided to the supervisors or within any written reports were de-identified. The participant's contact details were kept separately from all other research data on the researchers password protected computer and in paper form in a locked drawer of the participants' office. All other electronic files regarding research data that related to the study were stored securely with password protected and backed up in Personal Digital Assistant (PDA) specifically dedicated for research purposes. Written documents and other documentation/information were kept in a locked filing cabinet in the School of Nursing & Midwifery at the University of Newcastle. Information and searched material from publication journals that were obtained during the study were used only for research purposes. After completion of the project the hard copies of documents will be shredded. All data on the computer will be transferred to university on CDs. The data will be stored in the School of Nursing and Midwifery for the required duration of five years and then all information will be destroyed by erasure.

CHAPTER 5 INTERVENTION

5.1 INTRODUCTION

This chapter describes the development and implementation of the intervention. The intervention consisted of a midwifery antenatal breastfeeding educational program. The program was created based on current knowledge about the importance of breastfeeding (see Chapter 2) and evidence based literature about successful midwife-led antenatal breastfeeding education programs (chapter 3). Key elements for successful breastfeeding (summarised in chapter 2) and components of the intervention design (summarised in chapter 3); were combined together to design a midwife-led intervention to extend the duration of predominant breastfeeding rates in a community in Thailand. These keys elements were applied to the classes as summarised in Table 3.

Table 3 Summary of components of midwife-led antenatal group-based breastfeeding education intervention

Components	**Class 1** **(Gestational age 28-32)**	**Class 2** **(Gestational age 30-34)**	**Class 3** **(Gestational age 32-36)**
Breastfeeding Statement (WHO & UNICEF, 1989)	**Breastfeeding policy** Exclusive breastfeeding is recommended up to 6 months of age, with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond. **Key successful breastfeeding "Ten Steps"** 1. Every facility providing maternity services and care for newborn infants should have a written breastfeeding policy that is routinely communicated to all health care staff. 2. Train all health care staff in skills necessary to implement this policy. 3. Inform all pregnant women about the benefits and management of breastfeeding. 4. Help mothers initiate breastfeeding within half an hour of birth. 5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants. 6. Give newborn infants no food or drink other than breast milk, unless medically indicated. 7. Practice rooming-in - that is, allows mothers and infants to remain together - 24 hours a day. 8. Encourage breastfeeding on demand. 9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants. 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.		

Table 3 Summary of components of midwife-led antenatal group-based breastfeeding education intervention (continued)

Components	Class 1 (Gestational age 28-32)	Class 2 (Gestational age 30-34)	Class 3 (Gestational age 32-36)
Breastfeeding Statement (WHO & UNICEF, 1989) (continued)	**Step 1-2-3 above were related to this study**		
Class aims	• To create a friendly environment and group dynamics • To facilitate group discussion so that participants feel free to share their experiences and opinions	• Participants sharing stories of their task experiences and sharing their journal reflections • Facilitating and encouraging women to identify action strategies that they preferred to use either individually or collectively with the aim of promoting health and breastfeeding • Promoting the establishment of support structures for breastfeeding	• Practice breast care, Skin-to-Skin contact, positioning and attachment for successful breastfeeding using doll and breast models • Prepare participants for returning to work; hand expressing / breast pump and storage of breast milk
Key elements for successful breastfeeding (see heading 2.7)	Midwives are a good source of breastfeeding information Timing of breastfeeding education Breastfeeding education session content		
	Breastfeeding is more beneficial for baby and mother Breastfeeding rates have not yet achieved the global target rate Recommended breastfeeding education content (Ten Steps of Successful Breastfeeding) Breastfeeding intention	International and Thailand and breastfeeding initiatives Family support is important Breastfeeding problems and solutions	Return to work policies can influence breastfeeding behavior Breastfeeding initiation and maintenance of breastfeeding for extended duration Breastfeeding intention Breastfeeding self-efficacy
Key elements of designing the intervention (see heading 3.13)	3.13.1 Midwives are the appropriate healthcare professionals to deliver breastfeeding education. 3.13.2 Interventions should include an antenatal breastfeeding education component. 3.13.3 The number of antenatal classes required is unknown but previous studies have used one to three sessions. 3.13.7 It may be most appropriate to recruit mothers during the second trimester and provide breastfeeding education in the third trimester to minimise the time between learning and the application of breastfeeding skills and knowledge. 3.13.8 It is important that partners/families are involved in breastfeeding education so that they can provide critical support in the postnatal period. 3.13.10 Group-based education appears to be an effective teaching approach.		

Table 3 Summary of components of midwife-led antenatal group-based breastfeeding education intervention (continued)

Components	Class 1 (Gestational age 28-32)	Class 2 (Gestational age 30-34)	Class 3 (Gestational age 32-36)
Key elements of designing the intervention (see heading 3.13) (continued)	3.13.4 The content of antenatal classes should include "Skin to Skin contact", "Early suckling", and the Ten Steps for Successful Breastfeeding".	3.13.5 Midwives follow up in the postnatal period is important.	3.13.4 The content of antenatal classes should include "Skin to Skin contact", "Early suckling", and the Ten Steps for successful breastfeeding". 3.13.6 There is some evidence that self-efficacy is considered to be an important element in breastfeeding education programs. 3.13.9 A variety of educational strategies and skills training can be used in antenatal breastfeeding education sessions.
Midwifery Philosophy (ACM Philosophy for Midwifery, 2011)	• Midwives focus on a woman's health needs, expectations and aspirations • Midwives include collaboration and consultation between health professionals	• Midwives are informed by scientific evidence, by collective and individual experience and by intuition • Midwives focus on holistic in its approach and recognise each woman's social, emotional, physical, spiritual and cultural needs, expectations and context as defined by the woman herself • Midwives recognises every woman's right to self-determination in attaining choice, control and continuity of care from one or more known caregivers • Midwives encompass the needs of the woman's baby, and includes the woman's family, her other important relationships and community, as identified and negotiated by the woman herself • Midwives follow each woman across the interface between institutions and the community, through pregnancy, labour and birth and the postnatal period so all women remain connected to their social support systems; the focus is on the woman, not on the institutions or the professionals involved	• Midwives recognise every woman's responsibility to make informed decisions for herself, her baby and her family with assistance, when requested, from health professionals

Table 3 Summary of components of midwife-led antenatal group-based breastfeeding education intervention (continued)

Components	Class 1 (Gestational age 28-32)	Class 2 (Gestational age 30-34)	Class 3 (Gestational age 32-36)
Self-efficacy theory (Bandura, A., 1994)	**Key concept:** Vicarious learning (modelling) **Mission to meet the concept** • Women understood "Ten Steps for Successful Breastfeeding" • Women asked friends or colleagues who have successfully breastfed	**Key concept:** Verbal persuasion and Physiological and psychological responses **Mission to meet the concept** • Women were encouraged to belief that they and their baby have the necessary physiological and psychological responses to be able to succeed at breastfeeding • Family support including the support from breastfeeding professionals	**Key concept:** Mastery experience: skills, ability, self-expressing **Mission to meet the concept** • Skills practice, women ability, self-expressing, social practical/support • Women included partners would plan to gain the support and encouragement of extended family/friends

5.2 IMPLEMENTATION

5.2.1 Intervention

In the intervention stage, the women were provided with education and care as described below.

The women who were allocated to the control group were only provided with the standard antenatal care offered by midwives or obstetricians at the antenatal units.

The women who were allocated to the intervention group were provided with the antenatal breastfeeding intervention education program that consisted of three 90 minutes semi-structured education group sessions as summarised in Figure 4. The classes were commenced when the women were approximately 28-32 weeks pregnant and thereafter at two week intervals. Husbands and/or other relatives or friends were also invited to the classes. The antenatal breastfeeding teaching plan is outlined in Table 4.

The antenatal breastfeeding intervention sessions were held separately at the education room in the antenatal clinics where the women had their appointments. All the women in the intervention group were expected to attend the breastfeeding intervention classes. The researcher used adult learning approaches and group-based discussions as part of the implementation of the intervention used in this study. Alternatively, the women who received standard care received breastfeeding advice and education from routine antenatal clinics.

Group-based learning is designed and aims to encourage learners to take greater self-responsibility and develop more self-awareness. Group-based learning offers many opportunities for enriched learning experiences through collaboration and sharing of knowledge. Effective group-based learning takes some planning and the activities need to be well thought out during the design process. Educators also need to look at the social and group skills necessary for group success (Strijbos 2000, Centre for Learning and Teaching. University of Brighton 2011). Group-based learning was used to assist the women to raise their awareness about breastfeeding and improve breastfeeding rates as group learning adopts a learner-centred approach.

The three classes were provided for groups of primiparous pregnant women and their partners or their supporters. The goals of these classes were to provide participants with the information and skills they needed to improve their breastfeeding outcomes following the birth of their baby. In addition, the education was expected to increase women's experiences about initiation and continuation of predominant breastfeeding at one, three and six months after birth.

In each session, the following format was applied: 1) check in, each participant was invited to talk/feedback briefly; 2) reflection and evaluation of each session and program; 3) overview of the session content; 4) reflection, evaluation and recommendation from participants; 5) socializing time and close the session. An environment in which women could explore their ideas about breastfeeding, correct misinformation and enhance their breastfeeding confidence was provided. Each group meeting included a facilitated discussion about breastfeeding experience. During the education sessions, the midwife facilitated discussion by using opened-ended questions to enable the women to share freely. Participants were also encouraged to contribute to journal reflections, drawings, photographs or any other form of self-expression participants wished to use in presenting their experiences. At the end of each session, the participants were asked to evaluate the sessions (Appendix I). There was also a program evaluation (Appendix J) at the end of the entire program included in session three. The details of each session were described below.

Antenatal breastfeeding education intervention program

Three breastfeeding education classes were provided to the participants who were allocated in the experimental group. The duration of each class was approximately 90 minutes (plus 15 minutes break).

The first class: "Breastfeeding knowledge and perception"

The first session consisted of introductions and building relationships between the researcher and group members at 28 to 32 weeks gestation. The main objective of the first session was to facilitate group discussion so that participants could feel free to share their experiences and opinions.

Topics focused / discussed:

- Introduction
- Sharing breastfeeding experiences
- Ten Steps to Successful Breastfeeding from WHO
- Prepared topics / scenarios / problems about breastfeeding
- Task “fun work” (Homework)

Class Aims:

- To create a friendly environment and group dynamics
- To facilitate group discussion so that participants feel free to share their experiences and opinions

Class Activities:

- Knowledge about breastfeeding was discussed following PowerPoint presentations, video education and printed guidelines based on the Ten Steps to Successful Breastfeeding as recommended by the World Health Organization
- A summary of key points of discussion was presented to participants
- Women were then given a brief task (fun work) consisting of a list of trigger questions about breastfeeding to ask their mother or mother in law about their breastfeeding experiences. In addition, women were invited to journal, draw, take photos or undertake any creative way of depicting the information they generated from this task.
- The first session evaluation was completed at the end of the class

The second class: "Breastfeeding problems and solutions"

The second session consisted of exploring information and ideas from the task interviews / artwork / self-expression and correcting misinformation as well as predicting and solving problems at 30 to 34 weeks gestation. The main objective of the second class was to explore information and ideas from the task (fun work) interviews / artwork / self-expression and to correct misinformation.

Topics focused / discussed:

- Sharing breastfeeding stories
- Discussing common breastfeeding problems such as breast engorgement, cracked nipples and decreased breast milk supply

Class Aims:

- Participants sharing stories of their task experiences and sharing their journal reflections
- Facilitating and encouraging women to identify action strategies that they preferred to use either individually or collectively with the aim of promoting health and breastfeeding
- Promoting the establishment of support structures for breastfeeding

Class Activities:

- The researcher invited participants to share stories of their 'fun work' experiences and journal reflections.
- Common breastfeeding problems were discussed in small groups using the doll and breast models.
- Participants were encouraged to state their breastfeeding intention and write on a prepared card so that the researcher could guide them to think about their plan for

returning to work and how they were going to store breast milk. They were encouraged to bring this card back for breastfeeding practice in the third class.

- The second session evaluation was completed at the end of the class.

The third class: "Maintaining breastfeeding and support"

The third session involved practical hands on experience with modelling breastfeeding, including positioning and attachment for success at 34 to 36 weeks or more gestation.

Topics focused / discussed:

- Breast care
- Skin-to skin contact
- Latching and positioning
- Hand expressing / breast pump
- Storage of breast milk
- Preparing ourselves for returning to work

Class Aims:

- Practice breast care, skin-to-skin contact, positioning and attachment for successful breastfeeding using doll and breast models
- Prepare participants for returning to work; hand expressing / breast pump and storage of breast milk

Class Activities:

- Each woman was asked to share her feedback from the previous session and her breastfeeding perception/intention.
- The class demonstrated the process of breast care, latching and positioning, hand or breast pump expression, breast milk storage and preparing themselves for returning to work.

- A card which included the researcher's contact details was provided to the women so that they could easily contact the researcher.
- The participants were reminded about the phone call they would receive when their baby was four weeks old and also reminded them to let the researcher know when they were due to give birth.
- The researcher thanked the women for their participation in the research.
- After class, the third session evaluation and the program evaluation were completed respectively.

5.2.2 Post-intervention period

Prior to the telephone call the two groups of participants' midwifery data such as confinement date, date of birth, type of birth and birth outcome were extracted from the hospital information record system. The participants, who could be contacted were phoned by the researcher. Midwife support during the phone call was only provided if needed by the women. The breastfeeding behavior at one, three, and six months after birth was evaluated by using a telephone follow up survey. The data from the survey were recorded on the semi-structured telephone interview follow up forms.

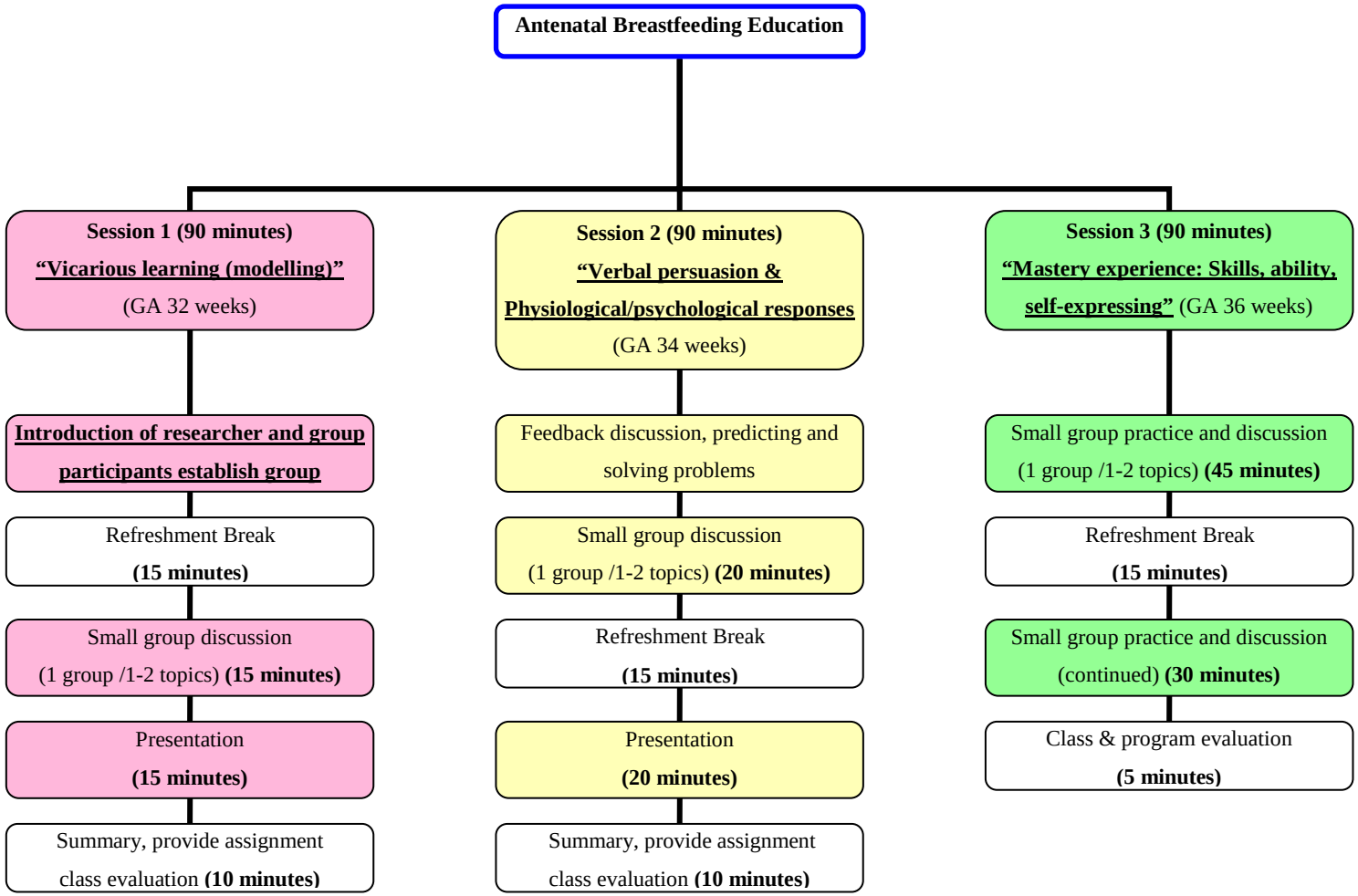

Figure 4 Group-based antenatal breastfeeding education session summary

Table 4 Antenatal Breastfeeding Education (Teaching plan)

Session	Duration	Group	Implementation	Researcher Teaching activity	Women Learning activity	Resources
1 **(28-32 wks.)**	**90 mins.**		**Breastfeeding knowledge and perception**			
			Self-efficacy concept: Vicarious learning, Women & Family response **Mission:** 1. Introduction 2. Exploring knowledge 3. Identifying topics of interest			• Provide to participants • Breastfeeding DVD • Breastfeeding leaflet/card • Refreshments • Breastfeeding interview guide form for fun-work at home
	50 mins.		**1. Introduction; 2. Exploring knowledge**			
	5 mins.	Large group	Introduction of facilitator/researcher and group participants establish group agreement	• Introducing self • Facilitating • Introductions and group agreement	• Introducing each other • Discussing group agreement	
	15 mins.	Large group	Explore: women's breastfeeding knowledge/perception. What do they know?	• Facilitating discussion • Ensuring all have a voice • Record decisions	• Brainstorming breastfeeding view/information	• Pens • Butcher's paper • Power point/DVD • Model breasts • Baby dolls

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher Teaching activity	Women Learning activity	Resources
	15 mins.	Large group	Describe: importance/benefits of breastfeeding (WHO) 'Ten Steps'	• Describe briefly • Demonstrate	• Listen/share/ask	
	15 mins.	Large group	Refreshment Break	• Free discussion	• Free discussion	• Refreshments
	35 mins.		**3. Raising information or topics**			
	15 mins.	Small groups	Choosing prepared topic: each group choose topics from box with cards; scenarios/problems on cards (Appendix W)	• Dividing group • Facilitate choice of cards • Monitoring group discussion • Timekeeping	• Discussing scenarios • Brainstorming ideas and suggestions/solutions for common problems • Recording main points	
	15 mins.	Large group	Present: each group presents main points of small group discussion Discuss: large group discusses each presentation/feedback each group	• Facilitate presentations • Correct misinformation • Fill in gaps • Questioning women present • Demonstration	• Sharing ideas and solutions, discussing options, listening to each other, questioning • Listen/share/ask	• Model breasts • Baby dolls • Breastfeeding photos

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher teaching activity	Women learning activity	Resources
	5 mins.	Large group	Summarise: main ideas of the day Fun-work at home: Interview women/partner' s mother about their breastfeeding experience	• Summarise discussion • Allocate fun work and explain same	• Listen/question/ discuss	• Guided topics interview form
	5 mins.		**4. End of session**			
		Large group	Evaluation: women will be asked to evaluate class session (the 1st class evaluation)	• Distribute & explain evaluation form; leave women to fill out	• Filling in assessment form	• Assessment form
2 **(30-34 wks.)**	**90 mins.**					
			Self-efficacy concept: Verbal persuasion, physiological and psychological responses, and family/community supports/responses **Mission:** Application of "Ten Steps" 1. Feedback discussion 2. Predicting and solving problems			• Provide to participants • Breastfeeding leaflet/card • Refreshments • Card for breastfeeding plans
	40 mins.		**1. Expanding information / Feedback discussion**			
	5 mins	Large group	Welcome			

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher teaching activity	Women learning activity	Resources
	15 mins	Large group	Topic: feedback from interview of mother re breastfeeding experience / information focusing on the interviews from session one , fun-work	• Facilitate discussion • Record comments	• Sharing information • Discussing ideas • Questioning	• Pens
	20 mins	Small groups	Discuss: feedback discussion/ expanded problems	• Facilitate discussion • Record comments	• Sharing information • Discussing ideas	• Model breasts • Baby dolls
	15 mins.	**Large group**	**Refreshment Break**	• **Free discussion**	• **Free discussion**	• **Refreshments**
	30 mins.		**2. Predicting and solving problems**			
	20 mins	Small groups	Present: each group of women present the solution	• Encourage women present • Correct misinformation • Fill in gaps	• Present as group • Sharing information • Discussing ideas • Questioning	• Model breasts • Baby dolls
	10 mins	Small groups	Summarise: main idea of the day Fun-work at home: planning for breastfeeding	• Summary • Assign women and give women the prepared card (Appendix X)	• Listen/share/ask	• Card for breastfeeding plans

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher teaching activity	Women learning activity	Resources
	5 mins.		**End of session**			
		Large group	Evaluation: women will be asked to evaluate class session (the 2nd class evaluation)	• Distribute & explain evaluation form; leave women to fill out	• Filling in assessment form	• Assessment form
3 **(32-36 wks.)**	**90 mins**					
			Self-efficacy concept: Women ability / Self-expressing, Social practical / supports **Mission:** Application of "Ten Steps" 1. Skills Practice / Strategies 2. Expressing women ability 3. Roles of mother and father or supporter			• Provide to participants • Refreshments • BREASTFEEDING leaflet/card • Sample bag for storage milk
	45 mins.					
	5 mins.	Large group	Welcome back			
	15 mins.	Large group	Share women breastfeeding statement: each woman will be asked to share feedback from the previous session and breastfeeding intention	• Encourage women to share their statement of breastfeeding	• Listen/share/ask	

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher teaching activity	Women learning activity	Resources
	25 mins.	Small groups	Practice: • Breast care • Skin-to Skin contact • Latching and positioning • Hand expressing/breast pump • Storage of breast milk • Preparing milk for returning to work	• Demonstrate • Encourage women to practice • Provide missing information	• Listen/share/ask • Practice	• Model breasts • Baby dolls • Breast pump • Glass bottle/ bag for Storage milk • Cleaned small towels
	15 mins.	**Large group**	**Refreshment Break**	• **Free discussion**	• **Free discussion**	• **Refreshments**
	25 mins.					
	15 mins	Small groups	Practice (continued)	• Demonstrate • Encourage women to practice • Provide missing information	• Listen/share/ask • Practice	• Model breasts • Baby dolls • Breast pump • Glass bottle/ bag for Storage milk • Cleaned small towels
	10 mins	Small groups	Summarise: • Main idea of the day • Main ideas about breastfeeding from three sessions	• Summary	• Listen/share/ask	

Table 4 Antenatal Breastfeeding Education (Teaching plan) (continued)

Session	Duration	Group	Implementation	Researcher teaching activity	Women learning activity	Resources
	5 mins.		**End of session**			
		Large group	Evaluation: women will be asked to evaluate; class session per day (the 3rd class evaluation) antenatal breastfeeding program	• Distribute & explain evaluation form; leave women to complete	• Completing assessment form	• Assessment form

CHAPTER 6 RESULTS

6.1 INTRODUCTION

In this chapter the major findings of this study are presented. The participants were first-time mothers who received antenatal care at Maharaj Nakorn Chiang Mai Hospital and Nakornping Hospital during the period October 2011 to December 2012.

The presentation of these results is divided into three sections. The first section provides information about the demographics of the participants using descriptive statistics. This demographic information provides an overview of the sample of women including age, gravidity, hospital location, race, citizenship, religion, marital status, education, family income, language and literacy.

The second section will then report breastfeeding data (study outcomes) using descriptive statistics. Intention-to-treat (ITT) analysis was performed such that all women who were randomly assigned to one of the treatment groups were analysed together whether or not they completed or received that treatment. To present the most conservative results, in keeping with ITT analysis, all missing responses for questions and outcomes were assigned as the "worst" value for that question.

The data about the primary outcome, predominant breastfeeding at one, three and six months after birth, are reported. The secondary outcomes, women's breastfeeding initiation, perceived breastfeeding self-efficacy, perceived breastfeeding support, breastfeeding intention (for subsequent births) and evaluation of the breastfeeding program are also presented. In addition, the incidental findings; women's perceptions about satisfaction with feeding methods, women's working status after birth, reasons why women ceased breastfeeding and the nature of breastfeeding support are reported. Chi-square (Pearson) and Fisher's Exact analysis were used to compare categorical variables and determine differences between groups at one, three and six months after birth. However, Chi-square was calculated only if all expected cell frequencies were equal to, or greater than five. When the sample size was small and the frequency count in each cell of a data table was

less than five, the Fisher's Exact test was conducted instead (Field 2009). Statistical significance was determined at 5%. A GEE model was used and analysed using the SAS program to examine the association between the intervention group and breastfeeding rates at each time point, adjusting for correlation of time points within subjects for the primary outcome of predominant breastfeeding at one, three and six months. The McNemar's test was used to test differences between two related groups (Field, 2005), and was used for the intervention group pre intervention and post intervention (intervention group only) time points to compare scores for self-efficacy, support and intention to breastfeed.

The last section addresses potential harms during the conduct of the study as per CONSORT guideline requirements (CONSORT group 2010).

Summary of the Research Question

A pilot RCT was conducted to evaluate the effect of an evidence based intervention on primiparous women's predominant breastfeeding rates at one, three and six months after birth in the study sites in Chiang Mai, Thailand.

Although the study was designed to be an RCT, there were difficulties with recruitment. In addition, cultural factors such as time issues, inadequate level of uptake of the intervention and a resultant small sample size were influencing factors. The study was then deemed to be a pilot study.

Objectives of the study were as follows:

1. To determine if there is a difference in breastfeeding rates during one, three, and six months postpartum for primiparous women randomised to breastfeeding classes (the intervention) compared with women randomised to standard antenatal care.

2. To report measures of breastfeeding initiation, perceived breastfeeding self-efficacy, perceived breastfeeding support, breastfeeding intention (for subsequent births) and an evaluation of the breastfeeding program.

The flow diagram of participants throughout the trial as per CONSORT guideline requirements is illustrated in Figure 5 (CONSORT group 2010). Recruitment was commenced on 11 October 2011 and follow up was completed on 25 December 2012. The recruitment schema for the pilot RCT can be seen in Figure 5.

Of the 89 women recruited who were eligible to participate in the study; 63 women (70.8 %) consented voluntarily to participate and 26 of those women (29.2%) declined to participate. Sixty-three women (70.8%) signed the consent form and they were subsequently randomised into two groups: 26 in the control arm and 37 in the intervention arm.

All 63 women completed the initial background questionnaire, including questions assessing women's: 1) breastfeeding intention; 2) perceived breastfeeding support; 3) perceived breastfeeding confidence; and 4) opportunities for breastfeeding practice 5) opportunities to learn from other women breastfeeding and 6) knowledge about reasons why women ceased breastfeeding.

Intention to treat analysis was used; hence, all of the 63 (100%) women randomly allocated into two groups were available for analysis. One participant subsequently withdrew from each group because of medical complications (control group) and obstetrical complications (intervention group) that occurred during their pregnancy. There were 36 women who participated in the intervention group. Of these 36 women, 14 women were divided into six groups; (two groups of three women, and four groups of two women). Six partners participated in the group sessions. Twenty-two women were provided with individual education sessions. Three partners participated in the individual sessions, however most partners only participated in the first class. There was a 94% (n = 34) attendance rate for breastfeeding education classes in the intervention group (i.e. 34 women attended at least one class). Of those women, 25 (69.4%) completed three of the breastfeeding education intervention classes, but 11 (30.5%) did not (four women experienced premature labour, one woman birthed before the class date, four women attended routine antenatal classes instead (due to a scheduling conflict) and two moved out of the area).

Out of the 63 consenting women, 61 (96.8%) women birthed a healthy baby and two (3.2%) birth outcomes were unknown as these women moved elsewhere. All women who consented to participate in the study from both groups (standard care and intervention groups) were also intended to be followed up after discharge at 1, 3 and 6 months. There were a few women who asked for a support at one month after birth as their parent had introduced baby formula. In the intervention group, 36 (97.3%) women completed the telephone interview one month after the birth and 33 (89.2%) women completed the telephone interviews at three and six months. In the control group, 23 (88.5%) women completed the telephone interview one month after the birth and 20 (76.9%) women completed the telephone interviews at three and six months. Three women in each group could not be contacted at three and six months.

Ten (15.9%) women were lost from the study overall; four in the intervention and six in the control groups. In the intervention group, four women could not be traced or contacted due to one woman's withdrawal (prior to the commencement of the intervention) and three women being uncontactable at three and six months post discharge. In the control group, six women were lost from the study including one who withdrew during the antenatal period, two (7.7%) women who birthed elsewhere, and three (11.5%) women who could not be traced or contacted at three and six months post discharge.

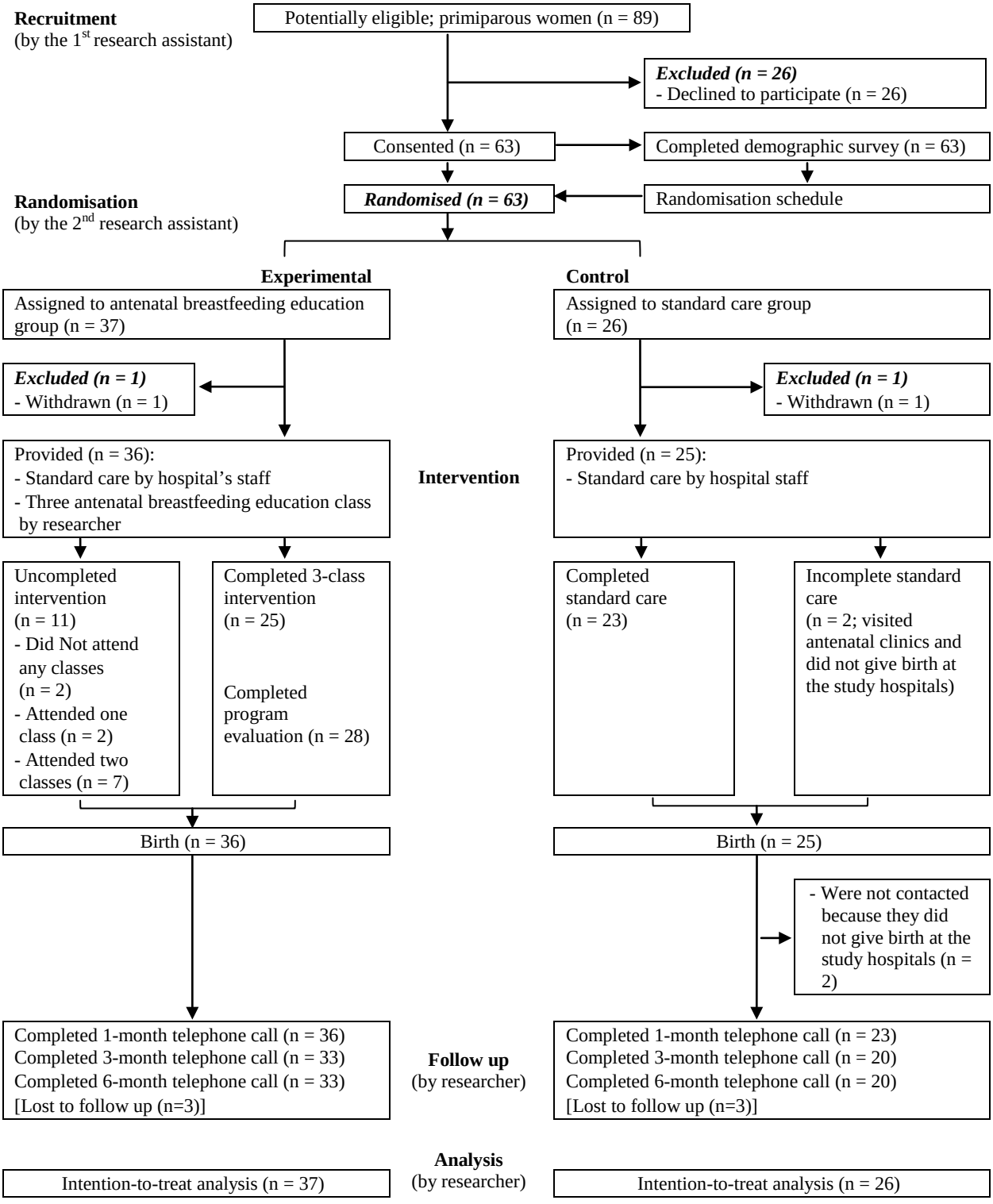

Figure 5 Flow diagram of the Pilot Randomised Controlled Trial

6.2 DEMOGRAPHIC DATA

Most participants (94%) were recruited from the tertiary hospital. Participants ranged in age between 15 and 42 (Mean = 26; SD = 5) years; from 15 to 39 (Mean = 26; SD = 5) years for the intervention group and from 17 to 42 (Mean = 26; SD = 6) for the control group. Of the 63 women; 57 (90%) and 58 (92%) were of Thai race and citizenship respectively, and three women (4.8%) were from other ethnic origins.

Mostly Buddhist women (n = 58, 92%) participated in the study whilst four (6.3%) of the women were Christian. Most women were married (44%). Single women in this study (33%), included those who had a de facto relationship with their partner. Approximately half of the women in this study had an educational level lower than a Bachelor's degree (primary and secondary school). The women in the intervention group had higher levels of undergraduate education than the control group (Bachelor degree; 49% and 15% respectively), but lower levels of education in post-graduate degrees (Masters degree; 0% and 7.7% respectively). The average women's family monthly income was 8,402 (Baht) and was higher for the intervention group (9,124 versus 7,500 Baht). All of the women were able to communicate in Thai language, but one (1.6%) woman was illiterate.

Baseline characteristics of the two randomised groups were similar except for differences in undergraduate educational backgrounds. In summary, the participants were first-time mothers who received antenatal care at Maharaj Nakorn Chiang Mai Hospital and Nakornping Hospital during the period October 2011 to December 2012. The typical participant was Thai, married, Buddhist, literate with an average age of 26 years old. Differences in education and income were seen between the groups; however any differences seen are assumed to be Type 1 errors. Participants' demographic data are presented in Table 5 for each of the treatment groups.

Table 5 Demographic characteristics

Characteristic		Breastfeeding Intervention		
		Control (n=26)	**Intervention (n=37)**	**Total (N=63)**
Age	mean (SD)	26 (6)	26 (5)	26 (5)
	median (min, max)	25 (17, 42)	26 (15, 39)	25 (15, 42)
Gravidity	1	25 (96%)	33 (89%)	58 (92%)
	2	1 (3.8%)	4 (11%)	5 (7.9%)
Place	Tertiary Hospital	25 (96%)	34 (92%)	59 (94%)
	Secondary Hospital	1 (3.8%)	2 (5.4%)	3 (4.8%)
Race	Thai	23 (88%)	34 (92%)	57 (90%)
	Others	1 (3.8%)	2 (5.4%)	3 (4.8%)
Citizenship	Thai	24 (92%)	34 (92%)	58 (92%)
	Others	1 (3.8%)	2 (5.4%)	3 (4.8%)
Religion	Buddhist	24 (92%)	34 (92%)	58 (92%)
	Christian	2 (7.7%)	2 (5.4%)	4 (6.3%)
Marital Status	Single	9 (35%)	12 (32%)	21 (33%)
	Married	12 (46%)	16 (43%)	28 (44%)
	Divorced/Separated	1 (3.8%)		1 (1.6%)
Education	1 No education	2 (7.7%)	1 (2.7%)	3 (4.8%)
	2 Primary/ high school	16 (62%)	13 (35%)	29 (46%)
	3 Bachelor’s degree	4 (15%)	18 (49%)	22 (35%)
	4 Postgraduate degree / Masters	2 (7.7%)		2 (3.2%)
	5 Others- non-formal education	2 (7.7%)	4 (11%)	6 (9.5%)
Income (Baht)	mean (SD)	7500 (4247)	9124 (3325)	8402 (3806)
	median (min, max)	6000 (2000, 20000)	8300 (4300, 20000)	8000 (2000, 20000)
Language	Thai	26 (100%)	36 (97%)	62 (98%)
Literacy	Illiteracy	1 (3.8%)		1 (1.6%)
	Literacy	24 (92%)	36 (97%)	60 (95%)

6.3 BREASTFEEDING DATA: STUDY OUTCOMES

6.3.1 Analysis of primary outcome

6.3.1.1 Predominant breastfeeding measured in intervention and control groups at one, three, and six months

Women's predominant breastfeeding rates were measured at one, three, and six months during the postnatal period for intervention and control groups. In addition, breastfeeding initiation was measured by women's self-report during the one month follow up telephone survey.

At one and six months, 95% and 41% of women were predominantly breastfeeding respectively in the intervention group and 77%, and 46% in the control group; however, the differences between the groups at these time intervals were not significant. At three months predominant breastfeeding rates were 81% and 54% respectively for the intervention and control groups and the difference between these rates was significant ($p = 0.0204$).

Post intervention data about babies being breastfed compared with babies who received formula are reported in Table 6a. In both groups, the breastfeeding rates were high at one month (95% and 77%) and had decreased at three months to 81% and 54% in the intervention and control groups respectively. At six months breastfeeding rates continued to decrease; however, there was a substantial difference between the study groups from the three-month breastfeeding rate (40% and 8% respectively). Similar percentages were evident for babies in both groups who were formula feeding at one, three and six months of age.

In this univariate testing, significant differences were seen between groups for exclusive/ predominant breastfeeding at three months (81% vs. 54%, $p = 0.0204$), nearing toward significance at one month (intervention 95% vs. control 77%, $p = 0 .0562$), but not at six months (41% vs. 46%, $p = 0.6576$) Table 6a.

Women in the intervention group had a very high breastfeeding initiation rate, and sustained a higher rate at three months than the initial breastfeeding rate in the control group; however, this diminished rapidly between three and six months. In contrast, women in the control group had a lower breastfeeding initiation rate that diminished rapidly in the first three months, and then more slowly between three and six months.

Table 6 a) Predominant breastfeeding vs Partial breastfeeding/Formula at 1, 3 and 6 months

Time period	Method	Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (N = 63)	p-value
Breastfeeding Initiation	Breastfed	23 (88%)	36 (97%)	59 (94%)	0.2975
	Did not breastfeed	3 (12%)	1 (2.7%)	4 (6.3%)	
Predominant Breastfeeding 1 months	Exclusive breastfeeding or Predominant feeding	20 (77%)	35 (95%)	55 (87%)	0.0562
	Partial breastfeeding or Fully formula	6 (23%)	2 (5.4%)	8 (13%)	
Predominant Breastfeeding 3 months	Exclusive breastfeeding or Predominant feeding	14 (54%)	30 (81%)	44 (70%)	0.0204
	Partial breastfeeding or Fully formula	12 (46%)	7 (19%)	19 (30%)	
Predominant Breastfeeding 6 months	Exclusive breastfeeding or Predominant feeding	12 (46%)	15 (41%)	27 (43%)	0.6576
	Partial breastfeeding or Fully formula	14 (54%)	22 (59%)	36 (57%)	

Table 6 b contains additional detail about partial breastfeeding and formula feeding for the women in this study.

Table 6 b) Breastfeeding Method at 1, 3 and 6 months

Time Period	Method	Control (n = 26)	Intervention (n = 37)	Total (N = 63)	p-value
Breastfeeding Method 1 month	Exclusive breastfeeding (BF + Expressed BM)	20 (77%)	32 (86%)	52 (83%)	0.1129
	Breast milk + Water		3 (8.1%)	3 (4.8%)	
	Breast milk + Water + Formula	3 (12%)	1 (2.7%)	4 (6.3%)	
	Formula only	3 (12%)	1 (2.7%)	4 (6.3%)	
Breastfeeding Method 3 months	Exclusive breastfeeding (BF + Expressed BM)	12 (46%)	27 (73%)	39 (62%)	0.0905
	Breast milk + Water	2 (7.7%)	3 (8.1%)	5 (7.9%)	
	Breast milk + Water + Formula	6 (23%)	2 (5.4%)	8 (13%)	
	Formula only	6 (23%)	5 (14%)	11 (17%)	
Breastfeeding Method 6 months	Exclusive breastfeeding (BF + Expressed BM)	9 (35%)	13 (35%)	22 (35%)	0.8179
	Breast milk + Water	3 (12%)	2 (5.4%)	5 (7.9%)	
	Breast milk + Water + Formula	4 (15%)	8 (22%)	12 (19%)	
	Formula only	10 (38%)	14 (38%)	24 (38%)	

* Chi2 test. All other tests are Fisher's exact test.

6.3.1.2 Predominant Breastfeeding at one, three and six months (GEE approach)

A GEE model was used to examine the association between the intervention and control groups and breastfeeding rates at each time point, adjusting for correlation of time points within subjects. The model clusters time points on a woman (using an exchangeable correlation structure). As this study was a pilot randomised controlled trial, it was not necessary to adjust for any confounders in the model. Variables in the model therefore included treatment group, time point and an interaction term between intervention and time (Table 7).

Table 7 GEE model for the association between the intervention and control groups and breastfeeding rates at each time point.

7a: Wald Statistics for Type 3 Analysis

Parameter	Chi-Square	p-value
Group	2.96	0.0855
Month	26.84	<.0001
Group-Month Interaction	9.19	0.0101

7b: Odds Ratio (95%CI) for Predominant Breastfeeding for Intervention vs Control

Parameter		Odds Ratio	95% CL		p-value
Group (vs. Control)	Month		Lower	Upper	
Intervention	1 month	5.25	0.97	28.51	0.055
Intervention	3 months	3.67	1.19	11.34	*0.024
Intervention	6 months	0.80	0.29	2.19	0.658

* The odds of predominant breastfeeding at three months was significantly (3.7 times) higher in the intervention group than in the control group (p = 0.024) at three months. At one month, the effect of the intervention approached, but did not quite reach significance (p = 0.055) and there was no difference seen at six months between the intervention and the control groups (p = 0.658).

6.3.2 Analyses of secondary outcomes

Secondary outcomes were measured using the following instruments: 1) Demographic data survey; 2) Antenatal breastfeeding program evaluation; and 3) Semi-structured follow up telephone survey. All of the women who could be contacted after the birth of their baby, were surveyed by the researcher at one, three and six months. The secondary outcomes measured are presented below.

6.3.2.1 Women's breastfeeding initiation rates measured in intervention and control groups by self-report at one month after birth

Table 8 displays women's breastfeeding initiation rates for the intervention and control groups reported by women during the telephone survey at one month. Most of the women (94%) in both groups, in the intervention group (97%) and in the control group (88%) were exclusively breastfeeding (no water added).

Table 8 Women's breastfeeding initiation rates

Characteristic	Method	Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (N = 63)	p-value
Breastfeeding Initiation	Breastfed	23 (88%)	36 (97%)	59 (94%)	0.2975
	Did not breastfeed	3 (12%)	1 (2.7%)	4 (6.3%)	

6.3.2.2 Women's perceived breastfeeding self-efficacy measured in intervention and control groups at recruitment and post intervention (before birth)

The following secondary outcomes for self-efficacy were measured at two specific points in time that included at recruitment for both intervention and control groups and following the intervention (before the birth).

1) Women's perceived breastfeeding self-efficacy measured for intervention and control groups at recruitment

Women's perceived breastfeeding self-efficacy was reported by all women at recruitment. The following concepts (presented in Table 9) measured self-efficacy:

1) Breastfeeding confidence

2) Knowledge about the reason why women cease breastfeeding (Physiological and psychological factors)

3) Observing other women breastfeeding (Vicarious learning/Experience: modelling; practical modelling and role modelling)

4) Practicing breastfeeding technique (Mastery experience; skills)

Additional information was collected about reasons women ceased breastfeeding (see Table 21) and breastfeeding support related to verbal persuasion at one, three and six months during telephone interviews (see section 6.5).

These questions were modified based on Bandura's self-efficacy resources (Bandura 1993, Bandura 1994, Bandura 2006), Baghurst et al. (2007) study (Baghurst, Pincombe et al. 2007) and the literature review by Meedya et al. (Meedya, Fahy et al. 2010). At recruitment, all women in both groups felt confident to breastfeed.

Self-efficacy measures for breastfeeding were compared between intervention and control groups at recruitment. Table 9 displays the comparison of women's breastfeeding self-efficacy before birth (at recruitment) between the intervention and control groups. There were similar results for self-efficacy concepts: Confidence and reasons why breastfeeding was ceased (physiological and psychological factors) (97% versus 100% and 54% vs. 62% respectively), observation of breastfeeding (vicarious learning/experiences) (68% vs. 81%), and mastery experiences (skills practice) (14% vs. 15%) between women in the intervention and control groups respectively. No significant differences were seen in self-efficacy between treatment groups at recruitment.

Table 9 Self-efficacy at recruitment (pre-intervention stage)

Self-Efficacy		Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (N = 63)	p-value
Confidence (Physiological and psychological factors)	Yes	26 (100%)	36 (97%)	62 (98%)	1.000
Reasons why cease breastfeeding (Physiological and psychological factors)	Yes	16 (62%)	20 (54%)	36 (57%)	0.612
Observation (vicarious learning)	Yes	21 (81%)	25 (68%)	46 (73%)	0.3876
Mastery (opportunities to practice breastfeeding with equipment)	Yes	4 (15%)	5 (14%)	9 (14%)	1.000

Note: All categorical comparisons are Fisher's exact test.

2) Women's perceived breastfeeding self-efficacy before birth: after intervention classes

Self-efficacy was measured again following the last intervention classes for women in the intervention group, using the same questions. This was done to determine whether the antenatal education intervention improved women's perceptions about breastfeeding self-efficacy. These results are presented in Table 10, and are compared with perceived self-efficacy from women in the control group at recruitment.

Table 10 Self-efficacy at post-intervention stage (before birth)

Self-Efficacy		Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (n = 63)	p-value
Confidence	Yes	25 (96%)	29 (78%)	54 (86%)	0.0688
Reasons why cease breastfeeding	Yes	15 (58%)	24 (65%)	39 (62%)	0.6062
Observation	Yes	20 (77%)	27 (73%)	47 (75%)	0.7767
Mastery	Yes	4 (15%)	27 (73%)	31 (49%)	< 0.001

Following the intervention (the antenatal breastfeeding program), the intervention group had significantly better self-efficacy in mastery than the control group ($p < 0.001$).

Table 11 Self-efficacy, pre and post-intervention for intervention group

Self-Efficacy		Time point		
		Pre-intervention (n = 37)	Post-intervention (n = 37)	p-value
Confidence	Yes	36 (97%)	29 (78%)	0.0156
Reasons why cease breastfeeding	Yes	20 (54%)	24 (65%)	0.3437
Observation	Yes	25 (68%)	27 (73%)	0.7905
Mastery	Yes	5 (14%)	27 (73%)	<0.001

Women in the intervention group reported significantly worse confidence post-intervention (76% vs. 97%). For notation, women who did not answer were coded as “No” for purposes of intent-to-treat analysis; pre-intervention one woman did not answer, and post-intervention nine women did not answer. Women in the intervention group had significantly better mastery after the intervention. No significant change was seen for reasons why women ceased breastfeeding or for observation of breastfeeding within this intervention group.

McNemars test was used to compare the pre vs. post-intervention self-efficacy measures for the intervention group (Table 11).

6.3.2.3 Women's perceived breastfeeding support measured in intervention and control groups at recruitment, post intervention (intervention group only) and one, three, and six months (both groups)

Table 12 Overall perceived support

Support		Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (n = 63)	p-value
Recruitment	Yes	26 (100%)	36 (97%)	62 (98%)	1.000
Post-intervention	Yes	0	28 (76%)	28 (76%)	.
Support, 1 month	Yes	22 (85%)	29 (78%)	51 (81%)	0.7462

Support was not measured post-intervention for the control group and comparison of support was not measured for the control group at recruitment to intervention group post-intervention because this comparison could be confounded by time (since control group did not answer post intervention questions).

McNemars test was used to compare the pre vs. post-intervention for support in the intervention group (Table 13).

Table 13 Support, pre and post-intervention for intervention group

Support	Time point		
	Pre-intervention	Post-intervention	p-value
Yes	36 (97%)	28 (76%)	0.0078

Women in the intervention group reported significantly less overall support after the intervention compared to perceived support at recruitment.

Breastfeeding supported by women's family

The following tables present the comparison of breastfeeding supported by woman's primary support (husband/partner) and secondary support (woman's mother, woman's mother in law, woman's sister and woman's grandmother) at one, three and six months between the intervention group and the control group. Generally, woman's primary and secondary supporters in both groups supported women to successfully breastfeed. However, in both groups, the support gradually decreased over a period of time. There were no statistically significant differences between groups.

Breastfeeding supported by women's family at one month

In the intervention group at one month after birth, less than half of the women were supported by primary support (41%) and secondary support (46%). In the control group there were similar percentages of women who were supported by primary support (38%) and almost half of the women received secondary support (46%). In the intervention group, however, five (13.5%) women had been discouraged to breastfeed by secondary support whereas none of the women in the control group were discouraged to breastfeed.

Breastfeeding supported by women's family at three months

In the intervention group at three months after birth, more women were supported to breastfeed by secondary support (43%) compared with primary support (35%). Likewise, in the control group, more (46%) women were supported to breastfeed by secondary support compared with primary support (31%). In the intervention group five women were discouraged to breastfeed by secondary support (13.5%) compared with no women in the control group.

Breastfeeding supported by women's family at six months

In the intervention group at six months after birth, similar percentages of the women were supported by primary support (32%) compared with almost a third (31%) of women in the control group. Likewise, there was a similar percentage of the women (43%) in the intervention group who were supported by secondary support compared with the control group (46%). In the intervention group, six women (16.2%) were discouraged to breastfeed by secondary support compared with no women in the control group.

Table 14 Support by partner/husband (primary)

Support		Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (n = 63)	p-value
1 month	Yes	10 (38%)	15 (41%)	25 (40%)	1.000
3 months	Yes	8 (31%)	13 (35%)	21 (33%)	0.7904
6 months	Yes	8 (31%)	12 (32%)	20 (32%)	1.000

Table 15 Support by other family (secondary)

Support		Breastfeeding Intervention			
		Control (n = 26)	Intervention (n = 37)	Total (n = 63)	p-value
1 month	Yes	13 (50%)	17 (46%)	30 (48%)	0.8017
3 months	Yes	12 (46%)	16 (43%)	28 (44%)	1.000
6 months	Yes	12 (46%)	16 (43%)	28 (44%)	1.000

No significant differences were seen in overall, primary or secondary support between treatment groups.

6.3.2.4 Women's breastfeeding intention measured in intervention and control groups at recruitment and post intervention (intervention group only) and at one, three, and six months

At recruitment, all women in both groups intended to breastfeed. Breastfeeding intention was also measured for all women who participated in the intervention group at the conclusion of the program. In addition, breastfeeding intention for the subsequent child was measured for all women in both groups at one, three and six months after birth. These data were collected during a postnatal telephone call. The results were similar in both groups and there were no statistically significant differences between the groups as presented in Table 16.

Table 16 Breastfeeding intention in intervention and control groups at recruitment and post intervention (before birth) and at 1, 3 and 6 months

Characteristic		Breastfeeding Intention			
		Control (n = 26)	Intervention (n = 37)	Total (n = 63)	p-value
BF Intention at Recruitment (Q13)	Yes	26 (100%)	36 (97%)	62 (98%)	1.000
BF Intention after Programme (PE Q4)	Yes	0	28 (76%)	28 (76%)	.
BF next child (1 month)	Yes	23 (88%)	36 (97%)	59 (94%)	0.2975
BF next child (3 months)	Yes	20 (77%)	33 (89%)	53 (84%)	0.2943
BF next child (6 months)	Yes	20 (77%)	33 (89%)	53 (84%)	0.2943

McNemars test was used to compare breastfeeding intention pre vs. post-intervention for the intervention group (Table 17).

Table 17 Intention, pre and post-intervention for intervention group

Time point			
Intention	Pre-intervention	Post-intervention	p-value
Yes	36 (97%)	28 (76%)	0.0078

Assessment of breastfeeding intention after the intervention could only be evaluated for the women (n = 28) who completed the intervention. Most women who completed the intervention program intended to breastfeed at recruitment but reported significantly less intention to breastfeed after the intervention. Intention to breastfeed increased in the intervention group (for the next child) but decreased in the control group over 6 months.

6.3.2.5 Evaluation of breastfeeding program

Women's evaluation for the antenatal breastfeeding education program was assessed by the women in the intervention groups. The assessment could only be evaluated for the women (n = 28) who attended the last session. All women evaluated the breastfeeding intervention program by way of content, teaching tools and technique and all (n = 28) were very satisfied. The responses included: not satisfied, fairly satisfied and very satisfied. There were also some suggestions given by the women: 1) the time duration for delivering breastfeeding content should have been extended; and 2) teaching tools were interesting, and simple to understand. An evaluation score of the three classes and a program evaluation was calculated for women in the intervention group as well as their satisfaction scores about the antenatal education intervention (Table 18).

Table 18 Evaluation of breastfeeding program (Intervention group only)

Variable		Total (n = 37)
Class 1 Evaluation	n	34
	mean (SD)	31 (2)
	median (min, max)	31 (26, 36)
Class 2 Evaluation	n	29
	mean (SD)	33 (2)
	median (min, max)	33 (30, 37)
Class 3 Evaluation	n	28
	mean (SD)	35 (2)
	median (min, max)	35 (32, 38)
Program Evaluation	n	28
	mean (SD)	35 (2)
	median (min, max)	35 (32, 38)
Intervention Satisfaction	Extremely helpful	34 (92%)
	9	1 (2.7%)
	88	2 (5.4%)

Overall, 92% of the women who underwent the intervention found it “extremely helpful”. Women who did not answer the intervention satisfaction question were coded as the worst response (I felt discouraged to breastfeed) as per intent-to-treat analysis.

6.4 BREASTFEEDING DATA: INCIDENTAL FINDINGS

6.4.1 Women's perceptions about satisfaction with feeding methods

Table 19 presents all (intervention and control group) of the women's satisfaction rates with their current feeding methods. In both groups, at one and three months after birth, the majority of women (90.5% and 82.5% respectively) were satisfied with feeding their baby breast milk. At six months of age almost two-thirds (61.9%) of all women were satisfied with feeding baby breast milk. Overall, there were higher percentages of women who were satisfied feeding their babies with breast milk in the intervention group compared with the women in the control group. In both groups, at six months of age, there were 13 women (20.6%) who were satisfied with feeding baby breast milk together with formula. In addition, there was one woman who was satisfied feeding baby with formula at six months of age. These data are not presented.

Table 19 Comparison of women's perception on satisfaction with feeding baby breast milk at one, three, and six months between groups

Satisfied with feeding the baby with breast milk	**Number (%)**			**Odds Ratio (95% CI), p-value [Intention to Treat; ITT (n = 63)]**
	Control (n = 26)	**Intervention (n = 37)**	**All women (n = 63)**	**Intervention (n = 37) vs. Control (n = 26)**
1 month	23 # (88.5)	34 # (91.9)	57 # (90.5)	1.478 (0.274 to 7.976), p = 0.684§
3 months	20 (76.9)	32 (86.5)	52 (82.5)	1.920 (0.517 to 7.128), p = 0.339§
6 months	15 (57.7)	24 (64.9)	39 (61.9)	1.354 (0.483 to 3.792), p = 0.564†

Note: # = some participants did not provide responses to every data item. The total of number responses for each item is presented in the table.
§ = Fisher's Exact test was conducted because frequency counts were less than five in some cells of the data table
† = Chi square (Pearson) analysis was conducted because frequency counts in each cell were greater than or equal to five

6.4.2 Women's working status after birth

Women in both intervention and control groups had the highest rate of returning to work at three months. However, at three months, the women in the intervention group had a higher rate (37.8%) of returning to work compared with the women in the control group (23.1%); but these were not significantly different (Table 20).

Table 20 Comparison of women's working status after birth between intervention and control groups

Women's working status afterbirth	**Number (%)**			**Odds Ratio (95% CI), p-value [Intention to Treat; ITT (n = 63)]**
	Control (n = 26)	**Intervention (n = 37)**	**All women (n = 63)**	**Intervention (n = 37) vs. Control (n = 26)**
Returned to work/study after the baby turned 1 month of age	4 (15.4)	7 (18.9)	11 (17.5)	1.283 (0.334 to 4.931), p = 1.000 §
Returned to work/study after the baby turned 3 months of age	6 (23.1)	14 (37.8)	20 (31.7)	2.029 (0.656 to 6.272), p = 0.215 †
Returned to work/study after the baby turned 6 months of age	4 (16.0)	2 (5.4)	6 (9.5)	0.314 (0.053 to 1.862), p = 0.220 §

Note: § = Fisher's Exact test was conducted because frequency counts were less than five in some cells of the data table

† = Chi square (Pearson) analysis was conducted because frequency counts in each cell were greater than or equal to five

6.4.3 Reasons why women ceased breastfeeding related to woman's self-efficacy at one, three and six months after birth

Reasons why women ceased breastfeeding related to woman's self-efficacy were measured at one month, three months and six month time points for women who were feeding with formula only (Table 21) by telephone survey (See Appendix K and L: Question numbers Q2a).

At one month, four women did not have a breastfeeding method specified and using intention-to-treat, they were classified as "formula only". These four women did not answer the "reason ceased breastfeeding" questions, and as such, no data are presented at one month. Data were collected from 11 women at three months and 24 women at six months.

Table 21 Reasons women ceased breastfeeding related to woman's self-efficacy at one, three, and six months after birth

Reason ceased breastfeeding		Breastfeeding Intervention			
		Control	Intervention	Total	p-value
Vicarious learning, 3 months	Yes	0/6	1/5 (20%)	1/11 (9.1%)	0.4545
Vicarious learning, 6 months	Yes	4/10 (40%)	6/14 (43%)	10/24 (42%)	1.000
Physiological, 3 months	Yes	0/6	1/5 (20%)	1/11 (9.1%)	0.4545
Physiological, 6 months	Yes	4/10 (40%)	9/14 (64%)	13/24 (54%)	0.4081
Mastery, 3 months	Yes	0/6	1/5 (20%)	1/11 (9.1%)	0.4545
Mastery, 6 months	Yes	3/10 (30%)	5/14 (36%)	8/24 (33%)	1.000

No significant differences were seen in self-efficacy for reasons to cease breastfeeding between treatment groups at three or six months.

6.4.4 Nature of breastfeeding support

Table 22 reports the nature of breastfeeding support that women received after birth at one, three and six months. Compared with the control group, women randomised to the intervention group received more support such as being encouraged to breastfeed at three and six months (73% vs. 61.5% and 70.3 vs. 61.5% respectively). At one month after birth, 83.8 % of women in the intervention group were supported with breastfeeding compared with 65.4% of women in the control group. However, these results were not significant.

Table 22 Comparison of the nature of breastfeeding support between groups

Nature of breastfeeding support	Number at the recruitment (%)			Odds Ratio (95% CI), p-value [Intention to Treat; ITT (n = 63)]
	Control (n = 26)	Intervention (n = 37)	All women (n = 63)	Intervention (n = 37) vs. Control (n=26)
At 1 month				
Helping with the baby	10 # (38.5)	15 # (40.5)	25 # (39.7)	1.091 (0.391 to 3.047), p = 0.868 †
Encourage to breastfeed	17 (65.4)	31 (83.8)	48 (76.2)	2.735 (0.832 to 8.994), p = 0.091 †
Role model for breastfeeding	1 (3.8)	4 (10.8)	5 (7.9)	3.030 (0.319 to 28.811), p = 0.394 §
At 3 months				
Helping with the baby	19 (73.1)	27 (73)	46 (73)	0.995 (0.321 to 3.08), p = 0.993 †
Encourage to breastfeed	16 (61.5)	27 (73)	43 (68.3)	1.688 (0.577 to 4.933), p = 0.337 †
Role model for breastfeeding	0	3 (8.1)	3 (4.8)	n/a
At 6 months				
Helping with the baby	9 (34.6)	14 (37.8)	23 (36.5)	1.150 (0.404 to 3.273). p = 0.794 †
Encourage to breastfeed	16 (61.5)	26 (70.3)	42 (66.7)	1.477 (0.512 to 4.259), p = 0.469 †
Role model for breastfeeding	0	3 (8.1)	3 (4.8)	n/a

Note: # = some participants did not provide responses to every demographic data item. The total of number responses for each item is presented in the table.

† = Chi square (Pearson) analysis was conducted because frequency counts in each cell were greater than or equal to five

§ = Fisher's Exact test was conducted because frequency counts were less than five in some cells of the data table

n/a = insufficient data for statistical analysis

6.5 VERBAL PERSUASION AND BREASTFEEDING SUPPORT

Postnatal telephone interviews about women's breastfeeding experiences were completed after birth at one, three, and six months. All women who could be contacted in both groups were interviewed. Almost all of the women provided additional comments about breastfeeding support from their support people that were related to verbal persuasion. The data indicated that approximately 80% of the women in the intervention group and 100% of the control group received encouragement to breastfeed and positive influences from their support people. However, no women in the control group were discouraged to breastfeed as opposed to three (8%) women in the intervention group.

In addition, there were some comments from seven women in the intervention group that were more detailed, and that provide insight into the reasons underlying some of the discouragement experienced by these women. All of these responses reflected views of family members (usually grandparents) who had strongly held traditional and cultural beliefs about how a new mother should behave and how their baby should be fed. Some examples follow:

"*Her parents do not trust that exclusive breastfeeding at 6 months is important for baby. Her baby cried after she fed her baby with the frozen breast milk. Her parents really believe that the frozen breast milk caused the crying. She disagrees because she has gained the knowledge from the intervention class. However, she was blamed seriously by her parents "do not give my niece the frozen milk anymore". In addition, her parents (main influence is her mother) believe that the baby continues to cry because the "Ghost" makes the baby get sick too. (The "ghost" is one of the ancient Thai beliefs.). Then she gave up breastfeeding*".

"*Her grandmother (beside her mother) encourages her to eat everything to ensure sufficient breast milk supply. Other family members support breastfeeding but they do not allow her to eat certain foods because they believe that the food is poisonous food for breastfeeding. The food can cause ill health for the post-partum woman. This eating idea is*

from a Thai antiquated belief. Currently, in the remote area of northern of Thailand, post-partum women are encouraged to lie by the fire after childbirth (women remain by a fire after parturition so that the uterus can shrink back faster into the pelvis). After giving birth, most postpartum mothers are encouraged by the parents who have the ancient belief, to eat only rice and fish for one month. Not much food is allowed within this time period".

"*Her husband really supports breastfeeding. He has participated twice in the breastfeeding classes with the woman. He is upset with the woman's parents because her parents will be complementary feeding the baby with minced rice and minced banana when the baby turns one month (minced rice and minced banana is typical Thai nutrition for baby*)".

"*Her mother in law has a derogatory view about breastfeeding and encourages her to feed the baby with formula. Her husband who owns his business as a cow-milk farmer thinks that cow milk is suitable for the newborn and baby. At times he encourages her to feed the baby formula*".

"*Encouraging her to breastfeed. However, her mother is afraid that the baby will not have sufficient water and might be thirsty, so her mother encourages her to feed the baby water instead of breastfeeding exclusively*".

"*Encouraging her to breastfeed. However, even though her family supports breastfeeding, her family pities her as she has flat nipples which causes her stress. Her family encourages her to feed the baby sometimes with formula*".

"*Encouraging her to breastfeed. Her mother supports breastfeeding but her mother does not believe the baby is receiving sufficient water from breast milk, so she feeds the baby with water*".

These data indicate that there are some significant factors may contribute to women ceasing to breast feed in Thailand. Traditional beliefs about how (and what) the mother should eat; what is suitable food for a one month old baby (including feeding with water, formula, and minced rice and banana), and what is not suitable food for the baby (e.g. frozen breast milk); and spiritual/superstitious beliefs about ghosts; are all significant factors that may contribute to women ceasing to breastfeed in Thailand.

6.6 HARMS

There were no reported adverse events for the women and families observed during this pilot study.

CONCLUSION

In conclusion, the results of this study indicated that the difference between the intervention and control groups was significant at three months ($p = 0.0204$). Women in the intervention group had a very high breastfeeding initiation rate (95%), and sustained a higher rate at three months than the initial breastfeeding rate in the control group (77%); however, this diminished rapidly between three (81%) and six months (41%). In contrast, women in the control group had a lower breastfeeding initiation rate that diminished rapidly in the first three months, and then more slowly between three (54%) and six months (46%). The results of analysis of secondary outcomes include some significant results for self-efficacy of women in the intervention group following the intervention and prior to the birth, particularly for mastery, but they were less confident than women in the control group. In addition, significantly less support and significantly less intention to breast feed was reported by women in the intervention group after the intervention. All women who attended the breastfeeding educational program were satisfied with it, and considered that it was beneficial. Moreover, culture is a complex concept that can influence breastfeeding. Women in Thai society have cultural influences associated with breastfeeding and may have beliefs that create breastfeeding difficulties. Working style and policy are important issues facing Thai women that could ultimately influence and motivate them to breastfeed for longer.

CHAPTER 7 DISCUSSION

Introduction

This chapter will discuss the following items. Firstly, the null hypothesis of this study is discussed, then, the demographic data and the primary and secondary study outcomes will be discussed followed by the incidental findings. Strengths and limitations will then be discussed and finally a conclusion, details about the registration of this pilot RCT and recommendations will be provided.

This chapter will also compare this study's results with previous studies (seven studies) searched from 1999 to 2009 (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007) and four recent studies (Kupratakul, Taneepanichskul et al. 2010, McQueen, Dennis et al. 2011, Wambach, Aronson et al. 2011, Kronborg, Maimburg et al. 2012) published between November 2010 and August 2014.

7.1 NULL HYPOTHESIS OF THE STUDY

The aim of the study was to determine whether a midwife-led antenatal breastfeeding education program could improve postnatal breastfeeding rates for primiparous women compared with breastfeeding rates for women who received standard antenatal care.

The null hypothesis for this study was that there would be no difference in breastfeeding rates during one, three, and six months postpartum for primiparous women who attended breastfeeding classes compared with women who had standard antenatal care.

In summary, at three months after birth in this study, the null hypothesis was rejected. The rate of exclusive/predominant breastfeeding was statistically significantly higher at three months in the intervention group. This could be due to the implementation of the breastfeeding education intervention. However, exclusive/predominant breastfeeding was not sustained and decreased over time. Previous studies (Noel-Weiss, Rupp et al. 2006, Su, Chong et al. 2007, Kupratakul, Taneepanichskul et al. 2010, Wambach, Aronson et al. 2011) that employed similar interventions have also demonstrated that interventions introduced by researchers gradually decrease over time.

7.2 DEMOGRAPHIC DATA

Baseline characteristics of participants in this study were similar except for educational background. Approximately half of the women in this study had an educational level lower than a Bachelor's degree (primary and secondary school). The women in the intervention group had higher levels of undergraduate education than the control group (Bachelor degree; 49% and 15% respectively), but lower levels of education in post-graduate degrees (Masters degree; 0% and 7.7% respectively).

Noel-Weiss, Rupp et al. (2006)'s study (n = 92) also reported a similar educational background for the participants in their study. The majority of participants had completed post-secondary education (bachelor degree). (Noel-Weiss, Rupp et al. 2006).

7.3 PRIMARY OUTCOME

7.3.1 Primary outcome: Women's predominant breastfeeding rates at one, three and six months

The results of this study show that at three months of age, predominant breastfeeding rates were higher for the intervention group (81%) than the control group (54%) and the difference between these rates was significant (p = 0.0204). Essentially, a woman was 3.7 times more likely to breastfeed in the intervention group compared with a woman in the control group. This level also approached significance (p = 0.055) for the intervention group at one month. Most women in both the intervention and control groups were exclusively breastfeeding after the birth of their baby (initiated breastfeeding) and these results support the notion that women's experience of breastfeeding diminishes over time.

In addition, this study found that women in the intervention group had a very high breastfeeding initiation rate, and sustained a higher rate at three months than the initial breastfeeding rate in the control group; however, this diminished rapidly between three and six months. In contrast, women in the control group had a lower breastfeeding initiation rate that diminished rapidly in the first three months, and then more slowly between three

and six months. Previous studies (Noel-Weiss, Rupp et al. 2006, Su, Chong et al. 2007, Kupratakul, Taneepanichskul et al. 2010, Wambach, Aronson et al. 2011) that employed the same study design (RCT) and similar interventions have also demonstrated that interventions introduced by researchers gradually decrease over time. In this study, at six months, the breastfeeding rate had decreased to be 10% higher than the breastfeeding rate in Northern Thailand in 2009 (See Appendix R).

Noel-Weiss, et al., (2006) (n = 92) reported the infant feeding outcomes at eight weeks were significantly positively related to workshop attendance ($p = 0.005$) (Noel-Weiss, Rupp et al. 2006). Su, Chong et al., (2007) (n = 450) also reported similar results to this study that women who received antenatal education were more likely to breastfeed exclusively at six weeks ($p = 0.036$), three months ($p = 0.030$), and six months ($p = 0.036$) after birth (Su, Chong et al. 2007). Other recent studies (n = 80) conducted in Thailand by Kupratakul et al., (2010) reported that rates of exclusive breastfeeding in the study group using knowledge sharing practices with empowerment strategies were significantly higher when compared with those in the control group at 14 days (82.5% vs. 52.6%, p = 0.005), one month (77.5% vs. 52.6%, p = 0.021), two months (62.5% vs. 36.8%, $p = 0.023$), four months (35.0% vs. 7.9%, $p = 0.008$), five months (25.0% vs. 2.6%, $p = 0.012$), and six months postpartum (20.0% vs. 0%, $p = 0.005$) (Kupratakul, Taneepanichskul et al. 2010). Another study (n = 289) drawing on the theory of planned behaviour and developmental theory was conducted to determine if an education and counselling intervention provided by counsellor team (certified lactation consultant and a trained peer counsellor who had been a breastfeeding teen mother) increased breastfeeding initiation and breastfeeding duration up to six months postpartum among adolescent mothers. The intervention positively influenced breastfeeding duration by 177 days in the experimental group compared with 42 and 61 days in the attention control and usual care groups respectively (Wambach, Aronson et al. 2011).

Alternatively, another study (n = 981) by Forster, McLachlan et al., (2004) employing the same study design (RCT) and a similar intervention, delivered two antenatal sessions and reported no significant differences in breastfeeding initiation between the groups (practice

group: $p = 0.93$, attitude group: $p = 0.89$) and six months after the birth (practice group: $p = 0.53$, attitude group: $p = 0.60$) (Forster, McLachlan et al. 2004). The study by Lavender Baker et al., (2005) (n = 1,321) also provided a session of antenatal breastfeeding education delivered by a lactation consultant/midwife to pregnant women and did not find any differences in breastfeeding rates (breastfeeding on discharge, OR 1.2; 95% CI 0.8 – 1.7, $p = 0.3$ and exclusive breastfeeding at four months, OR 1.1; 95% CI 0.6 – 1.8, $p = 0.8$) (Lavender, Baker et al. 2005). The authors suggested that the results may be due to the difficulty of supporting education over an extended period of time.

Findings from the study by McQueen, Dennis et al. (2011) (n = 150) also suggested that their intervention (three individualised, self-efficacy enhancing sessions with the researcher: two in hospital and one by telephone) was feasible. Mothers in the intervention group had higher rates of breastfeeding self-efficacy, duration, and exclusivity at four and eight weeks postpartum. However, the differences between groups were not statistically significant (McQueen, Dennis et al. 2011). Buakhum's (2006) study (n = 60) applied self-efficacy in multiple breastfeeding education sessions, reported that women who received breastfeeding education demonstrated higher exclusive breastfeeding rates at four months (46.6 % in the intervention group vs. 0% in the control group) and longer exclusive breastfeeding duration rates (104.1 days in the intervention group vs. 19.6 days in the control group) ($p < 0.001$) (Buakhum 2006).

In summary, the results of this study suggest that the women who participated in this program were likely to be more motivated to breastfeed at three months of age than those women who did not participate in the education program. However, there were no significant differences reported for predominant breastfeeding at one and six months. The small sample size of this study may have contributed to this result. In addition, when reviewing the results from the existing literature, it is evident that it is difficult to sustain breastfeeding over time.

7.4 SECONDARY OUTCOMES

7.4.1 Breastfeeding initiation

In this study, breastfeeding initiation data were provided by self-report of the contactable women in both groups during the telephone survey at one month after birth. Most of the women (94% overall) in both groups, were exclusively breastfeeding (intervention group 97% and control group, 88%). There was no significant difference found.

This study presents similar results to a previous RCT study (n = 182) that reported a breastfeeding initiation rate of 82.3% in the experimental group, compared with 67.1 % in the control group (Gill, Reifsnider et al. 2007). Other previous RCT's reported that the breastfeeding initiation rates were also high, but no differences were reported in these studies (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Su, Chong et al. 2007). There was another recent study (n = 289) that reported breastfeeding initiation rates of 79% in the experimental group, and 66% and 63% respectively in the attention control and usual care groups and these were significantly different ($p < .03$) (Wambach, Aronson et al. 2011). No breastfeeding initiation rates were reported in other studies.

In summary, in this study, the difference between groups was not statistically significant. This could be partially due to the fact that the study intervention was provided at study sites where some breastfeeding policies were already in place. These policies would have likely resulted in the women being encouraged to breastfeed exclusively. This could possibly explain the high rates of breastfeeding initiation during their hospital stay.

7.4.2 Breastfeeding self-efficacy

Women's perceived breastfeeding self-efficacy was measured in both groups at recruitment and following the intervention (before birth) in the intervention group. Women's perceived breastfeeding self-efficacy was measured by the four self-efficacy concepts; confidence, reasons why breastfeeding was ceased (physiological and psychological factors),

observation of breastfeeding (vicarious learning/experiences) and mastery experiences (skills practice) (Bandura 1994, Meedya, Fahy et al. 2010).

This study found that post-intervention, the intervention group had significantly better perceived self-efficacy in mastery when compared with the control group ($p < 0.001$). In a similar study, Noel-Weiss, Rupp et al., (2006) ($n = 92$) reported that breastfeeding self-efficacy scores at four weeks postpartum were significantly higher in the intervention group ($p = 0.023$). Conversely, for this study, the women in the intervention group reported significantly worse confidence levels (78% vs. 96%, $p = 0.0688$) following the intervention and before birth compared with the control group (See Table 9 and Table 10). This confidence level for the intervention group was in contrast to the aforementioned mastery skills following the intervention. The mastery of practical skills required for breastfeeding further demonstrates the importance of antenatal education to address the woman's confidence and skills.

At the time of recruitment, all women in both groups felt confident to breastfeed. There was no significant difference in women's knowledge about reasons why women stopped breastfeeding (physiological or psychological factors) or for observation of breastfeeding (vicarious learning) between groups.

7.4.3 Breastfeeding support

Women's perceived breastfeeding support was measured in both groups at recruitment, following the intervention (only in the intervention group) and at one, three and six months. Women in the intervention group reported significantly less overall support after the intervention compared to the perceived support at recruitment ($p = 0.0078$). In both groups, perceived breastfeeding support decreased significantly over time, by approximately two thirds from the primary supporter, and one half from secondary supporters.

There were no other studies that reported similar results, but cultural factors could account for this decrease in support. Buakhum's, (2006) study ($n = 60$) included family/partners by encouraging them to participate and support the women within 24-48 hours in the postnatal

period and reported that the women who were supported to breastfeed by their family and/or husband/partner had higher and longer rates of exclusive breastfeeding ($p < 0.001$). Noel-Weiss, Rupp et al's. (2006) study ($n = 92$) included women's partners in their antenatal breastfeeding workshop and encouraged women to seek breastfeeding support from their family and the community; and they reported that for women whose partner participated with them in the antenatal breastfeeding workshop, there were significantly higher exclusive breastfeeding rates ($p = 0.004$). The study also reported that all infant feeding outcomes at eight weeks were significantly positively related to attendance at the workshop ($p = 0.005$) (Noel-Weiss, Rupp et al. 2006).

In summary, these studies indicate that family support including social support was one of the positive factors for successful breastfeeding. This study also found that women who had no positive breastfeeding support were more likely to cease breastfeeding earlier than those who received positive support.

7.4.4 Breastfeeding intention

Women's breastfeeding intention was measured in both groups at recruitment and at one, three and six months after birth; and only in the intervention group following the intervention (before birth). At recruitment, all women in both groups intended to breastfeed. Breastfeeding intention was also measured for all women who participated in the intervention group at the conclusion of the program. Women in the intervention group reported significantly less intention to breastfeed after the intervention compared with their intention at recruitment ($p = 0.0078$).

There were no differences in intention to breastfeed between the two groups. This may indicate that overall breastfeeding intention remained high in both groups.

There were no previously published studies that reported breastfeeding intention. However, the literature review conducted by Meedya et al., (2010) reported that breastfeeding duration is associated with the woman's breastfeeding intention (Meedya, Fahy et al. 2010).

In summary, the review by Meedya et al., (2010) reported modifiable factors that are positively associated with breastfeeding duration which include the woman's breastfeeding intention, her breastfeeding self-efficacy and her social support (Meedya, Fahy et al. 2010). In this study, breastfeeding duration was not sustained over time. Intention to breastfeed reduced over time but not significantly. Breastfeeding duration was shown to be affected by some elements of Self-efficacy: Psychological factors (confidence); and possibly Physiological factors (reasons for ceasing breastfeeding such as being discouraged from breastfeeding), even though Mastery improved significantly). A clinically significant decrease in social support occurred over time, (reduced by two thirds from partners and by half from family members), that was also likely to have contributed to the decrease in breastfeeding over time. Self-efficacy and family support have been shown in this study to be significant factors that may contribute to reduced breastfeeding over time.

7.4.5 Breastfeeding program evaluation

Women's evaluation for the antenatal breastfeeding education program was assessed by the women in the intervention groups. All women evaluated the breastfeeding intervention program by way of content, teaching tools and technique and all (n = 28) were very satisfied, with 92% finding this antenatal intervention extremely helpful. In summary, the study program was a valuable tool used to encourage pregnant women to breastfeed. The educational program demonstrated increased levels of women's satisfaction. Moreover, the study program demonstrated a significant effect on increasing breastfeeding rates at three months and enhancing women's breastfeeding self-efficacy (mastery).

7.5 INCIDENTAL FINDINGS

7.5.1 Women's perceptions about satisfaction with feeding methods

In both groups, at one and three months after birth, the majority of women were satisfied with feeding their baby breast milk. Overall, there were higher percentages of women who were satisfied feeding their babies with breast milk in the intervention group compared with

the women in the control group. Overall, for both groups, women's satisfaction with breastfeeding decreased by approximately 30% at six months.

There were no significant differences found between groups. Even though women in the control group did not participate in the intervention program, they were still required to participate in routine breastfeeding education in the local hospital antenatal program.

7.5.2 Women's working status after birth

According to the Thai working policy as previously described in chapter 2, women are normally required to return to work between 45 and 90 days after the birth of their baby. Consequently, many women in this study had to return to work/study early. Women in both intervention and control groups had the highest rate of returning to work at three months. Most women decided to stop breastfeeding before returning to work. Many did not store breast milk because they thought it was not convenient to express breast milk in the workplace. This may be the most significant contributory factor for the reduction in breastfeeding at six months.

7.5.3 Reasons why women ceased breastfeeding related to woman's self-efficacy at one, three and six months after birth

Overall, most of the women had ceased breastfeeding because they had emotional problems such as stress and anxiety which they described to the researcher during follow up phone calls. At six months, there were more women in the intervention group that had ceased breastfeeding for all reasons including vicarious, physiological and psychological factors, mastery experience (skills) and verbal persuasion than women in the control group. These results were not statistically significantly different. These results are consistent with other data reported in this study that indicate that breastfeeding behaviour was not sustained over time. There were no previous studies that reported reasons related to self-efficacy that contributed to women ceasing breastfeeding.

The traditional Thai beliefs may constitute factors that are culturally unique, in that they do not reflect factors reported in the literature as contributing to cessation of breast feeding such as perceived lack of adequate breast milk, nipple and latching problems, mastitis and engorged breasts. Cessation of breast feeding appears to be strongly influenced by the type of support and discouraging family attitudes. There also seem to be some views about using formula that may be the result of successful marketing campaigns by companies that produce and sell formula in Thailand.

7.6 STUDY STRENGTHS AND LIMITATIONS

7.6.1 Strengths

This pilot study demonstrates a strong basis for designing a future randomised controlled trial. The intervention was theoretically designed. The evaluation of this antenatal breastfeeding education program demonstrated that the intervention was evaluated positively by participants. The high follow up rate was also one of the strengths of this study. The midwife (researcher) who provided the classes was also knowledgeable and skilled about breastfeeding and was available to share her breastfeeding expertise.

7.6.2 Limitations

There were limitations associated with this study because there were some unexpected obstacles that occurred during data collection and the following section describes these obstacles.

Recruitment

Field work and recruitment commenced on Tuesday 11 October 2011 following ethical approval at the participating study sites. The recruitment for this study was slow but consistent and recruited pregnant women between 24-29 weeks pregnant. Even though there was much interest generated for this study, many women did not consent to participate.

Although many women were interested in the intervention and thought that it was important, they were too busy to participate. Cultural reasons included women not having sufficient time to wait and attend classes and the necessity to return to work early. Moreover, in the second study site (secondary care hospital), there were fewer women recruited as they were uncomfortable participating in the study using Thai language. The pregnant women in this group were mostly Burmese and even though they could speak the Thai language, their level of understanding was poor. In addition some women may have already participated in some other projects/studies at the antenatal clinics. These factors could explain the resultant small sample size and consequently the researcher decided to conduct the study as a pilot study.

Limited generalizability and external validity due to small sample size

The study sample was calculated based on the minimum number of 138 with expected dropout rate of approximately 28 and a total of 166 (Appendix Q). There was also a time restriction that affected the numbers recruited for this study. During the approximate four months of recruitment, only 63 participants consented to participate in this study and the required sample size was not achieved (37 in the intervention group and 26 in the control group) resulting in two arms of this study not being equal.

The Intervention

The intervention, consisting of antenatal breastfeeding classes and support was commenced on 24 November 2011. This intervention process was conducted during the women's antenatal period at approximately 28-32 weeks, and followed up after the birth of their baby at one, three and six months post birth.

The antenatal breastfeeding classes were provided as group-based education sessions. Some classes were provided to a group of women, but some participants could not be grouped. This was because most women were willing to join the classes only on the day on their antenatal visit which was previously set. Therefore, most classes were delivered individually.

Normally, Thai women would only participate in the antenatal education sessions if they were scheduled along with their normal appointments as they did not have sufficient time. For instance, some women only took leave for half a day for the antenatal visit to enable them to work for the remainder of the day. Many of them refused to participate if the classes were not scheduled next to their routine appointments, as they needed to work for financial reasons. Some of the women were able to join group intervention classes because their appointments were scheduled on the same date. One woman left the group because she gave birth after completing the second class of the intervention. For these reasons, individual sessions were delivered instead of the planned group sessions for some women.

The women who participated in the group-based session intervention groups received the benefits of group dynamics that facilitated discussion, support, and connection for women. The delivery of individual sessions would not have provided these benefits. The women who attended individual sessions only had the opportunity to interact with the researcher and on some occasions with their partner if they also attended the session.

Most previous studies (Forster, McLachlan et al. 2004, Lavender, Baker et al. 2005, Buakhum 2006, Noel-Weiss, Rupp et al. 2006, Gill, Reifsnider et al. 2007, Lin, Chien et al. 2007, Su, Chong et al. 2007, Kupratakul, Taneepanichskul et al. 2010, McQueen, Dennis et al. 2011, Wambach, Aronson et al. 2011, Kronborg, Maimburg et al. 2012) provided their intervention as group-based education sessions. However, only two of these studies discussed the limitation of grouping participants to the class/classes. Noel-Weiss, et al.'s (2006) study (n = 92) presented minor variations in the antenatal workshop that could be referred to the different needs of each group and workshop size. The groups' size of the study varied from two to eight participants (Noel-Weiss, Rupp et al. 2006). Likewise, another study (n = 1,321) reported that for the women who were allocated to the intervention group, less than two-thirds of those participated in the antenatal class (Lavender, Baker et al. 2005). The class sizes of these previous studies were similar to this study; with one to six participants in each group.

Potential bias

There was potential for biased responses in the session evaluations following the delivery of the educational intervention because the researcher delivered the intervention, and there are some cultural expectations of compliance with desired behaviours when a knowledgeable health professional educates women during the antenatal period.

The potential for bias in the responses of participants in the postnatal interviews might have occurred because the researcher who delivered the intervention was also conducting these interviews. Culturally, Thai people are comfortable to provide more positive responses rather than negative responses. Biased responses were more likely to have occurred for the intervention group.

Field work time limitation for data collection

The field work time limitation was a significant factor in the conduct of this study. There was a restricted period of six months allowed for data collection. This was only able to be extended by one month and recruitment and data collection could not be continued after this period, as the expected date of confinement of the last participants was in May 2012, the remaining follow up interviews were completed in June 2012 via telephone. See also Appendix P: Timeline for the Study.

Early return to work of women

Women in this study normally return to work early according to the working policy of Thailand. Maternity leave is optional and of short duration, up to 90 days. Many women who need an income try to cease breastfeeding before returning to work, resulting in decreased breastfeeding rates at 6 months.

Cultural influences

The effect of women's intention to breastfeed and cultural aspects impacted the results of this study. Some family members such as grandmothers and relatives, who care for the babies when the mothers return to work, harboured negative views about breastfeeding. The parents' beliefs/views below reported by participants were considered to have contributed to women usually feeding their babies with formula and supplementary baby food instead.

1) In Thailand according to traditional beliefs, the postpartum woman is not allowed to eat/drink as normal. After giving birth, the parents, who hold these ancient beliefs, encourage the woman to eat mostly only rice, fish, and plain soup for one month. Not much food is allowed during this time period. The parents believe that other food is poisonous food for breastfeeding and it can cause illnesses to the woman postnatally.

2) The woman is encouraged to keep her body warm and not bathe or shower during the first month after birth. They believe that the being cold can also cause illnesses to the woman; including painful bones.

3) Family members were also in favour of feeding the baby with minced rice and minced banana (minced rice and minced banana is Thai's typical nutrition for a baby) when the baby turns one month old, because they are not sure that breast milk has enough nutrients. In addition, they believe that breast milk has lower nutrient factors compared with formula after six months of age.

4) In the remote areas of northern Thailand, postpartum women are mostly encouraged to stay home and lie by the fire after childbirth (women remain by a fire after birth so that the uterus can shrink back faster into the pelvis) for one month.

These factors may be culturally unique, in that they do not reflect factors reported in the literature as contributing to cessation of breastfeeding such as perceived lack of adequate breast milk, nipple and latching problems, mastitis and engorged breasts. There also seem

to be some views about using formula that may be the result of successful marketing campaigns by companies that produce and sell formula in Thailand.

In summary, the intervention was potentially feasible and had a significant effect on mastery of skills for participants in the intervention group and was viewed positively by the participants. However lower recruitment than expected and some loss of retention in the series of educational sessions proved to be challenging. Attendance at breastfeeding classes was only suitable for women on the same day as their antenatal visit. Consequently, the group-based intervention was provided as an individual delivery for many participants, not a group based approach. Cultural beliefs about family support, traditional feeding, use of formula, and associated policies that require women to return to work within three months are also considered to have been likely to have significantly affected the feasibility of this intervention study to achieve extended duration of breastfeeding.

7.7 REGISTRATION OF THE PILOT RANDOMISED CONTROLLED TRIAL

The ISRCTN reference number is ISRCTN32962146. The pilot randomised controlled trial was registered for an ISRCTN on 15 November 2010 and the ISRCTN assigned on 23 March, 2011. The application was completed online through the Current Controlled Trials website which has been developed by Current Controlled Trials Ltd (http://www.controlled-trials.com/ISRCTN32962146). This study was unfunded.

7.8 CONCLUSION

7.8.1 Summary of the study

This pilot randomised controlled trial provides valuable information about examining the feasibility of the trial design and intervention. Evidence from this study has demonstrated that the midwife-led antenatal breastfeeding education intervention program was potentially feasible and achieved an increased breastfeeding rate at three months, but not at one and six

months of age. This antenatal breastfeeding education program was effective in increasing participants'self-efficacy in terms of mastery experiences (skills/practice). However, other self-efficacy factors (confidence and reasons for ceasing breastfeeding), and the significantly reduced support experienced by these women combined with the requirement to return to work after 90 days, are all considered to be significant factors that contributed to the reduction in breastfeeding at six months.

7.8.2 Implications and recommendations

This study set out to determine whether a midwife-led antenatal breastfeeding education program could improve predominant breastfeeding rates for primiparous women. This study found that the mothers who participated in the antenatal breastfeeding education program demonstrated higher breastfeeding rates at three months in comparison to the mothers who received routine care only.

Recommendations for future research

The study could serve to inform other researchers to plan and evaluate antenatal breastfeeding programs. However, the intervention should be redesigned to increase the feasibility of the intervention by recognising cultural factors that may affect this population of Thai women. To increase recruitment and improve the design for a future RCT in a context where breastfeeding is not yet strongly promoted, policies that support breastfeeding, encourage family support and that are more workplace friendly should be considered. Due to the difficulty of scheduling group sessions, strategies should be considered for the appropriateness of planning a group-based intervention or individual interventions.

Additional strategies may be required in the design of future interventions, to increase confidence and support for women to breastfeed, and to sustain the duration of predominant breastfeeding to six months. Cultural factors and return to work policies will also have to be considered to achieve extended duration of predominant breastfeeding. In addition, qualitative studies involving in-depth interviews or focus groups could be conducted to

determine the influence of parents or family members on breastfeeding behaviour, especially for mothers who live with extended family members and intend to breastfeed, or to examine the role of husbands or relatives in breastfeeding promotion.

As this was a pilot study evaluating predominant and exclusive breastfeeding rates, a larger, adequately powered RCT is required to determine the effect of the antenatal education intervention with a longer period of follow-up.

Recommendations for education of women

The program could be commenced early in the antenatal period in order to encourage pregnant women to successfully breastfeed as recommended below.

1. Midwives should provide knowledge about breastfeeding by group discussion with support groups for first-time mothers to share and exchange breastfeeding information that they have received including their perceptions of breastfeeding.

2. Demonstration and skill training should be provided for first-time mothers to practise with breastfeeding materials and models such as baby dolls and breast models.

3. Breastfeeding material should be distributed to pregnant women for review at home in order to help them prepare and gain breastfeeding confidence.

4. Midwives involved in promoting breastfeeding could apply the program used in this study with some modifications in other settings in Thailand (See recommendations for future research above).

Recommendations for Policy

The national policy for breastfeeding is important for successful breastfeeding. There could be two obvious points recommended below.

1) Formula Code: The Thailand Code of Marketing of Foods for Infants & Young Children and Related Products 2008 is only a declaration of the Ministry of Public Health and is not a law. Thus it could be best to collaborate among university, government and private hospital/sector administrators to develop support for breastfeeding. Moreover, monitoring of marketing and involving more people in public health initiatives, doing training and providing breastfeeding materials would all contribute to increased breastfeeding success.

2) Working policy: There is no legislation for breastfeeding mothers who are working. However, the government should strongly motivate employers to follow the established breastfeeding policies and regulations to support breastfeeding for mothers in the workplace. In addition, encouraging mothers to use the maternity leave available as their right is recommended.

Conclusion

In conclusion, although there have been some breastfeeding promotion schemes at the study sites, the antenatal breastfeeding program in this study was a recommended program to use for breastfeeding promotion. The selection of the study design was determined by the aim of the research which was to design and test the effectiveness of a midwife-led antenatal breastfeeding education program in increasing the rate of predominant breastfeeding at one, three, and six months after the birth of the baby. The participants were very satisfied with the program. The women in both groups are in close geographic proximity that serves a demographically similar population. Strengths of the intervention included a pilot randomised controlled trial research design, high follow-up rate, and a skilled midwife who ran the antenatal breastfeeding intervention. The study aim was achieved and the null hypothesis was rejected. There is potential to use the results of this pilot study to inform the design of a major trial however, cultural factors would require further consideration in subsequent studies.

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APPENDICES

APPENDIX A: PARTICIPANT INFORMATION STATEMENT

Information Statement for the Research Project:

Breastfeeding rate at one month in Thailand: an RCT

Document Version 3 [H-2011-0010]; dated [22/08/11]

You are invited to participate in the research project identified above which is being conducted by Mrs Podjanee Parkpoom, PhD candidate (Midwifery) from the School of Nursing and Midwifery at the University of Newcastle, Australia. The research is part of Podjanee's studies at the University of Newcastle, supervised by Associate Professor Ashley Kable and Dr Virginia Skinner from the University of Newcastle, Australia.

Why is the research being done?

The purpose of the research is to test whether a midwifery breastfeeding education program would be successful in extending the time that women and babies breastfeed. Breastfeeding has positive health benefits for babies, for some it is lifesaving. However, many modern Thai women stop breastfeeding before the baby is even one month old; usually due to family and social factors that make continuing breastfeeding difficult. The Thai government and the World Health Organisation both recommend exclusive breastfeeding until babies are six months old.

Who can participate in the research?

All pregnant women who are having their first babies and who are more than 24 and less than 29 weeks pregnant weeks are eligible to participate and they will be invited to join the study.

What choice do you have?

Participation at any stage of this research is entirely your choice. If you wish to withdraw at any time you may do so without the need to give a reason. You also have the option of withdrawing any data which identifies you. If you do decide to withdraw, your decision will not disadvantage you in any way.

What would you be asked to do?

If you join this study you will be randomly assigned to one of two possible groups: one group will receive an educational intervention designed to promote success with breastfeeding and one group which receives standard antenatal care and advice about breastfeeding. If you join the study you have a 50:50 chance of being assigned to the education program. You will be asked to complete a short survey shortly after you consent to participate.

At about one month after birth we would like to telephone you briefly to enquire about whether breastfeeding commenced and, if so, is it continuing? With your permission we will verify the details of the birth of your baby from the birth records to ensure that it is appropriate to telephone you. If, for any reasons, you do not want to be phoned, you can contact the research team (email and phone numbers below) and we will not contact you at all.

If you are randomised to the Education Group you will be invited to attend 3 antenatal classes of 90 minutes each. The classes will begin when you are around 32 weeks pregnant. Husbands and/or other relatives or friends are also invited to the classes.

How much time will it take?

- If you are NOT in the education group then the time required is minimal. The questionnaire will take approximately fifteen minutes to fill out. The questionnaire can be completed whilst waiting in the Antenatal Clinic or at home and post to me in the provided pre-paid return envelope. There will be one telephone call around 4 weeks after birth which will take only about 5 minutes.

- If you ARE in the education group then you will be asked to fill in the questionnaire and receive the phone call as described above. In addition, your attendance at the 3 education sessions will take approximately ninety minutes each.

What are the risks and benefits of participating?

You may not obtain any benefits from the study. If you are selected for the standard care group you will not receive anything in addition to standard care. If you are in the education group you will be offered specific education about breastfeeding which may be of benefit to you and your baby if it is successful in prolonging breastfeeding.

Every effort will be made to ensure that the education groups are experienced as emotionally and socially ‘safe’ by all participants. However, there is a small risk that you may become upset during or after a group meeting. If this occurs you are invited to let me know as soon as possible and, if needed, I will refer you for counselling by psychologists within the hospital.

There will be no physical risks to you or your baby if you participate in this study.

What reimbursement will be provided?

If you are allocated into the intervention group, you will be provided reimbursement for your time and/or your petrol/travel expenses for $10 per time.

How will your privacy be protected?

Only the researcher (Podjanee) will have access to your names and contact details. All data and any written reports will be de-identified. Your contact details will be kept separately from all other research data on the researchers password protected home computer and in paper form in a home locked drawer. All other electronic files regarding research data that related to the study will be kept in a desktop personal home computer with password protected and back up data in a Personal Digital Assistant (PDA) which will only be used for research purposes. Electronically stored data will be also password protected. Written documents and other documentation/information will be kept in a locked filing cabinet in the School of Nursing & Midwifery at the University of Newcastle. Restrictions on access to data allow for access by supervisors. Apart from the student researcher, no others will have any right to access to your secured information. Your identity will be protected by the use of coding during data analysing. Participants will be asked maintain the confidentiality of the group discussion and not divulge the specific content to outside parties.

Your consent form and the de-identified research data will be stored in the School of Nursing and Midwifery for the required duration of five years and then all information will be destroyed according to University of Newcastle procedure.

How will the information collected be used?

The results of the study will be used to judge the work of the educational intervention in terms of whether it leads to an increased the rate of breastfeeding at one month for those women who experienced the intervention. The results will be published as a scholarly dissertation to be submitted for Mrs. Podjanee Parkpoom's PhD degree. Journal articles may be published in national and international journals. No identifying data will be presented in anything that is published from this study. A summary of results will be available to you on request at the completion of the study.

What do you need to do to participate?

You may choose to simply place your completed consent form in the envelope in the box marked "Breastfeeding Study" in the waiting area of the Antenatal Clinical. Alternately, you can choose to complete the attached Consent Form and return it in the reply paid envelope provided as part of this Information and Consent Package.

If there is anything you do not understand, or you have questions, contact the midwives or research assistants who gave you this information sheet or ring me, Podjanee (my details are below).

If you are consenting on behalf of a child or young person under 18 years of age please be sure that she understands what is being asked of her and that she truly wants to participate before making your decision. Where a parent/guardian consents to their child or young person participating, the final decision will rest with the child / young person.

Further information

If you would like further information please contact me, Mrs Podjanee Parkpoom (PhD student, University of Newcastle) on this Number; Thailand (+66) (0)53 125785 or Associate Professor Ashley Kable (Principal supervisor) on (+61) 2 4921 6334.

Thank you for considering this invitation.

Mrs. Podjanee Parkpoom

[Signature]

Principal supervisor:
Associate Professor Ashley Kable
Deputy Head of School, Research,
School of Nursing and Midwifery,
University of Newcastle
Phone: +61 2 4921 6334
Fax: +61 2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

Co supervisor:
Dr Virginia Skinner
Midwifery Lecturer and
Program Convenor Bachelor of Midwifery
School of Nursing and Midwifery,
University of Newcastle
Phone: +61 2 4921 6641
Email: Virginia.Skinner@newcastle.edu.au

[Signature] [Signature]

Complaints about this research

This project has been approved by the University of Newcastle's Human Research Ethics Committee, Approval No. H-2011-0010; Version 2 dated 04/04/11 and the Faculty of Medicine's Research Ethics Committee Approval coded NUR FAC-11-02-16A-13-X.

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Ethics Officer, Faculty of Medicine, Chiang Mai University, Chiang Mai province 50200, Thailand, telephone (+66) (0) 53 946641, office time on Monday to Friday at 3 pm – 4.30 pm, email: apirada81@yahoo.com

APPENDIX B: CONSENT FORM

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

RESEARCH TOPIC: Breastfeeding Education Study

Document Version 3 [H-2011-0010]; dated [22/08/11]

I, ……..... (name) agree to participate in this study which is described in the attached information sheet (above). I give my consent freely.

I consent to:

- Completing a survey
- The researcher accessing my medical records to check the details of the birth of my baby.
- Receiving a telephone interview approximately one month after the birth of my baby
- If I am randomised to the educational intervention group I also consent to:
  - participating in the sessions of antenatal breastfeeding education study
  - completing an anonymous evaluation of the quality of the breastfeeding educational program

I have read and understood the Information Sheet. I have had the opportunity to ask questions and have them answered to my satisfaction. I understand that access to counselling will be provided by the health service, if required.

If I am not able to write and read in Thai language, I understand that:

- my husband / partner / relative / friend / research assistant will read research information for me, and she/he and I sign in consent form together.
- it is an accepted standard practice by law in Thailand to take a thumbprint as opposed to a signature as evidence of agreeing to participate in the research.

Signature: .....…….....……

Date: .....…….....…….

If you are aged < 18 years you are also required to have the consent of your parent or guardian.

Parent/guardian's Name: ……

Parent/guardian's Signature: .....

Date: .....

Your Contact details:

Your Name: ……

Your Address: ……

Your Telephone: ……

Your Email: ……

Your Mother's Address: ……

Your Mother's Telephone Number: ……

Your Husband's or Friend's Telephone: ……

Your Husband's or Friend's Email: ……

Please put in the prepared box pasted on the booking desk marked "Breastfeeding Study", antenatal clinic or post to me in pre-paid envelope by…… (insert date)

APPENDIX C: LETTER OF ACCESS MEDICAL RECORDS

Research Student: Podjanee Parkpoom
PhD Candidate
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University Drive, Callaghan, Newcastle, 2308,
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Phone: (+61) (0)2 4921 6334
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Email: Ashley.Kable@newcastle.edu.au

RESEARCH TOPIC: breastfeeding rate at one month postpartum in Thailand

Document Version 3 [H-2011-0010]; dated [22/08/11]

Dear Director of Maharaj Nakorn Chiang Mai Hospital and Nakornping Hospital,

My name is Mrs. Podjanee Parkpoom and I am a midwifery lecturer at the Faculty of Nursing, Chiang Mai University, Northern Area, Thailand. Currently, I am studying for a PhD in Midwifery at the School of Nursing and Midwifery, Faculty of Health, The University of Newcastle, New South Wales, Australia, My Principal supervisor is Associate Professor Ashley Kable and co-supervisor is Dr Virginia Skinner.

My proposed research is a randomised controlled trial. The purpose of the study is to design and test a theory and evidence-based midwifery intervention which aim to increase breastfeeding rates at one month postpartum. This study is important because breastfeeding rates at one month postpartum in Thailand are low at 5.4% exclusive breastfeeding (UNICEF, 2005). However, Thailand's national report in 2010 has mentioned exclusive breastfeeding at 29% (Ministry of Public Health, 2010).

I am writing to ask your permission to access medical records of participants when they come to attend at antenatal clinics in your hospital; particularly the birth record so that I can be aware of any woman who had a stillbirth, neonatal death or very premature baby where it would not be appropriate to ring them after birth to enquire about breastfeeding.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

With respect I look forward to your reply.

Yours Faithfully

Student: Podjanee Parkpoom

[Signature]

Principal supervisor:
Associate Professor Ashley Kable
Deputy Head of School, Research,
School of Nursing and Midwifery,
University of Newcastle
Phone: +61 2 4921 6334
Fax: +61 2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

Co supervisor:
Dr Virginia Skinner
Midwifery Lecturer and
Program Convenor Bachelor of Midwifery
School of Nursing and Midwifery,
University of Newcastle
Phone: +61 2 4921 6641
Email: Virginia.Skinner@newcastle.edu.au

[Signature] [Signature]

APPENDIX D: SELECTION CRITERIA – FOR POTENTIAL PARTICIPANTS

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

RESEARCH TOPIC: breastfeeding rate at one month postpartum in Thailand

Document Version 3 [H-2011-0010]; dated [22/08/11]

Instruction for research assistants and midwives

INCLUSION CRITERIA

Demographic Criteria: All pregnant women who meet all these criteria are eligible to participate

☐ Age ≥ 13 years old
☐ Gestational ages between 24 and 29 weeks
☐ Having their first babies
☐ Ability to speak Thai language
☐ Neither intellectually nor mentally impaired in ways that would preclude effective group interaction

If a woman is eligible to participate please discuss the study with her and give her an information sheet and consent form. Please invite her to contact me at my address above, if she wishes.

NOTE: Women who have a stillbirth, early neonatal death, a premature baby or a baby with significant abnormalities will not be telephoned after the birth as it may be insensitive and intrusive.

APPENDIX E: LETTERS OF INVITATION TO DIRECTOR RE MIDWIFE: MAHARAJ NAKORN CHIANG MAI HOSPITAL

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

December, 2010

Dear Director of Maharaj Nakorn Chiang Mai Hospital

My name is Mrs Podjanee Parkpoom. I am a midwifery lecturer in Faculty of Nursing, Chiang Mai University in Thailand. I am studying for a PhD in Midwifery at the School of Nursing and Midwifery, Faculty of Health, The University of Newcastle, New South Wales, Australia. My principal supervisor is–Associate Professor Ashley Kable; Deputy Head of School (Research). My co-supervisor is Dr Virginia Skinner; midwifery lecturer.

My proposed research is a randomised controlled trial. The aim is to design and test a theory and evidence-based midwifery intervention which can be used by other midwives in Thailand to increase breastfeeding rates postpartum in Thailand. Currently, exclusively breastfeeding at six months postpartum in Thailand is increasing; however, breastfeeding rates are generally low. This study is important because breastfeeding protects the newborn from many diseases and provides optimal nutrition. Breastfeeding is also important for supporting maternal-infant attachment.

I am writing to ask your permission to Mrs. Dusanee Rojchanasaree as my clinical project advisor when I am conducting research in your hospital (The information statement is attached). I have already discussed my research with Mrs. Dusanee Rojchanasaree and she has agreed to provide a clinical supervisor with your approval.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

With respect I look forward to your reply.

Yours Faithfully

Student: Podjanee Parkpoom

[Signature]

APPENDIX F: LETTERS OF INVITATION TO DIRECTOR RE MIDWIFE: NAKORNPING HOSPITAL

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

September, 2011

Dear Director of Nakornping Hospital

My name is Mrs Podjanee Parkpoom. I am a midwifery lecturer in Faculty of Nursing, Chiang Mai University in Thailand. I am studying for a PhD in Midwifery at the School of Nursing and Midwifery, Faculty of Health, The University of Newcastle, New South Wales, Australia. My principal supervisor is–Associate Professor Ashley Kable; Deputy Head of School (Research).My co-supervisor is Dr Virginia Skinner; midwifery lecturer.

My proposed research is a randomised controlled trial. The aim is to design and test a theory and evidence-based midwifery intervention which can be used by other midwives in Thailand to increase breastfeeding rates postpartum in Thailand. Currently, exclusive breastfeeding at six months postpartum in Thailand is increasing; however, breastfeeding rates are generally low. This study is important because breastfeeding protects the newborn from many diseases and provides optimal nutrition. Breastfeeding is also important for supporting maternal-infant attachment.

I am writing to ask your permission to Mrs. Kanjana Naunkaew and Mrs. Warin Chaisaeng Boling as my clinical project advisors when I am conducting research in your hospital (The information statement is attached). I have already discussed my research with Kanjana Naunkaew and Mrs. Warin Chaisaeng Boling and they have agreed to provide clinical supervisors with your approval.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

With respect I look forward to your reply.

Yours Faithfully

Student: Podjanee Parkpoom

[Signature]

APPENDIX G: LETTERS OF INVITATION TO DIRECTOR RE RESEARCH ASSISTANTS

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
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Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
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FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

September, 2011

Dear Director of Maharaj Nakorn Chiang Mai and Nakornping Hospital

My name is Mrs Podjanee Parkpoom. I am a midwifery lecturer in Faculty of Nursing, Chiang Mai University in Thailand. I am studying for PhD in Midwifery at the School of Nursing and Midwifery, Faculty of Health, The University of Newcastle, New South Wales, Australia. My principal supervisor is Associate Professor Ashley Kable; Deputy Head of School (Research).My co-supervisor is Dr Virginia Skinner; midwifery lecturer.

My proposed research is a randomised controlled trial. The aim is to design and test a theory and evidence-based midwifery intervention which can be used by other midwives in Thailand to increase breastfeeding rates postpartum in Thailand. Currently, exclusive of breastfeeding at six months postpartum in Thailand is increasing; however, breastfeeding rates are generally low. This study is important because breastfeeding protects the newborn from many diseases and provides optimal nutrition. Breastfeeding is also important for supporting maternal-infant attachment.

I am writing to ask your permission to Miss Weerawan Jangmo and Ms Podjanee Khwan-ngern as a recruiter and a randomiser for my research when I am conducting research to your hospitals (The information statement is attached). I have already discussed my research with Miss Weerawan Jangmo and Ms Podjanee Khwan-ngern. They have agreed to provide support and needed sources with your approval.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

With respect I look forward to your reply.

Yours Faithfully

Student: Podjanee Parkpoom

[Signature]

APPENDIX H: GENERAL DEMOGRAPHIC INFORMATION (VERSION 3)

Please fill in the blank and tick the boxes below:

1. Name _____Age_____years
2. Date of birth _____
3. Gravidity _____
4. Visiting antenatal clinic at 1) ☐ Maharaj Nakorn Chiang Mai Hospital
   2) ☐ Nakornping Hospital
5. Race/Ethnic group 1) ☐ Thai 2) ☐ Others _____
6. Citizenship 1) ☐ Thai 2) ☐ Others _____
7. Religious 1) ☐ Buddhist 2) ☐ Christian 3) ☐ Others _____
8. Marital status 1) ☐ Single 2) ☐ Married 3) ☐ Divorced/separated
9. The highest level of education 1) ☐ No education 2) ☐ Primary School and High School
   3) ☐ Bachelor's degree 4) ☐ Postgraduate degree
   5) ☐ Others _____
10. Estimated family income _____ per year
11. Language/s spoken 1) ☐ Thai 2) ☐ Others _____
12. ☐ Literacy ☐ illiteracy
13. Breastfeeding intention 1) ☐ Yes 2) ☐ No
14. Do you feel supported by your family to breastfeed? 1) ☐ Yes 2) ☐ No
15. Do you feel confident to breastfeed your baby when it is born? 1) ☐ Yes 2) ☐ No
16. Have you had opportunities to learn from, or observe other women breastfeeding? 1) ☐ Yes 2) ☐ No
17. Do you know any reasons why women sometimes stop breastfeeding?
    If yes – please provide some examples _____
18. Have you had opportunities to practice breast feeding techniques with breast feeding equipment?
    1) ☐ Yes 2) ☐ No

APPENDIX I: SESSION EVALUATION FORM: ANTENATAL BREASTFEEDING STUDY

Breastfeeding Session: ☐ 1 ☐ 2 ☐ 3

Date of attendance: ……

Participant detail: ☐ Women; Current gestational age:……weeks

☐ Partner

How do you feel? Please tick in the box.

1. Content of the session

☐ ☺ ☐ 😐 ☐ ☹

Suggestion:……...

2. Teaching tools

☐ ☺ ☐ 😐 ☐ ☹

Suggestion:……...

3. Teaching technique

☐ ☺ ☐ 😐 ☐ ☹

Suggestion:……...

Thank you for your assessment.

Note: ☺ Feel very much satisfied 😐 Feel satisfied ☹ Do not feel satisfied

APPENDIX J: PROGRAM EVALUATION FORM: ANTENATAL BREASTFEEDING PROGRAM

Date of evaluation……..……..

Participant detail: ☐ Women; Current gestational age:……..……weeks

☐ Partner

How do you feel? Please tick in the box.

1. Content of the program

☐ ☺ ☐ 😐 ☐ ☹

Suggestion: ……..

2. Teaching tools

☐ ☺ ☐ 😐 ☐ ☹

Suggestion: ……..

3. Teaching technique

☐ ☺ ☐ 😐 ☐ ☹

Suggestion: ……..

Note: ☺ Feels very satisfied 😐 Feel satisfied ☹ Does not feel satisfied

PROGRAM EVALUATION FORM: Antenatal Breastfeeding Program (continued)

Do you intend to breastfeed when your baby is born?

1) ☐ Yes 2) ☐ No

Do you feel supported by your family to breastfeed?

1) ☐ Yes 2) ☐ No

Do you feel confident to breastfeed your baby when it is born?

1) ☐ Yes 2) ☐ No

Have you had opportunities to learn from, or observe other women breastfeeding?

1) ☐ Yes 2) ☐ No

Do you know any reasons why women sometimes stop breastfeeding?

1) ☐ Yes 2) ☐ No

If yes – please provide some examples _____

Have you had opportunities to practice breast feeding techniques with breastfeeding equipment?

1) ☐ Yes 2) ☐ No

Thank you for your assessment.

APPENDIX K (VERSION 3): SEMI-STRUCTURED TELEPHONE INTERVIEW: EXCLUSIVE BREASTFEEDING RATE AT ONE MONTH

"Hello; this is Mrs. Podjanee Parkpoom, the researcher who is studying breastfeeding? "Do you remember me"?

"Are you OK if I ask you some questions about BF?" If the answer is "yes", continue with the interview. If the answer is "no", check if a different time would be OK or if the woman does not want to discuss her BF experience at all. Then stop the interview and re-schedule if appropriate.

INITIATION OF BREAST FEEDING

Q. 1 Did your baby receive any of your breast milk?

☐ Yes; continue to Q. 3

☐ No; continue to only 2

Q. 2. a) What was/were the reason/s for not breastfeeding? (NB consider self-efficacy)

☐ Vicarious learning……

☐ Physiologic responses ……..

☐ Skills Practice ……

2. b) How do you feel about not breastfeeding? [Discuss the possibility of re-lactating and partial BF if the woman's answer indicates that would be appropriate]

……

……

PLEASE GO DIRECTLY TO QUESTION 6

BREAST FEEDING AT ONE MONTH

Q. 3 Is your baby receiving any of your breast milk now?

☐ Yes; continue to Q. 5

☐ No; continue to Q 4

Q. 4 a) What was/were the reason/s for stopping? (NB consider self-efficacy)

☐ Vicarious learning……

☐ Physiologic responses ……

☐ Skills Practice ……

4 b) For how long did you breastfeed?

……

4 c) How do you feel about not breastfeeding now? [Discuss the possibility of re-lactating and partial BF if the woman's answer indicates that would be appropriate]

……

Q. 5. How are you feeding your baby now?

☐ Exclusively breast milk by breastfeeding only

☐ Exclusively breast milk by breastfeeding and expressed milk

☐ Partial breast feeding using breast milk and water only

☐ Partial breast feeding (including or excluding expressed milk) and additional formula

☐ Fully formula fed

5 a) How do you feel about your feeding method now? [Discuss the possibility of re-lactating and partial BF if the woman's answer indicates that would be appropriate]

……

BREASTFEEDING SUPPORT

Q. 6. How supported, are/were you, in breastfeeding?

☐ Extremely well ☐ Fairly well ☐ Not well ☐ Actively discouraged

Note: .....

6 a). Who have been the person/people who have most influenced your sense of being supported or not?

☐ Partner ☐ Mother ☐ Mother in law ☐ Sister ☐ Sister in law ☐ other (specify)

Note: .....

*** NB ONLY FOR WOMEN IN THE BREASTFEEDING EDUCATION GROUP**

Q. 6 b) How helpful were the breastfeeding education sessions that you attended?

☐ Extremely helpful ☐ Fairly helpful ☐ Not very helpful ☐ I felt discouraged

6 c) Do you have any recommendations for improving the education session?

……

6 d) If you have another baby, do you intend to breastfeed?

☐ Yes ☐ I am not sure ☐ No

APPENDIX L: BREASTFEEDING EDUCATION STUDY: BRIEF TELEPHONE SURVEY

[3 months (6 months if applicable)]

Document Version1 [H-2011-0010]; dated [11/09/2012]

Hello, this is Podjanee Parkpoom, the researcher who is studying breastfeeding.
You may remember the breastfeeding study that you participated in early this year. I am contacting you again about the study to ask if you would be willing to answer some more questions about breast feeding.

YES _____ NO _____Date_____

If No – Thank you for participation in the study. I will not contact you again.

BREAST FEEDING AT THREE MONTHS

Q. 1 Is your baby receiving any of your breast milk now?

☐ Yes; continue to Q. 3

☐ No; continue to Q 2

Q. 2

2 a) What was/were the reason/s for stopping? (NB consider self-efficacy)

☐ Vicarious learning……

☐ Physiologic responses ……

☐ Skills Practice ……

2 b) For how long did you breastfeed?

...……

2 c) How do you feel about not breastfeeding now? [Discuss the possibility of re-lactating and partial BF if the woman's answer indicates that would be appropriate]

……

Q. 3

How are you feeding your baby now?

☐ Exclusively breast milk by breastfeeding only

☐ Exclusively breast milk by breastfeeding and expressed milk

☐ Partial breast feeding using breast milk and water only

☐ Partial breast feeding (including or excluding expressed milk) and additional formula

☐ Fully formula fed

3 a) How do you feel about your feeding method now? [Discuss the possibility of re-lactating and partial BF if the woman's answer indicates that would be appropriate]

……

BREASTFEEDING SUPPORT

Q. 4 How supported, are/were you, in breastfeeding?

☐ Extremely well ☐ Fairly well ☐ Not well ☐ Actively discouraged

Note: .....

Q. 5. Who have been the person/people who have most influenced your sense of being supported or not?

☐ Partner ☐ Mother ☐ Mother in law ☐ Sister ☐ Sister in law ☐other (specify)

Note: .....

Q. 6. Would you be willing to receive a telephone interview again when your baby is six months old?

YES _____ NO _____

Thank you for your time and for answering these questions today.

APPENDIX M: RANDOMISATION SCHEDULE FOR 166 PREGNANT WOMEN IN THE BREASTFEEDING EDUCATION STUDY

Study number	*Treatment*	*Patient identifier*
1001	Control	
1002	Control	
1003	Breastfeeding education	
1004	Breastfeeding education	
1005	Breastfeeding education	
1006	Control	
1007	Breastfeeding education	
1008	Control	
1009	Breastfeeding education	
1010	Control	
1011	Control	
1012	Breastfeeding education	
1013	Breastfeeding education	
1014	Breastfeeding education	
1015	Control	
1016	Breastfeeding education	
1017	Control	
1018	Breastfeeding education	
1019	Breastfeeding education	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	*Treatment*	*Patient identifier*
1020	Breastfeeding education	
1021	Control	
1022	Breastfeeding education	
1023	Breastfeeding education	
1024	Control	
1025	Breastfeeding education	
1026	Breastfeeding education	
1027	Control	
1028	Breastfeeding education	
1029	Control	
1030	Control	
1031	Breastfeeding education	
1032	Control	
1033	Breastfeeding education	
1034	Breastfeeding education	
1035	Control	
1036	Breastfeeding education	
1037	Breastfeeding education	
1038	Control	
1039	Breastfeeding education	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	***Treatment***	***Patient identifier***
1040	Control	
1041	Control	
1042	Breastfeeding education	
1043	Breastfeeding education	
1044	Control	
1045	Control	
1046	Breastfeeding education	
1047	Breastfeeding education	
1048	Breastfeeding education	
1049	Breastfeeding education	
1050	Breastfeeding education	
1051	Breastfeeding education	
1052	Breastfeeding education	
1053	Breastfeeding education	
1054	Control	
1055	Control	
1056	Breastfeeding education	
1057	Control	
1058	Control	
1059	Breastfeeding education	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	*Treatment*	*Patient identifier*
1060	Breastfeeding education	
1061	Control	
1062	Breastfeeding education	
1063	Control	
1064	Control	
1065	Control	
1066	Control	
1067	Control	
1068	Breastfeeding education	
1069	Breastfeeding education	
1070	Breastfeeding education	
1071	Breastfeeding education	
1072	Breastfeeding education	
1073	Breastfeeding education	
1074	Breastfeeding education	
1075	Breastfeeding education	
1076	Control	
1077	Breastfeeding education	
1078	Control	
1079	Breastfeeding education	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	***Treatment***	***Patient identifier***
1080	Control	
1081	Control	
1082	Breastfeeding education	
1083	Control	
1084	Breastfeeding education	
1085	Breastfeeding education	
1086	Control	
1087	Breastfeeding education	
1088	Breastfeeding education	
1089	Breastfeeding education	
1090	Control	
1091	Control	
1092	Breastfeeding education	
1093	Control	
1094	Breastfeeding education	
1095	Breastfeeding education	
1096	Breastfeeding education	
1097	Control	
1098	Control	
1099	Control	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	*Treatment*	*Patient identifier*
1100	Control	
1101	Control	
1102	Control	
1103	Control	
1104	Breastfeeding education	
1105	Breastfeeding education	
1106	Control	
1107	Control	
1108	Control	
1109	Breastfeeding education	
1110	Control	
1111	Control	
1112	Breastfeeding education	
1113	Control	
1114	Control	
1115	Control	
1116	Breastfeeding education	
1117	Control	
1118	Control	
1119	Control	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	***Treatment***	***Patient identifier***
1120	Control	
1121	Control	
1122	Control	
1123	Control	
1124	Breastfeeding education	
1125	Breastfeeding education	
1126	Control	
1127	Breastfeeding education	
1128	Control	
1129	Control	
1130	Control	
1131	Breastfeeding education	
1132	Breastfeeding education	
1133	Control	
1134	Breastfeeding education	
1135	Breastfeeding education	
1136	Breastfeeding education	
1137	Control	
1138	Breastfeeding education	
1139	Breastfeeding education	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	*Treatment*	*Patient identifier*
1140	Breastfeeding education	
1141	Control	
1142	Control	
1143	Breastfeeding education	
1144	Control	
1145	Breastfeeding education	
1146	Control	
1147	Breastfeeding education	
1148	Control	
1149	Control	
1150	Control	
1151	Breastfeeding education	
1152	Control	
1153	Breastfeeding education	
1154	Control	
1155	Breastfeeding education	
1156	Control	
1157	Control	
1158	Breastfeeding education	
1159	Control	

Randomisation schedule for 166 pregnant women in the breastfeeding education study

(continued)

Study number	***Treatment***	***Patient identifier***
1160	Breastfeeding education	
1161	Control	
1162	Breastfeeding education	
1163	Control	
1164	Control	
1165	Breastfeeding education	
1166	Control	

APPENDIX N: LETTERS OF AGREEMENT

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

RESEARCH TOPIC: breastfeeding rate at one month postpartum in Thailand

September 2011

Dear Associated Professor Watana Navacharoen

My name is Mrs. Podjanee Parkpoom; a midwifery lecturer at Faculty of Nursing, Chiang Mai University, Chiang Mai Province, Thailand. I am currently a PhD research student and conducting research under the supervision of Associate Professor Ashley Kable and Dr Virginia Skinner, from the University of Newcastle, Australia.

My proposed research is a randomised controlled trial. The aim is to test the effectiveness of group-based antenatal breastfeeding education in increasing the rate of initiation and continuation of breastfeeding to three months postpartum in Thailand. At only 5.4% (UNICEF, 2005), Thailand has the lowest rates of exclusive breastfeeding at 6 months in Asia. However, Thailand's national report in 2010 has mentioned exclusive breastfeeding at 29% (Ministry of Public Health, 2010). This study is important because breastfeeding protects the newborn from many diseases and provides optimal nutrition. Breastfeeding is also important for supporting maternal-infant attachment.

I am writing to ask your permission to involve your staff in recruitment of women from the antenatal clinic at Maharaj Nakorn Chiang Mai Hospital, Chiang Mai Province, Thailand. Potential participants are primiparous pregnant women under 30 weeks gestation at the time of recruitment. The research plan is that nurses/midwives in antenatal clinic would approach women who may like to be involved in the research and give them an information sheet about the study.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

If you agree in principal to my request then I will write again with more details and an application for ethical approval at your hospital.

Your 'in principal' approval is necessary for me to be able to gain ethical approval at Newcastle as the University needs to know that my plans for the research are feasible. If you grant 'in principal' approval of my recruitment request then sign in the space provided below and return this letter to the address below:

Podjanee Parkpoom (PhD Midwifery Candidate)
School of Nursing and Midwifery, The University of Newcastle, University Drive, Callaghan, NSW 3208 AUSTRALIA, Tel: (+61) (0)2 4921 6651 Mobile Phone : (+61) (0)4 2184 3049
Email: podjanee.bfrct@gmail.com

With respect I look forward to your reply.

Yours Faithfully

Podjanee Parkpoom	**Ashley Kable**
Researcher PhD Midwifery Candidate	Associate Professor Deputy Head of School (Research) Principal Supervisor

Researcher candidate Signature: _____

Supervisors' Signatures: _____

Supervisors' Signatures: _____

Approval

I give permission for Mrs. Podjanee Parkpoom, a PhD (Midwifery) student under the supervision of Associate Professor Ashley Kable and Dr Virginia Skinner, The University of Newcastle, Australia to recruit women for the research project: *Midwifery antenatal breastfeeding education intervention for increasing the rate of breastfeeding at one month postpartum in Thailand* at Maharaj Nakorn Chiang Mai Hospital, Chiang Mai Province, Thailand.

Name and Signature: Chief of Maharaj Nakorn Chiang Mai Hospital, Chiang Mai Province, Thailand:

Signature _____

Print
name_____

Date: _____
Day/Month/Year

Research Student: Podjanee Parkpoom
PhD Candidate
Home phone: (+66) (0)53 125785
Mobile phone: Thailand
FAX: (+66) (0)53 125785
Email: podjanee.bfrct@gmail.com

Principal Supervisor: Ashley Kable
Associate Professor
School of Nursing and Midwifery,
Faculty of Health, The University of Newcastle,
University Drive, Callaghan, Newcastle, 2308,
AUSTRALIA
Phone: (+61) (0)2 4921 6334
FAX: (+61) (0)2 4921 6301
Email: Ashley.Kable@newcastle.edu.au

LETTERS OF AGREEMENT

RESEARCH TOPIC: breastfeeding rate at one month postpartum in Thailand

September 2011

Dear Doctor Chatchaval Sirinirundr

My name is Mrs. Podjanee Parkpoom; a midwifery lecturer at Faculty of Nursing, Chiang Mai University, Chiang Mai Province, Thailand. I am currently a PhD research student and conducting research under the supervision of Associate Professor Ashley Kable and Dr Virginia Skinner, from the University of Newcastle, Australia.

My proposed research is a randomised controlled trial. The aim is to test the effectiveness of group-based antenatal breastfeeding education in increasing the rate of initiation and continuation of breastfeeding to three months postpartum in Thailand. At only 5.4% (UNICEF, 2005), Thailand has the lowest rates of exclusive breastfeeding at 6 months in Asia. However, Thailand's national report in 2010 has mentioned exclusive breastfeeding at 29% (Ministry of Public Health, 2010). This study is important because breastfeeding protects the newborn from many diseases and provides optimal nutrition. Breastfeeding is also important for supporting maternal-infant attachment.

I am writing to ask your permission to involve your staff in the recruitment women from the antenatal clinic at Nakornping Hospital, Chiang Mai Province, Thailand. Potential participants are primiparous pregnant women under 30 weeks gestation at the time of recruitment. The research plan is that nurses/midwives in antenatal clinic would approach women who may like to be involved in the research and give them an information sheet about the study.

I have submitted my research proposal variation and await unconditional ethics approval. I hope to commence data collection in October 2011.

If you agree in principal to my request then I will write again with more details and an application for ethical approval at your hospital.

Your ‘in principal’ approval is necessary for me to be able to gain ethical approval at Newcastle as the University needs to know that my plans for the research are feasible. If you grant ‘in principal’ approval of my recruitment request then sign in the space provided below and return this letter to me the address below:

Podjanee Parkpoom (PhD Midwifery Candidate)
School of Nursing and Midwifery, The University of Newcastle, University Drive, Callaghan, NSW 3208 AUSTRALIA, Tel: (+61) (0)2 4921 6651 Mobile Phone : (+61) (0)4 2184 3049
Email: podjanee.bfrct@gmail.com

With respect I look forward to your reply.

Yours Faithfully

Podjanee Parkpoom

Researcher
PhD Midwifery Candidate

Ashley Kable

Associate Professor
Deputy Head of School (Research)
Principal Supervisor

Researcher candidate Signature: _____

Supervisors’ Signatures: _____

Supervisors’ Signatures: _____

Approval

I give permission for Mrs. Podjanee Parkpoom a PhD (Midwifery) student under the supervision of Associate Professor Ashley Kable and Dr Virginia Skinner, The University of Newcastle, Australia to recruit women for the research project: *Midwifery antenatal breastfeeding education intervention for increasing the rate of breastfeeding at one month postpartum in Thailand* at Nakornping Hospital, Chiang Mai Province, Thailand.

Name and Signature: Chief of Nakornping Hospital, Chiang Mai Province, Thailand:

Signature _____

Print
name_____

Date: _____
Day/Month/Year

APPENDIX O: ASSOCIATE RESEARCHERS

Associate Researcher 1: Clinical Project Advisor

Title: Forename/Initials: Surname: Mrs Dusanee Rojchanasaree

Suburb/Town: Chiang Mai

State: Northern of Thailand

Country: Thailand

Organisation: Maharaj Nakorn Chiang Mai Hospital, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

Department: Antenatal Clinic

Position: Senior expert midwife

Summary of qualifications and relevant expertise:

Mrs Dusanee holds a Bachelor of Nursing and Midwifery. She graduated with a Masters degree of Health Promotion from Faculty of Education, Chiang Mai University, Thailand. She has been giving pregnant women education for many years. She is also a clinical advisor for nursing and midwifery students who practice clinically at the antenatal clinic.

General competing interests:

Mrs Dusanee is a senior expert midwife and she is interested in being a researcher in midwifery and women health.

Description of the role of the associate researcher / investigator in this project:

Mrs Dutsanee is a senior expert midwife who is invited to be a clinical project advisor at Maharaj Nakorn Chiang Mai Hospital. She has responsibility at Maharaj Nakorn Chiang Mai Hospital.

Associate Researcher 2: Clinical Project Advisor

Title: Forename/Initials: Surname: Mrs Kanjana Naunkaew

Suburb/Town: Chiang Mai

State: Northern of Thailand

Country: Thailand

Organisation: Nakornping Hospital, Chiang Mai, Thailand

Department: Antenatal Clinic

Position: Head of Antenatal Clinic; senior expert midwife

Summary of qualifications and relevant expertise:

Mrs. Kanjana holds a Bachelor of Nursing and Midwifery. She has been giving pregnant women education for many years. She is also a clinical advisor for nursing and midwifery students who practice clinically at the antenatal clinic.

General competing interests:

Mrs. Kanjana is a senior expert midwife. She is interested in being a researcher in midwifery and women health.

Description of the role of the associate researcher / investigator in this project:

Mrs. Kanjana is a senior expert midwife who is invited to be a clinical project advisor at Antenatal Clinic, Nakornping Hospital. She is a clinical project advisor and a consultant when the researcher may have some difficulties during recruitment processes at the Antenatal Clinic of the hospital. She has responsibility at Nakornping Hospital.

Associate Researcher 3: Clinical Project Advisor

Title: Forename/Initials: Surname: Mrs Warin Chaisaeng Boling

Suburb/Town: Chiang Mai

State: Northern of Thailand

Country: Thailand

Organisation: Nakornping Hospital, Chiang Mai, Thailand

Department: Pueperium Department (Postpartum ward)

Position: SubHead; senior expert midwife

Summary of qualifications and relevant expertise:

Mrs Warin holds a Bachelor of Nursing and Midwifery. She has worked as a midwife and she has been giving women education for many years. She is also a clinical advisor for nursing and midwifery students who practice clinically at the postpartum ward.

General competing interests:

Mrs Warins is a senior expert midwife and she is interested in being a researcher in midwifery and women health.

Description of the role of the associate researcher / investigator in this project:

Mrs Warin works at postpartum ward at Nakornping Hospital as a senior expert midwife and subhead. She is invited to be a clinical project advisor at the postpartum ward, where

the researcher will be using the room to provide the breastfeeding classes. She is available for consultation on any issues related to the breastfeeding education intervention. As the Antenatal Clinic (ANC) is a small Out Patient Department (OPD) and has no spare rooms for the researcher to educate participants about breastfeeding, the researcher has requested to use the educational room which belongs to the postpartum ward. Therefore, Mrs Warin can be both an authorized senior midwife who supports the researcher the room when the researcher has difficulties accessing the rooms and a consultant in any issues of the research project.

Associate Researcher 4: Research assistant

Title: Forename/Initials: Surname: Miss Weerawan Jangmo

Suburb/Town: Chiang Mai

State: Northern of Thailand

Country: Thailand

Organisation: Faculty of Ecomomy, Chiang Mai University, Chiang Mai, Thailand

Department: -

Position: Master student

Summary of qualifications and relevant expertise:

Miss Weerawan holds a Bachelor of Economy from Chiang Mai University, Thailand. Miss Weerawan Jangmo is available to help in the recruitment process. She is experienced in quantitative research.

General competing interests

Miss Weerawan is a quantitative researcher in Economy.

Description of the role of the associate researcher / investigator in this project:

Miss Weerawan is the research assistant who will be recruiting participants at antenatal clinics of both sites; Maharaj Nakorn Chiang Mai Hospital and Nakornping Hospital.

Associate Researcher 5: Research assistant

Title: Forename/Initials: Surname: Ms Podjanee Khwan-ngern

Suburb/Town: Chiang Mai

State: Northern of Thailand

Country: Thailand

Organisation: Rachawait Private Hospital, Chiang Mai Province, Thailand, Chiang Mai, Thailand

Department: Nursing Unit at Le Meridien Hotel, Chiang Mai, Thailand

Position: Registered nurse and midwife

Summary of qualifications and relevant expertise:

Ms Podjanee Khwan-ngern is a registered nurse and midwife in Thailand. She holds a Bachelor of Nursing and Midwifery from Chiang Mai University, Thailand. She is working as a full-time nurse at the nursing unit in the hotel and possesses good computer skills.

General competing interests

Ms Podjanee is a registered nurse and midwife.

Description of the role of the associate researcher / investigator in this project:

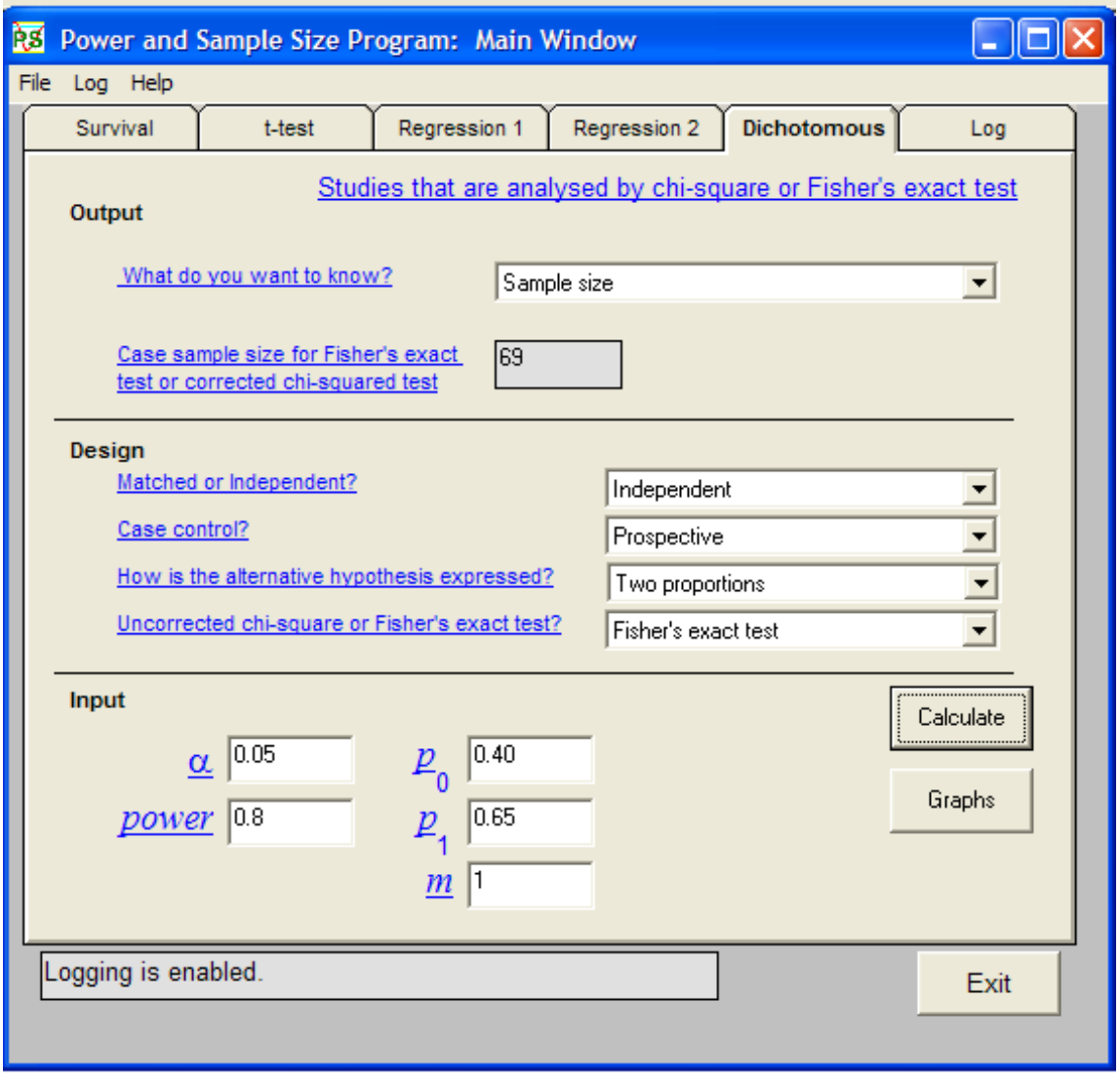
Ms Podjanee is the research assistant who will be allocating the consented participants into two groups with the random number table by using the excel program.

APPENDIX P: TIMELINE 4 YEARS STUDY

	July –December 2009						January-December 2010												January-December 2011												January-December 2012												January-July 2013						
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Standard 4 years	21																																															21
Year 1: Confirmation (Australia)																																																	
Enrol PhD (July 2009)	21																																																
Completed proposal for confirmation (July 2010)																																																	
Submit proposal paper													7																																				
Deliver Seminar													28																																				
Confirmation													29																																				
UoN Ethic approval (November 2010)																																																	
Thai Ethic approval (December 2010)																																																	
Year 2: Collecting data (Thailand)																																																	
Collect data in Thailand (commence January 2011)																																																	
Start writing draft chapter 1,2,3																																																	
Continue writing draft chapter 1,2,3																																																	
Return to Australia (February 2012)																																																	
Year 3: Analysis & Writing (Australia)																																																	
Complete chapter 1,2,3																																																	
Data analysis																																																	
Write findings and conclusion chapter																																																	
Year 4: Graduation (Australia)																																																	
Submit thesis paper (January 2013)																																																	
Waiting for the result																																																	
Graduate																																																21	
Go to Thailand																																																	

APPENDIX Q: POWER SAMPLE SIZE ANALYSIS

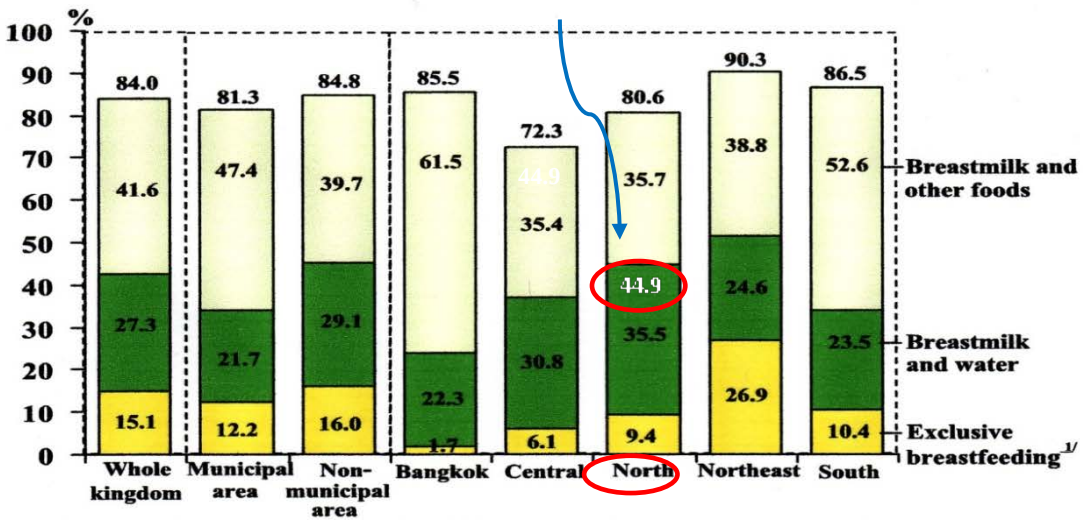
25% for the difference (1/4)



APPENDIX R: BREASTFEEDING RATES NATIONAL STATISTICS

Figure 14 Percentage of ever-married women aged 15-49 years whose last living child is under 6 months according to infant feeding practices in the 24 hours prior to the interview by area and region, 2009

The rate of exclusive breastfeeding and predominant breastfeeding



The North, Chiang Mai City where this study was conducted

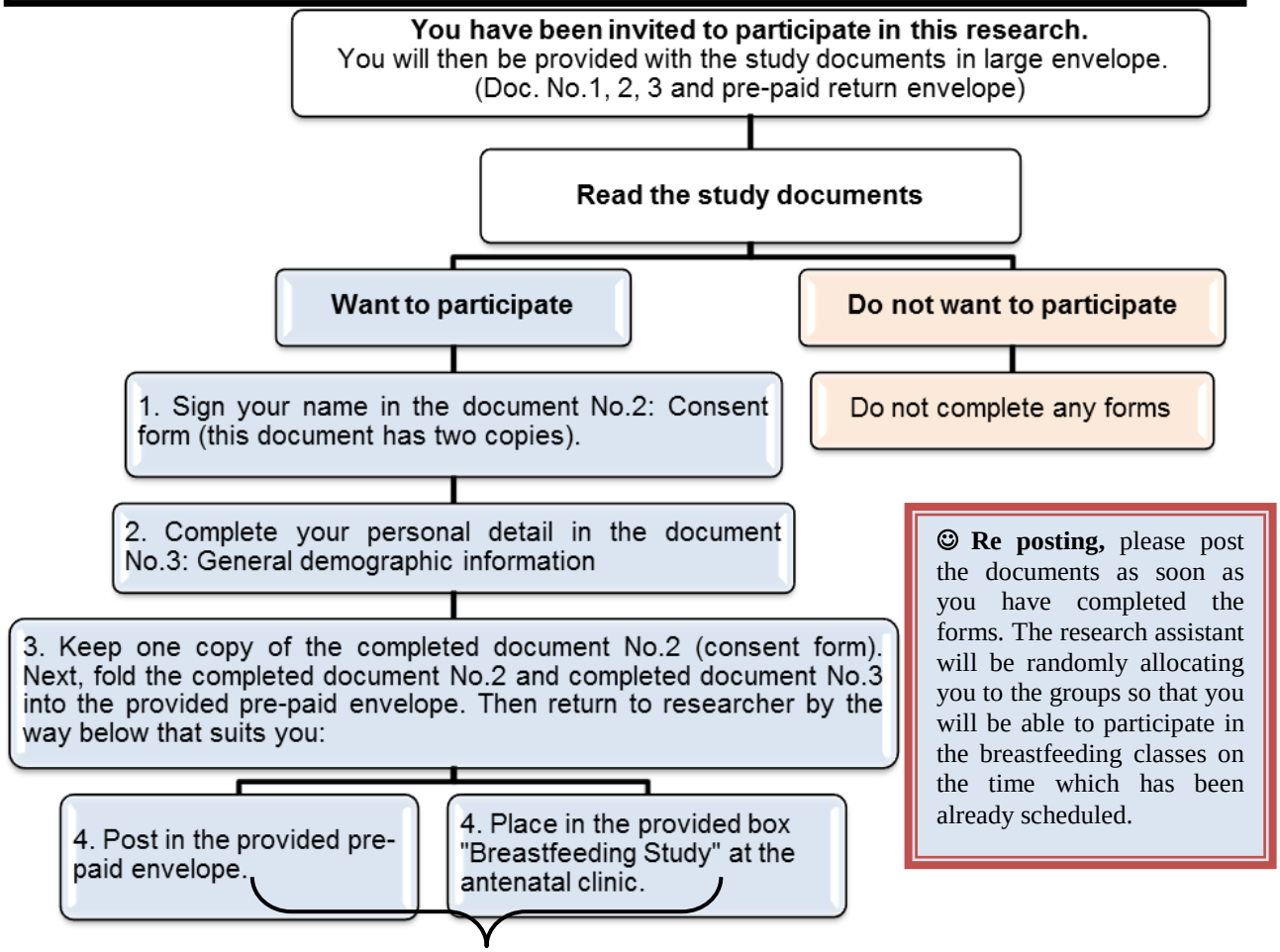
1/ "Exclusive breastfeeding" indicates that the infant consumed only breastmilk in the 24 hours prior to the interview (in addition to vitamin/mineral supplements or medicines if applicable)

Thailand breastfeeding national statistic 2009 http://web.nso.go.th/index.htm under "latest release" click "Reproductive Health Survey" or go to http://web.nso.go.th/en/survey/reprod/rhs09_100810.pdf page 54

APPENDIX S: FLOWCHART: GUIDELINE FOR PARTICIPATING/NOT PARTICIPATING IN THE RESEARCH

Flowchart:

Guideline for participating / not participating in the research



☺ **Re posting,** please post the documents as soon as you have completed the forms. The research assistant will be randomly allocating you to the groups so that you will be able to participate in the breastfeeding classes on the time which has been already scheduled.

5. After returning/posting your documents to me, you will be phoned in about 2 weeks time to inform you about which group you have been assigned to:

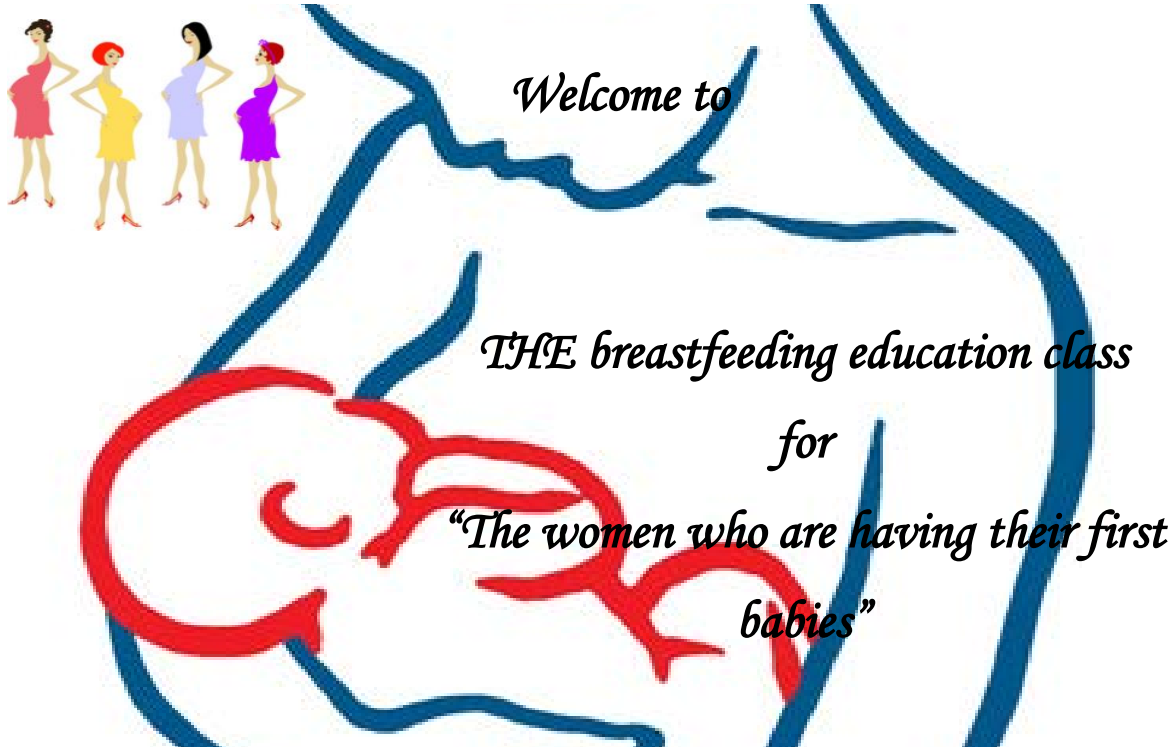
1) **If you are in the breastfeeding intervention group**

   You will have your routine standard care at the antenatal clinic plus attending 3 antenatal classes of 90 minutes each. The classes will begin when you are around 32 weeks pregnant. Husbands and/or other relatives or friends are also invited to the classes.

2) **If you are in the control group**

   You will have only your routine standard care at the antenatal clinic.

APPENDIX T: RECRUITMENT MATERIAL



APPENDIX U: SEARCH RESULTS

"Are antenatal breastfeeding education classes effective in increasing the rate of predominant breastfeeding between one and six months after birth?"

Research Design defined for searching: "Randomised Controlled Trial"

STRING 1: Antenatal

			Last run the search		
	2/10/2009	2/10/2009	4/10/2009	2/10/2009	6/10/2009
Keywords and synonyms	**MEDLINE**	**CINAHL**	**PUBMED**	**COCHRANE**	**SCOPUS**
antenatal	16,479	3,000	-	1,379	44,028
prenatal	100,801	15,233	-	2,482	231,021
prenatal care/	-	-	8,390	-	-

STRING 2: Education

Keywords and synonyms	**MEDLINE**	**CINAHL**	**PUBMED**	**COCHRANE**	**SCOPUS**
patient education	-	-	-	12,359	386,911
patient education as topic/	56,927	-	24,507	-	-
patient education/	-	33,377	-	-	-
health education	-	-	-	-	608,917
health education/	45,815	11,897	56,290	13,981	-
parenting education	87	-	-	1,853	16,956
parenting education/	-	1,182	-	-	-
health promotion	-	-	-	-	152,631
health promotion/	37,458	19,963	23,127	3,841	-
preparation	184,960	11,472	-	18,416	1,465,331
intervention	210,508	-	-	71,613	806,646
intervention or nursing intervention/	-	69,052	-	-	-
nursing process/	-	-	25,370	-	-

STRING 3: Breastfeeding

Keywords and synonyms	MEDLINE	CINAHL	PUBMED	COCHRANE	SCOPUS
breast feeding	-	-	-	-	53,594
breast feeding/	21,084	9,058	12,950	1,686	-

STRING 4: Randomized Controlled Trial

Keywords and synonyms	MEDLINE	CINAHL	PUBMED	COCHRANE	SCOPUS
randomized controlled trial	-	-	-	3	715,075
randomized controlled trial/	283,618	-	-	-	-
randomized controlled trial [Publication Type]	-	-	274,268	-	-
randomized controlled trial as topic/	-	-	8,875	-	-
clinical trials	-	70,106	-	-	-
cohort studies	-	-	-	14,282	453,134
cohort studies/	104,094	-	2,206	-	-
prospective studies/	-	110,030	-	-	-

STRING 5: Results from combination each string

Keywords and synonyms	MEDLINE	CINAHL	PUBMED	COCHRANE	SCOPUS
String 1+2 (antenatal or prenatal) and (patient education or health education or parenting education or health promotion or preparation or intervention)	6,301	1,744	646	1,545	4,964
String (1+2) + 3 (antenatal or prenatal) and (patient education or health education or parenting education or health promotion or preparation or intervention) and (breast feeding)	350	136	38	91	590
String ((1+2) +3) + 4 (antenatal or prenatal) and (patient education or health education or parenting education or health promotion or preparation or intervention) and (breast feeding) and (randomized controlled trial or cohort studies)	**35**	**23**	**7**	**80**	**271**

Total Citation

Keywords and synonyms	**MEDLINE**	**CINAHL**	**PUBMED**	**COCHRANE**	**SCOPUS**
Total Citation (Database: The University of Newcastle)	**35**	**23**	**7**	**80**	**271**
Summary	**416**				
Online database (Google)	1				
Total Citation	**417**				

Note: / MeSH (Medical Subject Headings) that is the (U.S.) National Library of Medicine's controlled vocabulary thesaurus used for indexing articles.

APPENDIX V: SUMMARY TABLE OF ARTICLES

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
1	A comparison of two methods of antenatal breast-feeding education (Sheehan 1999)	***Design*** Longitudinal, Non-randomised intervention study ***Aim*** To compare a woman-centered antenatal breastfeeding program based on concepts of peer and husband / partner support with a control group, who received antenatal breastfeeding education led by a midwife childbirth educator)	154 primiparous women (86 participants in the control group and 68 in the experimental group)	No differences were found between groups in relation to maternal perceptions of success or duration rates. Overall, breast-feeding duration rates were very high when compared to previously reported breastfeeding duration rates in Australia. There were no differences in breastfeeding duration rates or in maternal perceptions of success between those babies given supplementary feeds in hospital and those who were not, although early supplementation at home appeared to reduce breastfeeding duration.	**Excluded** Reason: • Used convenience sampling, participants not randomised • Measured maternal perception of success
2	Effectiveness of breastfeeding peer counseling in a low-income, predominantly Latina population: a randomized controlled trial (Chapman, Damio et al. 2004)	***Design*** Prospective Randomised, Controlled Trial ***Aim*** To evaluate the effectiveness of an existing breastfeeding peer counselling program within the United States.	219 pregnant women (Peer counselling group = 113; Control group = 106)	The proportion not initiating breastfeeding was significantly lower in the intervention group than in the controls group (8/90 [9%] vs 17/75 [23%]; RR, 0.39; 95% CI, 0.18-0.86). The probability of stopping breastfeeding also tended to be lower in the intervention group at both one month (36% vs 49%; RR, 0.72; 95% CI, 0.50-1.05) and 3 months (56% vs 71%; RR, 0.78; 95% CI, 0.61-1.00).	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
3	Two mid-pregnancy interventions to increase the initiation and duration of breastfeeding: a randomized controlled trial (Forster, McLachlan et al. 2004)	***Design*** Randomised, Controlled Trial with "Intention to Treat" only ***Aim*** To compare two strategies for increasing the initiation and duration of breastfeeding	981 pregnant women from a Tertiary Referral Centre, Singapore (Intervention: Practical Skills group = 327 Attitude group = 329 Control: Standard care = 328)	There were no statistically significant differences occurred among groups in breastfeeding initiation and duration 1. No statistically significant differences occurred among groups in breastfeeding initiation, as measured by breastfeeding status at interview two to four days after the birth. 2. No statistical differences in breastfeeding duration occurred among groups at the 6-month interview.	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding
4	A randomized controlled trial to test the effect of an antenatal educational intervention on breastfeeding duration among Canadian primiparous women (Kluka 2004)	***Design*** Randomised Controlled Trial ***Aim*** To test the effect of an antenatal educational intervention on breastfeeding duration	209 primiparous women (The intervention group = 111, the control group = 98)	There was no statistically significant difference between the groups regarding the proportion of women still mainly breastfeeding at 24 weeks after birth. Multivariate analyses yielded three significant predictive variables of breastfeeding duration including higher breastfeeding confidence (p = 0.001), non-smoking status (p = 0.017), and the mother receiving a visit by a community health nurse within two weeks after the infant's birth (p = 0.023)	**Excluded** Reason: The abstract of the study met inclusion criteria. However, at the time of searching (2009), full text of this paper could not be obtained by the University of Newcastle's library databases

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
5	Lactation counseling increases exclusive breastfeeding rates in Ghana (Aidam, Perez-Escamilla et al. 2005)	***Design*** Randomised Controlled Trial ***Aim*** To measure the effect of lactation counselling on exclusive breastfeeding behaviours	231 pregnant women (Intervention group 1 = 74, group 2 = 72; Control = 85)	At six months postpartum, 90.0% in intervention group 1 and 74.4% in intervention group 2 had exclusively breastfed during the previous month. In contrast, only 47.7% in control group were doing so (p = 0.008). Similarly, the percentage of exclusive breastfeeding during the six months was significantly higher (p = 0.02) among the intervention group 1 and the intervention group 2 (39.5%) than among the control (19.6%).	**Excluded** Reason: • Did not investigate the effectiveness of group-based antenatal breastfeeding education in increasing breastfeeding rates that delivered by midwife
6	A randomized trial assessing the efficacy of peer counselling on exclusive breastfeeding in a predominantly Latina low-income community (Anderson, Damio et al. 2005)	***Design*** Randomised Controlled Trial ***Aim*** To assess the efficacy of peer counselling to promote exclusive breastfeeding)	162 expectant mothers, less than 32 weeks gestation and considering breastfeeding	At hospital discharge, 24% in the control group compared with 9% in the peer counselling group had not initiated breastfeeding, with 56% and 41%, respectively, nonexclusively breastfeeding. At 3 months, 97% in the control group and 73% in the peer counselling had not exclusively breastfed (RR = 1.33; 95% CI, 1.14-1.56) during the previous 24 hours. The likelihood of non-exclusive breastfeeding throughout the first 3 months was significantly higher for the control group than the peer counselling (99% vs 79%; RR=1.24; 95% CI, 1.09-1.41).	**Excluded** Reason: • Did not investigate the effectiveness of group-based antenatal breastfeeding education in increasing breastfeeding rates that delivered by midwife

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
7	Randomized, controlled trial of a prenatal and postnatal lactation consultant intervention on duration and intensity of breastfeeding up to 12 months (Bonuck, Trombley et al. 2005)	***Design*** The randomized, non-blinded, controlled trial ***Aim*** To determine whether an individualised, prenatal and postnatal, lactation consultant intervention resulted in increased cumulative intensity of breastfeeding up to 52 weeks.	The analytic sample included 304 women (intervention: n = 145; control: n = 159) with ≥ 1 postnatal interview	The intervention group was more likely to breastfeed through week 20th (53.0% vs 39.3%). Exclusive breastfeeding rates were low and did not differ according to group. In multivariate analyses, control subjects had lower breastfeeding intensity at 13 weeks (OR: 1.90; 95% CI: 1.13–3.20) and 52 weeks (OR: 2.50; 95% CI: 1.48–4.21). US-born control subjects had lowest breastfeeding intensity at 13 weeks (OR: 5.22; 95% CI: 2.43–11.22) and 52 weeks (OR: 5.25; 95% CI: 2.44 –11.29).	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives
8	Effectiveness of breast-feeding peer counseling in a low-income, predominantly Latina population (Bowes 2005)	***Design*** A randomised, prospective trial ***Aim*** To evaluated the effectiveness of breastfeeding peer counselling	No number specified, but the study reported there was a large number of low-income Latina women aged 18 years or older were recruited from the prenatal clinic at their 26 weeks gestation or earlier.	Peer counselling was significantly associated with initiating breast feeding. Compared with control women, those counselled had a 61% lower risk of not starting breast feeding. Results at one month and three months postpartum were less impressive but still evident. At six months postpartum, no effect of peer counselling on the incidence of breast feeding was apparent.	**Excluded** Reason: The full text of this study could not be obtained by the University of Newcastle databases.

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
9	Breastfeeding expectations versus reality: a cluster randomised controlled trial (Lavender, Baker et al. 2005)	***Design*** Cluster Randomised Controlled Trial ***Aim*** To evaluate the effect of antenatal breastfeeding education intervention on women's breastfeeding duration	Four Primary Health Care Units (intervention group = 4 units, control group = 4 units) with randomised women 1,249 pregnant women who wanted to breastfeed (intervention group = 644, control group = 605)	There was no difference between the groups in the proportion of women who attained their expected duration of breastfeeding (OR 1.2; 95% CI 0.89 – 1.6, p = 0.2). There were no differences between the groups in the uptake of breastfeeding on discharge (OR 1.2; 95% CI 0.8 – 1.7, p = 0.3) or exclusively at four months (OR 1.1; 95% CI 0.6 – 1.8, p = 0.8). (In the UK, breastfeeding rate was lower than most other European countries. In the study setting, only 56% of women initiating breastfeeding of whom, only 1/8 was still breastfeeding 12 weeks later.)	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding
10	Randomized controlled trial of a prenatal and postnatal lactation consultant intervention on infant health care use (Bonuck, Freeman et al. 2006)	***Design*** Randomised Controlled Trial (non-blinded) ***Aim*** To determine whether infants of women randomised to a prenatal and postpartum lactation support intervention incur fewer otitis media, respiratory tract, or gastrointestinal-related visits than controls.	338 low-income, primarily Hispanic and/or black mother-infant dyads (n=163 for the intervention group and n=175 for the control group).	There was a significant interaction between treatment and Medicaid; among those not receiving Medicaid, the number of otitis media visits was higher among controls ($p \leq 0.03$). Visits for any illness and Breastfeeding Sensitive (BFS) illness, gastrointestinal, or respiratory tract illnesses did not differ by treatment group. Intervention group infants received more breast milk than controls, but exclusive breastfeeding rates remained low and did not differ between groups at any point.	**Excluded** Reason: • Did not measure women's breastfeeding experiences • Different study aim and results that determined infants health status

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
11	Effectiveness of breastfeeding program in Thailand (Buakhum 2006)	***Design*** Non-randomised intervention study ***Aim*** To investigate the effect of a breastfeeding-promoting program on the rate of 4-month exclusive breastfeeding in first time mothers	60 primiparous women in two groups of 30	Women in the experimental group demonstrated high rate of exclusive breastfeeding at a statistically significant level ($p < 0.001$) Women in the experimental group had longer average duration of exclusive breastfeeding than the women in control group at a statistically significant level ($p < 0.001$)	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding
12	Effect of intervention to improve breastfeeding technique on the frequency of exclusive breastfeeding and lactation-related problems (De Oliveira, Justo Giugliani et al. 2006)	***Design*** Randomised Clinical Trial ***Aim*** To compare frequencies of exclusive breastfeeding and lactation related problems during the first 30 days	211 mother-infant pairs (74 mothers who received a 30-minute counselling session on breastfeeding technique in the maternity ward, and 137 controls)	The frequency of exclusive breastfeeding among mothers who had received intervention was similar to controls by seven days (79.7% vs 82.5%, respectively) and 30 days (60.8% vs 53.3%). There was no difference between groups in the frequency of sore nipples at seven and 30 days, in breast engorgement and mastitis, and in the quality of breastfeeding technique at 30 days. Therefore, a single intervention at maternity was not sufficient to improve breastfeeding technique, increase exclusive breastfeeding rates, and reduce the incidence of breastfeeding problems during the first month.	**Excluded** Reason: • Did not recruit pregnant women • No antenatal educational program

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
13	Factors associated with breastfeeding at six months postpartum in a group of Australian women (Forster, McLachlan et al. 2006)	***Design*** Randomised, Controlled Trial with "Intention to Treat" only ***Aim*** To use combined data from a randomised controlled trial to describe and present the factors which predicted or were associated with women continuing to breastfeed any breast milk until at least the time of a telephone interview six months postpartum.	981 primiparous women	Factors that were positively associated with breastfeeding any breast milk at six months were: a very strong desire to breastfeed; having been breastfed oneself as a baby; being born in an Asian country; and older maternal age. There was an increasing association with increasing age. Factors negatively associated with feeding any breast milk at six months were: a woman having no intention to breastfeed six months or more; smoking 20 or more cigarettes per day pre-pregnancy; not attending childbirth education; maternal obesity; having self-reported depression in the six months after birth; and the baby receiving infant formula while in hospital.	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives • Secondary data analysis: The paper used data collected in 2004; a randomised controlled trial designed to test the effect of two different educational interventions provided in mid-pregnancy on the initiation and duration of breastfeeding.

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
14	The effect of a program of organised and supervised peer support on the initiation and duration of breastfeeding: a randomised trial (Muirhead, Butcher et al. 2006)	***Design*** Randomised Controlled Trial ***Aim*** To test if a specified program of peer support affects the initiation and/or the duration of breastfeeding	225 pregnant women at their 28 weeks gestation (Intervention group = 112, Control group = 113)	Thirty-five of the 112 (31%) women in the peer support group were breastfeeding at 6 weeks compared to 33/113 (29%) in the control group, a difference of 2% (95% CI = 10% to 14%). The Kaplan–Meier survival plot shows the peer support group overall breastfeeding slightly longer than the control group, with no statistically significant difference by Log rank test (p = 0.5). The median breastfeeding duration between primiparous women in the peer support group was seven days, compared to three days for the control group. Among women who started to breastfeed the medians were 72 days in the peer support group and 56 days in the control group. These differences were not statistically significant.	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives
15	Randomized controlled trial to determine effects of prenatal breastfeeding workshop on maternal breastfeeding self-efficacy and breastfeeding duration (Noel-Weiss, Rupp et al. 2006)	***Design*** Randomised Clinical Trial with Intention To Treat and Actual Attendance Analysis ***Aim*** To assess the effectiveness of breastfeeding workshop on Breastfeeding Self-efficacy Scores and breastfeeding duration	92 pregnant in two groups of 46	1. Intention To Treat analysis, Breastfeeding Self-efficacy Scores at four weeks postpartum were significantly higher in the intervention group, p = 0.023 2. Women who actually attended BFSES had higher rates of exclusive breastfeeding, p = 0.004 3. All infant feeding outcomes at eight weeks were significantly positively related to workshop attendance, p = 0.005 However, if analysed by ITT the differences were not statistically significant	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
16	Effects of support on the initiation and duration of breastfeeding (Gill, Reifsnider et al. 2007)	***Design*** Non-randomised intervention study ***Aim*** To increase the initiation of breastfeeding and its duration to six months	182 Hispanic immigrant women in the second trimester of pregnancy from the south-western United States (Intervention: 94, Control: = 88)	The intervention group had twice the odds (OR 2.31, 95% CI 1.10 – 4.96) the odds of starting breastfeeding, twice the odds (OR 2.66, 95% CI 1.84 - 3.15) of continuing to breastfeed for six months The intervention group had only half the odds (OR 0.515, 95% CI 0.50 - 0.54) of quitting compared with the control group. ***Note:*** - The median duration time for the intervention group was 122.1 days versus 48.8 days for the control group. - During the first 30 days, relative probability of those breastfeeding in the intervention group was 1.19 times that of the control, and the odds of breastfeeding in the intervention group were 1.84 times those in the control	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using intervention study design 2) Investigated the effectiveness of antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding
17	Effectiveness of a prenatal education program on breastfeeding outcomes in Taiwan (Lin, Chien et al. 2007)	***Design*** Intervention study ***Aim*** To design a structured prenatal education program on breastfeeding and to evaluate the effectiveness of the program	92 pregnant women between 20-36 weeks of pregnancy from a Medical Centre in Taipei City, Taiwan	The rate of exclusive breastfeeding was higher for the experimental group at three days (41% increased to 56%, p = 0.14) and one month postpartum (32% increased to 52%, p = 0.06); however, the differences only reached borderline significance at one month postpartum.	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
18	Simple antenatal preparation to improve breastfeeding practice: a randomized controlled trial (Mattar, Chong et al. 2007)	***Design*** Randomised Clinical Trial ***Aim*** To address the impact of simple antenatal educational interventions on breastfeeding practice (The intervention group A received booklet about breastfeeding and watched educational VDO15 including having individual counseling by lactation consultant who examined the woman's nipples to assess adequacy for breastfeeding and answered questions on breastfeeding. The intervention group B received booklet and watched VDO, no individual consultant)	401 pregnant women (The intervention; group A = 123 and group B = 132, the control; group C = 146)	Mothers receiving individual counselling and educational material practiced exclusive and predominant breastfeeding more often than mothers receiving routine care alone at three months (OR 2.6, 95% CI 1.2 – 5.4) and six months (OR 2.4, 95% CI 1.0 – 5.7) postpartum. More mothers practiced exclusive and predominant breastfeeding at six months among women receiving individual counselling compared with women exposed to educational material alone (OR 2.5, 95% CI 1.0 – 6.3).	**Excluded** Reason: • The intervention in this study was not delivered by using midwife delivered group-based antenatal breastfeeding education • The results were specifically reported by focusing on the effectiveness of individual breastfeeding consultant

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
19	Antenatal education and postnatal support strategies for improving rates of exclusive breast feeding: randomised controlled trial (Su, Chong et al. 2007)	***Design*** Randomised Controlled Trial with Intention To Treat only ***Aim*** To investigate whether antenatal breast feeding education alone or postnatal lactation support alone improves rates of exclusive breastfeeding compared with routine care	450 pregnant women (Intervention: Group 2 = 150; antenatal breastfeeding education, Group 3 = 149; postnatal lactation support, Control: Group 1= 151; standard care)	There were no any significant differences in breastfeeding initiation rates of any groups 1. Compared with the women who received routine care: - Women receiving antenatal education were more likely to breast feed exclusively at six weeks (p = 0.036), three months (p = 0.030), and six months (p = 0.036) after birth. - Women receiving postnatal support were more likely to breastfeed exclusively at two weeks (p = 0.012), six weeks (p = 0.019), three months (p = 0.040), and six months (p = 0.042) after birth. 2. Women in postnatal support group were more likely to breastfeed exclusively compared with women who received antenatal education at two week, six weeks, three months, and six months (p = 0.139, 0.777, 0.918, and 0.948 respectively), but there were no significant difference 3. The rate of any breastfeeding six weeks was also higher in postnatal support group compared with women who received routine care (p = 0.008)	***Included*** Reason: Met all of these inclusion criteria which are: 1) Using randomised controlled trial or intervention study 2) Investigated the effectiveness of group-based antenatal breastfeeding education 3) Pregnant women were recruited 4) Measured the duration of breastfeeding

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
20	Evaluating effects of a prenatal breastfeeding education program on women with caesarean delivery in Taiwan (Shi, Zhang et al. 2008)	***Design*** Non-randomised intervention study ***Aim*** 1) To evaluate the effectiveness of a prenatal breastfeeding education program for primiparous women who have elected caesarean section as a model of delivery and 2) To evaluate its effectiveness for encouraging a positive attitude to breastfeeding and rooming-in and to increase exclusive breastfeeding rates within hospital and at one month postpartum	Primiparous women at 36-39 weeks who had chosen to deliver by caesarean section. (Control group = 46 subjects and the experimental group = 54 subjects)	The subjects of the experimental group exhibited a more positive breastfeeding attitude (p < 0 .001): 1) a higher 24 hours rooming-in rate (p < .001) and a higher exclusive breastfeeding rate (p = 0.004) during hospital stays 2) A higher exclusive breastfeeding rate (p < 0.001) for the one month postpartum period.	**Excluded** Reason: • Did not randomly recruit all pregnant women • The study recruited different participants who had chosen caesarean delivery.
21	Prenatal breastfeeding education and breastfeeding outcomes (Rosen, Krueger et al. 2008)	***Design*** Retrospective cohort design with patients attending a breastfeeding education class ***Aim*** To examine the impact of various breastfeeding outcomes of three cohorts receiving different methods of prenatal breastfeeding education	194 pregnant women (the new mothers' group = 59, the one-time teaching group = 75, the control group = 60)	Differences in breastfeeding initiation rates among the experimental groups and control group were not statistically significant (p = 0.27) Women who attended prenatal breastfeeding classes had significantly increased breastfeeding at 6 months when compared to controls (p = 0.01)	**Excluded** Reason: Different study design (used secondary data)

Summary table of articles (continued)

No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
22	Effective Antenatal education: Strategies recommended by expectant and new parents (Svensson, Barclay et al. 2008)	***Design*** A longitudinal, mixed-methods; to gain data from first-time expectant and new parents (In-depth interviews, focus groups, surveys, and participant observation) ***Aim*** To gain data from first-time expectant and new parents	251 women and 251 male partners	The majority of expectant and new parents who participated in this research stated that if antenatal education is to be effective, it must be broadened from the current situation that is from programs provided only in the final weeks of pregnancy They clearly stated that ‘‘one size does not fit all,’’ and they recommended a range of ‘‘programs’’ that they believed should be offered by a hospital, or such organization, during the child bearing year	**Excluded** Reason: Not randomised controlled trail or cohort study design

Summary table of articles (continued)

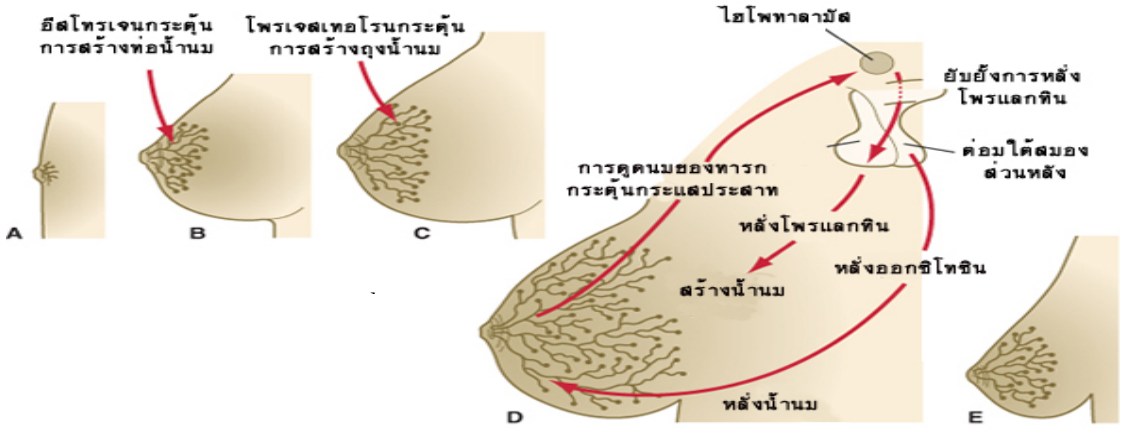
No	Title (Author)	Study design / Study aim	Sample size	Key finding	Include/exclude
23	Effectiveness of policy to provide breastfeeding groups (BIG) for pregnant and breastfeeding mothers in primary care: Cluster randomised controlled trial (Hoddinott, Britten et al. 2009)	***Design*** Cluster Randomised Controlled Trial ***Aim*** To assess the clinical effectiveness and cost effectiveness of a policy to provide breastfeeding groups for pregnant and breastfeeding women.	All babies born in 14 health boards in Scotland (Participants: Pregnant women, breastfeeding mothers, and babies)	No significant differences in breastfeeding outcomes were found. Any breastfeeding at six-eight weeks declined from 27% to 26% in intervention localities and increased from 29% to 30% in control localities ($p = 0.08$, adjusted for pre-trial rate). Any breastfeeding at six-eight weeks increased from 38% to 39% in localities not participating in the trial. Women who attended breastfeeding groups were older ($p < 0.001$) than women initiating breastfeeding who did not attend and had higher income ($p = 0.02$) than women in the control localities who attended postnatal groups.	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives
24	Antenatal peer support workers and initiation of breast feeding (MacArthur, Jolly et al. 2009)	***Design*** Cluster Randomised Controlled Trial ***Aim*** To assess the effectiveness of an antenatal service using community based breastfeeding peer support workers on initiation of breastfeeding	66 antenatal clinics with 2,511 pregnant women (Intervention group; the peer support worker service = 33 clinics including 1,140 women) (Control group = 33 clinics including 1,371 women)	Data on initiation of breastfeeding were obtained for 2398 of 2511 (95.5%) women (1083/1140 intervention and 1315/1371 controls). The groups did not differ for initiation of breast feeding: 69.0% (747/1083) in the intervention group and 68.1% (896/1315) in the control groups; cluster adjusted odds ratio 1.11 (95% CI 0.87 to 1.43).	**Excluded** Reason: • Did not investigate the effectiveness of antenatal breastfeeding education in increasing breastfeeding rates delivered by midwives

APPENDIX W: ANTENATAL BREASTFEEDING EDUCATION INTERVENTION: CLASS 1 – “QUESTION CARDS”

โครงการวิจัย

“ประสิทธิผลของโปรแกรมการส่งเสริมการเลี้ยงลูกด้วยนมแม่แก่หญิงมีครรภ์เพื่อเพิ่มอัตราการเลี้ยงลูกด้วยนมแม่ในระยะ 6 เดือนแรกหลังคลอด, งานวิจัยแบบสุ่มตัวอย่างเปรียบเทียบ”กิจกรรมในชั้นเรียน ครั้งที่ 1

บัตรคำถาม



เมื่อไรจึงจะเริ่มมีน้ำนม (When do I have breastmilk?)

ควรให้ลูกดูดนมแม่บ่อย และนานแค่ไหน (How often should I feed my baby and how long?)

โครงการวิจัย

"ประสิทธิผลของโปรแกรมการส่งเสริมการเลี้ยงลูกด้วยนมแม่แก่หญิงมีครรภ์เพื่อเพิ่มอัตราการเลี้ยงลูกด้วยนมแม่ในระยะ 6 เดือนแรกหลังคลอด,
งานวิจัยแบบสุ่มตัวอย่างเปรียบเทียบ"กิจกรรมในชั้นเรียน ครั้งที่ 1

บัตรคำถาม

ต้องให้นมชงเสริมหรือเปล่า (Is formula necessary?)

รู้ได้อย่างไรว่าลูกได้รับนมพอเพียง (How do I know my baby receive enough milk?)

Antenatal breastfeeding education intervention: Class 1 – "Question cards" (cont.)

โครงการวิจัย

"ประสิทธิผลของโปรแกรมการส่งเสริมการเลี้ยงลูกด้วยนมแม่แก่หญิงมีครรภ์เพื่อเพิ่มอัตราการเลี้ยงลูกด้วยนมแม่ในระยะ 6 เดือนแรกหลังคลอด, งานวิจัยแบบสุ่มตัวอย่างเปรียบเทียบ"กิจกรรมในชั้นเรียน ครั้งที่ 1

บัตรคำถาม

ลูกควรเริ่มได้อาหารเสริมเมื่อไร (When is the best time to start on baby food supplements?)

ควรให้ลูกหย่านมแม่เมื่อใดดี (When should I cease breastfeeding?)

โครงการวิจัย

"ประสิทธิผลของโปรแกรมการส่งเสริมการเลี้ยงลูกด้วยนมแม่แก่หญิงมีครรภ์เพื่อเพิ่มอัตราการเลี้ยงลูกด้วยนมแม่ในระยะ 6 เดือนแรกหลังคลอด,
งานวิจัยแบบสุ่มตัวอย่างเปรียบเทียบ"กิจกรรมในชั้นเรียน ครั้งที่ 1

บัตรคำถาม

ควรหลีกเลี่ยงอาหารอะไรขณะให้นมลูก

(What kind of food should I avoid while I am breastfeeding?)

หากแม่ต้องกินยา จะมีผลต่อลูกไหม

(Taking medications while breastfeeding ! Will it harm my baby?)

APPENDIX X: BREASTFEEDING INTERVENTION: CLASS 2 – WOMAN COMMITMENTS CARD

Woman's self commitments to breastfeeding

Class 2

แม่วางแผนให้หนูกินนมแม่ แล้วนะคะ

- ลูกแม่ได้ดูดนมแม่ภายใน 30 นาทีแรกหลังคลอด (ไม่นานเกิน 1 ชั่วโมง)
- แม่ให้หนูได้นมแม่อย่างเดียว ไม่ได้ให้หนูดื่มน้ำเลยนะคะ ใน 6 เดือนแรก เพราะนมแม่มีน้ำมากพอแล้วค่ะ ประมาณร้อยละ 83 แน่ะ
- เมื่อหนูอายุ 6 เดือน แม่ให้จะอาหารเสริม ตามด้วยการกินนมแม่เป็นอาหารหลักจนหนูอายุ 1 ขวบ และจะให้หนูกินนมแม่ต่อไปนานที่สุด จนหนูโตวิ่งได้ และเลิกไปเอง
- จาก 1 ขวบ แม่จะให้หนูกินนมแม่เป็นอาหารเสริม จนอายุ 2 ขวบ และกินต่อไปเรื่อยๆ จนหนูเลิกไปเอง เพราะนมแม่ยังมีประโยชน์มากกว่านมอื่นใด เหมือนเดิมไม่เคยเปลี่ยนแปลง
- แม่จะบีบน้ำนมเก็บสะสมไว้นะคะ เพื่อให้หนูกินในวันที่แม่ต้องทำงาน หรือไปธุระ แม่จะเตรียมนมแม่ใส่ขวดหรือแก้วไว้ หนูเลือกดื่มตามถนัดนะคะ ... เราแม่ลูกเจอกันเมื่อไหร่มาดูดเต้าทันที

<u>สัญญาของแม่</u>

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