

A longitudinal evaluation of Kangaroo Care for preterm infants in Thailand

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Summary

The percentage of premature births is increasing worldwide (Hoyert, Mathews, Menacker, Strobino & Guyer 2006). In terms of statistics for preterm births in Government hospitals in Thailand between 1999–2004, the first and second largest numbers of live preterm births were at Nakhon-Si-Thammarat (the study site) and Songkla respectively (Health Information Unit, Bureau of Health Policy and Strategy 2004). The number of preterm births in Thai Government hospitals increased from 89,569 in 2003 to 91,722 in 2004 (Health Information Unit, Bureau of Health Policy and Strategy 2004), which may have been due partly to the fact that in developing countries, financial and human resources for neonatal care are limited and hospital wards for Low Birth Weight (LBW) infants are often overcrowded (Conde-Agudelo, Diaz-Rossello & Belizan 2003). The most recently reported rate of neonatal abandonment in Thailand ranges from 20–25 infants per day (Thai Government 2010). This occurs mainly in the hospital situation. At the study site, the Maharat Hospital, there were 5–10 preterm abandonments per month in 2008 and 2009 (Kongsuk and Committee on the Information Centre, Maharat Hospital 2010). Researchers have suggested that preterm infants are at increased risk of abandonment, abuse, and neglect related partially to maternal separation in the early stages after birth (Dodd 2005), which is known to affect children’s growth and development (Kennell & Klaus 1998).

This thesis reports research involving mothers and preterm infants from Thailand and Kangaroo Care (KC), an experimental intervention aimed at increasing mothers’ bonding with their infants. The research aimed to discover whether Kangaroo Care

could increase mothers' bonding with, and their responsibility towards their preterm infants. The research is long-term and based in Thailand for Thai people. Data was collected in Thailand in Thai language.

The objective of this research was to evaluate the 18-item Kangaroo Care protocol used in this study, and to show that Kangaroo Care can promote breastfeeding in preterm infants (and therefore increase mother-infant bonding) and should be introduced as part of the Baby Friendly Hospital Initiative policy for preterm infants in all hospitals in Thailand. Despite the Thai Government implementing a Baby Friendly Hospital Initiative for birthing, part of which is the aim to increase breastfeeding as part of overall improved Child Health Care in this developing country, there is still much neglect for preterm infants from their mothers in Thai hospitals.

The participants in this study comprised 36 mothers and preterm infants admitted to Maharat Hospital, in Nakhon-Si-Thammarat, a southern province in Thailand. Participants were randomly allocated to either an intervention (Kangaroo Care) or non-intervention group—there were 18 participants in each group. All mothers gave their standard care to their preterm infant but mothers in the Kangaroo Care group followed the additional Kangaroo Care protocol. All mothers in the study were given a total of four questionnaires at Day 1: one described their socio-demographic details; one described their preterm infant's demographic details; and two assessed bonding between mother and preterm infant (Mother Infant Bonding Questionnaire [MIBQ], self-administered by the mothers and Bonding Observation Check List [BOCL], administered by the researcher). The researcher then visited the mothers in their homes at Weeks 4, 12, and 24 in order to observe them with their infants, at

which time the mothers again completed the MIBQ and the researcher completed the BOCL to assess mother-infant bonding behaviour. Statistical analysis was used to analyse this data.

The mothers were similar demographically but the infants' demographic data showed a statistically significant difference for both the Apgar score at one and five minutes, and the hours per day spent by mothers with their infant in Nursery 2. In terms of bonding scores, there was a statistically significant difference between the two groups in six subscales of the MIBQ. Comparative analysis showed significantly higher mean scores for mothers in Kangaroo Care group compared to mothers in the non-intervention group for the MIBQ and the BOCL from Day 1 to Week 24.

Taking external influences and limitations of the study into account, the results support the hypothesis that Kangaroo Care does improve infant-mother interaction and subsequent bonding. The results provide evidence to support the introduction of Kangaroo Care as a method of caring for preterm infants at Maharat Hospital, Nakhon-Si-Thammarat, Thailand. Consequent to this, a recommendation will be made to the Health Department and appropriate Ministries of Health in Thailand for the Kangaroo Care 18-item protocol to become part of the hospital policy.

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: Thidarat Eksirinimit

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Glossary of terms

The following definitions are used for the purposes of this research with preterm infants.

Apgar score

The Apgar score is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. The five criteria are **A**ppearance, **P**ulse, **G**rimace, **A**ctivity and **R**espiration (Committee on Fetus and Newborn 2006).

Baby Friendly Hospital Initiative (BFHI)

Baby Friendly Hospital Initiative aims to encourage health care practices that support breastfeeding.

(Bonding) Maternal feelings and maternal-infant interaction

Maternal feelings are defined as affectionate emotions of a mother toward her infant. Maternal-infant interaction is defined as the action of a mother with her infant. Maternal feelings and maternal-infant interaction are possible indicators of maternal-infant bonding (Klaus & Kennell 1976).

Breastfeeding

Breastfeeding is defined as a combination of the exclusiveness of breastfeeding and infant weight, which indicates the growth of the breastfed infant. Sufficiency of milk supply is defined as the mothers' perception of the adequacy of their breast milk for their infant (Hill & Humenick 1989, 1996). Infant weight is defined as the number of grams of a nude infant after birth (Anderson, Anderson & Glanze 1994).

Kangaroo Care

Kangaroo Care (KC) is begun in the proposed study at one hour or slightly more post birth. Kangaroo Care is a method in which an infant wearing a diaper and sometimes a cap lies skin-to-skin in an upright and prone position between the mother's breasts, allowing for self-regulatory access to breastfeeding. The infant also can be covered with a blanket across the back if needed to maintain adequate warmth. The mother wears clothing with front access, such as a front buttoning shirt or dress or a hospital gown/robe (Gale & VandenBerg 1998).

Preterm infant

Infants born before 37 weeks gestation. There are three recognised categories: **moderate** prematurity is a birth between 35–37 weeks, **very** premature births occur between 29–34 weeks and **extreme** prematurity is a birth between 24–28 weeks (Mifflin 2003).

Primigravidarum

Women who are pregnant for the first time.

Chapter 1: Introduction

1.1 Introduction

This chapter begins by stating the focus of the study, then provides the background to the study followed by the specific aims and intended outcome. The background to the study takes into account the researcher's experiences in Thai hospitals, World Health Organization and Thai Government policies on mothers and infants, relevant Thai culture, and current statistics related to morbidity and mortality in preterm infants in Thailand. The chapter also describes the routine nursing care of preterm infants and their mothers in Thailand, and Kangaroo Care, the intervention being investigated in the study.

Despite extensive documentation of research into the care of infants who are born before 37 weeks' gestation in Western countries, this is not well researched or reported in Thailand. Therefore, this thesis seeks to address this gap in the research by reporting a study focusing on care of infants born between 32–37 weeks' gestation in Thailand; a gestational age range that fits within Mifflin's (2003) definition of 'preterm birth'—any infant born before 37 weeks' gestation. Specifically, the age range encompasses Mifflin's (2003, p. 13) “moderate prematurity” (“a birth between 35–37 weeks”) and “very premature” (birth “occurs between 29–34 weeks”) categories of preterm birth, but excludes the “extremely premature” range in which birth occurs “between 24–28 weeks”. The study aimed to use ‘Kangaroo Care’ (see sections 1.2.7–1.2.9 for a full description of Kangaroo Care) as a care intervention with preterm infants and their mothers to evaluate its effect on maternal-infant bonding and breastfeeding rates, and its possible

introduction as a consistent intervention across hospitals in Thailand as part of the United Nations Children’s Fund/World Health Organization (UNICEF/WHO 2006) ‘Baby Friendly Hospital Initiative’ (BFHI). The specific research aims and intended outcome are presented after the background information, which provides the justification for the study.

1.2 Background to the study

As a Registered Nurse and Midwife with more than 10 years’ working experience in a Newborn Intensive Care Unit (NICU) in Songklanakarind Hospital, Hatyai Hospital and Maharat Hospital in Thailand, the researcher noticed a rising occurrence of preterm births. Statistically, the number of preterm births in Thailand increased from 89,569 in 2003 to 91,722 in 2004 (Health Information Unit, Bureau of Health Policy and Strategy 2004). It is possible this increase has led to a corresponding increase in a lack of maternal bonding because preterm infants are known to be at a higher risk of suffering from lack of maternal bonding (Wong 2003).

In terms of preterm infants’ mothers, the researcher’s background experience is that some mothers are reluctant to handle their preterm infants. Furthermore, mothers of preterm infants cannot always share the early postpartum bonding period because of mother-infant separation. These mothers may experience a significantly higher incidence of psychological distress during the postpartum period than those who are not separated from their infants; they may also feel less confident in the parenting role (Mifflin 2003). All of these factors—separation, psychological distress and lack of confidence—are known to affect the way mothers bond with their infants (Feldman, Eidelman, Sirota & Weller 2002a). In Thailand, some mothers do not

bond with their preterm infants because their infants are either the result of an unwanted pregnancy and/or the pregnancy is not planned. Lack of bonding, the effects of which persist throughout a child's development, may contribute to child abuse and neglect (Center for the Study of Social Policy 2003). The infant may develop behavioural and/or intellectual impairments as a child, or may be abandoned at a very young age (Ministry of Social Development and Human Security 2006). Thus, bonding is an important health concern.

The Thai Government aims to improve child health care and has implemented a 'Baby Friendly Hospital Initiative (BFHI)' that supports early maternal attachment to the infant and the establishment of breastfeeding. However, the latest available data shows that in 2006 there were still high levels of neglect of preterm infants by mothers in Thai hospitals (Ministry of Social Development and Human Security 2006). Therefore, the researcher identified a need for studying ways of improving the bonding between mothers and their preterm infants in Thailand.

In recent years, the rate of preterm births has increased throughout the world (Hoyert *et al.* 2006). Thailand is no exception, as evidenced by the statistics mentioned above (Health Information Unit, Bureau of Health Policy and Strategy 2004). Furthermore, according to the most recently available data, neonatal causes amounted to 45 percent of the distribution of causes of death among children under five years of age in Thailand for the years 2000–2003. Preterm births accounted for 33 percent of the annual estimated proportion of deaths by cause for neonates (World Health Organization 2006). Therefore, doctors and nurses must be concerned about how to take care of mothers and preterm infants effectively.

Maternal feelings, maternal-infant interaction, bonding and breastfeeding are very important for humans and are areas of concern in maternal-child nursing. Although the health care system uses advanced technology and expert staff, preterm births lead to many physiological and/or psychological problems. They are one of the largest contributors to mortality in the neonatal period and infancy, and to morbidity in later life (Lee, Steer & Filippi 2006). Preterm infants also have an increased risk of health problems involving the nervous system, respiratory system, digestive system and cardio-vascular system, as well as intellectual disability and behavioural problems (Mifflin 2003; Petrou *et al.* 2003). It has been found that those preterm infants separated from mothers immediately after birth may suffer from a lack of maternal feelings and maternal-infant interaction (Wong 2003). In addition, preterm infants are very fragile; their care demands expensive infrastructure and highly skilled staff. These physical, social and emotional aspects are known to have a significant impact on families; they often result in very disruptive experiences (Ruiz-Peláez, Charpak & Cuervo 2004).

In Thailand, the mother who delivers a preterm infant cannot share the early postpartum bonding period because of separation from her infant. Separation may be due to the need for resuscitation and/or other health issues such as birth asphyxia, respiratory distress, hypoglycaemia or congenital heart disease. It is reported that mothers of preterm infants experience a significantly higher incidence of psychological distress than other mothers during the neonatal period (Tilokskulchai, Phatthanasiriwethin, Vichitsukon & Serisathien 2002). These women feel less confident in the parenting role because they must cope with an infant who is more difficult to care for due to prematurity and/or illness (Tilokskulchai *et al.* 2002). The infant's small size and physical characteristics may also influence maternal

behaviours (Tilokskulchai *et al.* 2002), suggesting that attachment between the mother and infant may be affected.

Birth is a special time for parents; if parents can touch, hold and/or stroke their infant, they feel fulfilled and satisfied with being close to him/her (Leonard & Mayers 2008). Almost twenty years ago, Zabielski (1994) recounted that mothers of preterm infants in the United States of America (USA) suggested poor contact as the reason they did not feel like mothers until they had a chance to hold their infant or interact with it. Thus, separation is seen as an important factor inhibiting the attachment process.

The separation of mother and infant immediately after birth may compromise bonding; maternal feelings and maternal-infant interaction are disrupted. Many early researchers have reported that, in both animals and humans, a short period of separation immediately after delivery impairs maternal feelings, maternal-infant interaction and mothers' later behaviours toward their children (Ali & Lowry 1981; Johnson 2005; Kennell & Klaus 1998). It was found that infants died or developed psychosocial problems later in life if they did not receive emotional attention, physical contact or affection (Lozoff, Brittenham, Trause, Kennell & Klaus 1977). Maternal affectionate behaviour was found to be significantly less common among mothers who had restricted early contact with their infants (Anisfeld & Lipper 1983). The earlier study of Sugar (1976) reported that full-term infants were less likely to be "battered" than preterm infants; a finding related to the absence of input from infant to mother due to the mother's ambivalence towards her infant and late attachment. More recently, interactions between mothers with preterm infants were found to be less mutually satisfying and developmentally appropriate than those between mothers

and full-term infants (Muller-Nix *et al.* 2004). Furthermore, Wilson and Widom (2009) found that the parent-child relationship promotes the child's social-emotional and behavioural development. Several researchers suggest that separating mothers from their infants following birth affects the children's growth and development, and can lead to an increase in subsequent risk of child abuse and neglect (Dodd 2005; Kennell & Klaus 1998; Sugar 1976; Wilson & Widom 2009). In particular, preterm infants are at increased risk of abandonment, abuse and neglect, which may be partially related to maternal separation in the early stages after birth (Dodd 2005).

Early research on attachment theory and the seminal work of Klaus and Kennell (1976) are central to understanding the phenomenon of attachment. The birth of a preterm infant is generally unexpected and always emotionally traumatic for mothers who had expected a normal birth experience and a healthy full-term infant (Tilokskulchai *et al.* 2002). Mothers of preterm infants often have delayed initial interaction with their infants. When they finally make contact they may have difficulty developing feelings of attachment. These mothers may also receive fewer positive responses from their tiny infants than mothers of full-term infants (Gorrie, Mckinney & Murray 1994; Singer *et al.* 2003).

1.2.1 Preterm birth in developing and developed countries

The high prevalence of preterm births is an important concern for public health in both developed and developing countries (Tucker & McGuire 2005). According to estimates for 2000–2003, preterm birth is the greatest single cause of neonatal deaths not associated with birth defects, accounting for 45 percent of all neonatal mortality (World Health Organization 2005). Neonatal mortality is defined as the number of deaths during the first 28 completed days of life per 1,000 live births in a given year

or period (World Health Organization 2011). Infant mortality is defined as the probability of dying between birth and exactly one year of age, expressed per 1,000 live births. Neonatal mortality accounts for 70 percent of infant mortality worldwide, while infanticide, child abuse, child abandonment and neglect also contribute to infant mortality (Population Reference Bureau 2008).

The most recent data available at the time of this study reported 8.1 million infant deaths globally in 1993, with almost half (3.9 million or 48%) being neonatal deaths and almost-two thirds (2.8 million) occurring within one week of birth. The deaths of many infants after the first week were also due to perinatal causes (World Health Organization 1996). A later World Health Organization publication (2009) found that almost 20 percent of all deaths are in children under five years of age, and the maximum rate of neonatal mortality was 66 per 1,000 live births in 2004.

Preterm birth is currently the most urgent maternal-child health problem in the USA. Statistics of preterm births in the USA (Martin 2008) indicate a 36 percent increase from the early 1980s until 2008. Between 1981 and 1990, the percentage of preterm births in the USA increased from 9.4 to 10.6. It increased again to 12.5 percent between 1990 and 2004, with one in eight infants born prematurely in 2003 (Brown 2003). By 2008, 12.8 percent of babies (more than half a million a year) were being born prematurely in the USA (Martin 2008).

The burden of morbidity and mortality related to pregnancy and childbirth, however, remains concentrated in developing countries (Global Health Council 2002). While the latest available data shows that the preterm birth rate in South East Asia (Indonesia, Malaysia, the Philippines and Thailand) ranged from 6–15 percent in 2005 (The SEA-ORCHID Study Group 2008), statistical data on health in Thailand

(2002–2004) shows an increase in the infant mortality rate (infants under one year of age) per 1,000 live births from 6.5 in 2002 to 7.2 in 2003, with a further increase to 7.5 in 2004 (Committee on the Rights of the Child 2006). In terms of statistics for preterm births in Government hospitals in Thailand between 1999–2004, the first and second largest numbers of live preterm births were at Nakhon-Si-Thammarat (the study site) and Songkla respectively (Health Information Unit, Bureau of Health Policy and Strategy 2004). The number of preterm births in Thai Government hospitals increased from 89,569 in 2003 to 91,722 in 2004 (Health Information Unit, Bureau of Health Policy and Strategy 2004), which may have been due partly to the fact that in developing countries, financial and human resources for neonatal care are limited and hospital wards for low birth weight infants are often overcrowded (Conde-Agudelo *et al.* 2003). Thus, interventions for low birth weight and preterm infants that reduce neonatal morbidity and mortality, and associated costs, are an important advancement in care.

One intervention that may help reduce the infant morbidity and mortality rates for preterm infants is Kangaroo Care, or skin-to-skin contact, which may promote beneficial mother-infant interaction patterns resulting in better care of the infants (Feldman 2004). Close contact is known to increase the mother's familiarity with the infant and her improved mood may increase maternal investment in the infant. The development of the mother-infant relationship relies on the mother's gradual learning about the infant and his/her special interactive signals; knowledge that mothers typically acquire during moments of physical intimacy (Feldman 2004).

1.2.1.1 Infant abandonment

A high rate of infant abandonment has been a significant problem in Thailand for

many centuries. It continues to pose large social and economic problems. The most recently reported rate of neonatal abandonment in Thailand ranges from 20–25 infants per day (Thai Government 2010). This occurs mainly in the hospital situation. At the study site, the Maharat Hospital, there were 5–10 preterm abandonments per month in 2008 and 2009 (Kongsuk & Committee on the Information Centre, Maharat Hospital 2010). Studies have shown that abandoned infants are at increased risk for failure to thrive (Black *et al.* 2006; Johnson, Banghan & Liyao 1998), developmental delay (Brown & Schormans 2003; Halfon, Mendonca & Berkowitz 1995), poorer IQ scores (Depanfilis 2006), and severe psychological disturbance and child abuse (Lvoff, Lvoff & Klaus 2000).

Infant abandonment is not only an issue in Thailand. In New Jersey, USA, 80 percent of children who die as a result of abuse or neglect are aged six years or less, and 66 percent of children suffering near fatal neglect or injuries are infants under six months of age (The New Jersey Child Fatality and Near Fatality Review Board 2009).

Several reports have shown, however, that establishing early mother-infant contact may reduce maternal inadequacy and the rate of infant abandonment (Brown & Schormans 2003; Buranasin 1991; Depanfilis 2006; Klaus, Kennell & Klaus 1995; Lvoff *et al.* 2000; O'Connor, Vietze, Sherrod, Sandler & Altemeier 1980; Wilson & Widom 2009).

1.2.2 World Health Organization (WHO) and health policies in Thailand

Health policy and strategy includes public health policy. Formulating a good health policy and strategy system requires emphasis on the participation of all sectors to empower individuals, families, community and society, and to reduce social

inequalities and injustice.

The Thai Government and the World Health Organization (WHO) have had a long-term collaboration in striving to improve health care for the Thai people. In response to the World Health Organization's policy of 'Health for All' by the Year 2000, the Thai Government specified that public health care and primary health care should be the foundation of health care delivery (York, Bhuttarowas & Brown 1999). The growth of professional nursing and improved public health awareness in Thailand had contributed to decreased maternal and infant mortality in the decade 1981–1991 (York *et al.* 1999).

In March 1996, an important political and administrative change took place in Thailand's health policy with the decentralisation of authority to 2,760 local Tambon (sub-district) Administrative Organisations, along with delegation of financial authority. During these organisational reforms, the Thai Government health policy continued to emphasise extending service coverage to the whole population to respond more efficiently to people's needs. In terms of Millennium Development Goal 4 (MDG-4; reducing child mortality by two thirds between 1990 and 2015), based on the premise that neonatal mortality rates provide a useful indicator of overall maternal and infant health, and the care that mothers and infants receive (World Health Organization 2009), it is clear that this still represents a great challenge for Thailand.

In view of the already low baseline of 12.8 child deaths per 1,000 live births in 1990, it was argued that the targeted 4.3 per 1,000 live births by 2015 would be difficult to achieve (Rukumnuaykit 2006). According to the official Thailand Report on Millennium Development Goals 2004 (National Economic and Social Development

Board, United Nations and World Bank, 2004), this MDG target may not be applicable to Thailand. Instead, the Government has defined more specific goals for the country to reduce child mortality by half between 2005-2015 in highland areas, selected northern provinces and the southernmost provinces, and to reduce the infant mortality rate to 15 per 1,000 live births by 2006 (Rukumnuaykit 2006). The problems of geographic mal-distribution of physicians and nurses in Thailand are similar to those found in the USA, where health care resources are concentrated in and around the major population centres. In Thailand, physicians practise primarily in district clinics and hospitals, while nurses practise in sub-district health clinics as well as these health care facilities. In 1999, York *et al.* (p. 148) stated that:

The infrastructure of the health care delivery system in Thailand is administered at the national level through the Ministry of Public Health. Health policy and practice are implemented via a system of provincial health officers, district health officers, and sub-district health officers.

This is still the system in Thailand today. While sub-district health clinics are easily accessible at the local level, they provide limited medical health care delivery in rural facilities. It is mandated that each sub-district be staffed with at least one nurse-midwife to provide maternal infant care. However, a shortage of nurses and nurse-midwives, leading to the lack of access to health care in rural areas, means this does not happen. Instead, traditional birth attendants continue to perform much of the maternal and infant care. Traditional birth attendants do not have any formal health education and they learn their trade from other women who have fulfilled similar roles in village life. Recognising this situation, the Ministry of Public Health in Thailand now offers a program to train traditional birth attendants more formally in aseptic techniques, basic medical knowledge and Western childbirth techniques. However, the training is not compulsory.

The Ministry of Public Health in Thailand has placed responsibility for infants' health directly on childbearing women (Country Health Profile Thailand 2006) rather than recognising the essential role that government and society in general must play in ensuring the health of all infants and mothers.

The Committee on the Rights of the Child (2006) report that the Ministry of Public Health had established crisis centres for children and women in hospitals, providing a one-stop service through a multidisciplinary approach. This was a result of the 'Health Thailand' plan, under which Thailand adopted a policy in 2005 to establish centres in 120 public hospitals throughout the country to provide assistance to children and women who were victims of abuse (Committee on the Rights of the Child 2006). For example, Hotlines and Call Centres attached to Narentorn Emergency Medical Centre were established with the intention of providing multiple services such as counselling, welfare assistance, treatment, home visits, legal assistance, sheltering and occupational training (Committee on the Rights of the Child 2006).

The Ministry of Public Health also adopted a policy to promote exclusive breastfeeding for a minimum period of six months through "exclusive breastfeeding" campaigns in hospitals and health centres, setting a goal of 30 percent of mothers breastfeeding (Committee on the Rights of the Child 2006). The 'National Master Plan of Operation' to implement "A World Fit for Children" set a goal of 40 percent of all mothers breastfeeding exclusively for the first six months after their infant's birth by the year 2014 (Committee on the Rights of the Child 2006). The committee reported that issues affecting children, which Thailand considered to be priorities, required the most urgent attention with regard to implementation of the convention.

The Thai Government has recently collected national data for the purpose of developing the country's 'National Policy and Action Plan' for children for the period 2005–2014, based on the approach suggested in the United Nation's agreed outcome document "A World Fit for Children (WFFC)" (Committee on the Rights of the Child 2006). As a result, in addition to the four areas highlighted in 'WFFC', which include health, education, protection and HIV/AIDS, the Thai Government has identified seven other areas that also deserve priority attention. These are:

1. Family strengthening.
2. Recreation.
3. Children's participation.
4. Media.
5. Culture and religion.
6. Safety and injuries in children.
7. Laws, regulations and administrative measures related to Children.

For each of these issues, the Government has identified both immediate and long-term measures that need to be implemented (Committee on the Rights of the Child 2006).

1.2.3 Cultural beliefs and professional staff in Thailand

It is well established that breastfeeding has positive health benefits for both mothers and infants. However, the decision to breastfeed may be influenced by cultural beliefs, and attitudes of family and health professionals. Some mothers may require support to establish and maintain breastfeeding.

The issue of professional staff influences on breastfeeding has been debated over

many years. It is known that health professionals influence mothers' infant feeding decisions (Chezem, Friesen & Clark 2001), and that education and personal experience have been found to influence midwives' attitudes and behaviours in promoting breastfeeding (Chezem *et al.* 2001; Patton, Beaman, Csar & Lewinski 1996). Thus, it is imperative that health professionals have appropriate knowledge to help women breastfeed (Kaewsarn, Moyle & Creedy 2003). Implementing best practice in the healthcare system is an important part of any program to promote breastfeeding, as it will help ensure that the health services are able to support mothers who choose to breastfeed (Hangchaovanich & Voramongkol 2006).

Thailand is both a conservative and a modern country. Abortion is illegal except in cases of rape or when the woman has been exposed to chemicals that could cause birth deformities. Nevertheless, every year 300,000 Thai women have illegal abortions (Country Health Profile Thailand 2006). On the other hand, strong cultural beliefs about abortion mean that many women give birth each year to unwanted infants, which leads to decreased breastfeeding and mother-infant bonding.

In Thailand, nursing students must learn how to take care of pregnant women as part of their overall four-year nursing degree, after which they are qualified for the position of 'Registered Nurse and Midwife'¹; being a midwife is not a separate profession. Kaewsarn, *et al.* (2003) reported that Thai nurses' cultural beliefs about breastfeeding and postpartum practices are significant determinants of health care behaviours, and that these health care professionals have an important influence on infant feeding decisions and maternal postpartum care.

The results of Kaewsarn *et al.*'s (2003) research showed that only 50 percent of

¹ This position will be referred to as 'nurse' from this point onwards.

midwives encouraged mothers to breastfeed immediately following birth. Moreover, they identified a need for professional development strategies, such as peer review, to address some health professionals' inadequate knowledge and out-dated practices, as well as continuity of care models to assess quality care outcomes that are culturally appropriate (Kaewsarn *et al.* 2003).

Kaewsarn *et al.* (2003) found that nurses provided support to breastfeeding women, with 197 (53%) reporting that they encouraged women who had a spontaneous vaginal birth to attach infants to the breast immediately after birth, and 68 (18.3%) encouraging women to do so as soon as they “recovered” (Kaewsarn *et al.* 2003). About 59 nurses (15.9%) provided positive encouragement to mothers to breastfeed after the infant had been checked (Kaewsarn *et al.* 2003), with only five (1.3%) reporting that they did not encourage breastfeeding in the delivery room, and 43 (11.6%) reporting that they provided encouragement at other times (Kaewsarn *et al.* 2003). Only 39 percent (n=145) of nurses encouraged breastfeeding immediately postpartum for women who had an instrument-assisted delivery, 50 percent (n=186) for caesarean section with epidural, and 6.2 percent (n=23) for caesarean section. Others reported that mothers were “very weak” and needed “time for recovery”. Around half (n=212, 57%) reported that they encouraged breastfeeding as soon as mothers had recovered (Kaewsarn *et al.* 2003).

In order to establish breastfeeding, it is important for the mother to breastfeed the infant as soon as possible after birth (Lawrence & Lawrence 2005). As just described, Kaewsarn *et al.* (2003) found wide variability in the time of commencement of breastfeeding, with some nurses not encouraging feeding for up to 3 days and 57 percent reportedly encouraging mothers to breastfeed as soon as

possible after they had recovered from delivery. Henderson, Stamp and Pincombe (2001) showed that uninterrupted skin-to-skin contact between mother and infant until after the first breastfeed protects the infant's instinctive ability to breastfeed effectively, and facilitates women's confidence to feed and care for their infants. Thus, it is clear that an important part of the midwives' role in breastfeeding promotion is to ensure that the infant has its first breastfeed as soon as possible after birth (Kaewsarn *et al.* 2003).

While Kaewsarn *et al.* (2003) focused on nurses in Thailand, the ongoing global debate about health professionals' influence on mothers' infant feeding decisions looks at the influence of all health professionals. In the earlier literature, Burtlehaus, Smith, Sheps and Green (1997) showed that a mixture of health professionals (including doctors, midwives and community health nurses) influence infant feeding decisions. Vogel and Mitchell (1998) agreed, stating that some women, especially first-time mothers, complain of inadequate help with breastfeeding while they are in the hospital. Health professionals' attitudes may be ambiguous, inconsistent and occasionally harmful to the initiation of breastfeeding; they may provide inaccurate and confusing information to mothers about infant feeding (Wilmoth & Elder 1995). Unfortunately, some health professionals have been found to support formula feeding as the solution for any perceived breastfeeding complications (World Health Organization 1993). Health professionals' lack of knowledge may also inhibit changes to some hospital routines (Burtlehaus *et al.* 1997), while inadequate training in the practical aspects of lactation management may contribute to a lack of understanding of the needs of breastfeeding women (World Health Organization 1993). Lack of technical, evidence-based knowledge may, therefore, result in inaccurate information regarding breastfeeding, while a lack of technical assistance

may contribute to a sense of discouragement and failure in new breastfeeding mothers (Whelan & Lupton 1998).

The more recent literature iterates some of the issues raised in the earlier literature. Moran, Dykes, Burt and Shuck (2006), for example, identify a lack of support for, and inconsistent advice about, breastfeeding. They highlight the need for maternity/birthing units to consider how individual staff communicate information to women. It is also important to address how and when information on practical aspects of infant care is provided if women and their partners are to feel confident after the mothers' and infants' transfer home from hospital (Beake, Rose, Bick, Weavers & Wray 2010).

1.2.4 Baby Friendly Hospital Initiative (BFHI)

More than one million infants worldwide die every year because they are not breastfed or are given other foods too early. Millions more live in poor health, contract preventable diseases and battle malnutrition (UNICEF/WHO 2006). The 'Baby Friendly Hospital Initiative' (BFHI) is a global program sponsored by the World Health Organization and the United Nations Children's Fund (UNICEF) to encourage and recognise hospitals and birthing centres that offer an optimal level of care for infant feeding (UNICEF/WHO 2006). Thus, BFHI aims to encourage health care services and workers to promote and support breastfeeding and, where necessary, to enable practice and policy changes (Philipp, Merewood & O'Brien 2001). BFHI accreditation is a quality improvement measure. If a hospital achieves accreditation it demonstrates that it offers the highest standard of care to all mothers who breastfeed their infants. BFHI is also the global standard for assessing and accrediting hospitals. It is internationally recognised as a way to encourage mothers

to start and maintain breastfeeding. Moreover, a BFHI accredited hospital supports, respects and encourages a mother's informed choice of the method of infant feeding (UNICEF/WHO 2006).

Breast milk is known to be the best natural source of nutrition. Nowadays, the World Health Organization promotes breastfeeding for at least six months and complementary breastfeeding until two years of age. In Thailand, according to a report from the Department of Health, Ministry of Public Health (2009), there has been an increasing rate of exclusive breastfeeding in Thailand within the first six months of life. The rate was three percent in 1996 and rose to 16 percent in 2002. However, the rates mentioned above were still lower than the target of more than 30 percent assigned by the 'Ninth National Health Development Plan'.

1.2.4.1 Initiation and history

Since UNICEF and the World Health Organization launched the BFHI in 1991–1992, the initiative has grown to the point where more than 19,600 hospitals in 152 countries have been designated as BFHI over the last 15 years. During this time, a number of regional meetings offered guidance and provided opportunities for networking and feedback from dedicated professionals involved in implementing BFHI (UNICEF/WHO 2006).

1.2.4.2 Implementation of the BFHI

“Baby-Friendly” is a designation that a hospital or birthing facility receives if it demonstrates compliance with the standards and guidelines summarised as the ‘Ten Steps to Successful Breastfeeding, which are:

1. 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 the policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within 1 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: allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic. (Philipp *et al.* 2001, p. 585)

In the USA and the United Kingdom (UK), the BFHI has increased the rates of breastfeeding at birth and in the first six months of life (Broadfoot, Britten, Tappin & MacKenzie 2005; Philipp *et al.* 2001; Radford 2001).

1.2.4.3 Implementation of BFHI in Thailand

Thailand, mainly through the BFHI, has established a policy on promoting breastfeeding that follows the WHO/UNICEF's 'Ten Steps to Successful Breastfeeding'. In 1996, WHO/UNICEF declared that Thailand was the second most successful country after China in establishing the BFHI (Ministry of Public Health 1999). In 1997, 772 hospitals under the Ministry of Public Health, including provincial hospitals and one university hospital, were designated "BFHI". In the same year, three years after BFHI implementation, an evaluation of the sustainability of the 'Baby Friendly' hospitals was undertaken by the Centre for Breastfeeding Promotion, Mahidol University, and the Faculty of Public Health. They found the

program successful in initiating breastfeeding and promoting its prolonged practice. The impact was so positive that the mandatory implementation of BFHI in all hospitals, both public and private, was strongly recommended (Durongdej 1997). In 2005, there were 792 BFHI-accredited hospitals representing 98.4 percent of all government hospitals in Thailand (Department of Health, Ministry of Public Health 2005). At present, Thailand has achieved “Baby-Friendly” status for all of its government hospitals under the Ministry of Public Health.

The Committee on the National Statistical Office, Thailand (2009) reported that 16 percent of mothers who breastfed their infants exclusively lived in non-municipal areas and 12.2 percent lived in municipal areas. There were large inter-regional differentials, however, with 26.9 percent of women in the northeast practising exclusive breastfeeding, followed by 10.4 percent of women in the south and only 1.7 percent in Bangkok.

While improvements in breastfeeding initiation are due in large part to the BFHI (Naylor 2001), it appears that influences such as health staff and/or cultural beliefs, as discussed previously in Section 1.2.3, may affect breastfeeding duration. This warrants further investigation.

Despite the high level of BFHI accreditation in Thailand, there is evidence that some staff may implement practices that hinder breastfeeding, such as separating infants from mothers on delivery and providing bottles of water, glucose and formula in the early postpartum period (Vogel & Mitchell 1998). This apparent contradiction will be discussed in Chapter 6.

Furthermore, some hospital practices in Thailand, as in other countries, expose mothers to medical procedures and medications that may make it difficult for them to

establish lactation in the immediate postpartum period (Wilmoth & Elder 1995). This is also an issue in countries other than Thailand. Studies in developed countries have reported that obstetric procedures during delivery, including sedation during labour and delivery, induction of labour, routine use of intravenous infusions and routine episiotomy for primigravidarum mothers limit and interfere with the initiation of breastfeeding (Vogel & Mitchell 1998). Medical treatment and hospital procedures may create obstacles for mothers, generate anxiety, give misleading messages about the adequacy of their breast milk and undermine initiation of breastfeeding (Kaewsarn *et al.* 2003).

The BFHI addresses a major factor that has contributed to the erosion of breastfeeding, that is, health care practices that interfere with breastfeeding (Hangchaovanich & Voramongkol 2006). Implementing best practice in the health care system is an important part of any program to promote breastfeeding because it will help to ensure that the health services are able to support mothers who choose to breastfeed.

1.2.5 Breastfeeding in Thailand

The ‘National Breastfeeding Project’ in Thailand began in 1992. Its objective is the “empowerment of all women to breastfeed their children exclusively for the first 4–6 months and to continue breastfeeding with complementary food well into the second year and beyond” (Hangchaovanich & Voramongkol 2006, p. 173). The main activities planned to meet these goals were the promotion of the BFHI, legislation on maternity leave and the ‘Code of Marketing of Breast-milk Substitutes’ (Hangchaovanich & Voramongkol 2006). These activities have been implemented and will be expanded further.

A global public health recommendation is for infants to be exclusively breastfed for the first six months of life to achieve optimal growth, development and health (Hangchaovanich & Voramongkol 2006). The guideline on infant feeding in Thailand has been adapted accordingly. In 2003, the recommendation for exclusive breastfeeding was changed from 4–6 months to 6 months (Department of Health, Ministry of Public Health 2005) to make it consistent with the World Health Organization and UNICEF recommendations. As stated earlier, the Thai national target set by the ‘Ninth National Health Development Plan’ for exclusive breastfeeding at six months was 30 percent at the end of 2006 (Hangchaovanich & Voramongkol 2006). A 2005 survey found that exclusive breastfeeding at four months was 20.7 percent and at six months it was 14.5 percent, while predominant breastfeeding at four months was 26.5 percent (Hangchaovanich & Voramongkol 2006). Adding water while feeding the infant at any age has been widely practised in Thai society for generations (Hangchaovanich & Voramongkol 2006). It will take time to change this practice.

1.2.5.1 Other impacts on the success of breastfeeding in Thailand

Hangchaovanich and Voramongkol (2006) identified the influence on breastfeeding of several factors other than hospital practices associated with breastfeeding promotion. These factors include changing cultural customs, social support and business practices that discourage breastfeeding.

Adoption of the ‘Code of Marketing of Foods for Infants’ and the provision of maternity leave in Thailand are very important steps taken by the Thai Government to encourage mothers and infants to stay together for three months after delivery. Thai Government control over the Code aims to improve the quality of life of mothers and infants in Thailand.

Hangchaovanich and Voramongkol (2006) stated that the ‘Code of Marketing of Foods for Infants and Young Children and Related Products 1995’ had been developed from the 1981 version of the ‘Code of Marketing’. Both codes were intended to strengthen, support and promote the ‘Breastfeeding Project’ by means of the BFHI. Thailand is one of the member countries of UNICEF that accepted this measure through a voluntary agreement between the government and businesses producing and marketing infant foods and related products

The Code has ten important provisions (Hangchaovanich & Voramongkol 2006, p. 175):

1. No advertising or other forms of promotion to the public.
2. No free samples to mothers (direct or indirect).
3. No promotion of products within the healthcare facilities.
4. No company sales representatives to advise mothers.
5. Information and educational materials on infant feeding may only be provided upon government approval. All information to mothers, for instance on labels, must stress the benefits of breastfeeding and the costs and hazards of artificial feeding.
6. No gifts to health workers.
7. Product information for health professionals must be scientific and factual.
8. No pictures of infants or other pictures or text idealizing the use of infant formula on labels.
9. No promotion of unsuitable products, such as sweetened condensed milk as breast milk substitute.

10. Manufacturers and distributors are responsible for monitoring their marketing practices according to the principles and aims of the Code and to take steps to ensure that their conduct conforms at every level.

Healthcare facilities are the target of manufacturers' and distributors' product promotional material because distribution in these facilities is the most efficient avenue of reaching mothers (Department of Health, Ministry of Public Health 2004). Monitoring and evaluation of the Code conducted in 1995 and 2004 found extensive Code violations in Thailand and worldwide (Hangchaovanich & Voramongkol 2006).

The inclusion of maternity leave in Thailand was legislated for in 1993 (Levine 1997). In parallel with this readjustment in health legislation, promotion campaigns aimed at the general public have strengthened recognition of the importance of exclusive breastfeeding for 4–6 months and of breastfeeding for up to two years. Outside the health sector, the inclusion of maternity leave in Thai national law since 1993 has helped to create a supportive environment for breastfeeding. Under this legislation, mothers have the right to 90 days of paid leave. The government pays the whole salary during this period for government officials, while the burden of payment is shared between the employer (50%) and the National Social Security Fund (50%) in the case of women employed in the private sector (Hangchaovanich & Voramongkol 2006).

However, in Thailand, as in other countries, mothers' return to work has been identified as an influential factor in them planning not to breastfeed (Galson 2008). Galson found that many mothers return to work within six weeks of giving birth, or even sooner, with one third returning to work within three months and two thirds

within six months.

1.2.6 Standard care in the Maternity Ward in Thailand

In Thailand today, it is customary to undertake the following procedure for all infants in the Maternity Ward. After delivery, the infant lies on the delivery table between the mother's legs. The infant's mouth and upper airways are rinsed and aspirated. The umbilical cord is clamped. Before the umbilical cord is cut, the Apgar score at one minute post-birth is evaluated. The infant's face, trunk and legs are wiped dry with a towel. The Apgar score is then evaluated again at five minutes and a physical examination is conducted. The infant is then shown to the mother for a brief glance for gender identification and put on the mother's chest for a short time, which is dependent on the infant's condition. A numbered bracelet is put around the infant's wrist. After that, the infant is taken to another area of the labour room for cleaning of the vernix caseosa with olive oil; and to record the weight, length, head and chest circumference measurements, and assess the vital signs. At this time, there is administration of one percent silver nitrate eye drops, umbilical care with 70 percent alcohol, one milligram vitamin K injection, gestation age evaluation and adding any item of clothing that may be required to keep the infant warm. This takes approximately 30 to 60 minutes. In the meantime, the mother is helped to deliver the placenta. Any tearing of the perineum or an episiotomy is then repaired. These procedures take approximately 30 to 60 minutes.

The preterm infant, with clothes on, is covered with a warm blanket and put in a crib under the radiant warmer or in an incubator to keep warm, and transferred to the

NICU in order to observe any symptoms.² The mother is transferred to the recovery area in the labour room and postpartum ward respectively. While the mother is in the postpartum ward, she is encouraged to visit and breastfeed the infant in the NICU as much as possible, depending on her ability to do so. If the infant's condition improves or his/her temperature is stable, he/she is returned to the mother who is encouraged to breastfeed the infant as often as possible.

The infant's vital signs are taken every 2–4 hours. The infant is bathed, weighed and receives cord care with 70 percent alcohol once a day and daily thereafter until discharge. The infant is examined by a physician daily and is breastfed depending on his or her feeding cues (in a self-regulatory manner). All infants are encouraged to breastfeed unless the mother has a problem with her breasts. If these problems are present, the infant is bottle-fed or cup-fed. If the mother has no breast problems but cannot breastfeed at some or all of the feedings for any reason, the infant is given expressed breast milk and mothers cup-feed their infants. This is done to avoid nipple confusion, in accordance with Department of Health, Ministry of Public Health guidelines (2005). The mother is examined by a physician once a day. Midwives teach her about hygiene, breastfeeding, breast care, diet for mothers and infants, exercise, vaccinations, family planning and follow-up after discharge from hospital.

1.2.7 Kangaroo Care

A major nursing challenge in the neonatal intensive care unit (NICU) is supporting mothers in the intensive, technology-driven environment by merging

² In the Maharat Hospital, the NICU originally catered for all newborn infants, both high and low risk, and with all forms of illness. At the time of this thesis study, the NICU was split into two sections: Nursery 1 for high risk and seriously ill infants, and Nursery 2 for low risk and ill infants. No infants in the study were admitted to Nursery 1.

physiological care of the infant, and meaningful mother-infant interactions involving touch, communication, and intervention. (Johnson, 2007, p. 568)

This challenge forms the basis for nursing interventions such as Kangaroo Care or skin-to-skin holding.

1.2.7.1 Definition of Kangaroo Care

Kangaroo Care is a method of choice in maternal-child nursing. Whitelaw (1990, p. 604) offered an early definition of Kangaroo Care as “the practice of holding a preterm infant naked (except for a nappy) between the mother’s breasts”. Bell and McGrath (1996, p. 387) added to this, stating that Kangaroo Care is “skin-to-skin holding of diaper-clad preterm infants in an upright position on the parent’s chest”. One of the accepted definitions is from Johnson (2005, p. 53), who states that Kangaroo Care is “skin-to-skin holding of infants dressed only in diapers against their mothers’ or fathers’ chest”. For the purpose of this thesis, a working definition for Kangaroo Care is the action of skin-to-skin contact between the mother’s chest and the preterm infant.

1.2.7.2 Categories of Kangaroo Care

Anderson (1999) identified five categories of Kangaroo Care: birth; very early; early; intermediate; and late.

1.2.7.2.1 Birth Kangaroo Care

Birth Kangaroo Care occurs at the first minute after birth. The naked infant is simply placed prone, upright, on the mother’s breasts.

1.2.7.2.2 Very early Kangaroo Care

Very early Kangaroo Care begins in the delivery or recovery room, usually between 30 and 40 minutes after birth.

1.2.7.2.3 Early Kangaroo Care

Early Kangaroo Care starts with infants who are stabilised during the first few hours or the first day after birth, and then returned to the mother for skin-to-skin contact (Anderson 1995).

1.2.7.2.4 Intermediate Kangaroo Care

Intermediate Kangaroo Care begins after infants have completed the early neonatal intensive care phase, but usually still need oxygen and may have apnoea or bradycardia. This includes stable infants receiving artificial ventilation. This stage occurs at about seven days after birth. Another way to give intermediate Kangaroo Care is to place a preterm infant at the breast during gavage feeding (Anderson 1995). This is an excellent way to stimulate milk production and gives the infant beginning experiences when they are still too unstable to breastfeed successfully (Anderson 1995).

1.2.7.2.5 Late Kangaroo Care

Late Kangaroo Care begins when an infants' condition is relatively stable and they can tolerate breathing room air and are almost ready to go home. This usually occurs many days after birth.

The concept of Kangaroo Care will be developed further in the literature review.

1.2.8 Initiation and history of Kangaroo Care

Kangaroo Care (KC) began in Bogota, Columbia, as an intervention to maintain infants' body temperature when incubators were not available in the early 1980s. This practice of skin-to-skin holding of infants for hours at a time spread worldwide due to its reported benefits (Johnson 2007). Although preterm birth is stressful for mothers and fathers, and often leads to thoughts of guilt and inadequacy, especially

in mothers, Kangaroo Care has been found to improve bonding. Mothers who provide Kangaroo Care have been shown to reach closure over the preterm birth, stop the “psychological haemorrhage of guilt and inadequacy,” and have greater confidence and competence about their nurturing abilities than mothers who do not engage in Kangaroo Care (Affonso, Bosque, Wahlberg & Brady 1993). Controlled trials, both randomised and nonrandomised, have confirmed less maternal anxiety (Lai *et al.* 2006), more maternal satisfaction with the NICU experience (Yin *et al.* 2003), better attachment (Gathwala, Singh & Balhara 2008) and more positive interactions with the infant (Feldman *et al.* 2002a) in mothers who provide Kangaroo Care. In a study by Roller (2005) exploring the essential elements of the relationship between the mother and the new infant, Kangaroo Care facilitated a special connection with the infant despite the initial anxiety and environmental barriers:

“My first experience with kangaroo caring for her ... when I took her out and put her against my skin, it was just ... a great sense of relief for the first time really I felt bonded with her, that it was my daughter. So I think that kangaroo care helps to bridge that initial ... gap that is between a mother and her preterm infant”.

This experience is a special time for parents; they have the unique opportunity to watch their infant develop as he/she would have in utero. Parents feel fulfilled and satisfied with the closeness of their infant: “I can touch her, hold her, stroke her”.

Despite initial fear, the intimate connection between parents and their infants was reflected by one participant as follows: “It’s a nice feeling ... it feels like I am bonded to my child” (Leonard & Mayers 2008, p. 21).

“Getting to know”—a theme which emerged from Roller’s study (2005) in respect to the essential elements of the relationship between the mother and the new infant—is echoed in Leonard and Mayers (2008, p. 20) as the theme of “intimate connection”. In addition, Neu (1999) and Fox (2005) identified that mothers felt empowered by

the skin-to-skin experience because it was their unique contribution to their infant's wellbeing. Kambarami, Mutambirwa and Maramba (2002) also reported that mothers felt that Kangaroo Care gave them the opportunity to closely monitor the infant's condition for early detection of any changes, such as colour, breathing or vomiting. Johnson (2007) discussed the fact that although many mothers report feeling "scared" or "nervous" the first time they hold their infants, their confidence increases by the third holding experience. Comments from mothers in Johnson's research include:

"I can feel her breathe and move against me," making this an "intense experience for both of us".

"She is telling me that everything is fine when she moves her hand near mine".

"You can't learn how to be a mother from a book. You have to learn with your infant" (Johnson 2007, p. 571).

Johnson (2007, p. 571) concluded that:

Observations of the mothers noticing behavioural cues and intervening to comfort their infant through containment, touch, and decreasing environmental stimuli, indicated an increase in confidence in knowing how to respond to their infants.

1.2.9 Kangaroo Care in Thailand

The practice of Kangaroo Care in preterm infants is not widespread in Thailand, even in the community hospitals. Almost all preterm infants are cared for in the hospital and more than 70 percent of pregnant women deliver in hospitals. Today, most BFHI-accredited hospitals practice Kangaroo Care for approximately 15–30 minutes after birth with healthy full-term infants (Shiao 1998). Although this is a general rule for practice in the BFHI hospitals, Hat Yai Hospital, Songkla province, Thailand, does not practice Kangaroo Care with mother-infant dyads due to the unavailability

of nurses. Maharat Hospital, Nakhon-Si-Thammarat province in Thailand, has just started the practice of Kangaroo Care in full-term infants.

In Thailand, the mother who delivers a preterm infant cannot share the early postpartum bonding period because of separation from the infant. Mothers of preterm infants experience a significantly higher incidence of psychological distress during the neonatal period. These women are also reported to feel less confident in the parenting role and struggle to cope with an infant who is more difficult to care for due to prematurity and/or illness (Tilokskulchai *et al.* 2002). It can be postulated that attachment between mother and infant may be affected.

According to Shiao's (1998) unpublished Masters thesis, the Maternal and Child Hospital at Chiang Mai province in the North of Thailand has implemented Kangaroo Care in its NICU since 1994, and encouraged Kangaroo Care only during the hospital stay. The main objective of Shiao's study of Kangaroo Care was to facilitate mothers to take care of their preterm infants. Her other objectives were to enhance maternal-infant bonding and reduce the number of abandoned infants.

According to Shiao (1998), when Kangaroo Care was first introduced at the Maternal and Child Hospital in Chiang Mai Province, mothers performed it for 30 minutes to one hour each time, three times a day. When mothers were familiar with Kangaroo Care they could perform it as much as they desired until they were discharged. Shiao's (1998) evaluation of the hospital's Kangaroo Care project showed that all mothers wanted to do Kangaroo Care because it helped them take care of their infants with more confidence. The mothers showed affectionate behaviour to their infants by touching them and talking with them. However, it is not known if the mothers continued to practise Kangaroo Care after leaving the hospital because

Shiao's work reflects the results only from the hospital. Therefore, this research builds on Shiao's work on bonding between mothers and preterm infants by exploring the use of Kangaroo Care both in hospital and up to six months after discharge.

Two other quasi-experimental studies about the effects of Kangaroo Care on maternal-infant bonding have been conducted in Thailand (Kojasuta 1995; Numprasert 1996). Kojasuta studied very early Kangaroo Care in mother-full-term infant dyads where they were allocated to one of four groups. The results showed that mothers who received analgesic drugs by continuous epidural block and had skin-to-skin contact with their infant had higher maternal-infant bonding scores than those who did not have skin-to-skin contact. Kojasuta explained that mothers who received narcotic drugs administered by intramuscular or intravenous injection did not have higher maternal-infant bonding scores than those who had epidurals.

Numprasert (1996) studied the effects of Early Kangaroo Care on maternal-infant bonding in low birth weight preterm infants less than 2,300 grams using Klaus and Kennell's (1976) bonding theory. The purposive sample consisted of 80 postpartum women (Kangaroo Care group=40, control group=40). Mothers in the Kangaroo Care group began to do Early Kangaroo Care at some time between eight hours and 24 hours postpartum. Kangaroo Care lasted for 20 minutes and occurred from at least one to four times during this period. On days two and three, Kangaroo Care lasted for 30 minutes for at least one to four times daily. Mothers in the control group visited their infant for one hour, one to four times per day for three consecutive postpartum days. Both groups received the usual care provided by the hospital setting. Maternal-infant bonding was measured by using Laohapensang's Maternal-infant Bonding

Questionnaire (1983) on day three postpartum. The results showed that the Kangaroo Care group had significantly higher bonding scores than the control group ($p < 0.001$). Thus, these two studies supported Klaus and Kennell's bonding theory (1976) that the practice of skin-to-skin contact promotes bonding.

Although three studies (Kojasuta 1995; Numprasert 1996; Shiao 1998) about the effect of Kangaroo Care on maternal-infant bonding have been done in Thailand, no longitudinal trial has been done to examine whether the effect of Early Kangaroo Care on bonding persists or whether Kangaroo Care affects breastfeeding success. The use of Kangaroo Care may be the solution to the problems of adverse physiological reactions, potential bonding issues, poor maternal-infant interaction and unsuccessful breastfeeding. Kangaroo Care represents a step toward the humanisation of health care, and promotes maternal-infant bonding and breastfeeding; two essential elements of survival for all infants in the world according to Rey-Vargus (1998).

In Thailand, Kangaroo Care has not been studied adequately in preterm infants and their mothers, especially the effects of Kangaroo Care on breastfeeding and bonding either in the hospital or after the mother and infant have returned home.

There are a lot of differing opinions from midwifery staff about the method of performing Kangaroo Care. In terms of the researcher's personal experiences, she found that some staff members felt comfortable with both parents participating in Kangaroo Care, while some only allowed mothers to participate. Some nurses allowed parents to hold an infant for hours while others believed this was too stressful and decreased the holding time. Some felt early breastfeeding was appropriate; while others believed the infants were not developmentally ready. Some

found time to help families but others did not. These inconsistencies resulted in disillusionment with Kangaroo Care among families and staff in hospitals. This led to Kangaroo Care gaining a poor standing in the NICU and a decrease in its implementation.

1.3 Catalysts for the research

The inconsistencies in implementation of Kangaroo Care, coupled with her research into the literature on care of preterm infants, were the catalysts that led the researcher on a personal quest to find and clearly state the best method of performing Kangaroo Care in the NICU at Maharat Hospital.³ Her aim was to improve the quality of life for preterm infants and their families. Hence, the research reported in this thesis focused on measuring the effect of Kangaroo Care on bonding between mothers and preterm infants in Thailand using the Mother Infant Bonding Questionnaire (MIBQ) and the Bonding Observation Check List (BOCL). It is the first research of its type because it followed the experience of Kangaroo Care for mothers and preterm infants over a six-month period. The study sought to achieve the following aims.

1.4 Research aims and intended outcomes

The specific aims of this longitudinal research were to find out:

- 1) If Kangaroo Care can increase bonding between mothers and their preterm infants as measured by the MIBQ and the BOCL over a six-month period.
- 2) If Kangaroo Care can promote breastfeeding practice and hence increase breastfeeding rates in preterm infants.

³ Early in the research, the NICU at Maharat Hospital, which had previously cared for both high risk and low risk preterm and ill infants, was reorganised into two units: Nursery 1 for high risk and seriously ill infants, and Nursery 2 for low risk infants and sick infants. All infants in the study were admitted to Nursery 2, not to the high risk Nursery 1.

3) If Kangaroo Care should be introduced as part of the ‘Baby Friendly Hospital Initiative’ (BFHI) policy for preterm infants in all hospitals in Thailand.

If the research results show that bonding between mothers and preterm infants can be strengthened through Kangaroo Care, this specific care intervention has the potential to reduce rates of abandonment of preterm infants and improve breastfeeding rates for this group of infants in Thailand. However, it can only do this if it is implemented as part of the BFHI in all hospitals in Thailand.

1.5 Summary

The Thai Government is aiming to decrease neonatal morbidity and mortality rates with the introduction of the ‘Baby Friendly Hospital Initiative’ (BFHI) in all Thai hospitals. This chapter has provided background information about preterm birth in both developed and developing countries; World Health Organization and Thai Government health policies that attempt to improve bonding and quality of life for preterm infants and their mothers (in particular the BFHI); cultural factors that need to be considered in the care of mothers and preterm infants in Thailand; and the concept of Kangaroo Care. The chapter has also introduced a study that aims to evaluate Kangaroo Care as an intervention to be used as part of the BFHI in Thailand in terms of increased bonding between mothers and their preterm infants, and increased breastfeeding rates in preterm infants, specifically at Maharat Hospital. The next chapter presents a review of the literature.

Chapter 2: Literature review

2.1 Introduction

The focus of this chapter is to review literature relevant to this research study, thus helping to lay the foundation of, and provide the context for, the study. This literature review is critical because understanding the literature is the basis for producing new evidence (Polit & Beck 2008). The purpose of this literature review is to investigate the evidence base in relation to the effects of Kangaroo Care, bonding and attachment between mothers and their preterm infants, and the relationships between breastfeeding, Kangaroo Care and bonding in the preterm infant. The review also sought to ascertain what research has been done to date in Thailand in relation to mothers, preterm infants, Kangaroo Care, bonding and breastfeeding.

This chapter reviews the international professional literature. The electronic databases Journals@OVID, Blackwell-Synergy and ProQuest 5000 were searched systematically to find relevant literature published in the English language. In addition, articles and books were sought using the reference lists from those research papers that related to this literature review. Key search terms included “Kangaroo Care”, “bonding/attachment”, “breastfeeding”, “physiological reactions”, “emotional reactions” and “preterm infants”. Most of the identified literature was published in Western countries, with limited literature published in Thailand. There were no year boundaries on the search.

The following section presents the review under the following major headings: conceptual framework; Kangaroo Care; bonding and attachment between mothers and preterm infants; and breastfeeding.

2.2 Conceptual framework

The conceptual framework for this study incorporates Anderson's 'Mutual Caregiving Model' (Anderson 1977) and Klaus and Kennell's (1976) theory of bonding. The Mutual Caregiving Model suggests that the maternal milieu is an ideal microenvironment that facilitates mutual caregiving between mother and infant, which results in mutual needs fulfilment.

Mutual caregiving is a continuous relationship between mother-infant dyads in which they touch, stimulate each other and respond to cues. Mutual needs fulfilment is the meeting of psychophysiological needs of both mother and infant through the process of mutual caregiving (Anderson 1977). The bonding theory states that maternal-infant interaction during the few hours after birth (the 'sensitive period') facilitates bonding (Kennell & Klaus 1998). Bonding is an affectionate tie between the mother and the infant that endures through time. The operational definition of maternal-infant bonding in this study was a combination of the maternal feelings and maternal-infant interaction. The maternal-infant contact and interaction through Kangaroo Care were important elements of a maternal milieu, and bonding (maternal feelings, maternal-infant interaction, and breastfeeding), and were proposed as ways of fulfilling mutual needs.

Kangaroo Care is expected to facilitate maternal feelings and maternal-infant interaction by creating a climate in the relationship whereby mothers feel closer to their infant and have more positive relationships with them. It is also expected to enhance breastfeeding by facilitating the mothers' capacity for sensitive caregiving, and developing their readiness to detect and respond to their infant's feeding cues (Tessier *et al.* 1998).

Bonding (maternal feelings and maternal-infant interaction) was measured by using the Maternal-Infant Bonding Questionnaire (MIBQ) and the Bonding Observation Check List (BOCL). Anderson's Mutual Caregiving Model is now explained in more detail.

2.2.1 Anderson's Mutual Caregiving Model

Anderson's Mutual Caregiving Model (Anderson 1977) proposes that the mother and her infant can be mutual psychophysiological caregivers to facilitate an optimal psychophysiological postpartum period. Mutual needs cause the mother and her infant to depend on each initially for mutual caregiving. Anderson's conceptualisation of mutual caregiving means Self-Regulatory Mother-Young Longitudinal Interaction (SMYLI) has been divided into three sections: interaction occurring during the antepartum, intrapartum and postpartum periods (Anderson 1977). Postpartum SMYLI involves ongoing self-regulatory interaction during the immediate and later postpartum periods. This interaction consists of sensory contact, nutritive and non-nutritive sucking and swallowing to satiety, and auditory stimuli.

The successful postpartum experience for this mother is consistent with the Mutual Caregiving model, in which Anderson (1977) proposes that infants can provide physiological benefits for their mothers if they are allowed to remain together following birth. Findings reported by Affonso *et al.* (1993) showed that a mother's Kangaroo Care experiences soon after birth helped her to feel more relaxed and secure in her role as a mother because she could see that her infant was calm and seemed satisfied under her care. Later physiological evidence suggests another reason why maternal need for infant contact could be elevated post-birth; beneficial effects for the infant and mother are particularly apparent in breastfeeding dyads.

During breastfeeding, the mother touches and stimulates her infant and responds to her infant's cues. During an infant's suckling, maternal oxytocin and prolactin are released in increased quantities, thereby producing and releasing milk. Oxytocin also stimulates uterine contraction (Uvnas-Moberg 1996), and has been called the 'hormone of love' because of its relationship to orgasm, birth, breastfeeding and bonding (Stuart-Macadam 1995). Prolactin released during infant suckling promotes maternal caretaking behaviour. Thus, this hormone has been called the 'mothering hormone' (Uvnas-Moberg 1996). This evidence of the physiological benefits of breastfeeding adds new support for the Mutual Caregiving Model.

Furthermore, skin-to-skin maternal-infant contact in and of itself stimulates the production of oxytocin and prolactin, which facilitate the let-down reflex and lactation (Wahlberg 1991), as well as uterine contraction and involution (Riordan 1998). Conceivably, therefore, the presence of the infant skin-to-skin on the mother's chest may stimulate activity of the Hypothalamic-Pituitary-Adrenal (HPA) axis. In turn, increased HPA axis activity early in the postpartum period may decrease a woman's risk for postpartum blues and subsequent depression (Magiakou *et al.* 1996).

Testing specific theoretical propositions of Anderson's Mutual Caregiving Model (Anderson 1977) and bonding theory (Klaus & Kennell 1976) would add to the body of knowledge in nursing about the effects of Kangaroo Care on enhancing bonding (maternal feelings, maternal-infant interaction) and breastfeeding. If supported, the quality of infants' lives would be improved because of the benefits of a close mother-infant relationship, love and breast milk. A warm, nurturing and consistent positive relationship between mother and infant, and the balanced nutrition of breast milk are

essential for healthy psychophysiological development of the child (Stuart-Macadam 1995). Nurses are in an ideal position to promote Kangaroo Care to mother-infant dyads without additional costs.

The research presented in this thesis explored the skin-to-skin contact inherent in Kangaroo Care, which creates a postpartum maternal milieu that resembles the infant's intrauterine experience (hearing the normal relaxed maternal heart beat and being rocked as the mother moves). Therefore, this contact was proposed to facilitate bonding and breastfeeding.

The proposed study took place during postpartum Self-Regulatory Mother-Young Longitudinal Interaction (SMYLI) and focused on the effects of Kangaroo Care on maternal feelings, maternal-infant interaction and breastfeeding on Day 1 (T1), Week 4 post-birth (T2), Week 12 post-birth (T3) and Week 24 post-birth (T4). The following flowchart (Figure 2.1) summarises how the concepts of Anderson's (1977) Mutual Caregiving Model, Klaus and Kennell's (1976) bonding theory and other affiliated research flow together to underpin this study.

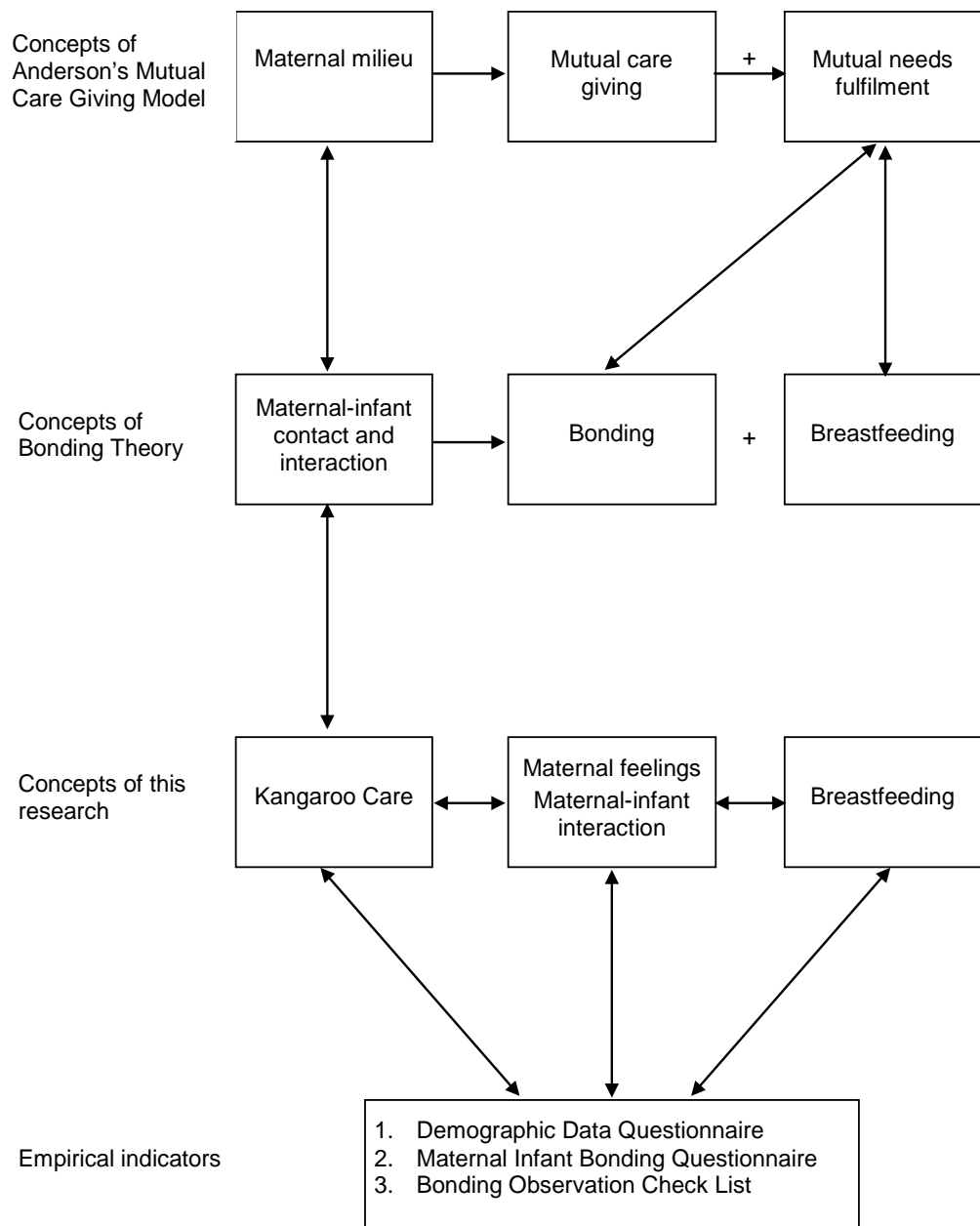


Figure 2.1: Conceptual Framework for the Study

2.2.2 Assumptions guiding this study

After examining the literature, the researcher identified several assumptions that guided her research:

1. The maternal milieu facilitates mutual caregiving, resulting in mutual needs fulfilment.
2. Mutual caregiving is a continuous process and a behaviour learned through mother and infant interaction.

3. Bonding (maternal feelings and maternal-infant interaction) is a process that occurs in human beings.
4. The time period following birth (0 to 120 minutes) is an optimal time for promoting bonding.
5. The time period following birth (0 to 120 minutes) is an important time for promoting successful breastfeeding.

These assumptions support the stated aims (Chapter 1) and research questions of this thesis study (see Chapter 3).

2.3 Kangaroo Care

Kangaroo Care is a simple nursing intervention that can be taught to all pregnant and postpartum women (Dombrowski, Anderson, Santori & Burkhammer 2001). The label Kangaroo Care was chosen to describe this strategy because the method is similar to how an infant kangaroo (joey) is carried by its mother in her pouch. It is estimated that Kangaroo Care is practised in about 82 percent of NICU in the USA (Ludington-Hoe *et al.* 2006).

Early Kangaroo Care (EKC) is an effective method in which a diaper-clad infant lies skin-to-skin in an upright, prone position between the mother's breasts and has self-regulatory access to breastfeeding (Anderson 1999). The Kangaroo Care position affords parents the only opportunity for full body contact with their preterm infant. The experience is expected to promote parent-infant attachment and enable working through the traumatic experience of premature birth (Feldman 2004). Regulation of the infant's physiology and behaviour, increased maternal lactation, and improvement in the mother's mood and sense of parenting are shown to be benefits of the Kangaroo Care intervention (Feldman 2004).

A series of randomised clinical trials in Columbia (Klaus & Kennell 1976) showed that the “kangaroo mother intervention” was safe in caring for low birth weight preterm infants. It did not increase infant mortality or morbidity rates when compared with standard incubator care (Feldman 2004).

2.3.1 Kangaroo Care: historical background

Not all areas in the world have the resources to provide technical interventions and sufficient health care workers to care for premature and low birth weight infants. Kangaroo Care began in the early 1980s in Bogota, Columbia, when Rey and Martinez introduced it as a method for alleviating the shortage of caregivers and lack of resources. They did so because the intervention was found to maintain an infant’s body temperature when incubators were not available (Ramanathan, Paul, Deorari, Taneja & George 2001). This practice of skin-to-skin holding of infants for hours at a time spread worldwide due to its reported benefits (Johnson 2007). Kangaroo Care was also developed as a method of ambulatory care for low birth weight infants in response to high morbidity and mortality associated with overcrowding and sepsis (Hall & Kirsten 2008). It was observed that in places where mothers carried their preterm infants in slings all day, every day, the mortality rate fell from 70 percent to 30 percent (Anderson 1989). As demonstrated by early research in Columbia (Ludington-Hoe & Golant 1993), Kangaroo Care is a feasible and appropriate method of care for preterm infants in hospitals with limited resources because it is a simple, low-cost technology. However, its implementation still needs institutional support, some resources and clinical competence.

Kangaroo Care begins only after the infant has stabilised. It is effective for infants who are appropriately grown for their gestational age (AGA) as well as those who

are small for their gestational age (SGA) (Anderson 1989). Kangaroo Care is now widely considered to be the most feasible, readily-available and preferred intervention for decreasing neonatal morbidity and mortality in developing countries (Charpak *et al.* 2005). Furthermore, Kangaroo Care can be practised in intensive care units, for example while the infant is being ventilated, and because the parents, in particular, feel empowered by this method, it is being practised more often in hospitals in developed countries (DiMenna 2006). The scientific research on Kangaroo Care that began in Bogota during 1978 was questioned because of some methodological inadequacies. Since then, randomised controlled clinical trials have been completed in Europe, Ecuador, Ethiopia, Columbia, Indonesia and Mexico, and one in the USA (Anderson 1995). All have demonstrated positive outcomes.

The first developed countries to study and implement Kangaroo Care were in Western Europe, where fathers were welcome participants (Anderson, Dombrowski & Swinth 2001). Anderson (1989) stated that Kangaroo Care had been a routine practice in various hospitals in Western Europe, mainly with weaker infants, and this practice has continued until today. The concept of Kangaroo Care was developed from touch therapy (Klaus & Kennell 1976), which has been shown to decrease stress and anxiety, and increase healing and relaxation (Johnson 2005). Countries that have used and studied Kangaroo Care in order to take care of preterm infants and their families include the USA (Johnson 2005), Sweden (Anderson 1999), England (Anderson 1999; Whitelaw 1990), Japan and India (Feldman 2004), Denmark (Anderson 1999), Columbia, Germany, and Zimbabwe (Johnson 2005).

The results of studies such as those mentioned above indicate that Kangaroo Care can be considered crucial to mother-infant bonding. Therefore, Kangaroo Care

should be promoted both in hospitals and after discharge from hospital (Tessier *et al.* 1998).

Despite the many studies about the effects of Kangaroo Care on maternal affectionate behaviour as a possible indicator of bonding, studies of this topic are still rare in some developing countries such as Thailand. The researcher expects that Kangaroo Care may contribute to improving infant survival in Thailand and should be investigated further, given its potential impact on global infant mortality. In particular, research should address the possibility of implementing Kangaroo Care as soon as possible after birth as a method for improving the stabilisation of preterm infants in Thailand.

2.3.2 Effects of Kangaroo Care on mothers and their infants

Early Kangaroo Care (EKC) begins some time between birth and seven days post-birth. Infants can begin Kangaroo Care as soon as they are born (Anderson 1999). As stated earlier, Kangaroo Care and breastfeeding help mothers know their infant better and feel closer to them, resulting in a better response to their infant's cues.

Kraernate, Teannadee and Chantapreeda (2006) studied the effect of Kangaroo Care on mother-infant attachment, maternal role satisfaction and preterm infants' body weight in the paediatric department of a general hospital in North Eastern Thailand. The study took place from October 2001 to January 2002, using a purposive sampling technique. Samples were divided into a control group (no Kangaroo Care; the first 10 premature infants) and an experimental group (Kangaroo Care; the next 10 premature infants). The results of this study revealed a statistically significant difference in mother-infant attachment between the experimental group and the control group, in that mothers in the experimental group showed greater participation

in caring for their infants than the mothers in the control group. This demonstrated a greater mother-infant attachment in the experimental group. However, no statistically significant difference was found in maternal role satisfaction or infant body weight between the two groups (Kraernate *et al.* 2006).

In another study conducted in Thailand, Premjit (2004) examined the effects of a perceived self-efficacy promotion program regarding newborn care and Kangaroo Care on mothers' child care behaviours, and on premature infants' weight gain. Subjects were 40 mothers and 40 premature infants. Twenty of each were assigned to a control group or an experimental group, matched by gestational age, body weight and calorie intake. Mothers in the experimental group received the perceived self-efficacy promotion program regarding newborn care and Kangaroo Care. This group of mothers' child care behaviours were significantly more apparent than those of mothers in the control group. However, weight gain in premature infants of mothers in the experimental group was not significantly different than that of the control group (Premjit 2004).

Thus, Early Kangaroo Care may help mothers have more success in establishing physiological reactions, maternal feelings, good maternal-infant interaction and breastfeeding with their infant. Fathers also have skin-to-skin contact with their infant but mothers do most of the infant care because of the opportunities for breastfeeding.

2.3.2.1 Physiological effects

2.3.2.1.1 Oxygenation and oxygen desaturation events

Kangaroo Care seems to be beneficial regardless of the infant's oxygen requirements; oxygen requirements may reduce or stabilise during Kangaroo Care

(Ludington-Hoe, Ferreira, Swinth & Ceccardi 2003). Begum *et al.* (2009) found that Kangaroo Care influences the stability of regional cerebral oxygenation (rSO₂) as well as heart rate (HR) and pulse oxygen saturation (SPO₂). Discrete results in the low-frequency/high-frequency ratio of rSO₂ may indicate that Kangaroo Care has different effects on rSO₂ associated with cerebral function. Evidence also suggests that oxygen saturations in preterm infants are stable or increased during Kangaroo Care, with the infants having less desaturation episodes during the skin-to-skin period (Ludington-Hoe *et al.* 2003). During a transfer from incubator to the mother for Kangaroo Care, the infant experiences stress, which may increase oxygen requirements; however, this often settles relatively quickly (Ludington-Hoe *et al.* 2003). As a result of improved oxygenation, breathing may become more relaxed and the infant will be calm and contented (Crawford & Hickson 2002). Nevertheless, some practitioners may feel uncomfortable recommending Kangaroo Care because of inconclusive evidence in the improvement of physiologic measures (Hunt 2008).

In a trial designed to study the safety of three continuous hours of Kangaroo Care for preterm infants, Ludington-Hoe, Anderson, Swinth, Thompson and Hadeed (2004) found that apnoea, bradycardia and periodic breathing were absent during Kangaroo Care. Regular breathing increased for infants receiving Kangaroo Care compared to infants receiving standard NICU care.

Quasi-experimental studies by Bohnhorst, Gill, Dordelmann, Peters and Poets (2004) showed that the possibility of an increase in the number of desaturation events (SaO₂ <80%) occurred during the second hour of Kangaroo Care. However, the authors admit that infant airway occlusions contributed to desaturation events in the first report, thus weakening the results. The relationship between desaturations (SaO₂

<87%) and feeding was described by Chen, Wang, Chang & Chi (2000), who compared bottle-feeding to breastfeeding during Kangaroo Care. Twenty desaturations ($\text{SaO}_2 < 87\%$) occurred during bottle feeding in the Kangaroo Care position but none occurred during breastfeeding in this position. Furthermore, Mori, Khanna, Pledge and Nakayama (2010) systematically searched and reviewed studies investigating research into heart rate, body temperature and oxygen saturation of infants during and/or after skin-to-skin contact. Meta-analyses to examine the effects, and meta-regression analyses to investigate correlations between the effects and birth weight, duration of the care, environmental temperature and resources of the setting were conducted. They found that meta-analyses showed evidence of an increase in body temperature (weighted mean difference [WMD] 0.22°C , $P < 0.001$) and a decrease in saturation of infants (WMD -0.60% ; $P = 0.01$) during skin-to-skin care, compared with those before skin-to-skin care.

Rojas *et al.* (2003) found that desaturation events ($\text{SaO}_2 < 88\%$) were also fewer during Kangaroo Care than with swaddled holding. Furthermore, oxygen saturation levels were found to increase by two to three percent (Fohe, Kropf & Avernarius 2000; Gazzolo, Masetti & Meli 2000) during Kangaroo Care. Generic to understanding Kangaroo Care's cardiorespiratory effects is a review of apnoea in response to Kangaroo Care. The predominant finding from randomised clinical trials is that the number of apnoeic episodes does not change during Kangaroo Care compared with incubator care (Bohnhorst *et al.* 2004; Ludington-Hoe *et al.* 2004).

One descriptive study revealed that no apnoea occurred during breastfeeding in the Kangaroo Care position (Chen *et al.* 2000). Heart and respiratory rates remained within clinically acceptable ranges (Ludington-Hoe *et al.* 2004) and were more stable

during Kangaroo Care than during incubator periods (Bergman, Linley & Fawcus 2004; Ludington-Hoe *et al.* 2004).

The practice of skin-to-skin holding is still limited due to concern over potential body heat loss in the preterm infant (Engler & Ludington 1999). Feldman (2004) mentioned that health care staff have to monitor heart rate, temperature and oxygenation during Kangaroo Care. Therefore, it is vital that health care staff know the gestational age of the infant and medical care of both mother and infant in order to prevent unexpected situations during Kangaroo Care (Feldman 2004). In particular, staff must care for each mother and infant closely in order to monitor their physical and mental health during the Kangaroo Care intervention (Feldman 2004).

2.3.2.2 Temperature control

The effect of Kangaroo Care on infant body temperature has been studied extensively with the same outcome; when healthy preterm infants are placed in the Kangaroo Care position their body temperature rises (Bohnhorst *et al.* 2004; Ludington-Hoe *et al.* 2004). Moreover, Galligan (2006) found that Kangaroo Care was used as an alternative to traditional rewarming. The evidence was graded and organised into an evidence-based practice guideline for the use of Kangaroo Care in the treatment of mild hypothermia in low risk infants. Thus, Kangaroo Care is used to promote thermoregulation instead of using separation and a warmer. It has been shown to keep a singleton preterm infant warm by body heat generated in maternal breasts, which is conducted to the infant (Ludington-Hoe *et al.* 2006). This is because warm touch increases skin blood flow (Yosipovitch, Chan, Tay & Goh 2003). Furthermore, Ludington-Hoe *et al.* (2006) found that infants had increased temperatures during Kangaroo Care, remained warm throughout the intervention and had temperatures that stayed above 36.5°C. When infant temperatures decreased

below 36.9°C, breast temperatures increased; when infant temperatures reached 36.9°C or higher, breast temperatures began to decrease. Ludington-Hoe *et al.* (2006) demonstrated that breast temperatures increased independently of each other, but not independently of the infant. In addition, they found that each breast responds independently of the other. The temperatures of each twin in a pair were different as they lay on their respective breast. Infant temperatures remained warm and increased during Kangaroo Care while staying within the neutral thermal zone of each infant (Ludington-Hoe *et al.* 2006).

Chwo *et al.* (2002) found that preterm infants receiving Kangaroo Care had higher mean tympanic temperatures, more quiet sleep and less crying than those receiving standard premature infant care. A higher mean tympanic temperature (within the normal range) is a general indicator of improved neonatal stability and the ability to maintain an appropriate body temperature. A study by Huang, Huang, Lin and Wu (2006) found that 78 consecutive term infants born via caesarean section who were experiencing hypothermia and receiving Kangaroo Care with their mothers in the post-operative room had a higher mean temperature than the second group of infants receiving routine care under radiant warmers. McCall, Alderdice, Halliday, Jenkins & Vohra (2010) examined trials using randomised or quasi-randomised allocations to test a specific intervention designed to prevent hypothermia (apart from 'routine' thermal care) applied within 10 minutes after birth in the delivery suite to infants of < 37 weeks' gestational age or birth weight \leq 2500 g. They found that plastic wraps or bags, plastic caps, skin-to-skin contact (SSC) and transwarmer mattresses all keep preterm infants warmer, leading to higher temperatures on admission to neonatal units and less hypothermia. However, the small numbers of infants and studies, and

the absence of long-term follow-up mean that firm recommendations cannot be made for clinical practice.

Swinth, Nelson, Hadeed and Anderson (2000) measured triplet infant temperatures when all three infants were simultaneously held by their mother. At the end of the first three-hour Kangaroo Care session, infant axillary temperatures ranged between 36.8°C and 37.1°C. At the end of the second session (45 minutes long) that evening, infant temperatures ranged between 37.0°C and 37.3°C. As stated earlier, warm touch increases skin blood flow (Yosipovitch *et al.* 2003), helping each breast respond individually to the infant. The warm touch perceived when an infant is placed on the breast also causes a release in calcitonin generated peptides that elevate local skin temperature (Noguchi *et al.* 2003).

Each infant has their own weight, posture and movement pattern as they lie on the breast, which arouses skin hair follicles in the mother's stratum corneum, stimulating the release of cutaneous corticotrophin-releasing hormone. This, in turn, locally vasodilates skin vessels (Crompton *et al.* 2003). Finally, the amount of corticotrophin-releasing hormone that is activated when the infant is held against the breast during Kangaroo Care affects the infant's movements, each of which further stimulates cutaneous corticotrophin-releasing hormone in the mother and breast skin temperature (Slominski, Pisarchik, Tobin, Mazzurkiewicz & Wortsman 2004). Thus, infant temperatures remained warm and increased during Kangaroo Care while staying within the neutral thermal zone. Hyperthermia in Kangaroo Care is rare. Only one of 374 studies in 2004 has reported infant hyperthermia (WHO-INK 2004). Infant warming during Kangaroo Care has been confirmed by recent meta-analyses (Conde-Agudelo & Belizan 2009; Moore, Anderson & Bergman 2007).

2.3.2.3 Blood glucose levels

Although the effect of Kangaroo Care on blood glucose levels has been studied extensively in full-term infants (Chantry 2005; Walters, Boggs, Ludington-Hoe, Price & Morrison 2007) and has consistently shown that Kangaroo Care at birth reduces frequency of hypoglycaemia over the first 90 minutes post birth, only one study with preterm infants could be found. This was a randomised controlled trial of 103 preterm infants who received 13.5 hours of Kangaroo Care per day. It showed that fewer Kangaroo Care infants than control infants had hypoglycaemia (Suman, Udanai & Nanavati 2008).

2.3.2.4 Behavioural effects

Kangaroo Care has many beneficial aspects for the preterm infant, particularly in the area of neurobehavioural development (Hunt 2008). Furthermore, Feldman and Eidelman (2003) conducted a prospective case-control study in one hospital with 70 very low and low birth weight preterm infants. The 35 infants who experienced Kangaroo Care for at least one hour a day for 14 days had significantly more rapid maturation of vagal tone between 32 and 37 weeks' gestation, and better behavioural organisation (e.g. longer periods of quiet sleep and alert wakefulness, and shorter periods of active sleep). In a historical-control study with healthy low birth weight infants, Ohgi *et al.* (2002) found that Kangaroo Care infants scored higher than controls on behavioural organisation during the neonatal period and on the 'Bayley Developmental Indices' at 12 months. In a trial of 28 preterm infants (Ludington-Hoe *et al.* 2006), arousals and rapid eye movement, two developmental milestones, were significantly lower for the group that experienced skin-to-skin contact. The patterns demonstrated by the skin-to-skin group were found to be analogous to more mature sleep organisation. Similarly, in a study by Ferber and Makhoul (2004),

infants and their mothers who received Kangaroo Care beginning 15 to 20 minutes after delivery and lasting for one hour slept longer, were mostly in a quiet sleep state, exhibited more flexor movements and postures, and showed less extensor movements than the group of infants receiving standard care.

2.3.2.5 Growth

Effects of Kangaroo Care on weight gain are controversial. Studies examining weight gain during hospitalisation have shown either no difference in weight gain (Chwo *et al.* 2002) between Kangaroo Care infants and those in incubators, or an increase in weight gain (Conde-Agudelo *et al.* 2003) and increases as great as 19.72 g/d for Kangaroo Care infants compared with a 10.0 g/d weight gain for infants who remained in incubators (Tallandini & Scalembra 2006). Meta-analysis confirms significantly more weight gain in infants receiving Kangaroo Care (Conde-Agudelo *et al.* 2003). In one study, well preterm infants who received Kangaroo Care 24 hours per day, seven days per week (called 24/7 Kangaroo Care) gained twice as much weight as a similar group that received no Kangaroo Care (Morelius, Theodorsson & Nelson 2005). Furthermore, one randomised controlled clinical trial showed that preterm infants who received Kangaroo Care 13.5 hours per day had a weekly increased head circumference of 0.75 cm compared with 0.49 cm in infants who did not receive Kangaroo Care (Suman *et al.* 2008). The same study also showed increased body length of 0.99 cm compared with 0.7 cm for infants who did not receive Kangaroo Care.

2.3.2.6 Early discharge

Research has shown that infants of mothers who practised early Kangaroo Care stayed in hospital for a shorter time (Johnson 2005). Furthermore, these infants had

good cognitive perception, motor development and relationships with their parents (Feldman *et al.* 2002a).

2.3.2.7 Reduced crying

Ludington-Hoe, Cong and Hashemi (2002) showed that crying of preterm infants may decrease oxygen and energy, and increase brain injury and cardiac dysfunction. Kangaroo Care can decrease crying in infants (Feldman 2004). Researchers have shown that infants rarely cry when in Kangaroo Care (Lai *et al.* 2006) and cry less than when in an incubator (Chwo *et al.* 2002; Lai *et al.* 2006). Sontheimer, Fischer and Buch (2004) found no crying at all when sick infants receiving Kangaroo Care were transported to a distant NICU. The evidence indicates that Kangaroo Care can be implemented to reduce and even prevent infant crying.

2.3.2.8 Infants' cognitive development

When Kangaroo Care was provided to stable premature infants 24 hours per day, seven days per week from 32 to 38 weeks' gestational age, all performance and planning functions related to brain development were advanced at one year of age in Kangaroo Care infants but not in non-Kangaroo Care infants (Tessier *et al.* 2003). Infants who received Kangaroo Care had higher mental and motor development scores than non-Kangaroo Care infants at six months (Feldman *et al.* 2002a) and at one year (Tessier *et al.* 2003). Feldman and Eidelman (2003) found that 30 or more minutes of Kangaroo Care daily during hospitalisation resulted in more mature habituation and orientation scores on the Neonatal Behavioral Assessment Scale at 37 weeks' gestational age. This led them to conclude that Kangaroo Care accelerates autonomic and neurobehavioral development. A controlled trial of 20 minutes per day of Kangaroo Care for four weeks being given early (starting within one week of birth) or late (starting at 4 months post-birth) found that the starting time made no

difference in memory or overall developmental ability at one year of age (Miles, Cowan, Glover, Stevenson & Modi 2006). Kangaroo Care is now recommended as an intervention to enhance neurobehavioral development and reduce the likelihood of developmental delay (Perlman 2003; Tessier *et al.* 2003).

2.3.2.9 Sleep organisation

Well-designed trials of Kangaroo Care have found that it improves sleep organisation, as evidenced by an increase in the quantity of quiet sleep, an improvement in sleep cycles and a decrease in arousals from sleep (Feldman, Weller, Sirota & Eidelman 2002b; Ludington-Hoe *et al.* 2006). Each Kangaroo Care session should be at least one hour so that the infant can complete at least one cycle of sleep (Ludington-Hoe 2008).

2.3.2.10 Psychological effects

Beginning with birth, the ideal habitat (ecological niche) for each infant is the specific and relatively familiar milieu provided by its mother. Kangaroo Care promotes a broad parasympathetic (vagal) response (e.g. glandular secretion), which is physiologically beneficial and comforting for both mother and infant, and logically promotes bonding and attachment (Bergman *et al.* 2004; Winberg 2005). Kangaroo Care protocols support individualised interactions between parents and their infants. Such interactions help the parent develop sensitivity and responsiveness to the infant's behavioural signs, especially during feeding. In addition, interactions between the parents and their infants are likely to facilitate the infant's development, and the parents' recovery and stability, by reducing parental anxiety, thereby fostering the bonding between parent and infant (Ohgi *et al.* 2002).

Early contact between infants and mothers is vital for initiating their relationship. However, preterm infants and mothers are often separated at birth and physical contact is very delayed, which may impede the development of the mother-infant relationship (Miles *et al.* 2006; Roller 2005). Kangaroo Care allows mothers to have physical contact with their preterm infant. Therefore, Kangaroo Care is particularly important in the bonding process for mothers whose infants are taken to the NICU immediately after birth. Nurses need to recognise the importance of introducing Kangaroo Care as early as possible (Clifford & Barnsteiner 2001; Roller 2005). Kangaroo Care has a big impact on the experience of parents in the NICU because parents often feel helpless and inadequate. It allows nurses to implement family-centred care in a practical and effective way, as supported by research (Crawford & Hickson 2002).

The studies discussed here indicate that the impact of Kangaroo Care on parents improves their experience of the NICU. Roller (2005) interviewed 10 mothers about their experiences of Kangaroo Care after their infants were discharged from hospital. Two essential themes that emerged from the Kangaroo Care experience were women's beliefs that they were "kept from knowing" their infants and "getting to know" their preterm infants. The mothers felt that Kangaroo Care was a calm, warm, positive bonding experience that provided an opportunity for them to get to know their infants during a stressful time. Both Feldman *et al.* (2002a) and Roller (2005) showed that Kangaroo Care improved the mother-infant relationship and the parenting process, and made mothers feel more confident (Feldman *et al.* 2002a; Roller 2005). Furthermore, Crawford and Hickson (2002) found that Kangaroo Care improved confidence in parents whilst allowing them to gain parenting skills. Feldman *et al.* (2002a) found that at three months, mothers and fathers of Kangaroo

Care infants were more sensitive and provided a better home environment. At six months, Kangaroo Care mothers were more sensitive and infants had higher mental and psychomotor development.

There are some limitations evident in the research into Kangaroo Care. Roller's (2005) study, for example, has limited transferability to the general population due to the participants' racial characteristics; seven out of the ten participants were African American, two were Caucasian and one was Asian (Roller 2005).

Dombrowski *et al.* (2001) found that adolescent parents demonstrated attachment behaviours and self-confidence when interacting with their preterm twins after experiencing Kangaroo Care. Similarly, Chiu and Anderson (2009), while stating that preterm birth often negatively influences mother-infant interaction, found that Kangaroo Care provided a channel for mothers to develop strong positive feelings towards their infants, and to reconcile their feelings about having a preterm birth, so that emotional healing could take place. This shows that Kangaroo Care post birth has positive effects on maternal feelings toward preterm infants, and on infant development and family interaction. Another study that reinforced the positive effects of Kangaroo Care was undertaken in 2007 by Johnson, who interviewed a group of 18 primiparous mothers who experienced 60 minutes of Kangaroo Care with their preterm infants three times in the first two weeks post birth. These infants were either receiving ventilator support or oxygen therapy. After Kangaroo Care, the mothers expressed their feelings as "heart-warming", "being needed" and having confidence in knowing how to care for their infants.

Positive effects of Kangaroo Care on mother-preterm infant interaction and infant and family health were also reported from a matched-control study conducted with

146 preterm infants in a hospital in Jerusalem, Israel. Feldman *et al.* (2002a) reported that at 37 weeks' gestation, Kangaroo Care mothers had more positive affect, touch, adaptation to infants' cues and perceptions of their infants. Feldman *et al.* (2002b) found that hospital-discharged Kangaroo Care infants had more mature state distributions and organised sleep-wake cycles, and at three months were more tolerant to negative maternal emotion (they displayed less negative affect), and their parents were more sensitive and less intrusive. Kangaroo Care parents also demonstrated more affectionate touching of their infants and of each other, and more often held their infants in a position conducive to mutual gaze and touch.

Tallandini and Scalembra (2006) examined the effects of Kangaroo Care on very low birth weight preterm infants and their mothers. In the study, control dyads (n=21) received routine care and Kangaroo Care dyads (n=19) experienced Kangaroo Care for at least one hour per day for a mean of 24.37 days (SD=11.06). The Kangaroo Care mothers were found to be less emotionally stressed while in the hospital, and mother-infant interaction was better at 38 gestational weeks.

Mothers of preterm infants are at high risk of depression because they are worried about their infants' social and cognitive development (Feldman *et al.* 2002a). Feldman *et al.* (2002a) reported that mothers in the Kangaroo Care group in their study were less depressed than mothers in the control group, and perceived their infants as less abnormal and more cognitively developed. Furthermore, they had a positive sense of the parenting role and high levels of confidence in taking care of their infants (Feldman *et al.* 2002a), a finding also reported by Charpak, Ruiz-Peláez, Figueroa and Charpak (2001). Moreover, fathers who used Kangaroo Care had more interaction patterns than those in the control group (Feldman 2004). Similarly,

another study reported that mothers' levels of postpartum depression decreased very quickly with planned Kangaroo Care after giving birth (Dombrowski *et al.* 2001). Upon discharge, maternal depression was lower among Kangaroo Care mothers, and an interaction effect of group and medical risk indicated that Kangaroo Care improved maternal mood. This was especially so among mothers with low-risk premature infants (Feldman 2004). These women were able to achieve full contact with their infants only several days after birth (Feldman 2004). This experience possibly improved the negative effects of infant incubation (Feldman *et al.* 2002a). These findings thus suggest that Kangaroo Care mothers are better prepared for the maternal role.

Kangaroo Care may promote mother-infant interaction patterns for several reasons. Close contact increases the mother's familiarity with the infant and her improved mood may increase maternal investment. The development of the mother-infant relationship relies on the mother's gradual learning about the infant and their special interactive signals, which mothers typically acquire during moments of physical intimacy (Feldman 2004). Mothers who experienced Kangaroo Care were found to provide more affectionate touch to their infant, were more adaptive to infant signals, and their infants were more alert during interactions (Feldman *et al.* 2002a).

2.3.2.11 Breastfeeding

Kangaroo Care has been found to help women breastfeed successfully. Infants who experience Kangaroo Care are more likely to be exclusively breastfed, which is why it is one of the ten steps to breastfeeding devised by UNICEF (2005). In a study of Kangaroo Care and breastfeeding, Hake-Brooks and Anderson (2008) report that Kangaroo Care dyads, compared to control dyads, breastfed significantly longer.

Kangaroo Care dyads also breastfed more exclusively at each measurement, and more Kangaroo Care dyads than control dyads breastfed at full exclusivity.

Exclusive breastfeeding is especially important for vulnerable premature infants because breastfeeding confers immunological and nutritional benefits to infants that cannot be duplicated with premature formulas (Blois 2007). In a prospective observational study of 119 mothers of very low birth weight infants, Kangaroo Care was one of the significant correlates that predicted successful lactation beyond 40 weeks corrected age (Furman, Minich & Hack 2002).

2.3.2.12 Infection in infants who receive Kangaroo Care

Infants hospitalised in the NICU have a high rate of health care-associated infections (Sakaki, Nishioka, Kanda & Takahashi 2009). Late-onset neonatal infections are nosocomial infections in the NICU. The major pathogens of late-onset infections are caused by gram-positive organisms such as coagulase-negative Staphylococci or *Staphylococcus Aureus* (Wei *et al.* 2005). Current data suggests that Kangaroo Care may be a risk factor for acquiring MRSA and further investigation is required to determine whether this can be demonstrated conclusively (Sakaki *et al.* 2009). Sakaki *et al.* (2009) suggest that additional studies are needed to examine the influence of Kangaroo Care on the development of MRSA infection in infants with regard to the criteria of adaptation and the start day.

Early Kangaroo Care may reduce the risk of serious infection by colonising infants with their mother's skin flora (Kitajima 2003). However, few studies to date have addressed bacterial flora species. In the study by Sakaki *et al.* (2009), where Kangaroo Care was conducted in a clean environment, a clean cloth was used and there was no fomite contamination. Therefore, it is difficult to consider that

Kangaroo Care may be directly associated with the cross infection of MRSA (Sakaki *et al.* 2009). However, the length of hospitalisation might be a genuine risk factor for MRSA infection (Sakaki *et al.* 2009).

Other studies have found that Kangaroo Care and breastfeeding are associated with reduced rates of infection and necrotising enterocolitis (NEC) (Kirsten & Kirsten 2000). Charpak *et al.* (2001) undertook a randomised controlled trial with 746 infants who were born weighing less than 2,000g. Infants were randomly assigned to two groups. The first group was the Kangaroo Care group. These infants were kept in an upright position in skin-to-skin contact, firmly attached to the mother's chest for 24 hours a day. Their temperature was maintained within the normal range by the mother's body heat. They remained in the Kangaroo position as long as possible. The control and intervention infants were kept in incubators until they could regulate their temperature and show appropriate weight gain. This research found that more of the infants who received Kangaroo Care were breastfed until three months of corrected age, spent less time in hospital than the traditional care infants, and had a reduced frequency and lesser severity of nosocomial infection than traditional care infants who remained in incubators until the usual discharge criteria were met.

Kangaroo Care has proven successful in improving survival rates of premature and low birth weight infants, and in lowering the risks of nosocomial infection, severe illness and lower respiratory tract disease (Conde-Agudelo *et al.* 2003). One randomised controlled trial of preterm infants who received Kangaroo Care for a mean of 13.5 hours per day found they had significantly fewer nosocomial infections than preterm infants who did not receive Kangaroo Care (Suman *et al.* 2008). However, two other randomised trials found no difference in the infection rate

between infants who received intermittent but not 24/7 Kangaroo Care, and infants who did not receive any Kangaroo Care (Kadam, Binory, Kanbur, Mondkar & Fernandez 2005). A Cochrane meta-analysis showed a decrease in infections in infants who experienced Kangaroo Care (Conde-Agudelo & Belizan 2009). Furthermore, Charpak *et al.* (2001) showed that while the Kangaroo Care group and the control group in their study showed no difference in the number of infections, infections were less severe in the Kangaroo Care group than in the control group.

2.3.2.13 The effect of Kangaroo Care on infant pain

It is important that staff give careful consideration to infant pain and distress because the cortisol response to pain results in behavioural, autonomic and hormonal responses (Gitau, Fisk & Glover 2004). This cortical capacity to interpret painful stimuli begins to function as early as 20 weeks gestation. The human foetus, and preterm infants, can mount hormonal stress responses to painful stimuli by 23 weeks gestation (Gitau, Fisk, Teixeira, Cameron & Glover 2001) and generate some analgesia through the endogenous endorphin system (Gibbins & Stevens 2001). Clinicians can assess pain reliably and validly in preterm and term infants in neonatal intensive care units using the Pain Assessment Tool (PAT) (Spence, Gillies, Harrison, Johnston & Nagy 2005).

It is known that maternal and infant skin responds to pleasant touch by releasing neuropeptides including cholecystokinin and opioids (Weller & Feldman 2003), and that as little as twenty minutes of Kangaroo Care is known to produce an opioid-mediated relaxation that can cause skin vasodilation and its concomitant warming (Crompton *et al.* 2003; Noguchi *et al.* 2003). It is also known that Kangaroo Care increases pituitary thyroid axis activity, which can increase metabolic rate and skin temperature in both mother and infant (Weller & Feldman 2003). Therefore,

Kangaroo Care may be a useful strategy for reducing the pain response in preterm infants.

An infant's cry is a stress behaviour and one of the most potent distress signals that an infant offers (Ludington-Hoe *et al.* 2002). In preterm infants, crying clearly occurs in response to pain. The management of pain is the main nursing responsibility and finding an intervention that reduces crying as a response to pain is needed. Research evidence suggests that Kangaroo Care could be a promising strategy for minimising the crying response to pain (Kostandy, Cong, Abouelfettoh, Bronson & Stankus 2008).

Harrison, Evans, Johnston and Loughnan (2002) studied bedside assessment of heel lance pain in the hospitalised infant. They found low interrater reliability for body movements but high interrater reliability for facial expressions and crying scores. Moreover, heart rate was responsive to the heel lance. Kangaroo Care has been shown to have an analgesic effect for term infants during a standard heel lance procedure. In a study by Gray, Watt and Blass (2000), crying and grimacing were reduced by 82 and 65 percent respectively in the skin-to-skin group. Kostandy *et al.* (2008) similarly showed that Kangaroo Care reduced crying in response to pain. During heel stick in medically stable preterm infants who were two to nine days old, crying time was less for infants being held in Kangaroo Care compared with infants lying in an incubator during the heel stick ($p=.001$) and recovery ($p=.01$) phases, regardless of sequence (Kostandy *et al.* 2008). This finding of a diminished pain response to a Kangaroo Care heel stick is similar to findings from previous studies with preterm infants, which reported more positive effects and decreased pain response in infants when mothers did Kangaroo Care (Feldman *et al.* 2002a;

Johnston *et al.* 2003; Ludington-Hoe, Hosseini & Torowicz 2005), and with full-term infants (Gray *et al.* 2000).

In examining responses to acute pain experiences, Miles *et al.* (2006) observed mothers who began daily sessions of Kangaroo Care with preterm infants less than 32 weeks postmenstrual age and continued Kangaroo Care for four weeks. Pain responses at four and 12 months corrected age were no different between infants who had received Kangaroo Care and those who had not. Nonetheless, for acute procedural pain, Kangaroo Care appears to reduce pain reactivity. This is further evidenced by Phillips, Chantry and Gallagher's (2005) finding that maternal holding is more analgesic than a pacifier for infants. In addition, Kangaroo Care has been found to be a useful analgesic during painful medical procedures (Gray, Miller, Philipp & Blass 2002) and to assist in the recovery process after heart surgery in full-term neonates (Gazzolo *et al.* 2000).

The studies discussed here make it possible to speculate that Kangaroo Care analgesia may inhibit stimulation of the infants' central pathways. However, while Kangaroo Care has been recommended as a non-pharmacologic pain management strategy (Clifford, Stringer, Christensen & Mountain 2004), the evidence supporting its practice with preterm infants is still limited. Definitive studies are needed to confirm that Kangaroo Care minimises pain without creating memories for the infant that associate the mother's holding with painful stimuli.

2.3.2.14 Period of hospitalisation

Kangaroo Care was originally conceptualised in response to overcrowding and insufficient resources (Charpak *et al.* 2005). Randomised trials have demonstrated that when Kangaroo Care infants were followed up at one year of corrected age, they

had been discharged home earlier from hospital and had spent less time in hospital (Charpak *et al.* 2001). Overall, a Kangaroo Care policy has been associated with major cost savings (Kirsten, Bergman & Hann 2001). Furthermore, Ramanathan *et al.* (2001) in their study in New Delhi, India, found that preterm infants who were given four hours of Kangaroo Care per day were allowed to go home earlier than those in the control group because their weight gain was better.

2.3.3 Infant readiness for Kangaroo Care

Examination of the infant's vital signs offers the best indication of physiologic readiness for Kangaroo Care (Ludington-Hoe 2008). In guidelines developed by Mallet *et al.* (2007), if the infant's heart rate is tachycardic (more than one third of baseline increase while at rest and undisturbed), Kangaroo Care should not be performed because tachycardia may be due to fulminating sepsis (Mallet *et al.* 2007). On the other hand, if tachycardia is due to agitation, Kangaroo Care should be allowed and the heart rate should be monitored closely for a return to normal limits within 10 to 15 minutes of the onset of Kangaroo Care. If the heart rate does not return to baseline, Kangaroo Care should be discontinued (Mallet *et al.* 2007). If the infant is bradycardic, Kangaroo Care is permitted because no increase in bradycardic events has been seen during Kangaroo Care (Bohnhorst *et al.* 2004) and bradycardia is rare during Kangaroo Care (Clifford & Barnsteiner 2001; Eichel 2001). If apnoea of any duration is accompanied by desaturation ($\text{SaO}_2 < 88\%$ for infant in room air and $\text{SaO}_2 < 85\%$ for infant on oxygen support) and/or colour change (Bohnhorst *et al.* 2004), then Kangaroo Care should not be performed (Ludington-Hoe 2008).

It is essential to consider an infant's oxygen saturation level as well as their heart rate. For infants at rest in an incubator on room air, if SaO_2 is 88 percent or more,

Kangaroo Care is allowed (Ludington-Hoe 2008). For infants at rest in an incubator receiving oxygen, if SaO₂ is 85 percent or more then Kangaroo Care is allowed; if SaO₂ is less than these values when the infant is at rest in the incubator, then Kangaroo Care should not be permitted (Ludington-Hoe 2008). A trial of Kangaroo Care may be performed with very close monitoring for worsening of desaturation due to rapidly increasing body temperature, especially during the second hour of Kangaroo Care (Smith 2003). If the infant has experienced any desaturation episodes of less than 80 percent of any duration in the previous 12 hours, Kangaroo Care is not to be done because these severe desaturation episodes may increase (Bohnhorst *et al.* 2004).

Infant activity can also signal infant readiness for Kangaroo Care. If the infant has normal activity for his or her gestational age—normal responsiveness to stimuli and normal tone—Kangaroo Care is allowed (Ludington-Hoe 2008).

2.3.4 Parental readiness for Kangaroo Care

While there is evidence that Kangaroo Care is an essential tool in enhancing parent-infant attachment through the positive relationships that are formed between parents and their preterm infants, it must be acknowledged that mothers need time to deal with the birth of their infant before starting a new relationship with that infant (Fegran, Helseth & Fagermoen 2008). A phenomenological study that explored the lived experience of parents who provided their preterm infants with Kangaroo Care at a tertiary-level maternity centre in the Western Cape described the challenges health care providers faced in working with parents to implement Kangaroo Care (Leonard & Mayers 2008). It made recommendations for providing information and support to parents about Kangaroo Care, including explaining clearly to parents that

although Kangaroo Care is a structured method of providing care, it is not a rigid set of step-by-step rules. It also recommended that health professionals need to acknowledge the parents' contribution to Kangaroo Care and partner with them in caring for their preterm infants (Leonard & Mayers 2008), a standpoint also adopted by Ludington-Hoe (2008). Checking parental emotional readiness, feeding intentions and parental health status can help ensure a positive Kangaroo Care experience for both infant and parent (Ludington-Hoe 2008).

Two criteria need to be met to establish parental willingness for Kangaroo Care. First, both the mother and the father need to have been given adequate information about Kangaroo Care so that an informed decision is being made. If the parent then agrees, Kangaroo Care is allowed. Second, parental readiness is signalled by the parent requesting an opportunity to hold the infant. If the parent does not request skin-to-skin contact when asking to hold the infant, skin-to-skin contact should be encouraged rather than swaddled holding so that the infant receives the multiple benefits of Kangaroo Care. If the parent requests an opportunity to hold the infant in Kangaroo Care and infant criteria are met, Kangaroo Care is allowed and parental willingness has been established (Ludington-Hoe 2008).

Furthermore, parental emotional readiness should be considered. Burkhammer, Anderson and Chiu (2004) recommend encouraging the parents to do Kangaroo Care because it helps them overcome feelings of guilt, empowers mothers and fathers, facilitates maternal emotional resolution of preterm birth, and promotes bonding, involvement and better parental-infant interaction patterns. In addition, Kangaroo Care has been demonstrated to be beneficial to mothers with a history of still birth. These mothers gain confidence as they try Kangaroo Care, and their guilt and

sadness associated with previous stillbirth experiences are decreased (Burkhammer *et al.* 2004).

Preterm infants have immature immune functions, therefore assessing maternal health is mandatory before Kangaroo Care. If the mother has a cold, fever, influenza or any skin rash, Kangaroo Care is not permitted (Gill 2006). Maternal peripartum and postpartum dermatologic lesions may be a source of morbidity for the infant (Gill 2006). Also, if the mother smokes, Kangaroo Care is still allowed but the mother needs to know that the scent of smoke lingers and can be detected by preterm infants (Goubet, Strausbaugh & Chesney 2007). Mothers should be encouraged to shower before providing Kangaroo Care, and if they smoke, to delay smoking until Kangaroo Care has ended for the day (Ludington-Hoe 2008).

2.3.5 Institutional readiness for Kangaroo Care

The assessment of institutional readiness encompasses the areas of physical, human and educational resources. Physical resources that should be available are space; a lounge/chair with foot support; a screen; a gown that closes in front for mothers to wear, or a wrap or a tube top that extends to the mother's waist so that her midriff is not exposed; a receiving blanket folded to insulate against heat loss across the infant's back; and a head cap for the infant. Johnson (2007) found that although the primary factor for implementing Kangaroo Care was the infant's assessed physiologic stability (stated by 98.5% of nurses), other factors identified as integral components included adequate staffing patterns, maternal readiness and encouragement from management. Nurses with five or more years of Senior Charge Nurse (SCN) practice were more likely to implement Kangaroo Care as an intervention to support attachment for any gestational age neonate. Chia, Sellick and

Gan (2006) found that neonatal nurses strongly support the use of Kangaroo Care in the NICU. Although the majority of nurses reported positive attitudes and practices, they identified a number of educational and practical concerns that need to be addressed to ensure Kangaroo Care with low birth weight infants is safe and effective (Chia *et al.* 2006).

Human resources questions that need to be addressed are as follows:

- Is there adequate nurse experience?
- Is there adequate nurse experience with Kangaroo Care?
- Is there adequate staffing available to help if needed?
- Is there support for the practice of Kangaroo Care from obstetrics, neonatal medicine, nursing administration and neonatal nurse practitioners?

Educational resources such as in-service education, videos, articles, pamphlets, continuing education courses and mentoring should be available to, and accessed by, staff before starting Kangaroo Care because education is needed for its successful implementation (DiMenna 2006; Mallet *et al.* 2007). Parents also need information.

A US national survey, conducted by Engler *et al.* (2002), indicated that most nurses who participated were open to introducing the intervention in their NICUs, but training and safety issues were raised as concerns. The option of Kangaroo Care and its benefits to preterm infants should be common knowledge to parents so that they can request providing it to their preterm infants. It is also important to allocate public funds for awareness and nurse training. The experience of Kangaroo Care experts has been that the method is most effective in nurseries where one nurse is in charge of introducing and supervising the intervention with staff and parents. Funds are thus

required to train special nurses and maintain forums on supervision, communicating knowledge and answering on-site problems (Engler *et al.* 2002).

Nyqvist *et al.* (2010a) found that Kangaroo Care reduced maternal postpartum depression symptoms; enhanced bonding and attachment; enhanced infant physiologic stability, reduced pain and increased parental sensitivity to infant cues; contributed to the establishment and longer duration of breastfeeding; and had a positive effect on infant development and infant-parent interaction. These findings and further recommendations for Kangaroo Care implementation, presented at the 7th International Workshop on Kangaroo Care (Nyqvist *et al.* 2010a) and subsequently published (Nyqvist *et al.* 2010b), need to be shared with neonatal nurses attempting to introduce and strengthen Kangaroo Care protocols in their hospitals.

2.3.6 Limitations of Kangaroo Care

The reluctance of health care professionals to recommend Kangaroo Care may be due to a lack of definitive evidence supporting this intervention and its long-term benefits. While some research suggests that there is no difference between the effects of Kangaroo Care and incubator care on cardio-respiratory stability (Wallin, Rudberg & Gunningberg 2004), there is clear evidence that Kangaroo Care is safe and has important benefits for growth and development of preterm infants, as discussed in this literature review. However, lack of time, space, knowledge and parental confidence to hold their infants are among many factors limiting the possible provision of Kangaroo Care (Dodd 2005). If Kangaroo Care is to be introduced into NICUs as a regular practice, both the ward environment and the ward culture need to change (Eichel 2001).

Ramanathan *et al.* (2001) reported that experience with Kangaroo Care is limited in South Asia. There is insufficient data in Thailand regarding the acceptability of Kangaroo Care to the mothers and health staff, early discharge policies and long-term outcomes (Ramanathan *et al.* 2001). Although Kangaroo Care appears to reduce severe infant morbidity without any serious deleterious effects, there is still insufficient evidence to recommend its routine use in low birth weight infants in hospitals with no appropriate neonatal facilities (Blois 2007; Kirsten *et al.* 2001).

Chia *et al.* (2006) presented four disadvantages of Kangaroo Care. The first was the time involved in preparing the infant, supporting parents and monitoring the infant's condition during Kangaroo Care. This was considered a major problem during times of staff shortage. The second issue reflected concerns about the NICU environment, such as lack of space and privacy for parents practising Kangaroo Care. The third problem focused on the safety and stability of the infant, with major concerns about dislodgement of equipment (e.g. arterial and venous lines) and the infant becoming hypothermic. The last issue was parents commenting on not having eye contact with their infant because of the positioning for Kangaroo Care.

2.4 Bonding and attachment between mothers and preterm infants

Early contact and opportunities for maternal-preterm infant interaction are advisable (Board & Ryan-Wenger 2000). Infants should receive visual and auditory stimuli while being held in their mother's arms so that maternal contact can provide a barrier to overwhelming stimuli (Feldman 2004).

2.4.1 Historical background to bonding and attachment

Klaus and Kennell established bonding theory in 1976 when they began to express the importance of mother-infant contact immediately after birth. Such contact, they maintained, was adaptive physiologically and was an important milestone in the development of emotional bonds necessary for secure attachment. Attachment is formed between a parent and infant shortly after birth and develops during the first three years of a child's life as the parent continually meets their child's physical and emotional needs. Attachment is based on trust.

2.4.2 Maternal-infant bonding

Bonding is defined as “a unique relationship between two people that is specific and endures through time” (Klaus & Kennell 1976, p. 2). Bonding theory is based on the idea that mothers can form a positive relationship with their infant during “a sensitive period”, which Klaus and Kennell (1982) suggest is 45–60 minutes after birth; a crucial time for mothers to have contact with their infant for bonding to occur. Moreover, the bond that is formed during early interaction between parent and infant has long-lasting consequences for the mother's parenting (Klaus & Kennell 1982). This bond is important to the survival and development of the infant because after birth the infants are dependent on their mothers. Mothers will take care of their infant day after day, night after night, changing dirty diapers, attending to the infant's cry, protecting them from danger and feeding them no matter what time it is. Maternal feelings and maternal-infant interaction are expected to influence the quality of the infant's subsequent attachments and all future bonds to other individuals. The consequences of unsuccessful bonding may be negative and long-lasting (Klaus & Kennell 1976).

Klaus and Kennell (1976) used animal studies and the retrospective observations of parents' behaviours with preterm infants as the theoretical background for their experimental studies of bonding in humans during the 1970s (Billings 1995; Klaus & Kennell 1982). Klaus and Kennell (1976) formulated seven principles as important components in the process of attachment (bonding). Three of these principles were used for this study:

1. There is a sensitive period in the first minutes and hours of life during which it is necessary that the mother and father have close contact with their neonate for later development to be optimal.
2. During the process of the mother's attachment to her infant, it is necessary that the infant responds to the mother by some signal such as body or eye movements.
3. Some early events have long-lasting effects.

The other four principles are not related to this research.

Klaus *et al.* (1995, p. 73) explained, in relation to the first principle, that "this does not imply that all mothers and fathers develop a close tie to their infant within a few minutes of the first contact".

A maternal-infant bond normally occurs during pregnancy and in the time immediately after the baby is born. Many times this bond strengthens instantaneously as the baby is placed on the mother's stomach after birth. However, some mothers may not be able to develop this instant bond with their baby for health reasons. This is especially so with premature infants and babies with health problems who are placed in the NICU following delivery (Feldman 2004).

For the purpose of this study, a working definition for "bonding" is the process by which a mother and a preterm infant make a connection with each other and start to

build a relationship that will be unique to them, and will be the basis for that preterm infant developing the ability to bond in the future with other people in their life.

In 1987, Kermode suggested that the actual process of maternal-infant bonding is not clear. Since that time, Ludington-Hoe and Golant (1993) have stated that bonding can occur during the first hour or two after birth when a healthy infant is calm and quiet. During this period, the infant can look at their mother's face, recognise her voice, become familiar with her odour, adapt to touch, seek out the mother's breasts and suckle. When these experiences are repeated, the bonding between the mother and the infant is enhanced. Affectionate behaviour can be expressed to the infant by exploring the infant's cheeks and fingers with touch, followed by stroking and embracing with love. After that, the mother will call to, and talk with, her infant visually, and physically explore her infant's body. When a mother refers to her infant as "my baby or my son or my daughter," this means bonding has begun.

Velandia, Matthisen, Uvnas-Moberg and Nissen (2010) found from their research with fathers and mothers having skin-to-skin contact with their infants that both communicated more vocally with their infants than did fathers ($p=0.003$) and mothers ($p=0.009$) without skin-to-skin contact. Fathers in skin-to-skin contact also communicated more with the mother ($p=0.046$) and performed more soliciting responses than the fathers in the control group ($p=0.010$). Velandia *et al.* (2010) believe that the sooner the mother can hold her infant in Kangaroo Care (not just touch the infant), the sooner she will feel the loving sensation that comes with bonding, resulting in the establishment of an affectionate relationship (Ludington-Hoe & Golant 1993).

Further, Feldman *et al.* (2002a) demonstrated that mothers who experienced Kangaroo Care had more bonding and were more receptive to infant signals than those in the control group. Moreover, infants showed increased activity during interaction and decreased negative emotion, which showed that there were fewer negative effects on infants, higher sensitivity in mothers, and better mother and infant interaction at six months in the Kangaroo Care group than in the control group (Feldman & Eidelman, 2003).

2.4.3 Differences between bonding and attachment

The terms “bonding” and “attachment” are often confused and sometimes used interchangeably in the research literature (Erickson 1996), and by Klaus and Kennell in their book (1976). Some authors have said that attachment is a reciprocal affectionate relationship between mothers or parents and infants, which develops gradually during the first year of life (Muller 1994). Coffman (1992) reported that there were 26 nursing research studies on parental and infant bonding/attachment supporting this definition. Furthermore, attachment theory refers to the role of attachment in the healthy emotional development of a child and helps to explain how a child’s previous life experiences affect their thoughts and behaviour, and their struggles in dealing with separation and loss (Schofield & Beek 2006).

Therefore, based on the “time and direction” of parent-infant interaction or feeling, the definition of attachment is usually opposite from the definition of bonding. “Bonding” is an affectionate tie from parent to infant, whereas “attachment” refers to the tie from infant to parent (Kennell & Klaus 1998). Bonding is the process that occurs from the first moment that mothers begin to feel connected to their infant, whereas attachment is the outcome of the bonding process and occurs on a

continuum (Erickson 1996). Attachment is the process of bonding, whereas bonding is a prerequisite to attachment (Erickson 1996). Therefore, maternity nurses and midwives can contribute to mother-infant bonding by promoting mother-infant acquaintance as soon as possible. “Bonding” and “attachment” will continue to be used interchangeably in the clinical environment and the literature. However, only the term “bonding” has been used in this study.

2.4.4 Factors facilitating bonding between mothers and infants

Many factors are important in facilitating maternal-infant bonding. These include:

- Planning, confirming and accepting the pregnancy (Klaus & Kennell 1976; Sluckin 1993).
- Seeing, touching, and caring for the infant (Klaus & Kennell 1976).
- Creating a calm, emotionally-supportive and responsive environment during labour, birth and the early postpartum period (Klaus & Kennell 1976).
- Skin-to-skin contact during the sensitive period between a mother and infant, suckling and mutual visual regard (Anisfeld & Lipper 1983).
- Touching mothers’ nipples by their infant (Kennell & Klaus 1998).
- Support from husband, family, friends and health care personnel (Hopkins 1988).
- Healthy infants and mothers (Erickson 1996).
- Giving pictures of the infant to the mothers (Huckabay 1987).
- The infant’s body odours (Porter, Cernoch & Perry 1983).
- Monotropy (single birth) (Klaus & Kennell 1976).
- Understanding the experiences of parents from all backgrounds (Roller 2005).

In terms of nurses, they need to see themselves as the connection between parents and children, and believe that they play an important role in creating the affective

attachment between parent and child (Conz, Merighi & Jesus 2008). Furthermore, nursing professionals must establish communication and interaction with the families of infants admitted to the NICU. Parents must be encouraged to participate in care (Conz *et al.* 2008).

Hopwood (2010) found that the NICU environment can have adverse effects on the attachment process between parents and their infants, and that neonatal nurses have the ability to facilitate or impede the attachment process through the quality of their care. Furthermore, positive touch, or skin-to-skin contact, and the use of therapeutic communication has the potential to enhance attachment.

Randomised and nonrandomised controlled trials have confirmed that mothers who provide Kangaroo Care have less maternal anxiety (Lai *et al.* 2006; Lee & Shin 2007; Miles *et al.* 2006), more maternal satisfaction with the NICU experience (Worku & Kassie 2005; Yin, Wang, Lee & Yux 2003), better attachment (Bauer, Uhrig & Versmold 1999; Gathwala *et al.* 2008) and more positive interactions with their infants (Feldman *et al.* 2002a; Gathwala *et al.* 2008).

2.4.5 Factors impeding bonding between mothers and infants

In contrast, several factors may impede bonding between mothers and infants. These include unwanted pregnancy and the infant's gender (de Chateau 1979), maternal age and infant's weight (Calisir & Karacam 2011), bad birth experiences (Crouch & Manderson 1995), maternal stress, (Moehler, Brunner, Wiebel & Resch 2006), depression, anxiety and low self-esteem (Erickson 1996), and separation of mother and infant immediately after birth (Calisir & Karacam 2011). Cultural influences (Klaus & Kennell 1982), mothers' values and expectations (Anisfeld & Lipper 1983), education and occupation as well as obstetric history (Schon 2007) might also

affect maternal-infant bonding, while hospitalisation and infants' ill health cause great stress for the family (Ramona & Walker 2006) and can interrupt the mother-infant attachment process. While nurses and other health care workers provide specialised care for sick and preterm infants in hospital, many mothers struggle with limitations in their maternal role (Johnson 2008).

The stress experienced by parents during their infants' hospital stay can affect the parent-infant relationship and their ability to bond reciprocally (Gale, Flushman, Heffron & Sweet 2004). Besides stress, Ludington-Hoe (2008) found many parameters that can impede bonding between mothers and infants, such as infants' diseases, parental readiness, nursing readiness, environmental support and institutional support. Maternal feelings of incompetence and/or depression may have a negative effect on maternal-infant attachment and on infant development (Field *et al.* 2001). While nurses' actions to promote affective bonding between infants and parents are based on care, empathy, social integration and sharing distress with parents of infants admitted to the NICU (Conz *et al.* 2008), improvement of nurses' knowledge on neonatal physiology, competence and skilful response to an infant's specific needs, an appropriate environment, providing individualised family-centred care and further efforts to position infants' parents as members of the health care team are needed (Conz *et al.* 2008). Currently, encouraging mothers to visit and take care of their infants as much as possible for Kangaroo Care to be successful is not accepted practice in some institutions; a situation that limits Kangaroo Care therein.

Placental transfer of opioids to the foetus, which may produce neonatal respiratory depression (Kopf & Patel 2009), can also impede maternal-infant bonding (Clark & Affonso 1976). The mother who receives these drugs during the first stage of labour

will have an infant who is sleepy for the first 48 hours of their life. The mother will also be sedated and perhaps even too tired to hold the infant immediately after birth. Anaesthesia and analgesia may limit a mother's ability to reach out and explore her infant, thus limiting her ability to develop the delicate synchrony so important to her future relationship with her infant. More recently, Ransjo-Arvidson *et al.* (2001) identified that these drugs may negatively affect newborn behaviour. Thus, while these factors were identified over 30 plus years ago, they remain significant today. It is therefore important that nurses and midwives have knowledge of these issues to identify factors that can impede bonding.

2.4.6 Outcomes of mother and infant bonding

Bowlby's first formal statement of attachment theory built on concepts from ethology and developmental psychology (Bowlby 1958). Bowlby postulated that the unmistakable attachment behaviour exhibited by two-month-old infants is made up of a number of instinctual responses that perform the function of bonding the infant to the mother and the mother to the infant. These component responses, among which are sucking, clinging and following, as well as the signalling behaviours of smiling and crying, mature relatively independently during the first year of life and become increasingly integrated and focused on a mother figure during the second six months (Bowlby 1958).

The researcher suggests that these component instinctual responses become integrated into attachment behaviour. It is difficult to know how this process of integration is related to the parallel process in the cognitive sphere, but it seems likely that there is a significant connection between the two and that a disturbance in one will create repercussions in the other (Bowlby 1958). Hence the importance of

studying the effects of Kangaroo Care and the potential significance it may have on attachment behaviour.

The consequences of mothers' success or failure to bond with their infant may be significant. The strength and durability of bonding may well determine whether or not the infants will develop optimally because they are totally dependent on their mothers to meet their basic needs (Klaus *et al.* 1995). The term "bonding failure" was originally defined as "the failure to develop normal parent-child love" (Lynch & Roberts 1977, p. 624), which is known to heighten the risk of disturbed mother-child relations, vulnerable child syndrome, development of mental and emotional problems in high risk infants, failure to thrive and battered child syndrome (Klaus & Kennell 1976). Conversely, opportunities for bonding have been linked to a lower risk of child neglect and non-organic failure to thrive (Lozoff *et al.* 1977).

The traditional separation of mother and infant at birth may impair the establishment of optimal mothering relationships and later psychological adjustment (Huckabay 1987; Klaus & Kennell 1976). Watson (1991) stated that the early days after birth are a good opportunity for mothers to learn about their infants and recognise and respond to their infants' cues. A mother responding to the cues will give the infant that special feeling of being cared for.

When mothers perceive their infants' signals and respond promptly and appropriately, their infants thrive and the relationship between mother and infant is enhanced. The process of reciprocity is adaptive as the mother learns to recognise her infant's cues, and adapt her behaviours and responses to meet the needs of her infant (Johnson 2008).

Bonding can influence child-raising practices (Thomas 1992). It enables mothers to

make the many sacrifices necessary for the care of their infant, such as attending, protecting and feeding, which helps in the infant's survival and development into an effective adult (Kennell & Klaus 1998).

The value of Kangaroo Care in bonding is illustrated by a mother quoted in Dombrowski *et al.* (2001, p. 215), who said:

It was important to both of us for bonding. It (Kangaroo Care) made me feel closer than I felt holding her regular, you know, wrapped. It calmed her down a lot more and made her more secure. It made me close to her and I was scared to be a mother but it gave me a sense of peace that I could do it (take care of the infant).

Early interventions to help mothers recognise infant cues and understand infant behaviour are particularly beneficial for promoting bonding, attachment and maternal competence, especially for mothers in difficult social situations (Dombrowski *et al.* 2001).

Feldman and Eidelman (2003) found that mothers of Kangaroo Care infants were more sensitive and less intrusive during mother-infant interactions, and infants showed higher social involvement and lower negative emotionality. The level of dyadic reciprocity between Kangaroo Care mothers and their infants was higher in comparison to a control group (Feldman & Eidelman 2003). In addition, Kangaroo Care may function to reverse some of the negative effects of premature birth on the mother-infant interaction (Feldman 2004). Family cohesiveness was higher and intrusiveness lower among the Kangaroo Care families, indicating that mother-infant contact has a beneficial effect not only on dyadic family relationships but also on the family as a whole (Feldman 2004). According to Feldman (2004), it is important for

nursing and psychosocial staff to work closely with each mother to address any physical or emotional difficulty that might arise during the intervention's application.

2.5 Breastfeeding

Breastfeeding is an important public health promotion initiative and cost effective intervention for maternal and child health, and human longevity (NHMRC 1996). Health care costs are minimised as a result of increased breastfeeding rates in association with reduced infant and maternal morbidity and mortality (UNICEF 2000). The World Health Organization (WHO) and government health authorities worldwide have set targets to increase both the initiation and duration of breastfeeding (UNICEF 2000). Breast milk is the best first food for infants because it has high nutritional value and immunoglobulins, both of which promote health in infants (Feldman 2004). Furthermore, initiation of breastfeeding within one hour after birth has been associated with reduced neonatal mortality in a rural Ghanaian population (Mullany *et al.* 2008). If the mother intends to provide breast milk, Kangaroo Care should be encouraged to commence as soon as possible after birth and to continue as frequently as possible. At least 20 minutes of Kangaroo Care each day promotes breastfeeding, and suckling at the breast during Kangaroo Care facilitates the hormonal 'cascade' that supports breast milk production (Browne 2001; Meier, Engstrom, Mingoelli, Miracle & Kiesling 2004).

2.5.1 Relationship between breastfeeding and Kangaroo Care

Bramson *et al.* (2010) have demonstrated a dose-response relationship between early skin-to-skin contact and breastfeeding exclusivity. Multivariate ordinal logistic regression analysis showed that maternal infant-feeding method intention, sociodemographic characteristics, intrapartum variables and early skin-to-skin

mother-infant contact during the first three hours following birth were correlated with exclusive breastfeeding during the maternity hospitalisation. Compared with mothers with no early skin-to-skin contact, exclusive breastfeeding was higher in mothers who experienced skin-to-skin contact for one to 15 minutes, 16 to 30 minutes, 31 to 59 minutes and more than one hour.

Suman *et al.*'s (2008) randomised clinical trial showed that 98 percent of preterm infants who received Kangaroo Care for 13.5 hours per day were exclusively breastfeeding at 40 weeks' gestational age compared with 76 percent of the infants who did not receive Kangaroo Care. An earlier study (Furman *et al.* 2002) found that Kangaroo Care was related to continuing maternal nursing beyond 40 weeks gestational age, while a study in New Delhi, India, reported that low birth weight premature infants who received four hours of Kangaroo Care per day had faster weight gains, were discharged earlier from hospital and their mothers were more likely to be exclusively breastfeeding compared to control groups (Ramanathan *et al.* 2001). Following the initial cohort of the infants who received Kangaroo Care in Bogota, Columbia, Charpak *et al.* (2001) found that most infants in the Kangaroo Care intervention group were breastfed by three months corrected age, whereas those infants in the incubator-cared group had a lesser rate of breastfeeding.

Anderson (2008) focused on breastfeeding duration and exclusivity of mother-infant dyads in hospital and over the following 18 months. The study found that Kangaroo Care dyads, compared to control dyads, breastfed significantly longer (5.08 months vs 2.05 months; $p=.003$). Kangaroo Care dyads also breastfed more exclusively at each measurement ($p=.047$). More Kangaroo Care dyads than control dyads breastfed at full exclusivity (100% breast milk, index of breastfeeding status levels 1

or 2) at discharge and at one-and-a-half, three and six months. Mean Kangaroo Care contact per day was 4.47 hours.

Kangaroo Care was also shown to increase exclusive breastfeeding and for a longer duration, as well as improving maternal satisfaction and confidence (Charpak *et al.* 2005).

2.5.2 Importance of breastfeeding for preterm infants

Heird (2001), and Larque, Demmelmair and Koletzko (2002) have shown that breast milk provides the best source of nutrition for infants. This is because breast milk consists of proteins, enzymes, micro-nutrients, lipids, antibodies and particularly long chain polyunsaturated fatty acids, which are critical for the growth and development of premature infants (Heird 2001), and reduce the risk of specific neonatal morbidities such as infection (Feldman 2004). In addition, breast milk has a long-term effect on infants' cognitive development (Horwood, Darlow & Mogridge 2001).

In addition, the rate and severity of necrotising enterocolitis (NEC) in preterm infants who are fed breast milk appears to be reduced (Furman & Kennell 2000), and breastfeeding can possibly improve neurodevelopmental outcomes and increase maternal satisfaction (Furman & Kennell 2000). Furman and Kennell (2000) reported that in comparison to full-term human milk, preterm milk consistently contains a higher energy density, higher concentrations of protein, sodium and chloride, and a lower concentration of lactose. By four weeks of postnatal age, however, preterm milk of any gestation most closely resembles full-term milk. This is the reason why researchers, clinicians and parents share a strong interest in carefully examining the possibility that breast milk is “brain food” for the preterm infant (Furman & Kennell

2000).

Furman and Kennell (2000) reported that in terms of breastfeeding outcomes, preterm infants could be discharged home when full feeds were attained, without a need for documented weight gain in hospital. Even though breastfed infants weighed less, they attained all the developmental milestones at similar ages to formula-fed infants. At eight weeks, visual parts of the brain develop dramatically; development that requires eye-to-eye contact and maternal-infant interactions. These interactions, called “initiation” in biological terms, are vital to optimal development (Schore 2001). It is an innate neurobehaviour distinct from the “maintenance of breastfeeding” behaviour (Righard & Alade 1990). Initiation has also been identified as a “critical period”; a unique period in time that is vital for the optimal development of the organism. It is a time in which an event can take place and behaviour can be fully expressed (Righard & Alade 1990).

Ramanathan *et al.*'s (2001) randomised controlled trial on the effect of Kangaroo Care on breastfeeding rates, weight gain and length of hospitalisation of very low birth weight neonates consisted of two groups: the Kangaroo Care group (n=14), which was subjected to Kangaroo Care for at least four hours per day, with the infants receiving Kangaroo Care after discharge from NICU and at home; and the control group (n=14), which received only standard care. The results of the clinical trial revealed that the neonates in the Kangaroo Care group demonstrated better weight gain after the first week of life and earlier hospital discharge. The number of mothers exclusively breastfeeding their infants at the six-week follow-up in the Kangaroo Care group was double that of the control group (Ramanathan *et al.* 2001).

2.5.3 Difficulties preterm infants experience with breastfeeding

Preterm infants grow at a faster rate than full-term infants because they need to catch up. Like other infants, the best source of nutrition for them is breast milk. However, breastfeeding premature infants can be quite difficult because their mouths are so small that they may find it hard to latch on to the mothers' nipples. Another consideration is Jordan's (2006) suggestion that mothers and their clinicians may feel there is sufficient evidence to justify offering extra support to establish breastfeeding if mothers have received high doses of analgesics in labour (Jordan 2006). Righard and Alade (1990) have documented that infants' poor sucking performance may be a side effect of the antenatal administration of meperidine, and, while Montgomery and Hale (2006) identify that meperidine generally should not be used except in small doses less than one hour before anticipated delivery because of the greater incidence and duration of neonatal depression, cyanosis and bradycardia, its use and side effects must be considered in relation to establishing breastfeeding in preterm infants.

Mothers of preterm infants, especially very low birth weight infants, experience both physiological and emotional challenges that adversely affect breastfeeding rates for this population (Furman *et al.* 2002). Challenges include immature mammary development, poor hormonal responses, infant/maternal separation, stress, anxiety and fatigue (Jones & Spencer 2005), all of which are powerful inhibitors of lactation. The most important barrier to breastfeeding success is the practice of separating mothers and infants (Bergman *et al.* 2004). Shannon, O'Donnell and Skinner (2007, p. 570) state that women's concerns about breastfeeding are:

1. Fear of embarrassment associated with feeding in front of others.

2. Lack of social support or fear of criticism from friends and relatives who see breastfeeding in a sexual light.
3. Concerns about the time commitment to breastfeed and the effect it will have on their work or social lives.
4. Fear that breastfeeding will hurt.
5. Concern their eating habits will harm their infant.
6. Lack of confidence in their ability to produce enough milk to meet their infants' needs.

Therefore, health care staff need to give the mother and her family members the necessary information to enable the mother to gain the confidence to reach her breastfeeding goals. In addition, breastfeeding should be addressed during early prenatal visits.

2.6 Summary

A mother's physical contact with her preterm infant through direct skin-to-skin care has been proven to provide tactile, olfactory, auditory, thermal and proprioceptive stimulation in a unique interactive style (Kostandy *et al.* 2008). Furthermore, Kangaroo Care has been shown to have no adverse side effects in infants greater than 28 weeks gestational age (Browne 2004). The literature reviewed in this chapter shows that Kangaroo Care can result in preterm infants spending less time in the hospital, and having a reduced severity of infections and increased incidence of breastfeeding until three months of corrected age compared with non-Kangaroo Care infants (Charpak *et al.* 2001). Ramanathan *et al.* (2001) similarly found that Kangaroo Care-managed preterm infants had better weight gain after the first week of life, earlier hospital discharge and higher exclusive breastfeeding rates. Data from many randomised controlled trials have found that Kangaroo Care results in better

infant physiological outcomes and stability than the same nursing care provided in incubators (Bergman *et al.* 2004).

A recent meta-analysis (Conde-Agudelo & Belizan 2009) of three studies involving 1,362 low birth weight infants adds to the evidence for the use of Kangaroo Care. It found that Kangaroo Care was associated with the following reduced risks: nosocomial infection; severe illness; and lower respiratory tract disease at six-month follow-up. Kangaroo Care infants had an increased length of time in sleep and had gained more weight per day by discharge (Ludington-Hoe *et al.* 2006).

Kangaroo Care has psychological, physiological and clinical benefits, and, while it has not been shown conclusively to decrease infant mortality, it reduces morbidity without apparent short- or long-term negative effects (Conde-Agudelo & Belizan 2009). The Kangaroo Care intervention, which was shown to improve physiological regulation and reduce stress and crying, is viewed not only as a positive experience for the mother but as an intervention strategy of major clinical importance (Feldman 2004).

This review has demonstrated substantial benefits for mothers and their infants from Kangaroo Care. One of the most important benefits is that continued skin-to-skin contact provides a sense of satisfaction to the mother and enhances mother-infant bonding. The literature highlights the benefits of utilising Kangaroo Care in neonatal units and points to the possible benefits of introducing it in practice on general children's wards. All paediatric and neonatal nursing staff should recommend its use where appropriate and provide families with adequate, correct information.

Despite evidence becoming available, it is still rare to find literature providing evidence-based strategies on how to achieve change in practice (Wallin *et al.* 2004).

Lamp and Zadvinski (2007) are the exception. They suggested an evidence-based practice model to establish a new nursing practice about Kangaroo Care for healthy newborns. In other words, practice needs to change and follow the evidence being produced about the benefits of Kangaroo Care so that all infants and families can benefit from the skin-to-skin experience.

This chapter has described the study's conceptual framework and worked within it to explore the literature about Kangaroo Care, bonding and breastfeeding to evaluate Kangaroo Care in terms of the following questions:

- Is Kangaroo Care beneficial?
- Can it increase mothers' bonding to their preterm infants?
- Can it promote breastfeeding practice in preterm infants?
- Should it be introduced as part of the "Baby Friendly Hospital Initiative" policy for preterm infants in all hospitals in Thailand?

Preterm infants' wellbeing is an important health concern in Thailand. The government is aiming to improve child health care and has implemented a 'Baby Friendly Hospital Initiative' for birthing. However, as discussed in Chapter 1, there is still much maternal neglect of preterm infants in Thailand's 'Baby Friendly' hospitals. Thus, this research project evaluating the Kangaroo Care intervention over a longer term has potential implications for enhancing mothers' responsibility for, and bonding with, their preterm infants.

It is now time to describe the research method, which is presented in the following chapter.

Chapter 3: Method

3.1 Introduction

This chapter presents the research design for this project and also describes the data collection tools and procedures, the settings, the participants (mothers and their preterm infants) and ethical considerations.

This research is based on an intervention using Kangaroo Care for mothers and preterm infants. The project was undertaken initially at the Maharat Hospital, Nakhon-Si-Thammarat, and then in the nearby villages in the South of Thailand over the period from 1 April to 20 October 2007. This project used a quantitative research design plus researcher observation in the field to study the long-term effects of Kangaroo Care on bonding and breastfeeding in two groups of mothers of preterm infants.

Kangaroo Care was chosen as an intervention in this study because it is one kind of close contact that is expected to help mothers bond with their preterm infants. A mother can hold her infant skin-to-skin and touch her infant with the palm of her hand. Under these circumstances, stronger maternal feelings and maternal-infant interaction between the mothers and preterm infants is expected to occur more easily. While the process of attachment begins prior to birth, the initial contact between mother and infant is important immediately after delivery to consolidate the process and set the stage for future interactions (Tilokskulchai *et al.* 2002).

3.2 Research design

Abramson and Abramson (2008) state that a quasi-experimental research design functions to answer questions involving a predicted or possible outcome and the

effects of intervention. Therefore, the researcher chose a quantitative, quasi-experimental longitudinal research design for this study because she wanted to make predictions, based on scientific principles, about how phenomena will behave in the real world, specifically in Thailand. A quasi-experimental design could test hypotheses concerning the effects of the Kangaroo Care health intervention, which was directed at a specific population—Thai women giving birth to preterm babies. In addition, the researcher used observation in the field to enrich analysis of the quantitative data.

The study was conducted using a convenience sample of mothers who were about to give birth to preterm infants, and who consented to participate. The research aimed to evaluate Kangaroo Care in a local hospital and continue the evaluation for six months in the mothers' homes. The researcher used experience and deduction to develop both a theory and possible predictions for further empirical testing in the wider Thai clinical maternity setting.

The quasi-experimental design also allowed for more flexibility than a randomised controlled trial. Dealing with mothers about to give birth to preterm babies in a hospital maternity ward requires flexibility and allowance for uncertainty; a randomised controlled trial would not have been possible in this study. However, it was still possible to group mothers using random allocation into an intervention and non-intervention group after they had consented to participate in the study and the doctor had deemed them fit to do so, thus fulfilling part of the requirements for a quasi-experimental design (Macnee & McCabe 2008). Results from the two groups would be compared to evaluate the possible effects of the Kangaroo Care intervention.

Although much care was taken to have mothers from the two groups kept separate from one another, there may have been minimal communication between them because they were in adjacent rooms. This was another reason for adopting a quasi-experimental research design; it was not possible to completely artificially separate the two groups while they were in hospital. Once the mothers left hospital and were discharged home, they had no contact with each other.

The groups were labeled an intervention and a non-intervention group to avoid the term 'control' group. The study did not use a randomised controlled trial design because it was not possible to control the research environment and the experimental variable, nor could the researcher identify and rule out all threats to internal validity. It would have been almost impossible to eliminate these factors, which were not directly relevant, although threats to internal validity were carefully considered. Every attempt was made to randomise mothers' allocation to the two groups and to maintain each group as a separate entity, but this was not 100 percent possible in the hospital setting.

The mothers in the intervention group gave both standard care and Kangaroo Care to their preterm infants, while mothers in the non-intervention group gave standard care only. In terms of the intervention group in the hospital, mothers gave Kangaroo Care 2–3 times a day for periods ranging from 30 minutes to 1–2 hours each time (there was no set maximum time). Once mothers went home, some increased the amount of Kangaroo Care to 3–4 times per day for 2–3 hours at a time. Working mothers in the intervention group offered Kangaroo Care an average of twice a day until their infant was six months old (throughout the study period).

3.3 Advantages and disadvantages of a quasi-experimental design

3.3.1 Advantages

The design allows for practicality as well as feasibility while allowing for a degree of generalization (Polit & Beck 2010). In this study, the design allowed the evaluation of several hypotheses in a clinical setting, which, being situated in Thailand, allowed for a real world practice setting to be explored rather than a strict controlled experimental design. Most studies of public health interventions are non-experimental or quasi-experimental but their importance should not be minimised because non-experimental or quasi-experimental studies may be more practicable than true experimental designs, and can provide useful and sometimes generalizable lessons.

3.3.2 Disadvantages

One of the disadvantages of a quasi-experimental design and the way it has been used in this study relates to a cause and effect issue (Schneider, Whitehead & Elliott 2007) regarding the benefits of the Kangaroo Care intervention. Both groups of mothers (those applying the Kangaroo Care intervention and those without the intervention) were followed by, and had meetings with, the researcher, for a six-month period. This contact may have influenced the behaviour of both groups of mothers, who may have persevered with breastfeeding longer than they would have if they were not being observed by the researcher (see limitations in Chapter 6).

A further disadvantage is that the outcomes from such a research design, and from this project, will take time to impact on participants. The long-term benefits of Kangaroo Care in relation to maternal-infant bonding, and infant morbidity and mortality, as discussed in the introduction to this thesis, will not be known for several

years. Further follow-up research will be required to evaluate the research outcomes.

3.4 Study participants

The first 38 women who gave birth to preterm infants at the Maharat Hospital during the study's data collection timeframe, and who fitted the inclusion criteria for the study, were invited to participate. These women were provided with an information sheet (see Appendix 2) after delivery whilst in the postnatal ward. The sheet detailed the study topic, objectives, methodology, potential risks and potential benefits. Women who agreed to participate in the study were asked to sign a consent form (see Appendix 3) to confirm their willingness to be involved. Allocation to either the intervention or non-intervention groups then took place using a systematic sampling technique in which the first mother was allocated to the non-intervention group, the second to the intervention group and so on until a sample size of 38 was reached (see Figure 3.1 on page 97). Following this, only mothers in the intervention group received additional verbal and written information relating to Kangaroo Care (see Appendix 3).

Mothers in each group were separated from the mothers in the other group. The researcher spent time talking to mothers in both groups about how to care for their infants but discussed Kangaroo Care with the intervention group only. The researcher also spent time observing all the mothers' care of their infants. Mothers in the non-intervention group did not ask any questions about Kangaroo Care because they were separated from the Kangaroo Care group, and the staff did not give Kangaroo Care information to those mothers.

Two of these original mothers/infants were lost to the study. One mother in the Kangaroo Care group had to move to the North-East of Thailand, and the infant of a

mother in the non-intervention group died at two weeks due to severe sepsis, leaving a final number of 36 mothers and preterm infants. Nevertheless, 36 was considered a reasonable sample size for the purposes of this study; it provided sufficient statistics for the analysis.

Regarding the sample size, Weiss (2005, p. 341) stated that:

The farther the variable under consideration is from being normally distributed, the larger the sample size must be for a normal distribution to provide an adequate approximation to the distribution of \bar{x} . Usually, however, a sample size of 30 or more ($n \geq 30$) is large enough.

The flow chart on the next page (Figure 3.1) describes how participants were invited into the study and their allocation to either group, and how the study design was followed.

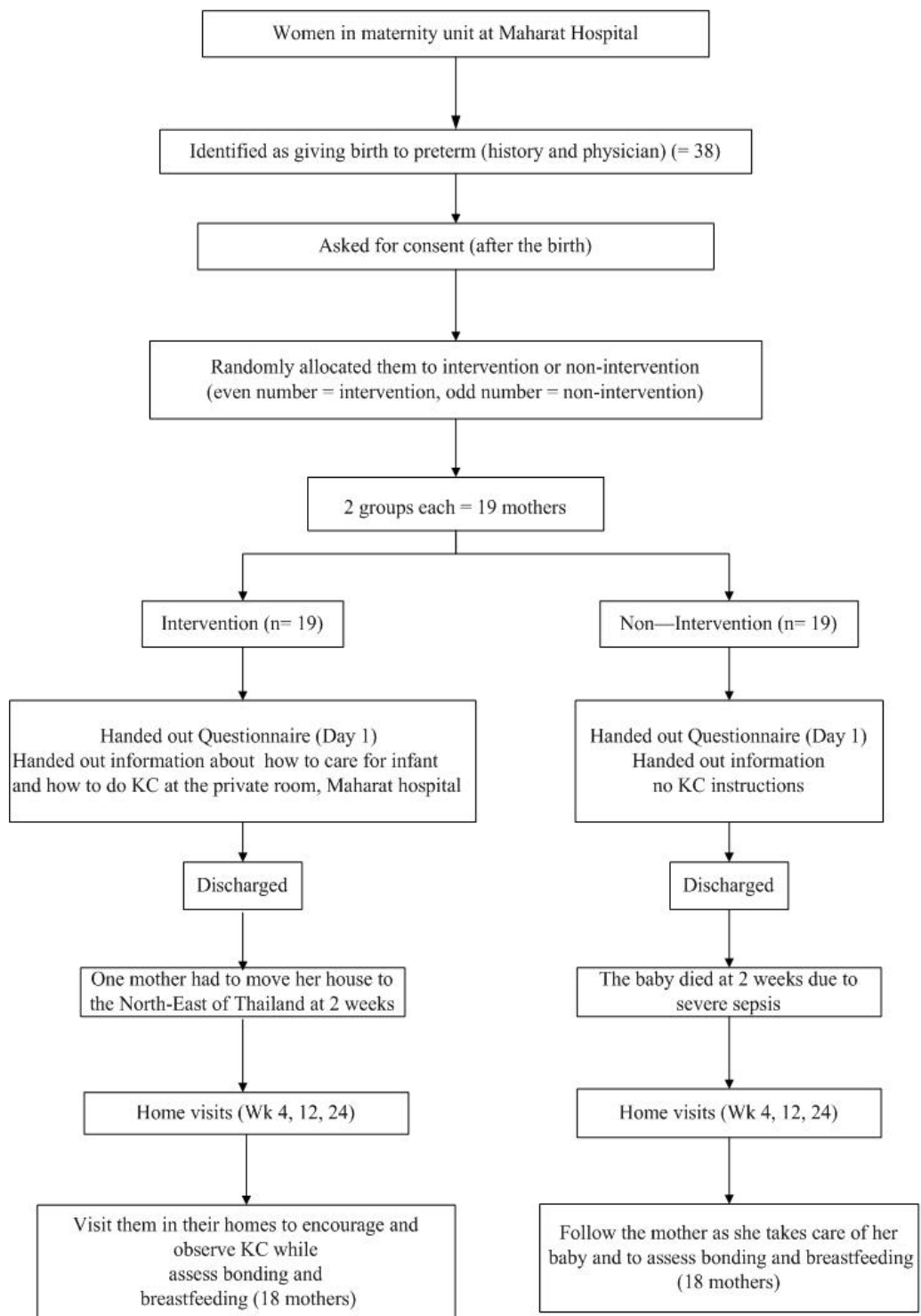


Figure 3.1: Flowchart of participant recruitment and data collection

3.4.1 The sample of mothers used in the study

The mothers' homes were located within driving distance from the Maharat Hospital in the South of Thailand so the researcher was able to visit them at all three home data collection periods with relative ease.

Maternal inclusion criteria were:

1. At least 18 years of age in accordance with Thai law for signing informed consent.
2. Ability to communicate and write in the Thai language.
3. Normal vaginal delivery.
4. Primigravidarum.
5. No other serious illnesses or complications after delivery (e.g. severe haemorrhage or shock).
6. Free of conditions that would prevent contact between mothers and preterm infants (e.g. receiving general anaesthesia or having uncontrolled epilepsy).
7. Willingness to be assigned to either group.
8. Delivered a healthy preterm infant between 32 and 37 weeks of gestation. This age group was chosen because the literature indicated that this is important for the infant's development (Feldman & Eidelman 2003). Normally, the period between 32–37 weeks gestational age is of critical importance for maturation of the vagal tone and circadian system, owing to cortical maturation, synaptic growth, and rapid myelination during this period (Feldman & Eidelman 2003).

Maternal exclusion criteria were:

1. Pre-existing medical problems or complications with pregnancy (e.g. infections, bleeding disorders, diabetes).
2. Diagnosis of depression or psychoses.
3. History of breast surgery, inverted nipples or hypoplastic breasts that might interfere with breastfeeding.

4. Serious complications after delivery (e.g. severe haemorrhage or shock).
5. Taking more than one hour from birth to complete delivery (delivery was complete when the placenta was delivered and the vaginal or perineal tears or the episiotomy had been sutured).

3.4.2 The sample of preterm infants used in the study

Infant inclusion criteria were:

1. Healthy preterm infants.
2. Age of 32–37 weeks gestation (due to reasons explained in point eight of inclusion criteria for mothers).

Infant exclusion criteria were:

1. Serious illness or complications that would prohibit or delay breastfeeding (e.g. major congenital malformations, cleft palate, oesophageal atresia or HIV infected).
2. Serious neonatal illness that would cause the infant to be referred to the NICU (high risk, seriously ill newborn – ‘Nursery 1’) immediately after birth, during the first hour post-birth or before the research data collection.
3. Preterm infants who have not received medication for at least 24 hours prior to the study.
4. Preterm infants who have not received theophylline (because theophylline is known to increase oxygen consumption, to stimulate breathing efforts and to reduce apnoea in preterm infants [Baird, Martin & Abu-Shaweesh 2002]).

All preterm infants in this study were admitted to Nursery 2 (low risk/sick newborn), where they stayed for a period of days until their body weight was more than 1,800 grams and their symptoms stabilised, which was confirmed by a medical doctor.

Based on the literature (Chiu & Anderson 2009; Crawford & Hickson 2002; Feldman *et al.* 2002a,b; Miles *et al.* 2006; Roller 2005), several factors affect maternal-infant bonding. Thus, mothers and preterm infants with variables such as multiple births,

depression, psychoses, unhealthy preterm infants or unhealthy mothers that may hinder maternal-infant bonding were excluded from the study.

3.5 The study setting

3.5.1 Maharat Hospital

The initial setting for the study was the Maharat Hospital, an 836-bed, urban teaching and government hospital in Nakhon-Si-Thammarat. This ancient city is located in a southern province of Thailand 780 kilometres from Bangkok. It has a population of around 85,000. The researcher collected data for six months from 1 April 2007 to 20 October 2007 in Nursery 2 (catering for low risk/sick newborns) of the Maharat Hospital. After discharge of the study participants from the Maharat Hospital, the study continued in the participants' homes, which were located within 120–250 kilometres of Nakhon-Si-Thammarat.

In Thailand, the majority of women giving birth do so in a hospital. Maharat Hospital has recorded a consistent number of live preterm infant births (Committee on the Information Centre, Maharat Hospital 2007) and is also one of the designated 'Baby Friendly' hospitals. This implies that most mothers are encouraged to begin breastfeeding their infants within 30 minutes after birth for approximately 15–30 minutes in a recovery area of a labour room. Then, at approximately two hours post-birth, mothers are transferred to the postnatal ward where they stay until discharged.

The researcher collected the demographic data and arranged the home visits during the time the mothers and preterm infants stayed at the hospital. On Day 1, data was also collected using the Maternal-Infant Bonding Questionnaire (MIBQ) and Bonding Observation Check List (BOCL). The researcher planned the 4, 12 and 24-week home visits. Three days before visiting the participants, the researcher would

call them by telephone in order to confirm the exact date of the meeting.

3.5.2 Mothers' homes

The second setting for this study was the mothers' homes after discharge from hospital. Most mothers' homes were located in the rural area of Nakhon-Si-Thammarat province. The rural family in the typical village setting has an extended family with many generations living in one house, or many houses within the same compound.

The researcher visited the mothers in their homes on an allocated day and at an agreed time at weeks 4, 12 and 24 to observe them and collect data using the MIBQ and BOCL to continue assessing bonding. The mothers self-administered the MIBQ at these times while the researcher administered the BOCL.

All mothers and their preterm infants continued their usual routine care for the preterm infant for the duration of the study. Only the mothers in the intervention group had the Kangaroo Care protocol in addition to the usual routine care.

3.6 Data collection instruments

Questionnaires are frequently used as a principal mechanism for generating quantitative research data; a questionnaire emphasises quantification in the collection and analysis of data (De Vaus 2002). Questionnaires are seen as involving principles of deductivism and objectivism. Houser (2008) defined questionnaires as a tool designed by the researcher to capture specific information from a population to answer a particular question. This method is a systematic approach used to gather information directly from respondents about their experiences, behaviours, attitudes or perceptions (Houser 2008). Participant responses are often described in numeric

terms and/or words. Important characteristics of numeric research surveys are that they use a systematic approach and allow for a quantitative analysis of reliability, validity and statistical conclusions (Walonick 2004).

The questionnaire is typically seen as the preferred research instrument within the quantitative research tradition because it can be readily adapted to concerns about reliability and validity (De Vaus 2002). Analysis of the questionnaire's results can be conducted in a way that is values-free. Such objectivism supports an ontological position that asserts that social phenomena and their meanings have an existence that is independent of, or separate from, social actors (Bryman 2004).

3.6.1 Strengths and weaknesses of questionnaires

The questionnaire method is both a quantitative and qualitative approach to the collection of data. It is often used because it offers flexibility, versatility and specialisation (Groat & Wang 2002). Questionnaire data can be collected in person or by telephone, direct mail or the internet, allowing access to samples dispersed over large geographic areas (Houser 2008). In addition, the use of well-designed and organised instrumentation can contribute to the efficiency of questionnaire research, with results being generalizable to other circumstances (Groat & Wang 2002).

Quantitative analysis procedures were used to analyse the psychometric data from this study. Two of the questionnaires—the Maternal-Infant Bonding Questionnaire (MIBQ) and the Bonding Observation Check List (BOCL)—were already validated tools from other studies (Huckabay 1987; Kojasuta 1995; Laohapensang 1983). Using validated tools maintains the consistency and stability with which they measure the target attributes. Therefore, they can be considered rigorous (Polit &

Beck 2010). The demographic data questionnaires, while not previously validated, used standard questions seen in any demographic questionnaire.

3.6.2 Questionnaires used in this study

In terms of this research, there were four questionnaires:

Demographic Data Questionnaire (mothers, see Appendix 4)

Demographic Data Questionnaire (infants, see Appendix 5)

MIBQ (already validated; see Appendix 6)

BOCL (already validated; see Appendix 7).

The researcher translated the BOCL to Thai before collecting data. The MIBQ was already in Thai. Since most of the data was numerical, very little translation from Thai to English was required in order to begin data analysis.

3.6.3 Questionnaire data: mothers

The mothers' demographic data was obtained using the Demographic Data Questionnaire for the Mother (Appendix 4). The researcher asked the mothers for the demographic information and reviewed their medical records. The mothers' demographic characteristics consisted of their ages, education, occupation, religion, marital status, family income, pregnancy history, complications during this pregnancy, breast problems, types of anaesthesia used and serious complications after delivery.

In addition, the researcher asked the mothers where they wanted the nurse to place their preterm infants after birth, and where the nurse actually placed the preterm infants. This question was to determine whether the nurse followed the mothers' wishes.

3.6.4 Questionnaire data: preterm infants

Information collected using the Demographic Data Questionnaire for the Infant (Appendix 5) included gender, gestational age, birth weight, length, Apgar scores at one minute and at five minutes, birth deformities, serious neonatal illnesses, type of postpartum ward, preterm infants' period of high risk, preterm infants' period of low risk, preterm infants' ages, in days, at discharge, and hours per day spent by mothers with their preterm infants in Nursery 2.

3.6.5 Maternal-Infant Bonding Questionnaire (MIBQ)

Laohapensang (1983) originally translated only one part of the 'Affectional Relationship Questionnaire' developed for measuring the effect of planned physical contact on enhancing the formation of paternal-newborn 'affectional' bonding (Bills 1980). Laohapensang (1983) at that time also renamed the questionnaire the 'Maternal-Infant Bonding Questionnaire' (MIBQ) (see Appendix 6). In 1995, Kojasuta fully translated the original 'Affectional Relationship Questionnaire' (Bills 1980) into Thai and used the adaptations made by Laohapensang (1983) to reflect the Thai culture. Kojasuta (1995) used this questionnaire to measure the maternal affectionate feeling (bonding) with full-term infants after implementing very early Kangaroo Care (begun within 30 minutes after birth) for 10 minutes in the delivery room in Thailand.

The researcher used the MIBQ (based on Kojasuta's 1995 version) as a tool to measure the intervention and non-intervention groups of mothers' affectionate feelings toward their preterm infants as one aspect of maternal-infant bonding. It was also used to find out how the mothers felt about their role as a mother. The mothers in both groups self-administered this questionnaire on Day 1 post birth in the

hospital, and in Weeks 4, 12 and 24 at their homes. It took approximately 30 minutes for the mothers to complete the questionnaire each time.

The MIBQ consisted of six subscales with a total of 31 items. The subscales used were: Subscale 1, 'Perception of Infant Features' (5 items); Subscale 2, 'Attention and Connection to the Infant' (6 items); Subscale 3, 'Acceptance of the Infant's Individuality' (5 items); Subscale 4, 'Acceptance of the Role of Mother' (4 items); Subscale 5, 'Preparation for Nurturing the Infant' (7 items) and Subscale 6, 'Desire to Touch or Hold the Infant' (4 items). Mothers marked each item on a 5-point Likert scale ranging from 1=definitely false to 5=definitely true, which provided an ordinal level of measurement. When analysing the data obtained from this questionnaire, the researcher treated the Likert scale scores as interval data, adopting the position of Polit and Beck (2004, p. 454) that "most analysts believe that treating them as interval measures results in too few errors to warrant using less powerful statistical procedures". The face validity and reliability of the MIBQ was determined by Kojasuta (1995) by having two experts in obstetric nursing and one in paediatric nursing test the questionnaire and determine the Cronbach's alpha reliability (tested at $\alpha=0.05$) to be 0.91, based on 120 postpartum Thai mothers.

In terms of this study, the researcher used Cronbach's alpha reliability with a range from 0 to 1.0. A value of 0 indicates no relationships among the responses to the different items in the scale used, while a value of 1.0 indicates that all answers to the items are completely connected or related to each other (Polit & Beck 2008). In general, researchers hope for an alpha coefficient of greater than 0.7, indicating a relatively strong relationship or connection among the responses to the different items on any particular scale (Macnee & McCabe 2008). The overall Cronbach's

alpha reliability ($\alpha=0.05$) for this study was 0.95, as discussed in the data analysis section (3.7.3). After reversing negatively scored items, the ratings of all items were entered. The average mean of each individual item was scored, and the average mean of each subscale was calculated for further measurement and data analysis.

3.6.6 Bonding Observation Check List (BOCL)

The purpose of the BOCL is to allow the researcher to objectively observe and measure the mother's affectionate behaviour (bonding) toward her infant. This checklist was established by Huckabay in 1987, based on Klaus and Kennell's (1982) theory of bonding. The researcher used the BOCL (see Appendix 7) in this study to assess the mothers' affectionate behaviour toward their premature infants on Day 1 and at Weeks 4, 12 and 24.

The content validity of the BOCL was established as stated in the literature by a panel of five judges composed of clinical nurse specialists and paediatric nurse practitioners with Masters' degrees in nursing. An agreement of 98.6 percent was obtained among the five judges as to whether each of the items indeed measured bonding behaviour with 40 mothers (Huckabay 1987). The inter-observer reliability of the BOCL, based on two observers' ratings of 20 subjects, was 98.4 percent.

In this study, the BOCL was translated into Thai with permission from Huckabay. The translation was done by the researcher initially, then given to two experts (a paediatrician and a maternal-child nurse professor) for comments and suggestions. The translated BOCL was approved without alterations and the instrument was then deemed satisfactory to use in this study. The Cronbach's alpha reliability for the BOCL in this study ($\alpha=0.05$) was 0.88, as detailed in the BOCL data analysis section (3.7.4).

In order to collect the BOCL data, the researcher directly observed the mothers' and the preterm infants' behaviours every minute over a 10-minute period and recorded these on the BOCL sheet. A wristwatch with a second hand was used to time this. These behaviours were observed while the mother was breastfeeding on Day 1 in the hospital, and in Weeks 4, 12 and 24 in the mothers' homes. The total possible score for each behaviour was 10 (varying from 0–10). The total marks for all behaviours observed in the 10-minute period were counted to create a total BOCL score. An average rank of the BOCL was used for the data analysis. Higher scores meant more maternal-infant bonding. These presented maternal-infant interaction and mothers' affectionate behaviours toward their preterm infants.

3.6.7 Protocols for Kangaroo Care intervention

Kangaroo Care for preterm infants can be offered during daily activities such as sitting, sleeping or walking at the hospital or at home. The Kangaroo Care protocol detailed in Appendix 8 has been compiled from a variety of published sources detailing its various steps (Bell & McGrath 1996; Gale & VandenBerg 1998; Ludington-Hoe & Golant 1993). Thus far there is no complete written procedure of Kangaroo Care the way it is described in this study.

3.7 Data Analysis

The Statistical Package for Social Sciences (SPSS) version 15, originally developed in 1968 by Norman H. Nie and C. Hadlai Hull, was used for all data analyses. As stated previously, the data was collected from four different sources: the mothers' demographics; the infants' demographics; the MIBQ; and the BOCL.

3.7.1 Analysis of participants' demographic details: mothers

The non-intervention and intervention (Kangaroo Care) groups each had 18 women,

all of whom gave birth to preterm infants. The demographic data from the mothers was analysed using both descriptive and inferential statistics, as presented in table form in Chapter 4. The frequencies of the demographic data were presented as percentages for each group. Non-parametric analysis (Mann-Whitney U test) was used to compare the two different groups of mothers for statistically significant variance.

3.7.2 Analysis of participants' demographic details: preterm infants

Similar analysis to that used for the mothers' data was used for the preterm infants' data. Descriptive statistics were used to present the data and a Mann-Whitney U test was used to compare and check for similarities or differences between preterm infants born to mothers in the non-intervention group and those born to mothers in the intervention (Kangaroo Care) group.

3.7.3 Analysis of data arising from the MIBQ

The MIBQ was used to measure maternal and infant bonding. It consisted of a number of questions related to the mothers' feelings toward their infants. The data was collected and initially analysed in frequencies and tested for normality. Parametric tests were used to compare the two groups of mothers because the data followed closely a normal distribution, mean, median, skewness and kurtosis. Furthermore, the numbers were interval numbers. A series of tests was used to compare data for the subscales in each group to establish whether there was a difference for the subscales (independent *t*-test) between the groups for the four different time periods.

The differences between the two groups were analysed in terms of mean and standard deviation within each subscale and time period (Day 1 and Week 4, Day 1

and Week 12, and Day 1 and Week 24) using a one-way repeated ANOVA for each item within each subscale. A one-way, repeated measures ANOVA design exposes each subject to two or more different conditions, or measures each subject on the same continuous scale on three or more occasions. It can also be used to compare respondents' answers to two or more different questions or items.

A Mann-Whitney U test was used for the six subscales for Day 1, Week 4, Week 12 and Week 24 to check whether the infants' gender may have had an effect on the results (which are presented in Chapter 4).

Cronbach's alpha reliability ($\alpha=0.05$) of the MIBQ, based on 36 postpartum Thai mothers for each individual time period, was 0.85 at Day 1, 0.84 at Week 4, 0.83 at Week 12 and 0.90 at Week 24. Further, Cronbach's alpha reliability ($\alpha=0.05$) for the MIBQ was measured overall for the six subscales (total 31 items) over the four time periods at 0.95, based on 36 postpartum Thai mothers.

3.7.4 Analysis of data arising from the BOCL

The BOCL contains 14 items that are scored at one-minute intervals over 10 minutes. This data was collected for Day 1, Week 4, Week 12 and Week 24, the same as for the MIBQ. Since the data collected for this check list was categorical, a non-parametric test (a Mann-Whitney U test) was used to analyse the results. All 14 items were compared for each time period. The four time periods were then compared to check for significant differences between the items in each period. Cronbach's alpha reliability for the BOCL was 0.88, based on 36 postpartum Thai mothers over the four periods. The results are tabulated and plotted in Chapter 4. Data for breastfeeding times, place of breastfeeding and mother's return to work were compared for the four time periods. The infant's gender, breastfeeding practices and

return to work results were analysed using a Mann-Whitney U test because these data were not normally distributed.

3.8 Ethical considerations

Ethics approval for the study was granted by Flinders Clinical Research Ethics Committee, Flinders Medical Centre, Adelaide, South Australia (see Appendix 1). Permission to undertake the research in Thailand was granted by the Research and Ethics Committee, Maharat Hospital, Nakhon-Si-Thammarat, Thailand (see Appendix 1).

The Australian National Statement on Ethical Conduct in Research Involving Humans was used to guide this research (Academic Ethics Sub-Committee, Staffordshire University 2006) in accordance with the following:

- The research proposals must be designed to ensure that any risks of discomfort or harm to participants are balanced by the likely benefit to be gained.
- Mothers' refusal to participate in a research project must be respected and participants must be free at any time to withdraw consent to further involvement in the research.
- The personal information about research participants has been collected, stored, accessed, used or disposed of in such a way that would strive to ensure that the participants' privacy, confidentiality and cultural sensitivities were protected.

Mothers signed informed consent to participate in either group prior to testing, and after university and hospital institutional review board approvals. It was made clear to all participating mothers that they could withdraw from the study at any time without any impact on their care.

The guidelines re participants' personal information were followed explicitly. While data was being collected and accessed for the purpose of writing the thesis, it was

stored in a locked filing cabinet at the School of Nursing and Midwifery at Walailak University in Thailand. During data analysis, the data was stored in a locked filing cabinet at the School of Nursing and Midwifery at Flinders University in Adelaide, South Australia. After final completion of this thesis, all data will be stored in a locked filing cabinet at Flinders University for five years, after which time it will be destroyed.

The researcher collected all data in handwriting in Thailand. After completing data collection, the researcher entered it into SPSS (Statistical Package for the Social Sciences) version 15 when she returned to Australia.

3.9 Summary

This chapter consists of a description of the research methods used to collect the data at Maharat Hospital and in the mothers' private residences in Thailand. It has provided justification for the use of a quantitative study design, a quasi-experimental approach and four questionnaires to collect data about the mothers' and infants' demographic profiles, bonding and breastfeeding behaviours. The researcher has identified and described the research sample and its division into two groups—the intervention group and the non-intervention group—as well as detailing the data collection and data analysis processes, including the rationale for statistical analysis and the use of non-parametric and parametric tools. An explanation is provided of why it was not possible to run the study as a randomised controlled trial, even though some of the same study design issues needed to be addressed. Finally, the ethical issues concerning the research were addressed, demonstrating conformity to the standard ethical principles for research.

The outcomes of the study and the results are now presented in Chapter 4.

Chapter 4: Results

4.1 Introduction

This chapter reports the study results and data analysis of the demographic data from the Mother and Infant questionnaires, the data from the Maternal-Infant Bonding Questionnaire (MIBQ) and the Bonding Observation Check List (BOCL) at Day 1 in the hospital and at Weeks 4, 12 and 24 at the mothers' homes.

As stated in Chapter 1, the research aims were to find out:

- 1) If Kangaroo Care can increase bonding between mothers and their preterm infants as measured by the MIBQ and the BOCL over a six-month period.
- 2) If Kangaroo Care can promote breastfeeding practice and hence increase breastfeeding rates in preterm infants.
- 3) If Kangaroo Care should be introduced as part of the 'Baby Friendly Hospital Initiative' (BFHI) policy for preterm infants in all hospitals in Thailand.

In addition, the research sought to answer the following four questions related to the specific times when the data was collected:

1. Are there differences in bonding on Day 1 postpartum (T1), and weeks 4 (T2), 12 (T3) and 24 (T4) between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?
2. Are there differences in breastfeeding rates on Day 1 postpartum (T1), and weeks 4 (T2), 12 (T3) and 24 (T4) between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?
3. Does the gender of the infant make a difference to bonding and breastfeeding rates over a period of six months?
4. Are there any other variables that might influence bonding or breastfeeding rates of the mothers in this study?

4.2 Questionnaire results

4.2.1 Questionnaire 1: demographic data for the mothers

This section presents the demographic data collected from the mothers related to their age, education, occupation, religion, marital status, family income, pregnancy history, complications (if any) in the current pregnancy, breast problems, wishes regarding placing of infant immediately after birth, actual placement of infant immediately after birth, anaesthesia and complications (if any) after delivery. Questionnaire 1 is presented in Appendix 4.

4.2.1.1 Age

The majority of participants in the non-intervention group were in the age range of 15–35 years, with equal numbers in the ranges of 15–25 years and 26–35 years (44.44% each). There were 11.11 percent in the oldest age range of 36–45 years. However, in the intervention group, the majority (55.55%) were aged 26–35 years, with 38.89 percent aged 15–25 and only 5.56 percent in the oldest age group, as shown in Table 4.1.

Table 4.1: Demographic characteristics of mothers' age

Characteristic (Age)	Non-intervention group (N=18) %	Intervention group (N=18) %
15-25 years old	44.44 (8)	38.89 (7)
26-35 years old	44.44 (8)	55.55 (10)
36-45 years old	11.11 (2)	5.56 (1)

() The number in parenthesis indicates the number of mothers

4.2.1.2 Education

The overall results, as presented in Table 4.2, show that participants in the non-intervention group had a higher education level than those in the intervention group. However, the majority in each group (72.2% in the non-intervention group and

88.9% in the intervention group) had a 12th grade or lower education level. This finding is typical of the Thai population who usually do not have post-secondary school education. In Thailand, only 5 percent of women have post-secondary education because the majority of Thai women go to work and marry at a young age.

Table 4.2: Demographic characteristics of mothers' education

Characteristic (Education)	Non-intervention group (N=18) %	Intervention group (N=18) %
12 th grade or less	72.20 (13)	88.90 (16)
Diploma	5.60 (1)	0
Bachelor degree	22.20 (4)	11.10 (2)
Master degree or higher	0	0

() The number in parenthesis indicates the number of mothers

4.2.1.3 Occupation

Results for question 3, “maternal occupation”, show that 44.4 percent of participants in the non-intervention group were workers, followed by housewives at 22.2 percent. The major occupation category in the intervention group was “gardener” at 44.4 percent. Most of those who identified as gardeners had rubber tree and palm tree gardens. The second highest occupation percentage for intervention group participants was “housewife” at 27.8 percent. Equal numbers of participants in both groups worked for the Thai Government (5.6%). In Thailand, “workers” and “gardeners” are separate employment categories.

Some participants who had worked in the Thai Government were teachers in primary and secondary schools. Some participants, all in the non-intervention group, were merchants, shopkeepers or retailers. Only one participant had her own business and one participant was a farmer who had a rice plantation. Both of these participants were in the non-intervention group.

Most participants in the non-intervention group were workers who had been hired as manual laborers to work in the fields or in building construction. Some of them were housewives who took care of their partners, children or family members in their homes. In terms of the overall results for the mothers' occupation, most participants were workers (66.6%), housewives (50%) or gardeners (44.4%). Thus, the mothers were typical of Thai women in the South of Thailand at the time of the study. The Household Socio-Economic Survey (2007) found that 57 percent of women were workers, 49 percent were housewives and 38 percent were gardeners. However, the typicality of the participants' occupations did not affect their responses. The data related to participants' occupations is presented in Table 4.3.

Table 4.3: Demographic characteristics of mothers' occupation

Characteristic (Occupation)	Non-intervention group (N=18) %	Intervention group (N=18) %
Government	5.60 (1)	5.60 (1)
Government enterprise	0	0
Merchant	16.70 (3)	0
Businesswoman	5.60 (1)	0
Gardener	0	44.40 (8)
Farmer	5.60 (1)	0
Orchard women	0	0
Worker	44.40 (8)	22.20 (4)
Housewife	22.20 (4)	27.80 (5)

() The number in parenthesis indicates the number of mothers

4.2.1.4 Religion

According to the Thai Government's National Statistics Office for 2007, 94.6 percent of the Thai population are Buddhists, 4.6 percent are Muslims and 0.7 percent are Christians, with another 0.1 percent allocated to various other religions (Barstow 2007). The distribution of religion among mothers found in this study follows this

norm for Thai people, with the vast majority identifying as Buddhist, the rest identifying as Muslim and none identifying as Christian, as shown in Table 4.4.

Table 4.4: Demographic characteristics of mothers' religion

Characteristic (Religion)	Non-intervention group (N=18) %	Intervention group (N=18) %
Buddhist	77.80 (14)	83.30 (15)
Islam	22.20 (4)	16.70 (3)
Christian	0	0

() The number in parenthesis indicates the number of mothers

4.2.1.5 Marital status

All participants in both groups identified as being married.

4.2.1.6 Family income

In Thailand, the monthly income is divided into 3 ranges in remote areas: 10,000 baht or more is considered wealthy; 5,000 to 10,000 baht is considered middle class; and less than 5,000 baht is considered poor (The Household Socio-Economic Survey 2007).

As can be seen from Table 4.5, there were slightly more middle class mothers in the intervention group than in the non-intervention group, with correspondingly fewer people considered poor. The percentage of wealthy families was the same in both groups. The participants' occupations (as previously explained in section 4.2.1.3) are reflected in the family income results for both the non-intervention and intervention groups. In the non-intervention group, 55.6 percent were middle class income earners and 27.8 percent were wealthy class income earners. In the intervention group, 61.1 percent were middle class income earners and 27.8 percent were wealthy class income earners. The 16.7 percent and 11.10 percent in the poor class income earners in the non-intervention and intervention groups respectively reflects that these

women were housewives. Their income consists of some money from their husbands or small amounts from an extra job. The types of family in Thailand—mainly nuclear families and extended families—might have had an effect on the family income results.

Table 4.5: Demographic characteristics of family income

Characteristic (Family income)	Non-intervention group (N=18) %	Intervention group (N=18) %
Less than 5,000	16.70 (3)	11.10 (2)
5,000-10,000	55.60 (10)	61.10 (11)
10,000 or more	27.80 (5)	27.80 (5)

() The number in parenthesis indicates the number of mothers

4.2.1.7 Pregnancy history

All participants reported that this was their first pregnancy, which supported the inclusion criteria that all were primigravid women.

4.2.1.8 Complications (if any) during this pregnancy

This study found that participants in the non-intervention group did not report having any serious illness, complications or significant conditions during this pregnancy. In the intervention group, one participant reported a bleeding disorder (5.6%) and one participant reported one episode of uncontrolled epilepsy (5.6%).

The participant with the bleeding disorder told the researcher that the doctor had given her two reasons for it. The first was because “she worked hard in her rubber tree garden”. The second was that “she might not have enough specific clotting factors during her pregnancy”. He suggested to her “not to work so hard and not to carry rubber fluid which is very heavy”. Her bleeding stopped without any intervention.

The participant who reported one episode of uncontrolled epilepsy stated that the doctor could not find the cause of the problem, and told her that “it may have happened because of stress” and that “there are no safe antiepileptic drugs in pregnancy”. This participant’s epilepsy was self-limiting and she did not require any medication.

These two participants from the total of 36 women represented such a low number that this result for complications during their current pregnancy is not significant, as tested with a Mann-Whitney U test.

4.2.1.9 Mothers’ breast problems

Participants in both groups did not report any breast problems that might interfere with breastfeeding. There were no reports of inverted flare nipples, breast reduction, breast augmentation or other breast surgery.

4.2.1.10 Mothers’ wishes regarding placement of infant immediately after birth

This study found that 88.9 percent of participants in both the non-intervention group and the intervention group wanted the nurse to place their preterm infant in their bed next to them immediately after birth, while 11.1 percent of participants in both groups wanted their infant on their chest, as shown in Table 4.6.

Table 4.6: Demographic characteristics of mothers’ wishes regarding placement of infant immediately after birth

Characteristic (Mothers’ wishes regarding placement of infant immediately after birth)	Non-intervention group (N=18) %	Intervention group (N=18) %
A crib	0	0
An Incubator	0	0
Your bed	88.90 (16)	88.90 (16)
On your chest	11.10 (2)	11.10 (2)

() The number in parenthesis indicates the number of mothers

4.2.1.11 Actual placement of babies

The actual placement of babies was in accordance with the ‘Baby Friendly Hospital Initiative’ policy of the Maharat Hospital; that is, that nurses place all infants on their mothers’ chests immediately after delivery.

In some cases, staff in Nursery 2 allowed the researcher to take some infants from incubators and place them on their mothers’ chests. The brief separation of preterm infants and their mothers, which delayed Kangaroo Care for a short time, did not appear to impede its success, as discussed in Chapter 5 (section 5.5).

4.2.1.12 Mothers’ anaesthesia

Pudendal block anaesthesia was given to all participants in both groups. This is typical in Thai hospitals for normal vaginal delivery (Aissaoui *et al.* 2008).

4.2.1.13 Mothers’ complications (if any) after delivery

No participants in either group had any complications after delivery.

4.2.1.14 Summary and comparison of demographic data for the mothers

A Mann-Whitney U test was used to compare the demographic data from mothers in the non-intervention and intervention groups. The test results show no significant difference ($p < 0.05$) between the two groups of mothers, indicating that the groups were demographically similar.

The Mann-Whitney U test results are presented in Table 4.7 (next page).

Table 4.7: The results of the comparison between the non-intervention and intervention mothers' groups from the demographic data

Outcomes DDQ: mothers	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig.(1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Age	19.17	345	17.83	321	0.35
Education	19.94	359	17.06	307	0.12
Occupation	18.58	334.50	18.42	331.50	0.48
Religion	19.00	342	18.00	324	0.34
Marital status	18.50	333	18.50	333	0.50
Family income	18.14	326.50	18.86	339.50	0.41
Pregnancy history	18.50	333	18.50	333	0.50
Complications during this pregnancy	19.50	351	17.50	315	0.08
Breast problems	18.50	333	18.50	333	0.50
Mother's wishes regarding placement of infant	18.50	333	18.50	333	0.50
Actual placement of infant	18.50	333	18.50	333	0.50
Anaesthesia	18.50	333	18.50	333	0.50
Complications after delivery	18.50	333	18.50	333	0.50

4.2.2 Questionnaire 2: demographic data for the infants

This section presents the demographic data collected from the infants related to their gender, gestational age, weight, length, Apgar score at one minute after birth, Apgar score at five minutes after birth, birth deformities, illnesses, postpartum ward to which the mothers were admitted, infants' period of high risk, infants' period of admission to Nursery 2, age (in days) at discharge, and hours per day mothers spent with their infants in Nursery 2. Questionnaire 2 is presented in Appendix 5.

4.2.2.1 Gender

In the non-intervention group, there were 50 percent male infants and 50 percent female infants. In the intervention group this percentage changed slightly with 61.1

percent males and 38.9 percent females. This data is presented in Table 4.8.

Table 4.8: Demographic characteristics of infants' gender

Characteristic (Infants' gender)	Non-intervention group (N=18) %	Intervention group (N=18) %
Male	50 (9)	61.10 (11)
Female	50 (9)	38.90 (7)

() The number in parenthesis indicates the number of preterm infants

4.2.2.2 Gestational age

Infants' gestational age at birth was divided into two categories:

- 32–34 weeks—considered very preterm
- 35–37 weeks—considered moderately preterm (according to Mifflin 2003).

In terms of the babies' weights and lengths, all babies in both groups were born at an appropriate weight and length for their gestational age (AGA).

The results for this characteristic are shown in Table 4.9.

Table 4.9: Demographic characteristics of infants' gestational age

Characteristic (Infants' gestational age)	Non-intervention group (N=18) %	Intervention group (N=18) %
32-34 weeks	16.67 (3)	27.78 (5)
35-37 weeks	83.33 (15)	72.22 (13)

() The number in parenthesis indicates the number of preterm infants

4.2.2.3 Weight

In terms of question 3 about infants' weight, preterm babies are classified by birth weight as low birth weight being under 2,500 grams, very low birth weight being under 1,500 grams and extremely low birth weight being under 1,000 grams (Lauwers & Swisher 2005).

In the non-intervention group, 61.11 percent of infants were in the weight range

2,001–2,500 grams (low birth weight), 33.33 percent were in the weight range 2,501–3,000 grams (normal birth weight) and 5.56 percent were in the weight range 1,500–2,000 grams (low birth weight). In the intervention group, the largest number of infants (44.44%) were in the weight range 2,501–3,000 grams (normal birth weight), with 38.89 percent in the birth weight range 2,001–2,500 grams (low birth weight) and 16.67 percent in the weight range 1,500–2,000 grams (low birth weight). No infants in either group were in the very or extremely low birth weight ranges.

The data for infants’ birth weight is presented in Table 4.10.

Table 4.10: Demographic characteristics of infants’ weight

Characteristic (Infants’ weight (grams))	Non-intervention group (N=18) %	Intervention group (N=18) %
1,500-2,000 grams	5.56 (1)	16.67 (3)
2,001-2500 grams	61.11 (11)	38.89 (7)
2,501-3,000 grams	33.33 (6)	44.44 (8)

() The number in parenthesis indicates the number of preterm infants

4.2.2.4 Length

Infants’ length was measured within three ranges: 41–44 cm; 45–47 cm; and 48–50 cm.

In the non-intervention group, 66.67 percent of the preterm infants were 45–47 cm in length and 11.11 percent were 41–44 cm. In the intervention group, the preterm infants’ lengths were almost equally divided among all three ranges. The data for infants’ length is presented in Table 4.11.

Table 4.11: Demographic characteristics of infants' length

Characteristic (Infants' length) (cm)	Non-intervention group (N=18) %	Intervention group (N=18) %
41-44 cm	11.11 (2)	27.78 (5)
45-47 cm	66.67 (12)	38.89 (7)
48-50 cm	22.22 (4)	33.33 (6)

() The number in parenthesis indicates the number of preterm infants

4.2.2.5 Apgar score at one minute after birth

The Apgar score is determined by evaluating the newborn infant on five simple criteria—**A**ppearance, **P**ulse, **G**rimace, **A**ctivity and **R**espiration—on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10 (Committee on Fetus and Newborn 2006), as shown in Table 4.12.

Table 4.12: The Apgar score

	Score of 0	Score of 1	Score of 2	Component of Acronym
Skin colour	blue all over	blue at extremities body pink (acrocyanosis)	no cyanosis body and extremities pink	A ppearance
Heart rate	absent	<100	>100	P ulse
Reflex irritability	no response to stimulation	grimace/feeble cry when stimulated	sneeze/cough/pulls away when stimulated	G rimace
Muscle tone	none	some flexion	active movement	A ctivity
Breathing	absent	weak or irregular	strong	R espiration

From Committee on Fetus and Newborn (2006, p. 1446)

The test is generally done at one and five minutes after birth, and may be repeated later if the score is, and remains, low. Scores of 3 and below are generally regarded as critically low, 4–6 fairly low and 7–10 normal. However, the purpose of the Apgar test is to determine quickly whether a newborn needs immediate medical care;

it was not designed to make long-term predictions on a child's health (Committee on Fetus and Newborn 2006).

The infants' Apgar scores recorded at one minute after birth for preterm infants born to mothers in the non-intervention group were 9 for 16 preterm infants (88.90%), 7 for one preterm infant (5.60%) and 10 for one preterm infant (5.60%). In terms of infants born to mothers in the intervention group, the Apgar scores at the first minute after birth were 6 for two preterm infants (11.11%), 8 for seven preterm infants (38.89%), 9 for eight preterm infants (44.40%) and 10 for one preterm infant (5.60%). The Apgar score data at one minute after birth is presented in Table 4.13.

Table 4.13: Demographic characteristics of infants' Apgar score at one minute after birth

Characteristic (infants' Apgar score at 1 minute after birth)	Non-intervention group (N=18) %	Intervention group (N=18) %
0-5	None	none
6	0	11.10 (2)
7	5.60 (1)	0
8	0	38.90 (7)
9	88.90 (16)	44.40 (8)
10	5.60 (1)	5.60 (1)

() The number in parenthesis indicates the number of preterm infants

4.2.2.6 Apgar score at five minutes after birth

The Apgar scores at five minutes after birth for infants in the non-intervention group were 10 for 13 preterm infants (72.20%), 9 for four preterm infants (22.20%) and 7 for one preterm infant (5.60%). Apgar scores for preterm infants within the intervention group were 10 for seven preterm infants (38.90%), 9 for nine preterm infants (50%), 8 for one preterm infant (5.60%) and 7 for one preterm infant (5.60%).

A five-minute Apgar score of 7–10 is considered normal. All preterm infants in this study were in the normal range at five minutes after birth. The data is presented in Table 4.14.

Table 4.14: Demographic characteristics of infants' Apgar score at five minutes after birth

Characteristic (Infants' Apgar 5)	Non-intervention group (N=18) %	Intervention group (N=18) %
0–6	0	0
7	5.60 (1)	5.60 (1)
8	0	5.60 (1)
9	22.20 (4)	50 (9)
10	72.20 (13)	38.90 (7)

() The number in parenthesis indicates the number of preterm infants

4.2.2.7 Birth deformities

None of the infants in this study from the non-intervention or intervention groups had any birth deformities.

4.2.2.8 Illnesses

Infants' illnesses refer to respiratory problems, metabolic problems, infectious diseases or congenital anomalies at birth. This study found that 12 (six from the non-intervention group and six from the intervention group) out of the 36 infants in the study had to be referred to Nursery 2 (low risk) immediately after birth because they had combined respiratory and metabolic (hypoglycaemic) problems. These results are comparable with other data showing that in Thailand respiratory and metabolic conditions are more typical in preterm infants than in full-term infants (Neonatal Society of Thailand 2011; Singhi, Singhi & Singh 1980). The data is presented in Table 4.15.

Table 4.15: Demographic characteristics of infants' illness

Characteristic (Infants' illness)	Non-intervention group (N=18) %	Intervention group (N=18) %
Respiratory problem	0	0
Metabolic problem	0	0
Respiratory and metabolic problems combined	33.33 (6)	33.33 (6)
Infectious diseases	0	0
Congenital anomalies	0	0

() The number in parenthesis indicates the number of preterm infants

4.2.2.9 Postpartum ward to which the mother was admitted

There were two ward categories to which the mothers were admitted: the VIP ward and the standard public ward. The VIP ward is more expensive and more comfortable than a standard public ward. It has a private area for mothers. Nonetheless, some mothers preferred the standard public ward because they only stayed a few days in hospital after giving birth. As shown in Table 4.16, most mothers in both the non-intervention and intervention groups preferred the standard public ward to the VIP ward, with more in the intervention group preferring the public ward.

Table 4.16: Demographic characteristics of infants' postpartum ward to which the mother was admitted

Characteristic (Postpartum ward to which the mother was admitted)	Non-intervention group (N=18) %	Intervention group (N=18) %
Standard public ward	66.70 (12)	88.90 (16)
VIP ward	33.30 (6)	11.10 (2)

() The number in parenthesis indicates the number of preterm infants

4.2.2.10 Infants' period of high risk

None of the infants were admitted to Nursery 1 (high risk).

4.2.2.11 Infants' period of admission to Nursery 2

All infants in the non-intervention group were admitted to Nursery 2 (low risk newborn ward) for varying periods. Nine infants (50%) were admitted for two days, five (27.78%) for three days, two (11.11%) for four days and two (11.11%) for seven days.

All infants in the intervention group were admitted to Nursery 2 (low risk newborn ward) for varying periods. Nine infants (50%) were admitted for two days, four infants (22.22%) for three days, two infants (11.11%) for four days, one infant (5.56%) for six days and two infants (11.11%) for seven days. The infants who had stayed in Nursery 2 longer had respiratory and metabolic problems. The data for infants' admission to Nursery 2 is presented in Table 4.17.

Table 4.17: Demographic characteristics of infants' period of low risk

Characteristic (infants' period of low risk) (day)	Non-intervention group (N=18) %	Intervention group (N=18) %
2 days	50 (9)	50 (9)
3 days	27.78 (5)	22.22 (4)
4 days	11.11 (2)	11.11 (2)
5 days	0	0
6 days	0	5.56 (1)
7 days	11.11 (2)	11.11 (2)

() The number in parenthesis indicates the number of preterm infants

4.2.2.12 Age (in days) at discharge

The preterm infants in the non-intervention group were discharged from the hospital at two days old (six infants=33.3%), three days old (four infants=22.2%), four days old (five infants=27.78%) or seven days old (three infants=16.67%).

Preterm infants in the intervention group were discharged from the hospital at two days old (eight infants=44.44%), three days old (three infants=16.7%), four days old

(three infants=16.70%), six days old (two infants=11.10%) or seven days old (two infants=11.10%).

Several criteria must be in place to ensure newborn infants are safely discharged. Infants should be judged healthy by the health care provider, and the mother should have demonstrated a reasonable ability to care for the infant and should have appropriate arrangements for ongoing care. The data for infants' age at discharge is presented in Table 4.18.

Table 4.18: Demographic characteristics of infants' ages, in days, at discharge

Characteristic (infants' ages, in days, at discharge)	Non-intervention group (N=18) %	Intervention group (N=18) %
2 days	33.30 (6)	44.44 (8)
3 days	22.20 (4)	16.70 (3)
4 days	27.78 (5)	16.70 (3)
5 days	0	0
6 days	0	11.10 (2)
7 days	16.67 (3)	11.10 (2)

() The number in parenthesis indicates the number of preterm infants

4.2.2.13 Hours per day spent by mothers with their infants in Nursery 2

Mothers in the intervention group spent more time with their preterm infants in Nursery 2 (low risk) than mothers within the non-intervention group. In the non-intervention group, one mother (5.6%) spent approximately 10 hours per day in Nursery 2 (low risk) with her preterm infant, six mothers (33.33%) spent approximately 12 hours per day, four mothers (22.2%) spent approximately 14 hours per day, one mother (5.6%) spent approximately 15 hours per day, one mother (5.6%) spent approximately 16 hours per day, four mothers (22.2%) spent approximately 18 hours per day and one mother (5.6%) spent approximately 20 hours per day in the nursery.

In the intervention group, the approximate time mothers spent with their preterm infants in Nursery 2 (low risk) was 10 hours (one mother=5.6%), 12 hours (one mother=5.6%), 14 hours (three mothers=16.7%), 16 hours (seven mothers=38.89%), 18 hours (three mothers=16.7%), 19 hours (one mother=5.6%) and 20 hours (two mothers=11.10%). This data is presented in Table 4.19.

Table 4.19: Demographic characteristics of hours per day spent by mothers with their preterm infant in Nursery 2

Characteristic (Hours per day spent)	Non-intervention group (N=18) %	Intervention group (N=18) %
10 hours	5.60 (1)	5.60 (1)
11 hours	0	0
12 hours	33.33 (6)	5.60 (1)
13 hours	0	0
14 hours	22.20 (4)	16.70 (3)
15 hours	5.60 (1)	0
16 hours	5.60 (1)	38.89 (7)
17 hours	0	0
18 hours	22.20 (4)	16.70 (3)
19 hours	0	5.60 (1)
20 hours	5.60 (1)	11.10 (2)

() The number in parenthesis indicates the number of mothers with their preterm infant

4.2.2.14 Summary of comparison of preterm infant demographic data

Table 4.20 shows the comparison between demographic data of the preterm infants in the non-intervention and intervention groups. The infants' demographic data showed statistical significance ($p < 0.05$) for both the Apgar score at one and five minutes, and the hours per day mothers spent with their preterm infants in Nursery 2 (low risk or sick newborn ward), as seen in the asterisked values in Table 4.20. The Apgar scores at the first minute after birth for preterm infants born to mothers in the non-intervention group were 9 for 16 preterm infants (88.9%), 7 for one preterm infant (5.6%) and 10 for one preterm infant (5.6%). In terms of infants born to

mothers in the intervention group, the Apgar scores at the first minute after birth were 6 for two preterm infants (11.11%), 8 for seven preterm infants (38.89%), 9 for eight preterm infants (44.4%) and 10 for one preterm infant (5.6%).

Possible reasons for the significant result for hours per day mothers spent in Nursery 2 are discussed in Chapter 5 (section 5.2.2).

Table 4.20: The results of the comparison between the non-intervention and intervention infant groups from demographic data of the preterm infants

Outcomes DDQ: infants	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig.(1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Gender	19.50	351	17.50	315	0.25
Age	19.50	351	17.50	315	0.21
Weight	18.22	328	18.78	338	0.43
Length	18.78	338	18.22	328	0.43
Apgar 1	22.14	398.50	14.86	267.50	0.01*
Apgar 5	21.44	386	15.56	280	0.03*
Respiratory system	19	342	18	324	0.37
Digestive system	19	342	18	324	0.37
Infant illness	18.50	333	18.50	333	0.5
Postpartum ward	20.50	369	16.50	297	0.06
Period of low risk	18.25	328.50	18.75	337.50	0.44
Day discharged	19.25	346.50	17.75	319.50	0.33
Hours mother spent in Nursery 2	15.50	279	21.50	387	0.04*

* Significant result at $p < 0.05$

The next section describes the results for the MIBQ and BOCL surveys.

4.2.3 The Mother Infant Bonding Questionnaire (MIBQ)

The MIBQ (Appendix 6), consisting of 31 items organised into groups of six subscales, was used to assess mother-infant bonding.

4.2.3.1 Comparison between non-intervention and intervention groups

Mothers marked each item on a 5-point Likert scale (1=definitely false to 5=definitely true). A *t*-test was used to analyse the relationship between mothers in the non-intervention and intervention groups for each of the MIBQ subscales. Results were tested for normality and skewness prior to using the *t*-test. The Mann-Whitney U test was also used to check the results for these findings from the four time periods (T1=Day1, T2=Week 4, T3=Week 12, T4=Week 24) to ensure accuracy. The Mann-Whitney U test results were found to be the same as those for the *t*-test, therefore they are not presented here.

A Mann-Whitney U test was used to compare the gender of the infant to check if gender had an influence on the results. The mothers' breastfeeding behaviours were also compared using a Mann-Whitney U test. In the following four tables, the data is presented for Day 1 (T1), Week 4 (T2), Week 12 (T3) and Week 24 (T4) respectively. Comparison of the results for the non-intervention and intervention groups obtained from Day 1 analysis of the MIBQ is shown in Table 4.21.

Table 4.21: The results of the MIBQ questionnaire's six subscales at Day 1

Outcomes (6 subscales)	Non-intervention group (N=18)		Intervention group (N=18)		t-test Sig.(1- tailed)
	Mean	Std. Deviation	Mean	Std. Deviation	
Subscale 1	4.21	0.56	4.30	0.31	0.28
Subscale 2	4.39	0.60	4.58	0.27	0.11
Subscale 3	4.46	0.46	4.48	0.28	0.43
Subscale 4	4.53	0.55	4.57	0.33	0.39
Subscale 5	4.28	0.46	4.21	0.47	0.34
Subscale 6	4.74	0.34	4.82	0.29	0.22

Table 4.21 shows no significant difference between the two groups for the six subscales for Day 1 (T1). Therefore, at this early stage, the bonding behaviour was

similar for both groups of mothers. The following table (Table 4.22) shows the results for Week 4.

Table 4.22: Results of the MIBQ questionnaire’s six subscales at Week 4

Outcomes (6 subscales)	Non-intervention group (N=18)		Intervention group (N=18)		t-test Sig. (1- tailed)
	Mean	Std. Deviation	Mean	Std. Deviation	
Subscale 1	4.40	0.43	4.49	0.33	0.25
Subscale 2	4.49	0.34	4.70	0.22	0.02*
Subscale 3	4.52	0.38	4.63	0.22	0.14
Subscale 4	4.49	0.53	4.72	0.26	0.05*
Subscale 5	4.27	0.45	4.39	0.35	0.19
Subscale 6	4.81	0.28	4.92	0.15	0.07

* Significant result at $p \leq 0.05$

A significant difference (*) was found between Subscale 2 and Subscale 4. After four weeks (T2), the items involving ‘attention and connecting to the infant’ (Subscale 2) and ‘acceptance of the role of the mother’ (Subscale 4) began to show a difference between the two groups of mothers. There were no significant differences between the two groups for the other subscales.

Results for Week 12 are shown in Table 4.23.

Table 4.23: Results of the MIBQ questionnaire’s six subscales at Week 12

Outcomes (6 subscales)	Non-intervention group (N=18)		Intervention group (N=18)		t-test Sig. (1- tailed)
	Mean	Std. Deviation	Mean	Std. Deviation	
Subscale 1	4.42	0.43	4.70	0.24	0.01*
Subscale 2	4.51	0.41	4.82	0.15	0.00*
Subscale 3	4.69	0.28	4.84	0.16	0.02*
Subscale 4	4.57	0.59	4.81	0.27	0.07
Subscale 5	4.32	0.34	4.60	0.28	0.01*
Subscale 6	4.78	0.33	4.92	0.12	0.05*

* Significant result at $p \leq 0.05$

Table 4.23 shows there was a significant difference between the two groups at Week

12 (T3) on all subscales of the MIBQ survey (1, 2, 3, 5 and 6), with the exception of Subscale 4.

Table 4.24 shows the results of the MIBQ questionnaire's subscales at Week 24 (T4).

Table 4.24: Results of the MIBQ questionnaire's six subscales at Week 24

Outcomes (6 subscales)	Non-intervention group (N=18)		Intervention group (N=18)		t-test Sig. (1- tailed)
	Mean	Std. Deviation	Mean	Std. Deviation	
Subscale 1	4.46	0.42	4.99	0.05	0.00*
Subscale 2	4.53	0.38	4.94	0.08	0.00*
Subscale 3	4.64	0.35	4.93	0.10	0.00*
Subscale 4	4.49	0.52	4.97	0.08	0.00*
Subscale 5	4.41	0.39	4.93	0.15	0.00*
Subscale 6	4.85	0.19	5.00	0.00	0.00*

* Significant result at $p < 0.05$

There was a significant difference between the two groups for all six subscales at Week 24. These results imply that the Kangaroo Care intervention made a statistically significant difference ($p < 0.05$) to the bonding measurements between mothers and their preterm infants. Variations in statistical significance for MIBQ subscales at the different measuring periods throughout the study are discussed in Chapter 5 (section 5.3).

Using the mean, median and skewness, the results from the MIBQ subscales over the four time periods were tested and shown to follow a normal distribution. Having established this, and having seen that there was a significant difference overall from Day 1 to Week 24, the researcher chose a one-way repeated ANOVA design to see whether differences occurred within each subscale. This design was used to test for comparison between the two groups for the six MIBQ subscales over the four different time periods. The one-way repeated ANOVA design made it possible to

check whether the Kangaroo Care intervention had a significant effect on bonding measurements between mothers and their preterm infants. It involved measuring on the same continuous scale (1=strongly disagree, to 5=strongly agree) on four occasions (Day 1, Week 4, Week 12 and Week 24) for each of the MIBQ subscales.

The results for the repeated ANOVA in the following section are those of the statistical analysis for the individual subscales from Day 1 to Week 24. These results are reported as Wilks' Lambda and tested for significance at $p < 0.05$.

4.2.3.2 Comparison between non-intervention and intervention groups, Subscale 1

Table 4.25 shows the results of the MIBQ questionnaire's Subscale 1 'Perception of Infant Features', using one-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24. There was statistically significant difference across the four time periods.

Table 4.25: Results of the MIBQ questionnaire's Subscale 1 'Perception of Infant Features' at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 1 (4 periods)	Number (N=36)		Wilks' Lambda (Value)	Wilks' Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.26	0.45	0.40	0.00*
Week 4	4.44	0.38		
Week 12	4.56	0.37		
Week 24	4.72	0.40		

* Significant result at $p < 0.05$

Table 4.26 shows the results of the MIBQ questionnaire's Subscale 1, 'Perception of Infant Features' using one-way repeated measures ANOVA to compare the two groups at Day 1, Week 4, Week 12 and Week 24.

Table 4.26: Results of the MIBQ questionnaire’s Subscale 1 ‘Perception of Infant Features’ between the two groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 1 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks’ Lambda (Sig) Period	Wilks’ Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.21	0.56	4.30	0.31	0.00*	0.01*
Week 4	4.40	0.43	4.49	0.33	(Value 0.35)	(Value 0.71)
Week 12	4.42	0.43	4.70	0.24		
Week 24	4.46	0.42	4.99	0.05		

* Significant result at $p < 0.05$

The results suggest a change in the mothers’ perception towards their infants across the four time periods. Figure 4.1 plots the mean of the ANOVA results for both groups of mothers from the MIBQ questionnaire’s Subscale 1 ‘Perception of Infant Features’ at Day 1, Week 4, Week 12 and Week 24, in accordance with results shown in Table 4.26.

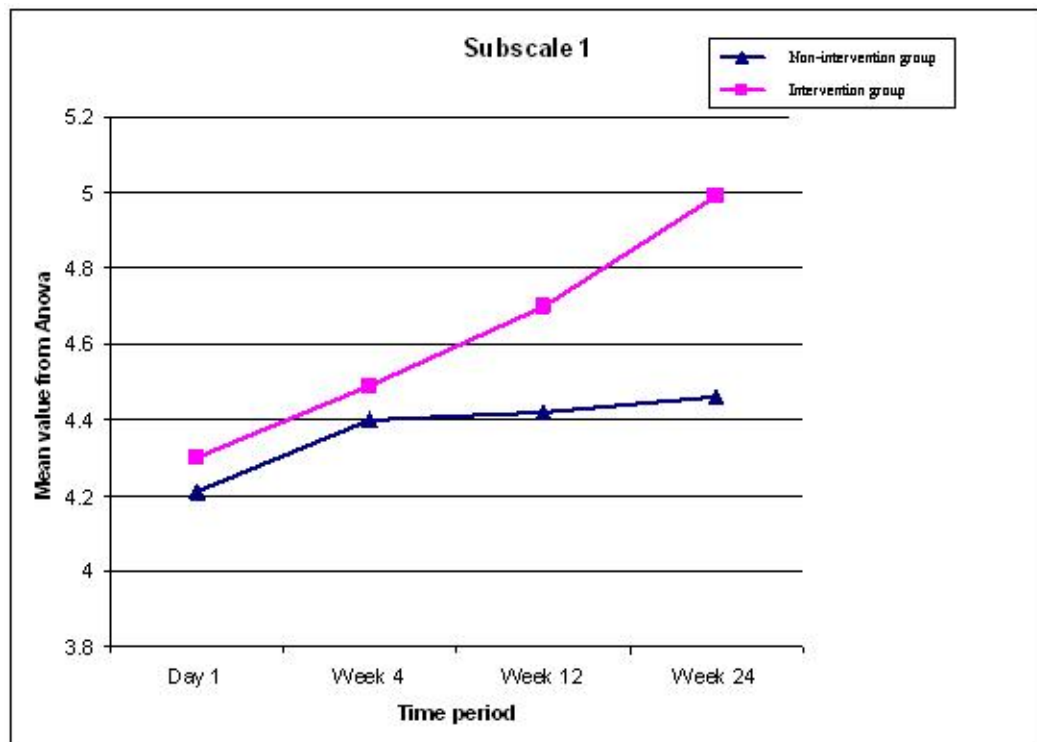


Figure 4.1: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 1 ‘Perception of Infant Features’ at Day 1, Week 4, Week 12 and Week 24

The line graph highlights the significant difference between the two groups of mothers for Subscale 1, with the intervention group having a significantly increased perception of infant features at Day 1, Week 4, Week 12 and Week 24 compared with mothers in the non-intervention group. The implications of this are discussed in Chapter 5 (section 5.3.1).

4.2.3.3 Comparison between non-intervention and intervention groups, Subscale 2

Table 4.27 shows the results of the MIBQ questionnaire's Subscale 2 'Attention and Connection to the Infant', using One-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24. The results show a statistically significant difference across the four time periods.

Table 4.27: Results of the MIBQ questionnaire's Subscale 2 'Attention and Connection to the Infant' at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 2 (4 periods)	Number (N=36)		Wilks' Lambda (Value)	Wilks' Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.49	0.47	0.68	0.01*
Week 4	4.60	0.30		
Week 12	4.67	0.34		
Week 24	4.74	0.34		

* Significant result at $p < 0.05$

Table 4.28 shows the results of the MIBQ questionnaire's Subscale 2 'Attention and Connection to the Infant' using One-way repeated measures ANOVA to compare the two groups of mothers at Day 1, Week 4, Week 12 and Week 24. The results show a statistically significant effect for both 'period', and for 'period and group'. This suggests there was a change in 'attention and connection to the infant' scores across the four different time periods.

Table 4.28: Results of the MIBQ questionnaire’s Subscale 2 ‘Attention and Connection to the Infant’ between the two groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 2 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks’ Lambda (Sig) Period	Wilks’ Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.39	0.60	4.58	0.27	0.02*	0.03*
Week 4	4.49	0.34	4.70	0.22	(Value 0.73)	(Value 0.75)
Week 12	4.51	0.41	4.82	0.15		
Week 24	4.46	0.42	4.99	0.05		

* Significant result at $p < 0.05$

The following figure was plotted using the results of the means from Table 4.28.

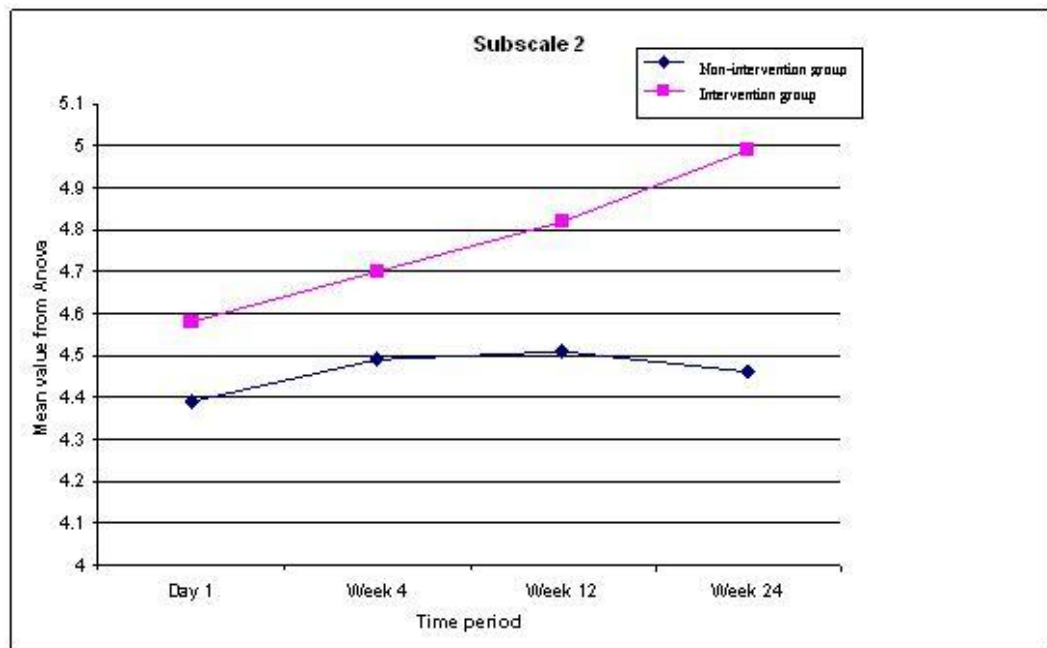


Figure 4.2: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 2 ‘Attention and Connection to the Infant’ at Day 1, Week 4, Week 12 and Week 24

The line graph shows that in the intervention group there was a significant increase in ‘Attention and Connection to the Infant’ at Day 1, Week 4, Week 12 and Week 24 compared with the non-intervention group. The implications of this are discussed in Chapter 5 (section 5.3.2).

4.2.3.4 Comparison between non-intervention and intervention groups, Subscale 3

Table 4.29 shows the results of one-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24 for the MIBQ questionnaire's Subscale 3 'Acceptance of the Infant's Individuality'. There was a statistically significant difference across the four time periods.

Table 4.29: Results of the MIBQ questionnaire's Subscale 3 'Acceptance of the Infant's Individuality' at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 3 (4 periods)	Number (N=36)		Wilks' Lambda (Value)	Wilks' Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.47	0.38	0.59	0.00*
Week 4	4.58	0.31		
Week 12	4.77	0.24		
Week 24	4.79	0.29		

* Significant result at $p < 0.05$

Table 4.30 shows the results of the MIBQ questionnaire's Subscale 3 'Acceptance of the Infant's Individuality' using One-way repeated measures ANOVA to compare the two groups of mothers. It shows no significant difference in 'period and group', leading to the conclusion that there is a statistically significant effect for time only. This suggests there was a change in 'Acceptance of the Infant's Individuality' scores across the four different time periods. This result also suggests that both groups of mothers accepted their preterm infant's individuality but over time the acceptance was greater for the intervention group. Possible reasons for this change are discussed in Chapter 5 (section 5.3.3).

Table 4.30: Results of the MIBQ questionnaire’s Subscale 3 ‘Acceptance of the Infant’s Individuality’ between the two groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 3 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks’ Lambda (Sig) Period	Wilks’ Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.45	0.46	4.48	0.28	0.00*	0.24
Week 4	4.52	0.38	4.63	0.22	(Value 0.59)	(Value 0.88)
Week 12	4.69	0.28	4.84	0.16		
Week 24	4.64	0.35	4.93	0.10		

* Significant result at $p < 0.05$

The following figure plots the results of the ANOVA from the MIBQ questionnaire’s Subscale 3 ‘Acceptance of the Infant’s Individuality at Day 1, Week 4, Week 12 and Week 24’ using the means for both groups of mothers from Table 4.30.

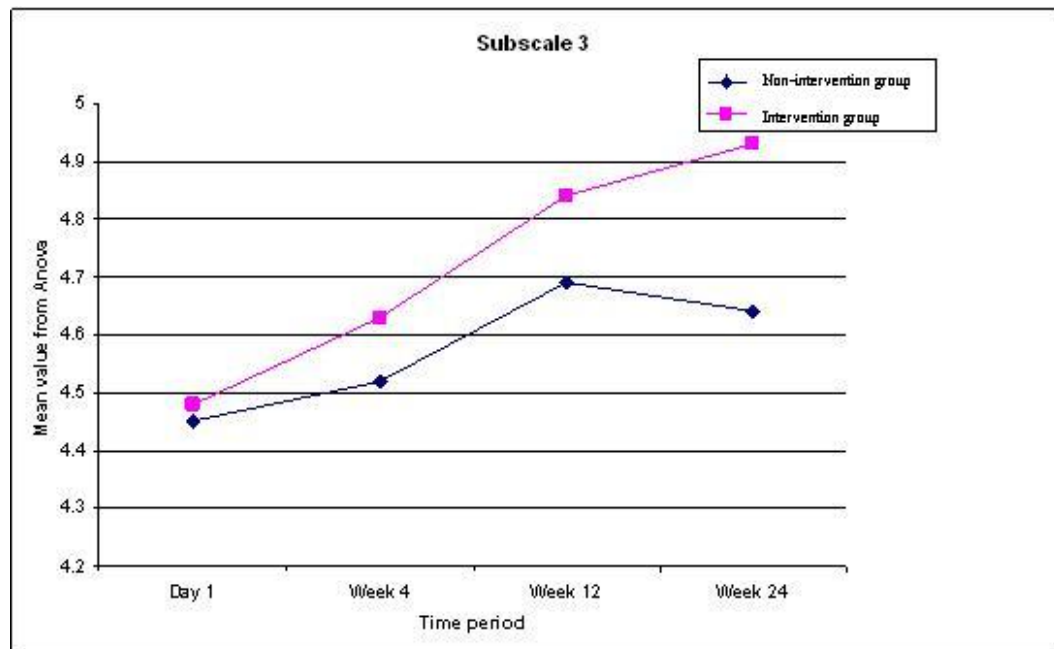


Figure 4.3: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 3 ‘Acceptance of the Infant’s Individuality’ at Day 1, Week 4, Week 12 and Week 24

The line graph highlights the significant increase of ‘Acceptance of the Infant’s Individuality’ among mothers in the intervention group at Day 1, Week 4, Week 12

and Week 24.

4.2.3.5 Comparison between non-intervention and intervention groups, Subscale 4

Table 4.31 shows the results of the MIBQ questionnaire's Subscale 4 'Acceptance of the Role of Mother' using one-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24. It shows there was no statistically significant difference across the four time periods.

Table 4.31: Results of the MIBQ questionnaire's Subscale 4 'Acceptance of the Role of Mother' at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 4 (4 periods)	Number (N=36)		Wilks' Lambda (Value)	Wilks' Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.55	0.45	0.82	0.09
Week 4	4.60	0.43		
Week 12	4.69	0.47		
Week 24	4.73	0.44		

Table 4.32 shows the results of the MIBQ questionnaire's Subscale 4 'Acceptance of the Role of Mother' using one-way repeated measures ANOVA to compare the two groups of mothers at Day 1, Week 4, Week 12 and Week 24.

Table 4.32: Results of the MIBQ questionnaire's Subscale 4 'Acceptance of the Role of Mother' between the two groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 4 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks' Lambda (Sig) Period	Wilks' Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.53	0.55	4.57	0.33	0.06	0.01*
Week 4	4.49	0.53	4.72	0.26	(Value 0.79)	(Value 0.71)
Week 12	4.57	0.59	4.81	0.27		
Week 24	4.49	0.52	4.97	0.08		

* Significant result at $p < 0.05$

The results indicate a statistically significant effect for ‘period and group’ in ‘Acceptance of the Role of Mother’. Possible reasons for this result are discussed in Chapter 5 (section 5.3.4). Results of the means for both groups of mothers from Table 4.32 were used to plot Figure 4.4, which highlights the significant difference between the two groups of mothers, with the intervention group showing a significant increase in ‘Acceptance of the Role of Mother’ at Day 1, Week 4, Week 12 and Week 24. The implications of this are also discussed in section 5.3.4.

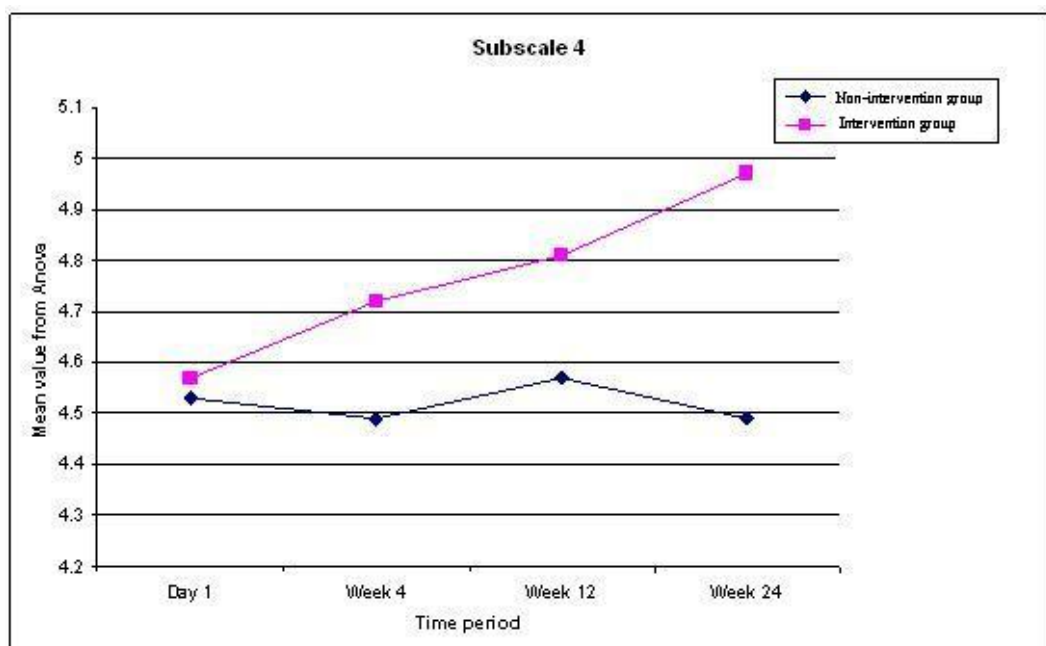


Figure 4.4: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 4 ‘Acceptance of the Role of Mother’ at Day 1, Week 4, Week 12 and Week 24

4.2.3.6 Comparison between non-intervention and intervention groups, Subscale 5

Table 4.33 presents the results of the MIBQ questionnaire’s Subscale 5 ‘Preparation for Nurturing the Infant’ using one-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24. It shows a statistically significant difference across the four time periods.

Table 4.33: Results of the MIBQ questionnaire’s Subscale 5 ‘Preparation for Nurturing the Infant’ at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 5 (4 periods)	Number (N=36)		Wilks’ Lambda (Value)	Wilks’ Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.25	0.46	0.55	0.00*
Week 4	4.33	0.41		
Week 12	4.46	0.34		
Week 24	4.67	0.39		

* Significant result at $p < 0.05$

Table 4.34 shows the results of the MIBQ questionnaire’s Subscale 5 ‘Preparation for Nurturing the Infant’ using one-way repeated measures ANOVA to compare the two groups at Day 1, Week 4, Week 12 and Week 24. There was a statistically significant effect for ‘period’ (time) and ‘period and group’, suggesting a change in ‘Preparation for Nurturing the Infant’ scores across the four different time periods as well as between the two groups of mothers.

Table 4.34: The results of the MIBQ questionnaire’s Subscale 5 ‘Preparation for Nurturing the Infant’ between 2 groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 5 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks’ Lambda (Sig) Period	Wilks’ Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.28	0.46	4.21	0.47	0.00*	0.01*
Week 4	4.27	0.45	4.39	0.35	(Value 0.45)	(Value 0.67)
Week 12	4.32	0.34	4.60	0.28		
Week 24	4.41	0.39	4.93	0.15		

* Significant result at $p < 0.05$

The following figure was plotted using the results of the means for both groups from Table 4.34.

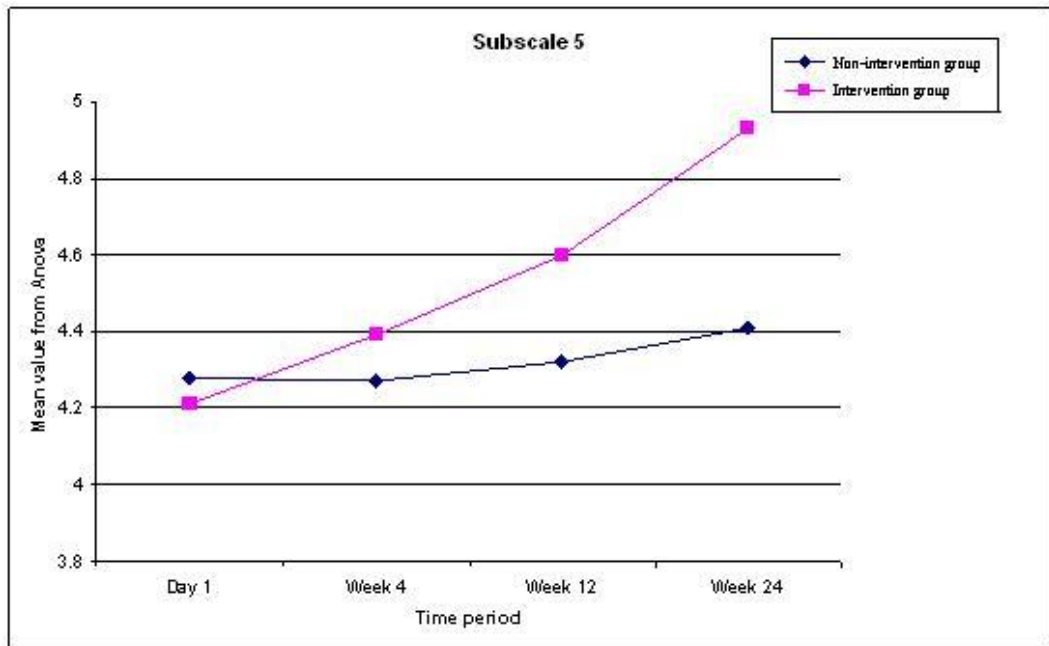


Figure 4.5: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 5 ‘Preparation for Nurturing the Infant’ at Day 1, Week 4, Week 12 and Week 24

The line graph highlights that there was a significant increase only at Day 1 in the non-intervention group for ‘Preparation for Nurturing the Infant’. However, in the intervention group, there was a significant increase after Day 1 at Week 4, Week 12 and Week 24. The implications of this result are discussed in Chapter 5 (section 5.3.5).

4.2.3.7 Comparison between non-intervention and intervention groups, Subscale 6

Table 4.35 shows the results of the MIBQ questionnaire’s Subscale 6 ‘Desire to Touch or Hold the Infant’ using one-way repeated measures ANOVA at Day 1, Week 4, Week 12 and Week 24. There was statistically significant difference across the four time periods.

Table 4.35: Results of the MIBQ questionnaire’s Subscale 6 ‘Desire to Touch or Hold the Infant’ at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 6 (4 periods)	Number (N=36)		Wilks’ Lambda (Value)	Wilks’ Lambda (Sig)
	Mean	Std. Deviation		
Day 1	4.78	0.31	0.79	0.05*
Week 4	4.86	0.23		
Week 12	4.85	0.26		
Week 24	4.92	0.16		

* Significant result at $p < 0.05$

Table 4.36 shows the results of comparison between the two groups of mothers for the MIBQ questionnaire’s Subscale 6 ‘Desire to Touch or Hold the Infant’ at Day 1, Week 4, Week 12 and Week 24. The comparison indicates a statistically significant effect for ‘period’ (time) but there is no significant effect for ‘period and group’. This suggests that while both groups of mothers wanted to touch the infant from the time of birth up to the end of this project (24 weeks), there was a change in ‘Desire to Touch or Hold the Infant’ across the four different time periods. The mean for the intervention group was consistently higher than for the non-intervention group across all time periods.

Table 4.36: Results of the MIBQ questionnaire’s Subscale 6 ‘Desire to Touch or Hold the Infant’ between the two groups at Day 1, Week 4, Week 12 and Week 24

Outcomes of Subscale 6 (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Wilks’ Lambda (Sig) Period	Wilks’ Lambda (Sig) Period & group
	Mean	SD	Mean	SD		
Day 1	4.74	0.34	4.82	0.29	0.05*	0.87
Week 4	4.81	0.28	4.92	0.15	(Value 0.79)	(Value 0.98)
Week 12	4.78	0.33	4.92	0.12		
Week 24	4.85	0.19	5.00	0.00		

Figure 4.6 was plotted using the results of the means for both groups from Table

4.36.

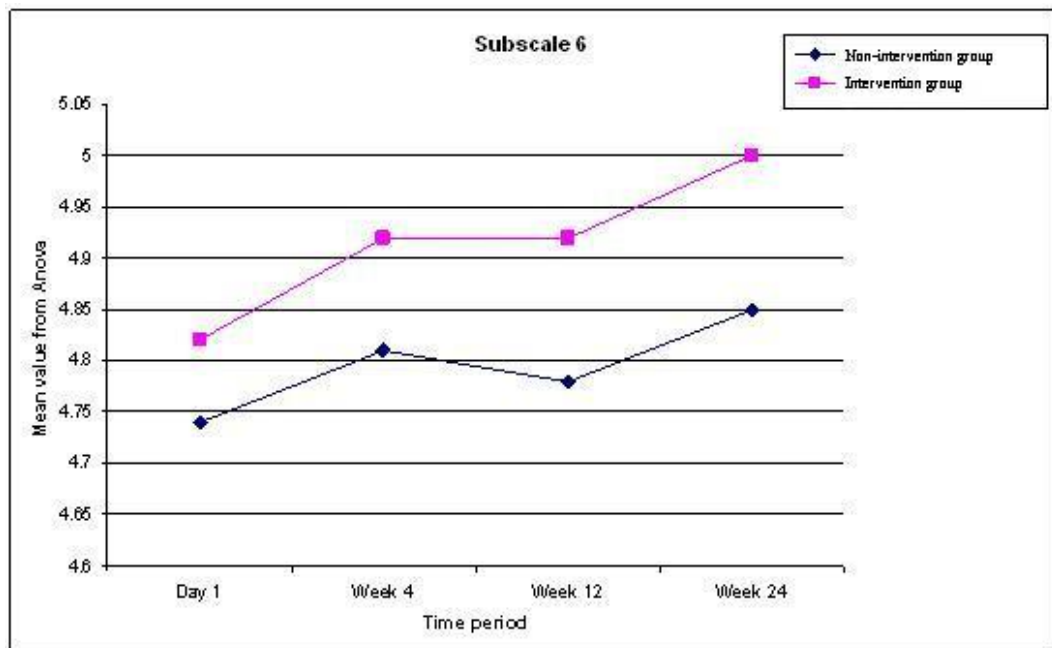


Figure 4.6: Line graph comparison of results for mothers in the non-intervention and intervention groups for the MIBQ questionnaire’s Subscale 6 ‘Desire to Touch or Hold the Infant’ at Day 1, Week 4, Week 12 and Week 24

The line graph reflects the significant difference between the two groups of mothers for Subscale 6, and the significant increase in the ‘Desire to Touch or Hold the Infant’ at Day 1, Week 4, Week 12 and Week 24. These results are discussed in Chapter 5 (section 5.3.6).

The next section presents the results for the effect of the infant’s gender on the outcomes of the MIBQ.

4.2.3.8 Gender of the infant

A Mann-Whitney U test was selected as the most appropriate method to analyse whether the gender of the child may have affected the outcomes of the MIBQ. It was chosen because the data was categorical. Results of the Mann-Whitney U test are presented in tables 4.37–4.40, which show that the only significant difference found

was for Subscale 2 ‘Attention and Connection to the Infant’ for Day 1, Week 4 and Week 12. By Week 24, there was no significant difference for this subscale. Table 4.37 shows the results of the infants’ gender and MIBQ at Day 1.

Table 4.37: Results of the infants’ gender and MIBQ at Day 1

MIBQ (6 subscales)	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Subscale 1	19.00	380.00	17.88	286.00	0.37
Subscale 2	21.00	420.00	15.38	246.00	0.05*
Subscale 3	16.03	320.50	21.59	345.50	0.06
Subscale 4	17.60	352.00	19.63	314.00	0.28
Subscale 5	16.80	336.00	20.63	330.00	0.14
Subscale 6	19.05	381.00	17.81	285.00	0.35

* Significant result at $p \leq 0.05$

Table 4.38 shows the results of the infants’ gender and MIBQ at Week 4.

Table 4.38: Results of the infants’ gender and MIBQ at Week 4

MIBQ (6 subscales)	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Subscale 1	17.93	358.50	19.22	307.50	0.36
Subscale 2	21.53	430.50	14.72	235.50	0.02*
Subscale 3	17.70	354.00	19.50	312.00	0.30
Subscale 4	19.63	392.50	17.09	273.50	0.23
Subscale 5	19.30	386.00	17.50	280.00	0.30
Subscale 6	18.50	370.00	18.50	296.00	0.50

* Significant result at $p < 0.05$

Table 4.39 shows the results of the infants’ gender and MIBQ at Week 12.

Table 4.39: Results of the infants' gender and MIBQ at Week 12

MIBQ (6 subscales)	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Subscale 1	19.20	384.00	17.63	282.00	0.33
Subscale 2	21.08	421.50	15.28	244.50	0.05*
Subscale 3	17.03	340.50	20.34	325.50	0.16
Subscale 4	19.68	393.50	17.03	272.50	0.21
Subscale 5	18.63	372.50	18.34	293.50	0.47
Subscale 6	18.20	364.00	18.88	302.00	0.41

* Significant result at $p \leq 0.05$

Table 4.40 shows the results of the infants' gender and MIBQ at Week 24.

Table 4.40: Results of the infants' gender and MIBQ at Week 24

MIBQ (6 subscales)	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Subscale 1	20.78	415.50	15.66	250.50	0.06
Subscale 2	20.65	413.00	15.81	253.00	0.08
Subscale 3	17.90	358.00	19.25	308.00	0.34
Subscale 4	19.50	390.00	17.25	276.00	0.23
Subscale 5	19.70	394.00	17.00	272.00	0.21
Subscale 6	19.20	384.00	17.63	282.00	0.27

In Table 4.40, in terms of the result for infants' gender with respect to the MIBQ at Week 24, there is no significant difference between results for male and female infants in all six subscales.

The results shown in Tables 4.37–4.40 indicate that all the mothers had accepted their preterm infants' gender by Week 24. These results also show that the gender of the preterm infant would not have affected the results of the MIBQ survey because all mothers had accepted their preterm infant by Day 1 on all subscales except Subscale 2, which showed a significant difference up to Week 12, after which there

was a change in the mothers and this subscale no longer showed a significant difference. The findings for mothers' acceptance of infants' gender are discussed in Chapter 5 (section 5.3.3).

This completes the results section for the MIBQ data. The BOCL survey results are presented in the next section.

4.2.4 The Bonding Observation Check List (BOCL)

Results from the BOCL showed a significant difference between the non-intervention and intervention groups of mothers for items 2 (Gazing), 3 (Talking to infant) and 6 (Holding the infant close to chest) at Day 1. Mothers in the intervention group were more willing to look at, talk to, and hold their infants than mothers in the non-intervention group. Mothers in both groups did not kiss, clean or straighten their babies. Table 4.41 (next page) shows these results of the BOCL (14 items) at Day 1.

Table 4.42 (on page 151) shows the BOCL (14 items) results at Week 4. There was a significant difference between the two groups on items 2 (Gazing), 3 (Talking to infant), 5 (Smiling), 6 (Holding the infant close to chest), 8 (Touching infant with fingertips), 9 (Touching infant with whole hand), 10 (Touching infant's fingertips and/or toes) and 11 (Touching infant's legs, trunk, body, etc). Mothers in the intervention group were shown to interact/bond more with their preterm infants than mothers in the non-intervention group. However, items 4 (Kissing), 13 (Cleans infant) and 14 (Straightens infant) again scored 0 for both groups, signifying that the mothers did not show this type of interaction with their preterm infant. Interpretation of these results is discussed in Chapter 5 (sections 5.4 and 5.5)

Table 4.41: Results of the BOCL (14 items) at Day 1

Outcomes (14 items)	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
1: En face ⁺	18.50	333.00	18.50	333.00	0.5
2: Gazing	14.00	252.00	23.00	414.00	0.00*
3: Talking to infant	15.00	270.00	22.00	396.00	0.01*
4: Kissing	0	0	0	0	0
5: Smiling	17.97	323.50	19.03	342.50	0.38
6: Holding the infant close to chest	14.97	269.50	22.03	396.50	0.02*
7: Caressing	18.00	324.00	19.00	342.00	0.16
8: Touching infant with fingertips	17.50	315.00	19.50	351.00	0.08
9: Touching infant with whole hand	18.00	324.00	19.00	342.00	0.16
10: Touching infant's fingertips and/or toes	18.00	324.00	19.00	342.00	0.16
11: Touching infant's legs, trunk, body, etc.	18.00	324.00	19.00	342.00	0.16
12: Mother just holding infant	18.50	333.00	18.50	333.00	0.5
13: Cleans infant	0	0	0	0	0
14: Straightens infant	0	0	0	0	0

* Significant result at $p < 0.05$

⁺ En face. means the mother's and infant's faces are on the same vertical plane with the mother looking into the infant's eyes.

Table 4.42: Results of the BOCL (14 items) at Week 4

Outcomes (14 items)	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
1: En face	18.50	333.00	18.50	333.00	0.5
2: Gazing	14.11	254.00	22.89	412.00	0.01*
3: Talking to infant	12.11	218.00	24.89	448.00	0.00*
4: Kissing	0	0	0	0	0
5: Smiling	15.03	270.50	21.97	395.50	0.02*
6: Holding the infant close to chest	11.22	202.00	25.78	464.00	0.00*
7: Caressing	18.50	333.00	18.50	333.00	0.5
8: Touching infant with fingertips	16.31	293.50	20.69	372.50	0.04*
9: Touching infant with whole hand	15.81	284.50	21.19	381.50	0.03*
10: Touching infant's fingertips and/or toes	16.00	288.00	21.00	378.00	0.01*
11: Touching infant's legs, trunk, body, etc.	15.19	273.50	21.81	392.50	0.01*
12: Mother just holding infant	18.50	333.00	18.50	333.00	0.5
13: Cleans infant	0	0	0	0	0
14: Straightens infant	0	0	0	0	0

* Significant result at $p < 0.05$

Table 4.43 shows the BOCL (14 items) results at Week 12. There was a significant difference between the two groups on items 2 (Gazing), 5 (Smiling), 6 (Holding the infant close to chest) and 9 (Touching infant with whole hand). Items 2, 5, 6 and 9 were also significantly different between the two groups in Week 4. In Week 12, less items showed a significant difference than in Week 4. In contrast to the results from Day 1 and Week 4, only item 14 continued to score 0, signifying that the mothers still did not show this type of interaction with their preterm infants.

Table 4.43: Results of the BOCL (14 items) at Week 12

Outcomes (14 items)	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
1: En face ⁺	18.50	333.00	18.50	333.00	0.5
2: Gazing	12.28	221.00	24.72	445.00	0.00*
3: Talking to infant	17.31	311.50	19.69	354.50	0.24
4: Kissing	19.44	350.00	17.56	316.00	0.20
5: Smiling	12.69	228.50	24.31	437.50	0.00*
6: Holding the infant close to chest	10.67	192.00	26.33	474.00	0.00*
7: Caressing	18.50	333.00	18.50	333.00	0.5
8: Touching infant with fingertips	16.83	303.00	20.17	363.00	0.08
9: Touching infant with whole hand	15.28	275.00	21.72	391.00	0.03*
10: Touching infant's fingertips and/or toes	18.08	325.50	18.92	340.50	0.38
11: Touching infant's legs, trunk, body, etc.	15.83	285.00	21.17	381.00	0.06
12: Mother just holding infant	18.50	333.00	18.50	333.00	0.5
13: Cleans infant	18.00	324.00	19.00	342.00	0.16
14: Straightens infant	0	0	0	0	0

* Significant result at $p < 0.05$

In Table 4.44, results for the BOCL (14 items) at Week 24 show a significant difference between the two groups of mothers on nine items—2 (Gazing), 3 (Talking to infant), 4 (Kissing), 5 (Smiling), 6 (Holding the infant close to chest), 9 (Holding the infant close to chest), 10 (Touching infant's fingertips and/or toes), 11 (Touching infant's legs, trunk, body, etc) and 13 (Cleans infant). Item 14 again scored 0.

Table 4.44: Results of the BOCL (14 items) at Week 24

Outcomes (14 items)	Non-intervention group (N=18)		Intervention group (N=18)		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
1: En face ⁺	18.50	333.00	18.50	333.00	0.5
2: Gazing	9.64	173.50	27.36	492.50	0.00*
3: Talking to infant	11.31	203.50	25.69	462.50	0.00*
4: Kissing	12.75	229.50	24.25	436.50	0.00*
5: Smiling	12.33	222.00	24.67	444.00	0.00*
6: Holding the infant close to chest	9.53	171.50	27.47	494.50	0.00*
7: Caressing	18.50	333.00	18.50	333.00	0.5
8: Touching infant with fingertips	17.50	315.00	19.50	351.00	0.24
9: Touching infant with whole hand	11.72	211.00	25.28	455.00	0.00*
10: Touching infant's fingertips and/or toes	15.92	286.50	21.08	379.50	0.02*
11: Touching infant's legs, trunk, body, etc.	11.61	209.00	25.39	457.00	0.00*
12: Mother just holding infant	18.50	333.00	18.50	333.00	0.5
13: Cleans infant	16.50	297.00	20.50	369.00	0.02*
14: Straightens infant	0	0	0	0	0

* Significant result at $p < 0.05$

These results at 24 weeks past birth show a long-term pattern of the mothers' bonding behaviour and suggest that mothers in the Kangaroo Care intervention group were bonding better long-term with their preterm infants than mothers in the non-intervention group. The continued 0 score for Item 14 signifies that the mothers did not show this type of interaction with their preterm infants throughout the six-month study timeframe. Possible reasons for this are discussed in Chapter 5 (section 5.4.4).

Table 4.45, shows the results of the BOCL (14 items) at each of the four time periods

using a Mann-Whitney U test to find differences between the two groups over the entire 24 weeks of the survey.

Table 4.45: Results of BOCL over the 4 time periods using a Mann-Whitney U test

Outcomes (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Asymp. Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Day 1	11.61	209.00	25.39	457.00	0.00*
Week 4	11.14	200.50	25.86	465.50	0.00*
Week 12	12.75	229.50	24.25	436.50	0.00*
Week 24	10.42	187.50	26.58	478.50	0.00*

* Significant result at $p < 0.05$

There was a significant difference between the two groups at each time period; Day 1, Week 4, Week 12 and Week 24. These results are plotted on the following graph (Figure 4.7).

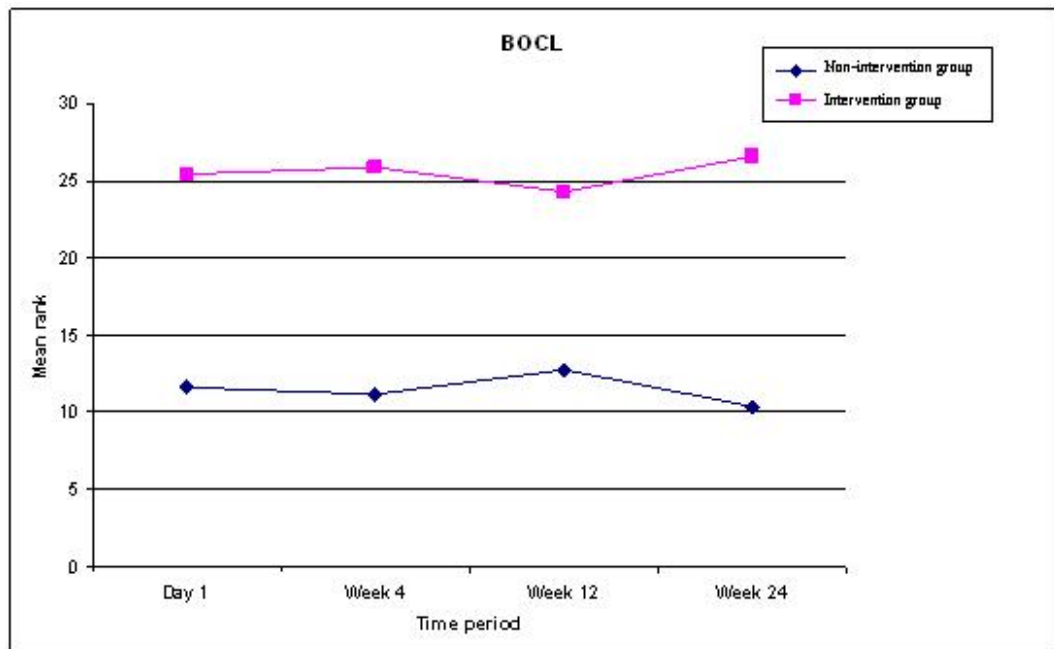


Figure 4.7: Line graph showing the results of the BOCL between the two groups over the four time periods

Figure 4.7 illustrates the significant difference between the two groups at Day 1,

Week 4, Week 12 and Week 24, with an increase of bonding behaviour (affectionate behaviour) in the intervention group at each time period. These findings are discussed in depth in Chapter 5 (sections 5.4 and 5.5).

Breastfeeding was included within the BOCL survey. All mothers breastfed their preterm infants at Day 1 at the hospital and continued breastfeeding at Weeks 4, 12 and 24 in their homes. Hence, the place for breastfeeding had no significant effect on the results. However, as shown in Table 4.46 (results for breastfeeding rates over the four time periods for the non-intervention and intervention groups), there was a significant difference between the two groups at Weeks 12 and 24, with mothers in the Kangaroo Care intervention group breastfeeding their infants longer than mothers in the non-intervention group.

Table 4.46: Breastfeeding rates over the four time periods using a Mann-Whitney U test

Outcomes (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Asymp. Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Day 1	18.50	333	18.50	333	0.50
Week 4	18.00	324	19.00	342	0.16
Week 12	15.00	270	22.00	396	0.00*
Week 24	13.00	234	24.00	432	0.00*

* Significant result at $p < 0.05$

Table 4.47 shows the BOCL results for mothers going back to work over the four time periods. Some mothers had to go back to work during the first six months (24 weeks) after delivery. A Mann-Whitney U test showed a significant difference between the two groups of mothers at Weeks 12 and 24, with more mothers in the non-intervention group returning to work than those in the Kangaroo Care intervention group. This could account for the findings shown in Table 4.46, which

showed that mothers in the intervention group continued breastfeeding longer than those in the non-intervention group. However, the place of breastfeeding was not affected by mothers returning to work. They continued to breastfeed at home. These findings are discussed in Chapter 5 (section 5.3.5 and 5.5.1).

Table 4.47: Results for mothers returning to work over the four time periods using a Mann-Whitney U test

Outcomes (4 periods)	Non-intervention group (N=18)		Intervention group (N=18)		Asymp. Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Day 1	18.50	333	18.50	333	0.50
Week 4	19.50	351	17.50	315	0.08
Week 12	21.00	378	16.00	288	0.03*
Week 24	23.50	423	13.50	243	0.00*

* Significant result at $p < 0.05$

Table 4.48 shows the results of the infants' gender and BOCL over the four time periods using a Mann Whitney U test. This test was used to check whether the infants' gender may have influenced the results of the BOCL survey.

Table 4.48: Results of the infants' gender and BOCL at the four time periods

BOCL (14 items)	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Day 1	19.55	391.00	17.19	275.00	0.25
Week 4	19.05	381.00	17.81	285.00	0.36
Week 12	18.25	365.00	18.81	301.00	0.44
Week 24	19.20	384.00	17.63	282.00	0.33

There was no significant difference between male and female infants for BOCL scores at Day 1, Week 4, Week 12 and Week 24. Hence, it can be concluded that gender made no difference to the mothers' bonding behaviours toward their preterm infants.

Table 4.49 shows the results for the infants' gender and breastfeeding over the four time periods. A Mann-Whitney U test was used to check whether gender may have influenced breastfeeding of the preterm infants.

Table 4.49: Results of the infants' gender and breastfeeding at the four time periods

Breastfeeding	Male		Female		Mann-Whitney U Sig. (1-tailed)
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks	
Day 1	18.50	370	18.50	296	0.50
Week 4	18.10	362	19.00	304	0.19
Week 12	18.40	368	18.63	298	0.45
Week 24	18.00	360	19.13	306	0.36

There was no significant difference between mothers' breastfeeding practices with male and female infants at Day 1, Week 4, Week 12 and Week 24 by the mothers. Hence, it can be concluded that gender made no difference to the mothers' breastfeeding practices with their preterm infants.

4.3 Summary

This chapter has presented the findings from each of the four questionnaires. The environment in which the data was collected has been described to allow the reader to appreciate the data collection settings. The results from the questionnaires have been presented as tables and graphs.

The results showed that the mothers were demographically similar. However, the infants' demographic data showed a statistically significant difference for both the Apgar score at one and five minutes, and the hours per day mothers spent with their infants in Nursery 2. In terms of bonding scores, there was a statistically significant difference between the two groups in six subscales of the MIBQ. Comparative analysis showed significantly higher means for mothers in the intervention group

than for mothers in the control group for the MIBQ and the BOCL from Day 1 to Week 24. Overall, mothers in the intervention group demonstrated a statistically significant greater degree of bonding, care and affectionate behaviour towards their infants than mothers in the non-intervention group. Mothers in the intervention group were also found to breastfeed their infants longer than mothers in the non-intervention group. Furthermore, the results for mothers returning to work showed that more mothers in the non-intervention group returned to work than those in the intervention group. It can be concluded that Kangaroo Care made a statistically significant difference to bonding between mothers and their preterm infants, and increased the mothers' care and affection for their infants over the four time periods.

The following chapter provides a discussion of the results.

Chapter 5: Discussion

5.1 Introduction

This chapter presents an evaluation of the study results in terms of the impact of Kangaroo Care on promoting breastfeeding and mothers' affectionate care for their preterm infants, thereby increasing mother-infant bonding. As already discussed in the literature review, mother-infant bonding is known to improve maternal and infant health. In light of the complex medical care of preterm infants, which demands expensive infrastructure and highly skilled staff (Ruiz-Peláez *et al.* 2004), the discussion seeks to establish the value of introducing and properly carrying out Kangaroo Care in all hospitals in Thailand as part of the Thai Government's 'Baby Friendly Hospital Initiative' as an inexpensive intervention for improving maternal and preterm infant health care. The researcher discusses observation data in conjunction with the statistical data presented in Chapter 4 to give insight into the mothers' thoughts and feelings, which adds a further dimension to the results in Chapter 4.

5.2 Demographic characteristics

5.2.1 Mothers

All mothers in the study were found to be similar in demographic characteristics, including age, religion, education, marital status, family income and pregnancy; there was no significant difference between mothers in the intervention and non-intervention groups (see Table 4.7). While two participants reported complications during their current pregnancy, results of the Mann-Whitney U test indicated that this number was non-significant.

The similarity of demographics of all the mothers is significant for the study outcomes because it establishes that any differences found between the two groups of mothers in relation to the results of the MIBQ and BOCL are not due to demographic differences.

5.2.2 Infants

The lack of any significant difference between the preterm infants' basic demographic characteristics, which included gender, gestational age, weight and length (Table 4.20), means these characteristics can be discounted as having an effect on the results of the MIBQ and BOCL.

The results for the infants' Apgar scores, and birth deformities and neonatal illnesses did not present any barriers to the success of the Kangaroo Care intervention. All infants' Apgar scores at five minutes were greater than 7, meaning there was no neurological impairment or asphyxia that would reduce their ability to suck. No infants were born with any deformities, and while six infants from each group (intervention and non-intervention) had respiratory and metabolic problems (hypoglycaemia) and spent time in Nursery 2 (low risk), all had recovered within seven days (see Tables 4.12, 4.13, 4.14, 4.15, 4.17). Therefore, these variables can be discounted as having any impact on the research outcomes.

However, the statistically significant difference in the hours per day spent by mothers in the intervention group with their preterm infants in Nursery 2 (low risk) compared with the hours per day spent by mothers in the non-intervention group with their preterm infants in Nursery 2 (see Table 4.19) has important implications for the study outcomes. It provides the first indication that even within a very short period of time, the Kangaroo Care intervention resulted in mothers paying more attention to

their infants.

5.2.3 Summary of mother and infant demographic characteristics

The findings described in this section (demographics for mothers and preterm infants) confirm that demographic characteristics of the mothers and infants in both the non-intervention and intervention groups would not have had a significant effect on the research outcomes. The major finding from the demographic data is that the Kangaroo Care intervention seemed to increase mothers' attention to, and care of, their infants. These findings are supported by those of Shiao (1998). However, Shiao (1998) has never published her findings. She presented them in an oral presentation at the Health Promotion for Thai Children Conference in Bangkok, Thailand, 1998. The researcher has been unable to find any other studies that evaluate the benefits of Kangaroo Care beyond the hospital stay.

The following sections discuss the implications of the results of the MIBQ and the BOCL across the study's four time periods—T1 (day 1), T2 (Week 4), T3 (Week 12) and T4 (Week 24)—in relation to four key questions:

1. Are there differences in bonding on Day 1 postpartum, Week 4, Week 12 and Week 24 between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?
2. Are there differences in breastfeeding rates on Day 1 postpartum, Week 4, Week 12 and Week 24 between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?
3. Does the gender of the infant make a difference to bonding and breastfeeding rates over a period of six months?
4. Are there any other variables that might influence bonding or breastfeeding rates of the mothers in this study?

5.3 Maternal-Infant Bonding Questionnaire (MIBQ)

This discussion relates to the themes of maternal-infant feelings, maternal-infant interaction, factors that facilitate bonding and factors that impede bonding. Each Subscale and items within it are discussed in order from Subscale 1 to Subscale 6.

Information regarding each Subscale is presented in Appendix 6.

5.3.1 Subscale 1: Perception of infant features

Overall, the results showed no statistically significant difference for Subscale 1 between mothers in the non-intervention group and the intervention group for Day 1 (Table 4.21) and Week 4 (Table 4.22). One mother in the intervention group told the researcher that when she first saw her infant: “I thought she felt like she was not mine” (Item 2) and “It was a bit frightening, she was so tiny”. One mother in the non-intervention group told the researcher: “I was so shocked he was very tiny. Is this my son? [Item 2] He did not look well to me”. These reactions are supported by findings from another study in which mothers who saw their preterm infants in the immediate postpartum period expressed fear, worry, relief and happiness (Reid 2000).

However, statistical significance was seen by Week 12 (Table 4.23) and Week 24 (Table 4.24). Further comparative analysis (see Tables 4.25 and 4.26) between results for the intervention and non-intervention groups suggested not only a change in perception of infant features across the four different time periods but also that mothers receiving the Kangaroo Care intervention reported a heightened perception of their preterm infant than did mothers in the non-intervention group. Since both groups of mothers were matched demographically and found not to be significantly different, one has to consider strongly that the Kangaroo Care intervention is the

reason for this result.

The lack of any significant difference in the results for both groups at Day 1 and Week 4 may be due to the fact that preterm infants tend to be thinner, appear to have proportionally longer limbs and have highly visible rib cages, which makes them less attractive than full-term infants (Blake, Stewart & Turcan 1975). Observations by Blake *et al.* (1975) showed that some parents of preterm infants are negatively affected by their bodily appearance and may take much longer to become attached to them than parents who are less affected by bodily appearance. The importance of parental expectation concerning infant appearance in the immediate postpartum period is exemplified in Robson and Moss' (1970) work on the process of maternal attachment. In addition, Boukydis (1981) reported that there does not appear to be any systematic research related to differences in the infant body somatotype that takes into account such features as relative length and weight; amount of body fat; body shape; characteristic posture; amount, distribution and darkness of body hair; and relative size of head, trunk and limbs. Cultural differences could be important here (Boukydis 1981) because babies will have features specific to their culture.

In addition, Affonso, Wahlberg and Persson (1989) reported from a study they conducted in Sweden that mothers who practised Kangaroo Care were more excited about the infant's movements than those mothers in a non-intervention group. Consequently, for recognition of one's own infant, an initial adverse or unfavourable reaction to specific features of its appearance may affect the mother's interaction with the neonate during the important immediate postpartum period (Boukydis 1981). Therefore, parental preconceptions of infant appearance, initial parental reaction to their newborn's appearance and parental reports of perception of infant

attractiveness over time following varying amounts of interaction with the infant are important measures. Such measures may be helpful indicators for those trying to predict the development of difficult and possibly abusive parent-infant relations in the postpartum period (Lozoff *et al.* 1977). With regard to examining the infant's face and body, morphological features and behavioural expressiveness have been shown to establish the relative importance of each in relation to parental perception and caretaking behaviour (Boukydis 1981). More research is needed pertaining to Hilderbrandt and Fitzgerald's (1977) age-related findings about the developmental morphology of facial features and changes in perceived attractiveness over time, beginning with the neonatal period.

5.3.2 Subscale 2: Attention and connection to the infant

All mothers in the study wanted to stay closer to their infants (Item 9), as observed by the researcher while they were in the hospital: "when my baby was admitted at Nursery 2, I went there every day". Thirty-three mothers reported on Day 1 that "I went to Nursery 2 every day to breastfeed him/her and help with bathing", indicating their desire to nurture their infant by themselves (Item 10). Parents' early handling of their infants is known to increase parent-infant bonding (Bills 1980). In regard to Item 6, 'My infant might feel lonely because he/she did not sleep with me', allowing mothers into Nursery 2 as soon as possible after birth to handle and care for their preterm infants who were still in an incubator (Klaus & Kennell 1976) helped the mothers connect with their infants. Even though the infants could not sleep with their mothers nursing them, mothers were able to establish breastfeeding during visits to Nursery 2.

It has been demonstrated conclusively that early contact between mothers and

preterm infants is not hazardous (Davis, Mohay & Edwards 2003), and that emotional ties are strengthened when mothers and their newborns are kept together from the moment of birth (Klaus & Kennell 1982; Klaus *et al.* 1995). The repeated ANOVA results (Table 4.27), which showed a statistically significant difference over the 24-week period, coupled with the statistically significant difference in results of the comparison between the two groups of mothers at Week 24 (see Table 4.28 and Figure 4.2), imply that while most mothers had attention for, and connected to their preterm infant, giving additional Kangaroo Care to their preterm infant over a long period increased mothers' attention and connection. This implication is in line with Affonso *et al.*'s (1989) finding that mothers in their intervention group who practised Kangaroo Care had more self-confidence about taking care of their infant at home than those mothers in their non-intervention group.

The finding that all mothers paid attention to, and connected to their preterm infants can be attributed to the Thai culture, in which mothers are taught by their senior and extended family members to attend and connect to their preterm infants. All mothers, regardless of whether they were in the intervention or non-intervention groups, were very concerned about their infants (Item 11). Some of the comments mothers made during the researcher's observations, which reflect the mothers' attention to their infants' needs and add strength to the statistical findings, included, "How can I tell whether my baby's getting enough breast milk?" and "May I put her socks on while doing Kangaroo Care?" The care and attention demonstrated by the mothers in this research, and seemingly handed down through generations as part of Thai culture, appears contradictory to the high rates of infant abandonment in Thailand. Perhaps the demographic make-up of both groups of mothers in the study sample and their awareness of the researcher observing them affected their responses.

5.3.3 Subscale 3: Acceptance of the infant's individuality

The results for this subscale showed that while all mothers at Day 1 accepted their preterm infant's individuality and most accepted their infant's gender (only five mothers said they were disappointed with the gender), their acceptance increased over time and this increase was greater for the intervention group than for the non-intervention group (Tables 4.29, 4.30 and Figure 4.3). This implies that Kangaroo Care may be a contributing factor in the statistically significant difference between the groups. As Ludington-Hoe and Golant (1993) found much earlier, the sooner parents could hold their infant in Kangaroo Care, the sooner they would feel the loving sensation that comes with bonding, thus removing any feelings of disappointment regarding the infant's gender, even in a country where male infants are preferred over females. Furthermore, Affonso *et al.* (1989) suggested that mothers who practised Kangaroo Care were thinking more strongly about "intimate feelings" than those who did not practise this intervention.

It is remarkable that both groups of mothers in the study reported in this thesis accepted their preterm infants' individuality at Day 1 because, as Ludington-Hoe and Golant (1993, p. 19) describe, it can be quite overwhelming for new mothers to see their preterm infants in the NICU (in this case Nursery 2, low risk/sick infants):

I know I'm going to be overwhelmed by all of the equipment, my goal on this first visit is just to see my baby's face. I probably won't get to see the eyes because they'll be closed, but I will look at the pretty little lips. They will be so small and delicate – almost like a porcelain figurine's face. They will be perfect but tiny.

Mothers in the thesis study reported at Day 1 that they were able to accept their infants' individuality, even though they were preterm, felt love for their infants and were able to give their infants a name. The majority told the researcher that their

infants looked similar to other babies but only the size was a bit different (Item 13); their infants were smaller than other babies. In regard to naming their infants (Item 14), most mothers by Day 1 had thought carefully about choosing a great name for their infant. The mothers were aware that their infants' names would be with them forever and could make a difference in regard to their infant being teased or bullied throughout their life. At Day 1, the preterm infants had only one full name. By Weeks 4 and 12 they had another name (nick name). Some of the preterm infants were given a third name by relatives or monks between Weeks 12 and 24. The importance the mothers in both groups placed on naming their infants is in accordance with Adams (2006), who found that one of the most important things parents should prepare is a name for their infants.

5.3.4 Subscale 4: Acceptance of the role of mother

Some mothers having to go back to work three months after delivery could have been a factor impacting the results for this subscale. While there was no statistically significant difference in the acceptance of their new role as mothers at Day 1 and Week 12, statistical significance was seen at Week 4 and by Week 24. At Day 1, 32 mothers told the researcher they felt complete as a mother (Item 17), but throughout the 24-week study period mothers in the Kangaroo Care intervention group always scored higher than mothers in the non-intervention group. Although most mothers (n=35) at Day 1 felt that their infant was the most important thing in their life (Item 18), by Week 24 the results from the repeated ANOVA (Table 4.32) show that the two groups had deviated significantly (see Figure 4.4). By Week 24, the mothers giving the additional Kangaroo Care intervention to their preterm infants were showing greater maternal roles. This finding implies that Kangaroo Care had a positive influence on the mothers' feelings about how they saw themselves in the

role of mother. Again, this finding is congruent with Affonso *et al.*'s (1989) study, which found that mothers who had practised Kangaroo Care perceived that they had the feeling of 'being a mother'; they felt more confident and more assertive, and believed they had developed better mothering skills. It can be argued that the close proximity of the infant during Kangaroo Care may make the mother more aware of, and responsive to, her infant's needs (Anisfeld, Casper, Nozyce & Cunningham 1990), thus heightening her acceptance of the role of mother. It is known that social factors and caregiving processes are important predictors of preterm infants' later outcomes and development, and mothers play a fundamental role in ensuring the optimal developmental outcome (Davis *et al.* 2003). Therefore, the study results for Subscale 4 imply that the wealth of extra nurturing offered through Kangaroo Care over the 24-week period would help preterm infants to increase their social development for future years. In Thai culture, where families can consist of many people (extended family), mothers have additional support from many family members. The Kangaroo Care intervention added to this nurturing and ensured that the infant continued to be nurtured, loved and cared for by all, including the mother. There was no evidence to suggest that some mothers felt unsure whether "the infant even knew I was the mother because so many others were taking better care of him or her", as was the case in Affonso *et al.*'s study (1989, p. 46).

In terms of Item 20, 'I may not be able to be a good mother' (negative item), 32 mothers in this study at Day 1 reported that they thought they might be able to be a good mother. However, over the 24-week period, the mothers in the Kangaroo Care intervention group were shown to rate better than those in the non-intervention group, indicating that, as was the case in Affonso *et al.*'s (1989) study, Kangaroo Care had a positive effect on the mothers' perceived confidence in their ability to

perform the role of mother. Bills (1980) stated that there must be a period of acquaintance between mother and infant before an affectional maternal-infant bond can be formed. This period includes 1) seeking information about the infant; 2) physical contact with the infant; and 3) initiating and maintaining positive feelings about the infant. Furthermore, Affonso *et al.* (1989, p. 44) reported that there are three constructs of cognitive adaptation, based on the themes obtained from the interview responses of mothers participating in their study: 1) search for meaning focused on active questioning, the process of mother and infant getting to know each other, and causal attributions of the preterm labour and birth experience; 2) sense of mastery focused on coping with the infant's feeding, anxieties about the nursery environment and readiness for the infant's discharge; and 3) self-enhancement, focused on the woman's image of herself as a mother (for example, mothers reported the "feeling of being a mother," perceiving that the infant was "getting to know me," enhanced self-confidence and excitement about the infant's exploratory movements). The researcher argues that the Subscale 4 results of the study reported in this thesis indicate that Kangaroo Care enhanced not only the acquaintance between mothers in the intervention group and their infants over the 24-week period but also these mothers' perceptions of their performance in the role of mother.

5.3.5 Subscale 5: Preparation for nurturing the infant

The stark contrast between the mean scores for the mothers in the intervention and non-intervention groups over the 24-week period indicates that Kangaroo Care significantly increased the mothers' perception of their ability to nurture their infants. This result was supported further by the repeated ANOVA scores (Tables 4.33 and 4.34). An interesting observation from these results was that initially, at Day 1, the non-intervention group scored better than the intervention group but by Week 24 the

trend had reversed, showing that mothers in the intervention group were feeling better about nurturing their preterm infants. This implies that mothers receiving the Kangaroo Care intervention had better preparation than the mothers in the non-intervention group for nurturing their preterm infants over time.

In relation to Item 23, 'I think my infant may have some special defects that a doctor still has not examined' (negative item), the majority of the mothers were happy about the condition of their preterm infant's health while still in hospital. This was an encouraging finding because, as Hurst (2001) identified, mothers require a great deal of information about subjects such as prematurity, their infants' specific health problems, treatment needed, prognosis and the NICU environment. For example:

I need to know what this all means, what I should worry about and what to expect.

I want to know how the nurses feel about my asking questions and what I can ask for or make suggestions about.

I need to be able to ask questions and discuss what it all means so that I can help decide what will work best for my baby (Hurst 2001, p. 46).

The mothers in the thesis study asked similar questions once they had taken their infants home. The researcher noticed 10 mothers (seven in the non-intervention group and three in the intervention group) asked such questions once or twice during the first four weeks. However, by Week 12 the mothers in both groups were no longer concerned, having been reassured by the researcher and also seeing that the infant was healthy and growing normally.

All mothers in this study believed it was important to breastfeed their infant as soon as possible after birth (Item 25). This is supported by the World Health Organization (1996), which found that staff should promote or teach mothers to start breastfeeding

within an hour of birth and on demand, without other fluids or food. The Kangaroo Care intervention did not appear to have any impact on this belief.

There was a difference between the intervention and non-intervention groups at Day 1 in relation to Item 26, 'I want to take a rest for as long as possible before breastfeeding my infant after birth' (negative item). Overall, only eight mothers at Day 1 (all in the non-intervention group) wanted to take a rest for as long as possible before breastfeeding. This result has no implications for the value or otherwise of Kangaroo Care. It may simply indicate that these mothers were either too tired, or did not think they had enough milk to breastfeed, as identified in Affonso *et al.*'s (1989) study.

In terms of breastfeeding time, the findings from this study showed that there were significant differences between the two groups at Weeks 12 and 24. Although mothers told the researcher their similar perceptions about breastfeeding their preterm infants (all wanted to breastfeed for longer than three months), putting these into practice was different for the two groups, resulting in significant differences in the length of time the mothers breastfed their preterm infants. Results showed that mothers in the intervention (Kangaroo Care) group breastfed longer than mothers in the non-intervention group. A total of 15 mothers in the intervention group and four in the non-intervention group breastfed their preterm infants for the entire 24 weeks of the project. However, this may be a reflection of the fact that more mothers in the non-intervention group had to return to work after 12 weeks. Comparing these results with other literature on Kangaroo Care, the intervention possibly did have an impact on the length of time mothers breastfed their preterm infants. In Affonso *et al.*'s (1989) study, for example, mothers who provided Kangaroo Care perceived that they

had a better experience with lactation and taking care of their newborns than mothers who did not provide Kangaroo Care.

5.3.6 Subscale 6: Desire to touch or hold the infant

At Day 1, in relation to Item 28, 'I would like to hold my infant', 35 mothers said they would like to hold their preterm infant but were afraid to because of their infant's small size. The findings indicate that mothers need more encouragement from staff not to be afraid to hold their preterm infants, in keeping with the BFHI policy.

Similarly, for Item 29 in this study, 'I would like to hug my infant', all mothers wanted to hug their preterm infant at Day 1 but felt afraid because of these infants' small size and apparent frailty. However, by Week 4, all mothers reported they no longer felt like that. This change indicates that it is possible to encourage and promote mothers' touching, holding, hugging and cradling their preterm infants, as was also shown by Gay (1981). The mothers' response to the final item in Subscale 6, 'I am more satisfied when I watch my infant than when I hold him/her' (negative item), indicated that at Day 1, some mothers (n=31) who wanted to hold their infant were afraid because their infant was too small; they preferred to watch rather than hold their infant at Day 1. This response supports the researcher's personal experience that some mothers do not want to handle, or are too afraid to handle, their preterm infant. This finding suggests that staff need to encourage parents to touch or hold their preterm infant as soon as they can.

The results for Subscale 6 are interesting (Tables 4.35 and 4.36) because mothers in both groups scored higher than in any other Subscale and there were significant differences between the groups at Weeks 12 and 24 (see Figure 4.6). The Kangaroo

Care intervention group had higher mean scores across all time periods, but particularly at Weeks 12 and 24, a result that cannot be seen as due only to the time factor. It can be deduced that Kangaroo Care played a significant role in the intervention group mothers' greatly increased desire to touch and hold their infants, because, while all mothers had a desire to touch their preterm infants from the time of birth and throughout the duration of the project (24 weeks), the difference was greater in the intervention group.

5.4 Bonding Observation Check List (BOCL)

The fact that the BOCL showed a statistically significant difference between the two groups for some items needs discussion. Importantly, statistically significant differences occurred in breastfeeding behaviours between the intervention and non-intervention groups, with mothers in the intervention group breastfeeding for longer. The following discussion describes how mothers interacted with their preterm infants while they were breastfeeding at the four study intervals: T1 (Day 1); T2 (Week 4); T3 (Week 12); and T4 (Week 24).

5.4.1 BOCL Results at Day 1

It could be assumed that all mothers would show the same affect for items 2 (Gazing), 3 (Talking to infant) and 6 (Holding the infant close to chest) on the BOCL at Day 1 because staff help mothers initiate breastfeeding within one hour of birth, and the practice of rooming-in allows mothers and infants to remain together 24 hours a day (Philipp *et al.* 2001), thus increasing bonding through actions such as gazing, talking to the infant and holding the infant close to their chest. However, the BOCL results for items 2, 3 and 6 at Day 1 imply that Kangaroo Care impacts positively on the mother-infant bonding because mothers in the Kangaroo Care group

showed greater affect with these items than the mothers in the non-intervention group.

5.4.2 BOCL Results at Week 4

Data collection at Week 4 was carried out in the mothers' homes. The fact that eight items—2, Gazing; 3, Talking to infant; 5, Smiling; 6, Holding the infant close to chest; 8, Touching infant with fingertips; 9, Touching infant with whole hand; 10, Touching infant's fingertips and/or toes; and 11, Touching infant's legs, trunk, body, etc.—showed a significant difference by Week 4 whereas only three items showed a significant difference at Day 1 can be interpreted as indicating that mother-infant bonding had strengthened greatly for the mothers in the Kangaroo Care intervention group over time, and was higher than for mothers in the non-intervention group. This could be attributed to the Kangaroo Care intervention increasing the amount of touch and close contact mothers had with their preterm infants. Mothers in the intervention group spent more time with their infants, thus promoting bonding. By Week 4, mothers in the intervention group were starting to become familiar with their preterm infants.

The reasons why mothers in both groups again scored 0 for kissing, cleaning or straightening their infants could be that once at home, extended family took over a lot of care for the infants while the mothers recovered from giving birth. Moreover, it is traditional cultural practice in Thailand that mothers do not show affection such as kissing, or intimate behaviour such as cleaning or straightening their infants, except in the presence of family members.

5.4.3 BOCL Results at Week 12

By Week 12, the results showed significant differences for only four items—2,

Gazing; 5, Smiling; 6, Holding infant close to chest; and 9, Touching infant with whole hand—with mothers in the intervention group demonstrating greater affect for these items than mothers in the non-intervention group. One reason for the drop in significant differences across the same or an increased number of items compared to Week 4 results could be that some mothers had to return to work, thus reducing the time they could spend with their infants. Mothers who work for the Thai Government have maternity leave for only three months (the Week 12 mark of the study) before having to return to their workplace. Mothers who needed to return to work had to adapt to a new routine which, for those in the intervention group, included adaptations to their practice of Kangaroo Care.

5.4.4 BOCL Results at Week 24

At Week 24, the significant difference between the intervention and non-intervention groups for nine items—2, Gazing; 3, Talking to infant; 4, Kissing; 5, Smiling; 6, Holding the infant close to chest; 9, Touching infant with whole hand; 10, Touching infant's fingertips and/or toes; 11, Touching infant's legs, trunk, body etc.; and 13, Cleans infant—represented a dramatic increase from the four items showing a significant difference at Week 12. Interestingly, two of the items showing a significant difference at Week 24 (Item 4, Kissing and Item 13, Cleans infant) previously had not been of any significance. These results indicate that mothers in the intervention group presented more bonding behaviours than those in the non-intervention group. They also demonstrate that mothers became more familiar with their infants over time and, when compared with the Week 12 results, that mothers were able to adjust their roles after returning to work.

The most interesting results were seen in Weeks 4 (eight items showing significant

difference between the two groups) and 24 (nine items showing significant difference between the two groups). The mothers in the intervention group, as shown clearly in Figure 4.7, scored significantly higher than the mothers in the non-intervention group. Possible factors affecting these results could be that at Day 1, mothers were faced with a preterm rather than a full-term infant; at Weeks 4, 12 and 24, when mothers were in their own homes, they were influenced by their family members; at Week 12 some mothers went back to work; and at all time periods, mothers were not accustomed to being observed by a stranger while they cared for their infant. The continuous 0 score for Item 14 (Straightens infant) appears to reflect Thai cultural practices and family taking over certain aspects of infant care.

5.5 Summary evaluation of MIBQ and BOCL results in relation to the impact of Kangaroo Care on mother-infant bonding and breastfeeding rates

In this section, overall results of the MIBQ and BOCL are evaluated in relation to each of the study's aims and corresponding key questions.

5.5.1 Aim 1: To discover whether Kangaroo Care can increase bonding between mothers and their preterm infants as measured by the MIBQ and the BOCL over a six-month period

Key question 1: Are there differences in bonding on Day 1 postpartum, Week 4, Week 12 and Week 24 between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?

Maternal-infant attachment is a development process that starts with pregnancy and continues over the months following the birth. It is a time when the mother develops a strong sense of commitment and an enduring feeling of affection for her infant. When an infant is healthy, there is a reciprocal maternal-newborn interaction immediately following birth that heightens and enhances this process (Roller 2005). The maternal-newborn interaction can be difficult when the infant is preterm. The

study presented in this thesis provides evidence from the MIBQ and the BOCL that the mother-preterm infant dyad in the intervention (Kangaroo Care) group had better bonding than that in the non-intervention group. Bonding comprises both feelings and interaction, and, over the 24 weeks of the study, the use of Kangaroo Care in the intervention group was shown to significantly increase the bonding scores between preterm infants and their mothers when compared with the bonding scores of mothers and their preterm infants in the non-intervention group. The mothers in the intervention group reported a positive perception of their preterm infants' features, better attention and connection to their preterm infant, and greater acceptance of their preterm infants' individuality. They had better acceptance of the role of mother, were better prepared for nurturing their preterm infants, and had an increased desire to touch and hold the infants.

The results suggest that the mothers in the intervention group bonded better with their preterm infants in the longer term than the mothers in the non-intervention group, indicating the strong probability that Kangaroo Care promotes long-term mother-infant bonding.

5.5.1.1 Mother-Infant Bonding Questionnaire

All six subscales of the MIBQ showed significant differences at Week 24, which could be attributed to the Kangaroo Care intervention. This deduction arises from the fact that the intervention encouraged the mothers in that group to spend more time with their infants over the 24 weeks, which added to their nurturing and ensured that the preterm infants continued to be nurtured, loved and cared for by all, including extended family. It is striking that the Kangaroo Care intervention increased the mothers' responsiveness to their preterm infants' features (Subscale 1) so that there was a statistically significant difference at Week 24. This finding indicates that the

Kangaroo Care intervention had a significant effect over time. It is even more important given the shock some mothers experienced at the small size of their preterm infants. It can be argued that, given the mothers' initial shock, Kangaroo Care might be especially important in helping mothers reconcile themselves with, and adjust emotionally to, the crisis of preterm birth. It may lessen the negative impact of the birth on their caregiving practices in hospital and later at home.

Changes in scores occurred over time between the intervention and non-intervention groups for Subscale 2, 'Attention and connection to the infant'. While there was no statistically significant difference between mothers in the two groups at Day 1, the statistically significant differences that developed at Weeks 4, 12 and 24 provide evidence that mothers receiving the Kangaroo Care intervention had better attention and connection to their infants over time than the mothers in the non-intervention group. Permitting mothers to visit Nursery 2 to handle their preterm infants may explain why all mothers at Day 1 gave much attention to, and showed connection with, their newborns. The Kangaroo Care intervention then impacted on the mothers and preterm infants in the intervention group, with the additional contact between these mothers and infants over time helping develop a stronger mother-preterm infant bond, resulting in the mothers giving more attention to, and connecting better with, their preterm infants than the mothers in the non-intervention group. This finding is congruent with the literature from proponents of Kangaroo Care, who encourage maintaining a skin-to-skin contact method for about six weeks so that both preterm infant and mother can establish breastfeeding (Mohrbacher & Stock 2003).

All mothers accepted their preterm infant's individuality (Subscale 3) but over the 24-week study period there was increasingly greater acceptance of infants'

individuality among the intervention group, resulting in a statistically significant difference between their scores and those of the non-intervention group at Weeks 12 and 24. The results demonstrate that although both groups of mothers accepted their preterm infants' individuality, Kangaroo Care had a positive impact on the level of acceptance over time. This correlates with Affonso *et al.*'s (1993) finding that Kangaroo Care facilitates maternal-infant attachment and enhances the mothers' ability to accept their preterm infants.

As discussed earlier in this chapter, the study results also support Affonso *et al.*'s (1993) assertion that Kangaroo Care facilitates the mothers' ability to establish their maternal role identity. The mothers receiving the Kangaroo Care intervention had better acceptance of the role of mother (Subscale 4) than the mothers in the non-intervention group throughout the 24-week period.

There were differences in the results over time for the intervention and non-intervention groups in relation to Subscale 5, 'Preparation for nurturing the infant'. Whilst there was no statistically significant difference between the groups at Day 1 and Week 4, the statistical significance at Weeks 12 and 24, with mothers in the intervention group continuing to breastfeed their preterm infant for longer than mothers in the non-intervention group, cannot be attributed to the Kangaroo Care intervention alone. Mothers returning to work appeared to have an impact on this result. Whilst 32 of the 38 mothers in the study expressed a desire at Day 1 to breastfeed their preterm infant for more than three months (Item 27), in reality this did not happen due to return to work, having insufficient breast milk or bottle feeding for convenience. However, of the mothers still breastfeeding at Week 24, 15 were from the intervention group and only four were from the non-intervention group,

implying a greater commitment to continue, and successful implementation of, breastfeeding as a result of Kangaroo Care.

Again, with the last subscale of the MIBQ (Subscale 6, 'Desire to touch or hold the preterm infant'), while there was no statistically significant difference between mothers in the non-intervention and intervention groups for Day 1 and Week 4, statistical significance appeared by Weeks 12 and 24. All mothers at Day 1 felt that holding and closely interacting with their preterm infant was important but by Weeks 12 and 24 mothers receiving the Kangaroo Care intervention had developed and expressed a greater desire to touch or hold their preterm infants than the mothers in the non-intervention group. Most mothers in the intervention group wanted to hold their infants but a minority of mothers in the non-intervention group were more satisfied to watch their preterm infant than hold him/her. This difference may be due to the constant touch of Kangaroo Care developing mothers' greater confidence in handling their infant, resulting in increased attachment and a secure mother-infant relationship as opposed to an anxious-ambivalent pattern of attachment (Anisfeld *et al.* 1990).

5.5.1.1.1 Summary for evaluation of MIBQ results in relation to Aim 1

The MIBQ results clearly demonstrate that there were significant differences across the four study time periods between results for the non-intervention and intervention (Kangaroo Care) groups of mothers in this study. The differences give a strong indication that the Kangaroo Care intervention significantly increased mothers' scores for all subscales, pointing to its use as a tool for developing stronger mother-preterm infant bonding over time. While there was no significant difference for most of the subscales at Day 1, the impact of Kangaroo Care became visible at Weeks 4 and 12, and particularly at Week 24. Whilst Kangaroo Care cannot be credited as the

sole reason for the differences between the intervention and non-intervention groups, particularly the Week 24 results (mothers' return to work clearly had an impact), it is possible to conclude that it had an effect over time.

5.5.1.2 Bonding Observation Check List

The overall finding from the BOCL was that the intervention group showed higher bonding scores than the non-intervention group across all four time periods, and increased bonding from Day 1 to Week 24, indicating that Kangaroo Care as an intervention enhanced bonding between mothers and their preterm infants over time. One result from Kangaroo Care was that mothers wanted to spend more time in Nursery 2 to take care of their preterm infants.

The unusual results for items 4 (Kissing) and 13 (Cleans infant), which scored 0 in both groups for Day 1 and Week 4, could be due to the mothers' embarrassment at openly showing affection for their infants in front of a stranger, in this case the researcher, during the early weeks of the study. Such embarrassment is in line with Thai culture, as discussed in section 5.4.2. As the mothers and family members became more familiar with the researcher over time, they were able to express their affection for their infants while the researcher observed them; hence the changed results for BOCL items 4 and 13 at Weeks 12 and 24. Having said this, the researcher's visits to the mothers can be discounted as having an effect on the significant differences found between the groups because the researcher visited and observed all mothers in both groups at Day 1, Week 4, Week 12 and Week 24.

The consistent score of 0 for both the non-intervention and intervention groups across all time periods for BOCL Item 14 (Straightens infant) needs careful consideration. It could be due to the mothers holding their infants securely with one

hand and using their other hand to support their breast while breastfeeding, fear of dropping the infant, or holding them in whatever position was comfortable for both mother and infant. Another possible explanation is that the consistent 0 score reflects the mothers' inexperience in holding smaller than full term newborns and general inexperience because this was their first infant.

Sandelowski and Black (1994) have demonstrated that mothers work hard at getting to know their infants, and want to take in all their infants' characteristics by seeing, touching and holding them. This is important because even very young infants can fixate, smile and vocalise when presented with the stimulus of an adult face (Lewis 1967); there is a clear link between infants' behaviour and an environmental stimulus (Davis *et al.* 2003).

Several reports have shown that establishing early mother-infant contact may reduce maternal inadequacy and thus the rate of infant abandonment (Buranasin 1991; Klaus *et al.* 1995; O'Connor *et al.* 1980; Wilson & Widom 2009), which is a pressing issue in Thailand. Having constant mother-infant contact as a result of Kangaroo Care would increase an infant's responsiveness, which in turn would encourage greater responsiveness to the infant from the mother. Nyqvist *et al.* (2010b) propose that preterm infants should be regarded as ex utero-gestational foetuses, which need Kangaroo Care to promote maturational responses.

Other research supports this study's BOCL outcomes. Research in NICUs in the United States, for example, has examined practices such as the effects of holding, cuddling, massage and skin-to-skin contact on even the most fragile preterm infants and found that infants held skin-to-skin were warm enough, had a regular heart rate and respiration, cried less and were discharged from hospital earlier than those who

did not receive this contact (Anderson 1991). In response to data supporting the benefits of affectionate handling in NICU areas, in some hospitals staff have attempted to expand the role of parents by adopting unrestricted visiting hours and encouraging parental participation in their infants' care (Davis et al. 2003). Other studies have also identified the relationship between mothers' acceptance of their infants, amount of physical contact and the infants' security of attachment (Egeland & Farber 1984; Main & Stadtman 1981). Maternal separation in the early stages after birth may be a factor in preterm infants' increased risk of abandonment, abuse and neglect (Dodd 2005).

Anisfeld *et al.* (1990) demonstrated that increasing the quantity of physical contact can afford mothers opportunities to show affectionate and tender behaviour, and affect certain infant behaviours such as crying, smiling and vocalising. Anisfeld *et al.* (1990) showed that increased physical contact is related to the development of attachment, and thus affects the quality of mother-infant interaction.

Rooming-in to allow mothers and infants to remain together 24 hours a day and to encourage breastfeeding on demand has been suggested as a bonding strategy (Philipp *et al.* 2001). Such constant mother-infant contact will increase the opportunity to promote bonding through BOCL items such as gazing and talking to the infant.

In Thailand, Apipalakul (1980) studied attachment behaviours and the needs of mothers of newborns through observation. She found that inspection was the first attachment behaviour but touching was the most frequent attachment behaviour. These results are discussed further in Section 5.5.2.3 'Cultural factors'. Furthermore, Tilokskulchai (2002) found that mothers visually and physically "explored" their

babies, initially using their fingertips on the infant's face and extremities, progressing to massaging and stroking the infant with their fingers. This was followed by palm of hand contact on the trunk. Eventually, mothers drew the infant toward them and held him/her. Mothers also expressed interest in interacting with their infant through eye-to-eye contact and sometimes talked and soothed the infant, or made comments about the infant, while interacting. Tilokskulchai (2002) also described mothers as exhibiting feelings of elation and satisfaction. The BOCL results from the thesis study indicate that Kangaroo Care can promote these bonding behaviours even further.

5.5.1.2.1 Summary of evaluation of BOCL in relation to Aim 1

Bonding is an important health concern in Thailand. Despite the Thai Government's aims to improve child health care through implementing the 'Baby Friendly Hospital Initiative' (BFHI) that supports early attachment to the infant and the establishment of breastfeeding, there is still much neglect of preterm babies by mothers in Thai hospitals (Ministry of Social Development and Human Security 2006). As stated earlier in this thesis (Section 1.2.1), a high rate of infant abandonment has been a significant problem in Thailand for many centuries and continues to pose a large social and economic problem.

The BOCL results have great significance in this climate. The demonstrated positive impact of Kangaroo Care on mother-infant bonding, particularly over time (increased effects from Day 1 to Week 24), should reinforce the need to encourage this practice in Thai hospitals. The implementation of Kangaroo Care in all Thai hospitals, as a tool for increasing mother-infant bonding, may also become a tool for reducing abandonment rates of preterm infants.

5.5.1.3 Study outcomes related to Aim 1 and Key question 1

Results for the MIBQ and the BOCL indicate that there were differences between the intervention (Kangaroo Care) and non-intervention groups across the whole study period. There is evidence that Kangaroo Care made a positive difference to the bonding between mothers and their preterm infants; it increased the bonding, which strengthened over time for the mothers and infants in the intervention group. However, it is necessary to acknowledge that other factors may have influenced the results. These are discussed in Section 5.6.

Mothers using the Kangaroo Care protocol had better opportunities to touch or hold their preterm infants and remained together for 24 hours a day, thus promoting and enabling the mothers' desire to touch or hold their infants. Mothers and infants in the intervention group had more time together to promote bonding; they had more time to learn about each other. The findings add to an increasing amount of literature that emphasises the major influence that mothers and families have on their infants' long-term outcomes.

5.5.2 Aim 2: To discover whether Kangaroo Care can promote breastfeeding practice and hence increase breastfeeding rates in preterm infants

Key question 2: Are there differences in breastfeeding rates on Day 1 postpartum, Week 4, Week 12 and Week 24 between mothers in the non-intervention group and those who experience Kangaroo Care in the intervention group?

The significant difference in the results between the two groups at weeks 12 and 24 indicates that mothers in the Kangaroo Care intervention group breastfed their infants longer than mothers in the non-intervention group, even though all infants were kept in hospital until they weighed 2,500g, after which they were discharged for routine follow up in Well Baby Clinics. At Day 1 and at Week 4, all mothers were breastfeeding. Some had to return to work at Week 12. The place for breastfeeding

made no significant difference because the mothers breastfed either in the hospital (Day 1) or in their homes (weeks 4, 12 and 24). Even though some of the ‘Ten Steps to Successful Breastfeeding’ (Philipp *et al.* 2001) were followed by staff for all the mothers while in hospital—staff encouraged the mothers to breastfeed as soon as possible after their infants’ birth, allowed mothers to spend time with their preterm infants in Nursery 2 and mothers roomed-in 24 hours a day with their infants—considerably more mothers (n=15) in the intervention group continued breastfeeding longer than those in the non-intervention group (n=4). Mothers in the non-intervention group returned to work sooner than those in the intervention group. While some mothers were told they had to start working, others contacted their workplace to extend the date for them to return to work because they wanted to continue taking care of their preterm infants. The results suggest that the increased bonding between mothers and their preterm infants in the intervention group as a consequence of Kangaroo Care may have encouraged these mothers to either stay at home with their infants and continue breastfeeding, or persevere with breastfeeding even after going back to work.

This result has important implications for health care, not only in Thailand but globally. The nutritional, immunological, behavioural, economic and environmental benefits of breastfeeding are overwhelming and indisputable (World Health Organization 1998). As Kirk (2002) points out, billions of dollars in health care costs would be saved if more mothers breastfed. Global and national health targets aim to increase the number of infants being fed exclusively on human milk for the first six months of life and to continue breastfeeding into the second year of life (UNICEF 2000). The study discussed in this thesis provides some evidence that the introduction of Kangaroo Care, coupled with implementation of the ‘Ten Steps to

Successful Breastfeeding' (Philipp *et al.* 2001), could encourage more mothers to breastfeed their infants (preterm and full term) soon after birth and to do so for longer. Hake-Brooks and Anderson (2008) have also shown that Kangaroo Care can promote breastfeeding in the long term.

Further supporting evidence is provided by Widström *et al.* (1990), who evaluated the effects of suckling within 30 minutes after birth when skin-to-skin body contact for mothers and infants was held constant in case (n=32) and non-intervention (n=25) groups. They suggest that mother-infant relationships are positively influenced as a result of skin contact time soon after birth. Suckling ability was assessed by the assisting midwife as “sucked well”, “tried to suck but licked most of the time”, and “did not suck or lick”. Mother-infant interaction during breastfeeding, infants’ time spent in the nursery and different aspects of breastfeeding were evaluated. Only six (19%) of the 32 case infants suckled at this time, 59 percent tried but licked most of the time, and 22 percent did neither. However, further results showed that in the group where all infants had touched or licked the areola and nipple, mothers left the infants in the nursery for a significantly shorter time and more mothers talked to their infants during the short breastfeeding observation. Importantly, an infant’s early touch of the mother’s areola and nipple positively influenced the mother-infant relationship during the first four days after birth (Widström *et al.* 1990). While these findings need to be treated cautiously due to limitations of Widström *et al.*’s study—infants assigned to the suckling group were “put to the breast” with assistance of the staff and mothers in the non-intervention group who first breastfed their infant at around eight hours after birth assessed the effectiveness of suckling themselves—they indicate the importance of skin-to-skin contact and early establishment of breastfeeding.

Sometimes, mothers can give Kangaroo Care and breastfeeding at the same time, a situation encouraged by the World Health Organization and UNICEF's 'Baby Friendly Hospital Initiative', which includes ten specific action items supportive of breastfeeding and nursing (Furman & Kennell 2000). Among these items are staff encouraging mothers to breastfeed their infants in hospital and in the community, and mothers maintaining exclusive breastfeeding for approximately the first six months of their infants' lives (Philipp *et al.* 2001). Furman and Kennell (2000) found that 20 mother-low birth weight infant dyads who received skin-to-skin contact reported higher milk production and a longer period of lactation after participation in Kangaroo Care. The outcome of their study was similar to the outcome in the thesis study; that is, Kangaroo Care had a positive influence on breastfeeding and bonding between mothers and preterm infants. However, Furman and Kennell's (2000) findings need to be considered for possible bias due to a lack of consistency in observing the effectiveness of suckling.

Righard and Alade (1990), and Schön (2007) have shown that contact between mother and infant should not be interrupted during the first hour after birth or until the first breastfeeding is accomplished, that the infant's efforts to suckle should be promoted and that delivery ward routines are very important for a good start to breastfeeding. Identifying factors that might interfere with breastfeeding is also important. Ransjo-Arvidson *et al.* (2001) found that certain analgesics (pethidine being one of these) given to the mother during labour interfere with the newborn's spontaneous breast seeking and breastfeeding behaviours, therefore restricting the use of drugs is recommended as a strategy for improving breastfeeding outcomes.

5.5.2.1 Importance of the educational role of nurses

If practice is in accordance with research evidence, infants are more likely to suckle effectively at the first breastfeed and mothers are more likely to gain confidence in their ability to breastfeed, have a positive breastfeeding experience, and be less likely to experience trauma, frustration, anxiety and dissatisfaction. However, hospital staff need to encourage mothers to breastfeed successfully. The new mother in a Thai hospital (and therefore all the mothers in this study) will remain in the labour and delivery unit for at least two hours. During this time, she is monitored for complications and is encouraged to breastfeed. However, the researcher in this thesis study found that advice provided by nurses to new mothers was not always appropriate, particularly in relation to discarding colostrum and giving boiled water. The continuation of this traditional belief is disturbing, given the importance of colostrum in providing protein, minerals and Vitamin A, fat and carbohydrate to the infant (American Academy of Pediatrics 1997), as well as anti-infective components (Riordan & Auerbach 1993). There is evidence that some women discard colostrum believing it to be “old and dirty milk”, harmful to the infant and able to cause sickness (Littler 1997).

The short length of postpartum hospital stay in Thailand—an average of 2–3 days for an uncomplicated vaginal delivery and 5–7 days for Caesarean birth, or less in public hospitals where the bed turn-over rate is much higher and a newly-delivered mother’s stay is dependent on availability of, and competition for, bed space—makes it more important for hospital staff to give new mothers correct advice and support for breastfeeding. It is important for nurses to possess accurate knowledge so that they can challenge misconceptions during pregnancy, discuss women’s knowledge and beliefs, and include significant others in antenatal and postnatal education. This

notion is supported by Kaewsarn *et al.* (2003).

There is evidence that some hospitals in Thailand continue to provide bottles of water and formula milk (Vogel & Mitchell 1998) despite the World Health Organization (2001) and American Academy of Pediatrics (1997) advising that babies should be at least six months of age before having any food other than breast milk because they have difficulty digesting it. Thus, it is important that appropriate breastfeeding education for staff continues to counter such practices in an attempt to change this entrenched culture, and that health professionals do not miss any opportunity to provide positive encouragement for mothers to persevere with breastfeeding (Hannon, Willis, Bishop-Townsend, Martinez & Scrimshaw 2000).

In the thesis study, mothers at Maharat Hospital were encouraged to breastfeed their preterm infants in Nursery 2 as soon as possible after birth. All mothers were breastfeeding at Day 1 until discharged from the hospital after which they continued to breastfeed their preterm infants in their homes. Some, mainly those in the intervention group, continued to breastfeed their preterm infants for the duration of the study, in keeping with the Thai Ministry of Public Health policy to promote exclusive breastfeeding for a minimum period of six months.

Lu, Lang, Slusser, Hamilton and Halfon (2001) examined the influence of encouragement on breastfeeding among 1,229 pregnant women in the USA. They found that women who were encouraged to breastfeed were more than four times as likely to initiate breastfeeding as those who did not receive encouragement (Kaewsarn *et al.* 2003). This finding and the finding from the thesis study contradict Humenick, Hill and Spiegelberg (1998) who found that primiparous women were more likely to decrease their level of breastfeeding if encouraged by health

professionals and to give supplementary feeds to the infant sooner.

The nutritional needs of pregnant and lactating women are greater than those of non-pregnant women. Again, health care staff can play a key role in educating mothers about the need for adequate amounts and specific types of food and fluids to ensure their ability to lactate successfully, support optimal growth for the foetus or infant, and maintain their own health (Bertelsen & Auerbach 1987). This was also addressed in this study while observing the mothers.

Support from partners is also an important factor in the duration and success of breastfeeding (Kaewsarn *et al.* 2003). Lactation consultants, nurses and health care professionals have indicated that women who receive support from their spouses are more likely to prolong breastfeeding (Scott *et al.* 2001). Thus, to ensure that partners and relatives are prepared for, and supportive of, breastfeeding, nurses should provide education opportunities for partners, discuss their attitudes and outline expected supportive behaviours.

5.5.2.2 Initiatives to promote breastfeeding

While research has emphasised the benefits of breastfeeding for infant health and child survival in developing countries, breastfeeding remains more common and of greater duration in rural women with low levels of education (Wilmoth & Elder 1995). Several authors argue that breastfeeding is being hampered by modernisation and urbanisation (Crichton & Thorley 1996), with the greatest decline in breastfeeding duration observed among the urban populations of developing countries (Wilmoth & Elder 1995). The Ministry of Public Health in Thailand adopted an initiative to promote breastfeeding throughout the country to try and address this issue but the breastfeeding promotion program has not been successful

in many cities (York *et al.* 1999). The Thai Government has since introduced a series of measures with a view to promoting mother and child nutrition, including public education campaigns. Workplaces, government agencies and the private sector are encouraged to provide services to promote breastfeeding and a healthy diet, as well as health care in early childhood centres, kindergartens, and public and private welfare homes (Committee on the Rights of the Child 2006).

5.5.2.3 Summary for Aim 2, Key question 2

In summary, measures of breastfeeding success strongly correlate with the implementation of skin-to-skin contact (Kangaroo Care) immediately after birth, as seen in this study and as found by Anderson, Moore, Hepworth & Bergman (2003). Therefore, further research is needed to: 1) determine the extent to which Thai nurses promote skin-to-skin contact following birth and until after the first breastfeed; 2) determine nurses' knowledge about current breastfeeding practice and support; and 3) investigate how nurses implement policy changes and evidence-based practice.

Key question 3: Does the gender of the infant make a difference to bonding and breastfeeding rates over a period of six months?

The results of the thesis study show that the infant's gender affected the mothers' attention and connection to the infant (MIBQ Subscale 2) at Day1, Week 4 and Week 12 because some mothers felt disappointed about their infant's gender. For example, they wanted to have a girl but they had a boy, or vice versa. For this reason, some mothers needed to adjust their mental perspective to accept their preterm infants. However, as the mothers adjusted to their infants' gender over time, the results showed no difference between the non-intervention and intervention groups of mothers at Week 24, and all could give attention and connection to the infants.

There was no significant difference between male and female for BOCL scores at

Day 1, Week 4, Week 12 and Week 24, indicating that gender made no difference to the mothers' bonding behaviours toward their preterm infants. Nor were there any significant differences between male and female for breastfeeding practices at Day 1, Week 4, Week 12 and Week 24 amongst the mothers. Hence, gender made no difference to the mothers' breastfeeding practices. These results for the MIBQ and the BOCL mean that gender can be eliminated as a factor impacting on bonding or breastfeeding rates over a six-month period.

Key question 4: Are there any other variables that might influence bonding or breastfeeding rates of the mothers in this study?

There were other variables that might have influenced bonding or breastfeeding rates of the mothers in this study. These were identified as current practices at Maharat Hospital for the newborn, weather conditions, cultural factors and pain in preterm infants. All of these factors may have impeded mother-preterm infant bonding in this study.

5.5.2.4 Factors that may have impeded bonding in this study

5.5.2.4.1 Current practices at Maharat Hospital for the newborn

Maharat Hospital is one of the 'Baby Friendly' hospitals in Thailand. Step 4 of the 10 steps to successful breastfeeding (refer to Chapter 1, Section 1.2.4.2), outlined by the 'Baby Friendly Hospital Initiative' (BFHI), encourages all normally delivered mothers to hold their infant, skin-to-skin, and to breastfeed their infant within 30-60 minutes after birth for approximately 30 minutes before being transferred to the postpartum ward together. If a mother gives birth to a preterm infant, staff will admit the infant to Nursery 2 to observe and treat them until their symptoms become stable. Then, they will be transferred to a postpartum ward in order to stay with their mother. An important practice underpinning 'Step 4' is that newborns should not be

separated from their mothers and that continuous skin-to-skin contact should be maintained at the time of birth (Righard & Alade 1990). The establishment of effective skin-to-skin contact, however, is often impeded by common practices at the time of birth such as suctioning, separation, wrapping, injecting and weighing (Righard & Alade 1990). It can be argued, however, that skin-to-skin contact should be promoted as often as possible in the immediate postpartum period (Anderson *et al.* 2003). At Maharat Hospital, mothers and infants room together for 24 hours a day until they are discharged. The goal of this practice is to educate mothers about newborn care, and to facilitate maternal feelings and maternal-infant interaction, which in turn may reinforce the inclination to breastfeed (Durongdej 1997). Curry (1982) also mentioned that rooming-in was a factor that may affect maternal affectionate behaviour.

Separation of mother and infant immediately after birth is one of several factors that may impede the initial and perhaps consequent bonding between mother and infant (Anisfeld & Lipper 1983; Klaus & Kennell 1976). However, in the thesis study, whilst rooming-in was an important factor for the bonding process between mother and infant, infants that were in Nursery 2 had their mothers with them constantly. Hence, those mothers had more opportunity to start bonding with their infants, which may be reflective of the results in Day 1 and through to Week 24.

Although Maharat Hospital did not practise skin-to-skin contact for all mothers because of the unavailability of staff, all mothers in the hospital were required to begin breastfeeding their infant during recovery in the labour room, and continued breastfeeding in the postpartum ward and/or in Nursery 2 until discharge. These conditions are conducive to successful breastfeeding.

5.5.2.4.2 *Weather conditions*

Thailand is located in the tropical zone (latitude 5–20°N and longitude 98–106°E). The climate was hot and humid in Maharat Hospital while this research was being conducted, especially between April and October, with a temperature of 25–42°C and humidity levels at approximately 90–100 percent. Based on the mothers' subjective impressions after doing Kangaroo Care in both the air conditioned Nursery 2 and non-air conditioned postpartum wards, mothers could not do Kangaroo Care for more than one hour at a time on the wards. The researcher noticed that most mothers and preterm infants perspired a lot during Kangaroo Care on the wards. Some preterm infants cried briefly during the Kangaroo Care intervention until cooled by a fan. The electric fans, hung on the walls, were not enough to cool the room. This was not a problem in the air conditioned Nursery 2, where the temperature could be controlled at about 22–25°C.

It has been documented that placing infants skin-to-skin on their mothers' chests raises the mothers' body temperature significantly (Ludington-Hoe, Nguyen, Swinth & Satyshur 2000) regardless of the climate. Ludington-Hoe *et al.* (2000) measured mothers' breast temperature at the beginning and end of Kangaroo Care and found it had risen from between 30.4–34.0°C to as high as 36.8°C. This observation supports the possibility that hot weather would have been an obstacle to doing Kangaroo Care for more than an hour at a time for the mothers in the thesis study.

5.5.2.4.3 *Cultural factors*

As discussed earlier, some affectionate behaviour such as kissing and cleaning were rarely seen in this study, probably due to cultural influences. These affectionate behaviours, especially kissing in public, are not appropriate or acceptable in Thai

culture. Talking, smiling and touching were seen in Weeks 4 and 24 more than in Week 12 when many of the mothers started going back to work. This could be due to Thai women being shy and modest. They are taught to behave this way and are afraid of both verbal and active expression of affection, especially in public. However, when Thai women are in their own homes, they feel more confident than they do in public. This was observed by the researcher.

Cleaning the preterm infant rarely occurred because the mother would not clean the infant during breastfeeding unless the infant passed faeces or urine, or vomited milk. Thai mothers are very protective of their preterm infant during breastfeeding. They are afraid of their preterm infant falling, hence they hold the infant with one hand and support their breast with the other. The mothers concentrated so much on breastfeeding that they seldom caressed or interacted with their infant. The cultural barriers were identified as a possible problem when using an observation scale for evaluating maternal-infant interaction in terms of maternal affectionate behaviour.

However, the BOCL results indicated that the maternal behaviours resulted in statistically significant differences between the intervention and non-intervention groups of mothers. This would also indicate that the cultural barriers may not have had any significant effect. Hales, Lozoff, Sosa and Kennell (1977) found that mothers in their intervention (Kangaroo Care) group showed significantly more 'en face' than mothers in their control group. Hale *et al's* (1977) observation of maternal behaviour was made 36 hours post-birth through a window from the hallway while Guatemalan mothers were breastfeeding, talking to, and caring for their infants as usual. In the thesis study, however, the researcher was with the mothers, and the extent of engagement behaviours of mothers in the intervention (Kangaroo Care)

group was significantly greater than the engagement behaviours in the non-intervention group.

Thus, in this study, the Kangaroo Care intervention made a significant difference even in an area that may have been inhibited by culture.

5.5.2.4.4 *Pain in preterm infants*

Many procedures are performed on preterm infants in NICU (both high risk and low risk) to guarantee their survival. Procedures include injections, heel lancing and blood tests. They are painful and the pain may impede mother-preterm infant bonding. Gray, Miller *et al.* (2002) have shown that the majority of newborns placed in Kangaroo Care during breastfeeding throughout a painful procedure, such as a heel lancing, demonstrate little or no response to pain. These analgesic effects can be facilitated by integrating Kangaroo Care and breastfeeding into routine procedures that elicit pain in the initial newborn period, including the administration of vitamin K, blood glucose testing or metabolic screenings (Gray *et al.* 2000; Gray, Miller *et al.* 2002).

Freire, Garcia and Lamy (2008) assessed the analgesic effect of Kangaroo Care compared to oral glucose on the response of healthy preterm neonates to a low-intensity acute painful stimulus. They studied 95 preterm infants between the ages of 28–36 weeks who were randomly assigned to three groups in a single-blind manner. In group one, the preterm infants were in the prone position in the incubator during heel lancing and did not receive analgesia. In group two, the preterm infants were held in skin-to-skin contact for 10 minutes before and during the heel lancing procedure. In group three, the preterm infants were in the prone position in the isolette and received oral glucose two minutes before heel lancing. The Premature

Infant Pain Profile scores were used to measure the infants' responses to pain. The results showed that skin-to-skin contact produced an analgesic effect in preterm infants during heel lancing. Freire *et al.* (2008, p. 31) stated that:

The neurobehavioral organization provided by the kangaroo position, ... increases the frequency, quality and duration of deep sleep, reducing newborn activity and promoting self-regulation; and another important factor is that the mother's touch and voice are a pleasant stimulus mediating the maturation of the circadian rhythm and autonomic system of preterm newborns.

Twelve of the preterm infants in the thesis study had heel pricks (not during Kangaroo Care) an average of 2–3 times a day because they had metabolic and respiratory problems, but at that time the researcher did not look at pain as a factor. Their mothers did not want to look at this procedure. This is a limitation of the study.

5.5.3 Aim 3: To discover whether Kangaroo Care should be introduced as part of the 'Baby Friendly Hospital Initiative' policy for preterm infants in all hospitals in Thailand

The study results' trend toward greater mother-preterm infant bonding when Kangaroo Care is carried out provides evidence to support the introduction of Kangaroo Care as a method of caring for preterm infants at Maharat Hospital, Nakhon-Si-Thammarat, Thailand. Consequently, a recommendation will be made to the Health Department and appropriate Ministries of Health in Thailand for the Kangaroo Care 18-item protocol to become part of Maharat Hospital policy. Factors that will influence the successful introduction of Kangaroo Care include educating nurses and other health professionals throughout the Thai health care system about this intervention and how the health care system works.

5.5.3.1 Health care in Thailand

Health care in Thailand is a little different from other countries. Thai hospitals are

very strict about payment, and Thai hospitals want confirmation of insurance before treatments are performed. In the event that patients do not have the appropriate medical insurance documents with them, they pay for their treatment in advance. Failure to pay will result in refusal to provide services. The costs associated with hospital care of preterm infants can be very high, therefore any cost effective intervention, such as Kangaroo Care, that can improve preterm infant outcomes would benefit families.

The universal measure of how solid a nation's health care system is lies with the infant mortality statistics. As stated earlier in the thesis, most Western nations have an infant mortality rate that is less than 5 deaths for every 1,000 live births. However, the infant death rate in Thailand as of 2008 is almost double that number at 9 deaths per 1,000 births. It should be noted, however, that this is vastly improved from the 1990 infant mortality rate of 26 per 1,000 live births. The thesis study results imply that introducing Kangaroo Care into all Thai hospitals may have some impact on reducing the infant mortality rate because the consequent increase in mother-infant bonding may reduce the abandonment rate for preterm infants.

Reduction of neonatal mortality does not need sophisticated technology or highly specialised skills. It is known that universal availability of evidence-based public health interventions before and during pregnancy, and during child birth and the postnatal period, can reduce the number of neonatal deaths by 60 percent (World Health Organization 2006). However, postnatal care for mothers and babies is absent or inadequate in Thailand. Postnatal interventions focusing on practices such as Kangaroo Care, early initiation and exclusive breastfeeding, thermal care, clean cord care, early recognition of, and care for, sickness, and community-based management

of pneumonia can make a significant contribution to reducing neonatal mortality (World Health Organization 2006).

5.5.3.1.1 Value of community-level health providers

In Thailand, where access to skilled care and health facilities is limited, organising home visits by community-level health providers for provision of postnatal care is an important option for hospital staff to consider. Even when delivery takes place in a health institution/hospital, the mothers and infants in most instances stay only for one or two days. Extra home visits for low birth weight infants and early care of sick low birth weight infants has the potential to reduce the high mortality burden in this vulnerable group.

5.5.3.1.2 Value of education about Kangaroo Care in the health system in Thailand

The thesis study findings imply that educating mothers about Kangaroo Care in the antenatal period would improve bonding and breastfeeding outcomes for mothers and infants post birth.

In terms of this thesis study's findings, Kangaroo Care practised during the mothers' and infants' hospital stay can add to the success of current postnatal interventions, particularly in terms of support for breastfeeding, early recognition of an infant's illness and seeking care for such illness. The higher bonding and breastfeeding rates among mothers and infants in the Kangaroo Care intervention group in Week 24 indicate that these mothers knew their infants very well and it could be surmised that they would be better able to recognise any change in their infants' health.

Traditional practices related to child birth, breastfeeding and confinement may adversely affect maternal and neonatal outcomes (World Health Organization 2006). Thus, there is a need to devise appropriate multi-sectoral strategies to address such

practices. If introducing Kangaroo Care immediately after birth can be brought into hospitals as part of the care culture, it may overcome some of these obstacles, particularly for preterm infants and their mothers.

Kupratakul, Taneepanichskul, Voramongkol and Phupong (2010) showed that knowledge sharing, practised with empowerment strategies for antenatal education and postnatal support, significantly improved rates of exclusive breastfeeding at 14 days, and one, two, four, five and six months postpartum. The mothers and preterm infants in the intervention group in the thesis study may have gained some of the benefits described by Kupratakul *et al.* (2010) through participating as a group in Kangaroo Care while in the hospital.

5.6 Summary

The study results and comparative literature provide evidence that use of early Kangaroo Care may play a major role in solving the problems of physiological reactions, lack of maternal feelings, poor maternal-infant interaction and unsuccessful breastfeeding. Kangaroo Care represents a step toward the humanisation of health care and promotes maternal-infant bonding and breastfeeding, two essential elements of survival for all preterm infants. It is hoped that providing mothers with the opportunity for early Kangaroo Care may have contributed to their willingness to assume responsibility for the care of their infants, and to the ease, comfort and pleasure the mothers displayed while interacting with them. The results support Klaus and Kennell's (1976) bonding theory and also Anderson's (1977) Mutual Caregiving Model, which provided the conceptual framework for the study. The results demonstrate that Kangaroo Care does improve mother-infant/infant-mother interaction and subsequent bonding.

Outside influences on the results could have come from the study site, sample characteristics, type of family such as the extended family typical in Thailand, the weather and Thai culture. Nonetheless, the results show a definite trend toward bonding when Kangaroo Care is carried out.

In terms of meeting the study's first two aims, Kangaroo Care has been shown to increase bonding between mothers and their preterm infants as measured by the MIBQ and the BOCL; and Kangaroo Care has been shown to promote breastfeeding practice and hence increase breastfeeding rates in preterm infants. The 'yes' answers to these aims, based on the study's evidence, are supportive of Kangaroo Care being introduced as a method of caring for preterm infants at Maharat Hospital, Nakhon-Si-Thammarat, in Thailand. They also lead to the recommendation that Aim 3 should be acted upon; that is, that Kangaroo Care should be introduced as part of the 'Baby Friendly Hospital Initiative' policy for preterm infants in all hospitals in Thailand.

The next chapter presents limitations to the study, conclusions, recommendations and final comments.

Chapter 6: Conclusion and final comments

6.1 Introduction

The preceding discussion and results, which have evaluated the impact of Kangaroo Care on mother-preterm infant bonding and breastfeeding over the first six months after birth, have clearly demonstrated that there is a case for introducing Kangaroo Care into hospitals in Thailand as a beneficial intervention. The results showed that Kangaroo Care made a statistically significant improvement in bonding and caring between mothers and infants. Therefore, it can be said that the 18-item Kangaroo Care protocol used in this study was effective and made a difference in improving the care, breastfeeding and nurturing the mothers gave their preterm infants.

This chapter presents the study limitations, recommendations, suggestions for future research and final comments.

6.2 Limitations to the study

6.2.1 Data collection

The researcher completed the BOCL from her observations of the mothers' interactions with their preterm infants, but the mothers self-administered the MIBQ, raising the possibility that social desirability may have affected the mothers' MIBQ responses. In Thai society, a nurse who is also a teacher (the researcher's position) has high social status. It is possible, therefore, that the mothers were influenced by their perception of the researcher's status. They may have answered the MIBQ according to what they thought was socially correct rather than giving a true answer. Even if this were the case, however, the fact that both groups of mothers met with the researcher implies that social acceptability would have influenced all mothers rather

than just those offering the Kangaroo Care intervention. Therefore, social acceptability should not have skewed the results. As discussed in Chapter 3, reliability issues were raised and addressed. Reliability for both instruments was found to be close to 1.

The Maharat Hospital has adopted the 'Baby Friendly Hospital Initiative' of the Thai Government and is carrying out the initial steps of the Kangaroo Care protocol but currently does not follow all of the steps to successful breastfeeding. Maharat Hospital does not have enough staff to focus on Kangaroo Care and at the current time there is no policy to implement this care. Inconsistent Kangaroo Care may have had some influence on the study results. Furthermore, the fact that some staff may have implemented practices that are known to hinder breastfeeding, such as separating infants from mothers after delivery and providing bottles of water, glucose and formula in the early postpartum period (Kaewsarn *et al.* 2003), may be seen as a limitation of this study. Also, the mothers might have lacked knowledge about infant feeding and may have taken advice from their extended families, particularly the elderly, which could have hindered breastfeeding.

6.2.2 Weather conditions and newborn procedures in Thailand

As discussed in the previous chapter, the hot weather could have been a possible obstacle to very successful Kangaroo Care. The heat made the mothers and preterm infants uncomfortable during Kangaroo Care. Lack of privacy and space also made it difficult for shy mothers to do Kangaroo Care. Using a private room with air conditioning would probably have made mothers feel more comfortable but these conditions would not be a true representation of the conditions to which all mothers in Thailand would be exposed, and might limit the generalizability of the study to the

real life situation in Thailand or other hot climates where there is no air conditioning. Similarly, the results cannot be generalized to situations where different weather conditions prevail.

Furthermore, it is routine practice in Thailand to perform infant care and assessment under a radiant warmer immediately after birth to minimise heat loss, which is uncomfortable in hot weather. Also, if infants are transferred to the newborn nursery immediately after birth, the process of skin-to-skin care is interrupted (Dabrowski 2007). Hence, both the hot weather and newborn procedures may limit skin-to-skin contact between preterm infants and their mothers.

In this study, all but six of the preterm infants in the intervention group were given Kangaroo Care by their mothers immediately after they were born, instead of being placed under a radiant warmer. The six preterm infants in the intervention group who were placed under the warmer had low risk health issues. All preterm infants in the non-intervention group were removed to a radiant warmer immediately after birth and then to the nursery. Placing six of the infants in the intervention group under the warmer instead of being given immediate Kangaroo Care did not appear to have any significant effect on the study results.

6.2.3 Sample size and hospital setting

The small sample size in this study (n=36 mothers; n=36 preterm infants) may have been considered a limitation. The original sample of 38 mothers and 38 preterm infants was reduced to 36 of each because one mother and her infant had to move a long distance away early in the study and one baby died at two weeks post birth. All other original participants completed the study; none expressed a desire to drop out. This became an advantage rather than a limitation because the longitudinal effects on

the sample were studied over the 24 weeks.

The validity of the sample may have been influenced in that the sample included only those mothers who volunteered and the study was conducted in only one 'Baby Friendly' hospital in the South of Thailand. Therefore, the findings can be generalized only to mothers who deliver their preterm infants at a gestational age of at least 32 weeks in other 'Baby Friendly' hospitals in the South of Thailand that use the same preterm infant care methods. The findings may have limited generalizability for other situations, such as a different duration of separation of mothers from their preterm infants after birth.

6.3 Recommendations

In view of the results, the researcher suggests that:

1. Administrators of Maharat Hospital implement the 18-item Kangaroo Care protocol (See Appendix 8) for all preterm infants, in addition to the normal care the mother may wish to provide to her newborn.
2. Maharat Hospital presents knowledge about Kangaroo Care gained from this study and future studies of the use of the Kangaroo Care protocol to other hospitals.
3. An evaluation of the Kangaroo Care protocol implemented at Maharat Hospital be used as the basis for the protocol to become part of hospital policy on standard procedures in the delivery room, nursery, NICU and postpartum wards throughout Thailand.
4. The Kangaroo Care protocol be added to the nursing curriculum.
5. All health care professionals in all health care settings across Thailand (hospital and community services) be educated about Kangaroo Care and the importance of encouraging mothers to continue the protocol in their homes after leaving hospital.

6.4 Further research

A follow-up study of the mothers and infants in the intervention and non-intervention groups in this study be undertaken to evaluate the long-term effects of the Kangaroo Care intervention.

6.5 Final comments

The Maharat Hospital has taken into account the ‘Baby Friendly Hospital Initiative’ of the Thai Government and is adopting the initial steps of the Kangaroo Care protocol. However, currently there is no policy to implement this care and the hospital does not follow all of the steps to successful breastfeeding. As stated earlier in the thesis, Maharat Hospital does not have enough staff to focus on fully implementing Kangaroo Care.

This study has shown the beneficial outcomes from implementing Kangaroo Care for preterm infants in that the mother-infant bonding dyad for the intervention group was significantly better than for those preterm infants born to mothers in the non-intervention group. The 18-item Kangaroo Care protocol proved to be effective and was also well accepted by all mothers in the Kangaroo Care intervention group.

All preterm infants involved in this study remained with the mother and family after discharge from hospital. No preterm infant was abandoned during the 24-week study period.

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Appendix 1: Ethics approval

*** Note: The candidate reverted to her maiden name Thidarat Eksirinimit during PhD completion

Flinders Clinical Research Ethics Committee, Flinders Medical Centre, Adelaide, South Australia

FLINDERS MEDICAL CENTRE
Flinders Clinical Research Ethics Committee
FWA00001785
IRB00001792



Government of South Australia
Southern Adelaide Health Service

7 March 2007

Bedford Park 5042
South Australia

MEMORANDUM

TO: Ms. T. Kamlangdee, 93 Shepherds Hill Rd, Eden Hills SA 5050
CC: Dr. L. Mayner, School of Nursing & Midwifery
FROM: Ms. C. Hakof, Executive Officer, Flinders Clinical Research Ethics Committee
TOPIC: **Review of Research Application**

Level 2
Room 2A221
Telephone
08 8204 6453
Facsimile
08 8204 4586

The Flinders Clinical Research Ethics Committee (FCREC) considered your application at the meeting held on 26 February 2007, with the following result:

Approval Status: Full Approval

Period of Approval: 26 February 2007 to 26 February 2010

067/120.4 Research Application 120/067 – Ms. T. Kamlangdee
L2 An evaluation of the Kangaroo Care for preterm infants in Thailand.
Reviewer: Mr. A. Govier

Letter dated 22 February 2007 responding to the Committee's concerns, was received and noted. Dr. Emery will liaise with the investigator and supervisor with further concerns the Committee have highlighted.

Note: Issues resolved and revised information sheet provided on 5 March 2007. This application now has final approval.

Please note the terms under which ethical approval is granted

1. If **conditional** ('subject to' or 'in principle') approval is granted, research involving human subjects **may proceed only after written acceptance of the conditions of approval** (including a copy of the modifications) has been received by the Committee.
2. Researchers are required to immediately report to the FCREC anything which might warrant review of ethical approval of the project, including:
 - a. Adverse effects of the project on participants, including the total number of participants recruited, and of steps taken to deal with these adverse effects.
 - b. Proposed changes in the project.
 - c. A change in the base for a decision made by the Committee, e.g. new scientific information that may invalidate the ethical integrity of the project.
 - d. Other unforeseen events which might affect continued ethical acceptability of the project.
3. Projects are approved for up to 3 years only and a progress report must be provided annually. Extensions after 3 years will not be granted without a report to the Committee and the provision of an updated submission.
4. Confidentiality of the research participants shall be maintained at all times as required by law.
5. All research participants shall be provided with a Patient Information Sheet and Consent Form, unless otherwise approved by the Committee.
6. The Patient Information Sheet and Consent Form shall be printed on the relevant site letterhead, stating the contact details for the researchers.
7. The Patient Information Sheet must state that the Executive Officer can be contacted for information concerning policies, rights as a participant, or should the participant wish to make a confidential complaint.
8. A copy of the signed consent form is to be filed in the participant's medical record.

The Flinders Clinical Research Ethics Committee is constituted and operates in accordance with the National Health and Medical Research Council's National Statement on Ethical Conduct in Research Involving Humans (June 1999).

Maharat Hospital, Nakhon Si Thammarat, Thailand

แบบฟอร์มขออนุญาตเก็บข้อมูลเพื่อการวิจัยหรือวิทยานิพนธ์ ณ โรงพยาบาลมหาวิทยาลัยศรีนครสวรรค์

ส่วนที่ 1 ข้อมูลผู้วิจัย

ข้าพเจ้า ~~นาย~~ / นาง / นางสาว ศิวรัตน์ นามสกุล ท้าวดี
 นักศึกษาระดับปริญญาตรี / ตำแหน่ง นิสิตอาสาสมัคร สาขา พยาบาลศาสตร
 คณะ พยาบาลศาสตร สถาบัน มหาวิทยาลัยศรีนครสวรรค์
 ขออนุญาตเก็บข้อมูลเพื่อทำวิจัยหรือวิทยานิพนธ์เรื่อง การประเมินผลของกรณีดูแลแบบแกวกรว หรือเป็นเคสพิเศษ
 สถานที่เก็บข้อมูล หอผู้ป่วยเด็กอ่อน 1 และ 2 ระหว่างกรอก (เค: ทางที่ติดต่อคุณกัญญา
 (รายละเอียดตามหนังสือ เรื่องขอจดหมายขอรับทราบการขอรวบรวมที่ ลงวันที่ 10 พ.ค. 2559
1059)

ส่วนที่ 2 คำยินยอมของผู้วิจัย

หลังจากเสร็จสิ้นการทำวิจัยหรือวิทยานิพนธ์แล้วข้าพเจ้ายินดี
 1. มอบผลงานวิจัยหรือวิทยานิพนธ์ฉบับสมบูรณ์ให้โรงพยาบาลมหาวิทยาลัยศรีนครสวรรค์ จำนวน 1 เล่ม
 เพื่อเป็นประโยชน์ในการศึกษาค้นคว้าและพัฒนางานของโรงพยาบาล
 2. หากโรงพยาบาลทำการศึกษาวิจัยในเรื่องที่เกี่ยวข้องนี้ ข้าพเจ้ายินดีและพร้อมให้คำปรึกษา หากทาง
 โรงพยาบาลต้องการ
 ลงชื่อ ศิวรัตน์ ท้าวดี
 (ศิวรัตน์ ท้าวดี)
 วันที่ เดือน พ.ศ.

ส่วนที่ 3 ข้อพิจารณาของผู้อำนวยความสะดวกหรือผู้รับมอบอำนาจ

อนุญาต
 ไม่อนุญาต เนื่องจาก.....
 ลงชื่อ ศิวรัตน์ ท้าวดี
 (ศิวรัตน์ ท้าวดี)
 วันที่ 29 เดือน พฤษภาคม พ.ศ. 2559

ส่วนที่ 4 การติดตาม (เจ้าหน้าที่งานผลิตและพัฒนาบุคลากร)

ได้รับวิจัยหรือวิทยานิพนธ์ฉบับสมบูรณ์ เมื่อวันที่ เดือน พ.ศ.
 ยังไม่ได้รับวิจัยหรือวิทยานิพนธ์ฉบับสมบูรณ์
 ลงชื่อ
 (.....)
 วันที่ เดือน พ.ศ.



FLINDERS UNIVERSITY
ADELAIDE • AUSTRALIA

School of Nursing & Midwifery
Faculty of Health Sciences

GPO Box 2100
Adelaide 5001 Australia
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Fax: +61 8-8201 3036
Email: kami0008@flinders.edu.au

วันที่ 10 พฤศจิกายน 2549

เรื่อง ขอจดหมายตอบรับการเก็บรวบรวมข้อมูล
เรียน นายแพทย์ประวิง เอื่อนนนท์

ข้าพเจ้า นางธิดารัตน์ ก่าลังดี ตำแหน่ง อาจารย์ สำนักวิชาพยาบาลศาสตร์ มหาวิทยาลัย
วลัยลักษณ์ ขณะนี้ข้าพเจ้ากำลังศึกษาในระดับปริญญาเอก ที่มหาวิทยาลัยฟลินเดอร์ (Flinders
University) ประเทศออสเตรเลีย โดยมีอาจารย์ที่ปรึกษาชื่อ ดร. ลิเดีย เมเนอร์ (Dr. Lidia Mayner)
งานวิจัยของข้าพเจ้าคือ การประเมินผลของการดูแลแบบแกงการหรือเนื้อแนบเนื้อระหว่างมารดา
และทารกที่คลอดก่อนกำหนด(32-37สัปดาห์) ข้าพเจ้าต้องการศึกษาถึงความรักใคร่ผูกพัน
การเลี้ยงบุตรด้วยนมมารดาและผลกระทบต่อสรีรวิทยาในทารก ซึ่งต้องการที่จะศึกษาถึงผลของ
การดูแลแบบแกงการหรือเนื้อแนบเนื้อและคุณภาพชีวิตในมารดาและทารกที่คลอดก่อนกำหนด

วิธีการวิจัยมี 3 ระดับ ระดับที่ 1 ข้อมูลจะถูกเก็บในโรงพยาบาลมารดา นศศรีธรรมราช โดยผู้วิจัย
จะมีการสังเกตรูปแบบของการสัมผัสที่มารดามีต่อบุตรตามธรรมชาติ เช่น การอุ้มสัมผัสบุตรแบบปกติ
หรืออุ้มสัมผัสโดยใช้แนวคิดเนื้อแนบเนื้อหรือไม่ยอมสัมผัสบุตรเลย ในขณะที่นมมารดาจะถูกถวาม
ถึงความสมัครใจว่าจะเข้าร่วมในการศึกษานี้หรือไม่ และมารดาจะถูกสุ่มให้เข้ากลุ่มทดลองหรือ
กลุ่มควบคุม โดยใช้โปรแกรมคอมพิวเตอร์ ซึ่งข้อมูลทั้งหมดจะถูกบันทึกในลักษณะ Code ซึ่งคนอื่น
จะไม่สามารถบอกหรือระบุได้ นอกจากผู้วิจัยเท่านั้น มารดาในกลุ่มเนื้อแนบเนื้อจะถูกสอนแนวทาง
ในการทำเนื้อแนบเนื้อ และการให้นมบุตร โดยมารดาทั้งหมดก็จะได้รับแบบสอบถามเพื่อตอบคำถาม
ประเมินถึงข้อมูลทั่วไป ความรักใคร่ผูกพันที่มีต่อบุตร การให้นมบุตร รวมทั้งการเปลี่ยนแปลง
ทางด้านสรีรวิทยาในบุตร ระดับที่ 2 ผู้วิจัยจะเยี่ยมบ้านของมารดาและทำการประเมินผล
ตัวแปรทั้งหมดในสัปดาห์ที่ 5 ระดับที่ 3 ผู้วิจัยจะมีการเยี่ยมบ้านของมารดาและทำการ
ประเมินอีกในสัปดาห์ที่ 12 และ 24 ซึ่งมารดาและทารกที่คลอดก่อนกำหนดยังต้องปฏิบัติ
การทำเนื้อแนบเนื้อ ตลอดระยะเวลาที่ทำการศึกษา ข้อมูลจะถูกเก็บรวบรวม โดยใช้แบบสอบถาม
การวัดความผูกพัน ของมารดาและทารก แบบวัดการสังเกตและแบบวัดการหลังน้ำนมของมารดา
รวมทั้งข้อมูลทั่วไป ข้าพเจ้าต้องการเก็บรวบรวมข้อมูลที่ Nursery 1 และ Nursery 2 ที่โรงพยาบาล
มารดาและชุมชน ในจังหวัดนครศรีธรรมราช ประเทศไทย ข้าพเจ้าขอการสนับสนุนจากท่าน
ในการอนุญาต ให้เก็บข้อมูลวิจัยที่โรงพยาบาลมารดาซึ่งผลการศึกษานี้ จะเป็นประโยชน์
แก่มารดาและทารกต่อไป

ข้าพเจ้าหวังว่าคงได้รับการตอบรับจากท่านในไม่ช้าหรือท่านสามารถติดต่ออาจารย์ที่ปรึกษาของ
ข้าพเจ้าได้ ตามที่อยู่ที่แนบมาให้

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตเก็บข้อมูล จักขอบพระคุณยิ่ง

ขอแสดงความนับถือ

(นางธิดารัตน์ ก่าลังดี)

Flinders University, South Australia

Walailak University, Thailand



มหาวิทยาลัยวลัยลักษณ์ WALAILAK UNIVERSITY

นครศรีธรรมราช : 222 ตำบลไทยบุรี อำเภอท่าศาลา จังหวัดนครศรีธรรมราช 80160

โทรศัพท์ 0 7567 3000, 0 7538 4000, 0 7552 3000 โทรสาร 0 7567 3708 E-mail : wu@wu.ac.th

กรุงเทพมหานคร : เลขที่ 979/44-45 อาคารเอสเอ็ม ทาวเวอร์ ชั้น 19 (ตรงข้าม ททบ.5) ถนนพหลโยธิน

เขตพญาไท กรุงเทพฯ 10400

โทรศัพท์ 0 2298 0244, 0 2299 0930 โทรสาร 0 2298 0248 E-mail : wu-bkk@wu.ac.th

MOE 57 04 02/ 6142

24 November 2006

Chancellor
Flinders University
GPO Box 2100,
Adelaide 5001,
South Australia

Dear Chancellor,

Re. Official Permission for Ms.Thidarat Kamlangdee

As a lecture as the School of Nursing of Walailak University, Ms.Thidarat Kamlangdee, who has been approved a leave of absence, from November 2004 to October 31st, 2007 to further her Ph.D. degree in Nursing, with her private funding as School of Nursing and Midwifery, Faculty of Health Sciences, Flinders University, is currently approaching the completion of the nursing program and, thus, expresses her wish to return to Thailand to conduct the necessary data collection for her dissertation.

Therefore, to support our nursing faculty member, Ms.Thidarat Kamlangdee, in achieving her objective, Walailak University hereby sent this letter to you as a proof of our official permission for her to return to Thailand for the intended dissertation data collection.

Yours sincerely,

Thirayudh Glinsukon, Sc.D

Professor and Acting Vice-President for Academic Affairs

For and On Behalf of the President of Walailak University

Division of Personnel
Tel : +66 75 673 711

Appendix 2: Participant information sheet



FLINDERS UNIVERSITY
ADELAIDE • AUSTRALIA

The Flinders Clinical Research Ethics Committee

GPO Box 2100
Adelaide 5001 Australia

Telephone: (+61 8) 8201 5962
Fax: (+61 8) 8201 2035
Email: sandy.huxtable@flinders.edu.au

This is a research project. You are invited to take part in a study exploring an evaluation of Kangaroo Care for preterm infants in Thailand. My project is an investigation of the effects from Kangaroo Care in preterm infants. I am looking at bonding and breastfeeding, which have been identified as indicators for Kangaroo Care and improving the welfare of the child and mother. This work has been documented extensively in Western countries but is very underdeveloped in Thailand where there is a predominance and rising occurrence of preterm babies born to mothers who do not want to handle or are afraid to handle such small babies. Thus many also do not breastfeed their infants.

This lack of bonding which persists through out the child's development has the potential (documented extensively) to develop into child abuse situations or the child may become behaviourally or mentally challenged or be abandoned and at a very young age.

This is a research project, and involvement entirely voluntary. If you do not wish to participate, your medical care will not be affected in any way.

If you choose to participate, you will be asked to read and sign a consent form to confirm your commitment to being involved in the study. You will be asked to complete several questionnaires about your living circumstances and demographic data, your infant, bonding with your child and a bonding check list. This will take approximately 1 hour.

Since you have been selected to be in the Kangaroo Care group you will provide the routine care to your baby as you normally would plus you will include the Kangaroo Care intervention.

Kangaroo Care intervention: Kangaroo Care in Preterm infants can be done during daily activities such as sitting, sleeping, or walking at the hospital and home.

1. Postpone Kangaroo Care if the mother is sick with a cold, fever, flu, cough or diarrhoea. Providers of Kangaroo Care must have clean, dry skin without odorous perfumes, colognes, oils, lotions, etc. No rashes, lesions or open areas of skin should be present in case these may come in contact with the participants during Kangaroo Care.

2. The mother must wear clean clothing with front access, such as a front buttoning shirt or dress, or a hospital gown/robe with the opening at the front.
3. The room temperature should be at about 25°C (77°F). It is important to avoid blowing air which can potentially cool the mother and infant, but on the other hand the mother and infant should not feel hot and uncomfortable. A fan or air-conditioner should be used if necessary.
4. The mother should empty her bladder before starting Kangaroo Care and whenever needed during Kangaroo Care.
5. To maximise skin-to-skin contact with the mother, the infant should be prepared by folding the diaper down to expose as much of the abdomen as possible. To ensure heat is not lost from the infant, a cap, booties or blanket may be needed over the infant's back.
6. To ensure privacy for the mother and infant, screens or curtains should be used.
7. Instruct and help the mother to put the infant against her naked chest and to place the palm of her hand on her infant's body.
8. Let the mother know that the researcher in this study or the nurses will be available to her at all times during Kangaroo Care. Inform the mother that at any time she can tell the researcher or the nurses if she feels uncomfortable or if she thinks the infant is uncomfortable, and that the infant will then be returned to his/her crib or incubator.
9. The mother should sit on a comfortable chair which has good padding at the back and the seat. Extra pillows may be needed to provide enough padding for lower back support. The chair also should have wide armrests and a footrest, or a stool to elevate the legs.
10. When resting in a bed the mother should be in a semi-upright position, supported by two or three pillows. Make sure that the infant is in an upright position to facilitate his/her breathing.
11. Teach the mother to stand for 2 to 3 minutes for every 60 to 90 minutes she sits in order to prevent blood clots in her legs and to keep her legs elevated while she is sitting.
12. Teach the mother that readjusting the infant's position will not awaken him/her if he/she is in a deep sleep, and not to be afraid to talk to others or to move around and change position once the infant has been placed in position. The mother should carefully support the infant's head against her chest with her open palm to prevent the head from flopping forward and backward.
13. Teach the mother to be prepared to feel warm. This is most pronounced when the infant is too cold, especially soon after birth. Be sure to have drinking fluids available while performing Kangaroo Care.
14. Educate the mother that the infant may stretch out an arm or leg from under the blanket during Kangaroo Care. Usually, these behaviours help the infant cool an

extremity so he/she does not become too warm. When these behaviours occur, the mother should notice whether the infant is squirming and sweating. The arm or leg should be put back under the blanket if the infant is not too warm. Leave the arm or leg where it is if the infant is too warm, since the researcher or the nurses will check the infant's temperature. If the temperature is 37.4°C (99.4°F) or higher, remove the cap and re-evaluate the temperature within 15 minutes. If the temperature is still 37.4°C or greater, the booties and/or cap can be taken off and a blanket can be placed across the infant's back. If the infant is still too warm, the blanket if folded can be unfolded. In some warm climates, the blanket can be removed and the mother can cover the diapered infant with her hospital gown. Normally, the mother should keep the infant's temperature between 36.8°C (98.2°F) and 37.0°C (98.6°F).

15. Assist the breastfeeding mother by: (a) teaching her to recognise the infant's early feeding cues, for example, rooting, tonguing (outward movement of tongue with mouth open), mouthing (rhythmical movement of oral muscles with mouth closed), sucking (tongue, digit, or hand), hand-to-mouth activities (hand-passing-mouth movement or hand-to-mouth movement), flexion of the arms and legs, fussing, or moving his/her head toward mother's nipple; (b) teaching her to express a few drops of milk as soon as the cues are noticed. This will soften the mother's nipple so that the infant can get the nipple into his/her mouth more easily; (c) helping the infant to latch on by stabilising his/her head if he/she is on the nipple but allow the infant to still be able to move his/her head from side to side; and (d) teaching her to recognise satiety cues (e.g., lack of facial movement, relaxation of the arms and legs, decreasing sucking, stopping sucking, opening hands, relaxing body, and spontaneous releasing of nipple).
16. Teach the mother to continue Kangaroo Care, sitting slightly reclined (about 60 degrees) for the first 10 to 15 minutes after feeding in order to prevent the infant regurgitating. After that, the mother can recline further and assume it into any position she wishes.
17. Inform the mother about the length of time she will be able to do Kangaroo Care which is recommended to begin as soon as possible and continue as often as possible for as long as possible each time. In addition, Kangaroo Care duration is recommended for at least 30 minutes, however, it depends on the infant's and the mother's desire. Kangaroo Care can be done for many hours. The mother should learn the signs that the infant wants to be removed from that position for example when the infant puts his or her limbs out, cries and fusses every time the mother tries to put him/her back in the kangaroo position.
18. Terminate Kangaroo Care immediately at mother's request or if infant exhibits sustained desaturations, colour changes, respiratory distress, heart rate instability, unrelenting irritability, or other signs of intolerance noted by mothers or staff.

Kangaroo Care is not harmful intervention. Your participation in the study is entirely voluntary and you have the right to withdraw from the study at any time. If you decide not to participate in this study or if you withdraw from the study, you may do this freely without prejudice to any treatment at Maharat Hospital.

You will not receive any payment for participating in this study. All records containing personal information will remain confidential and no information that could lead to your identification will be released to anyone outside the research team.

Should you require further details about the project, either before, during or after the study, you may contact Miss Thidarat Eksirinimit at this phone number: 075-522633 or this e-mail address: kaml0008@flinders.edu.au

Supervisors' details

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This study has been reviewed by the Flinders Clinical Research Ethics Committee. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, your right as a participant, or should you wish to make a confidential complaint, you may contact the Administrative Officer- Research, Ms. Carol Hakof, on (08) 8204 4507 or at the department of Administrative Officers at Maharat Hospital, on 075-347460.

***Note: The second supervisory role was changed to dual supervisors Dr Trudi Mannix and Dr Ian Blackman. Dr Lidia Mayner remained the primary supervisor.

Appendix 3: Consent form for all mothers and additional information for intervention group

Consent form 1



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ใบพิทักษ์สิทธิ

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อาจารย์ที่ปรึกษา : Dr. Lidia Mayner & Associate Professor Pauline Glover *** see note in Appendix 2

เบอร์โทรศัพท์ : 001-61-8201 3377 & 001-61-8201 3404; แฟกซ์ : (+618) 8276 1602

ข้าพเจ้า _____ (ผู้เข้าร่วมวิจัย) และบุตร

ตกลงใจที่จะเข้าร่วมเป็นกลุ่มตัวอย่าง ในการวิจัยที่ทำโดย นางธิดารัตน์ กำลั้งดี อาจารย์พยาบาลวิชาชีพ

ขณะนี้กำลังศึกษาอยู่ที่ School of Nursing and Midwifery, Flinders University, Adelaide

ประเทศออสเตรเลีย วัตถุประสงค์ของการวิจัย เพื่อศึกษาว่า การดูแลแบบแกงการ

ทำให้มีความแตกต่างในความผูกพันระหว่างมารดาและทารกที่คลอดก่อนกำหนดหรือไม่ ถ้าข้าพเจ้าและบุตร

ตกลงใจจะร่วมในการวิจัย ครั้งนี้ ข้าพเจ้าและบุตร จะถูกสุ่มให้อยู่ในกลุ่มการดูแลแบบปกติหรือแบบแกงการ

กลุ่มใดกลุ่มหนึ่ง ถ้าข้าพเจ้าและบุตรถูกสุ่มให้อยู่ในกลุ่มการดูแลปกติ

ข้าพเจ้าและบุตรก็จะได้อยู่ร่วมกันภายหลังคลอด

ข้าพเจ้าสามารถอุ้มลูกที่สวมใส่เสื้อผ้าได้ตามต้องการและสามารถให้นมลูกได้ตามที่ลูกต้องการ

ข้าพเจ้าและลูกจะอยู่ที่โรงพยาบาลจนกว่าแพทย์จะอนุญาตให้กลับบ้าน ซึ่งจะประมาณ 2-3

วันภายหลังคลอดสำหรับมารดา ส่วนลูกจะขึ้นอยู่กับอาการของลูกและดุลยพินิจของแพทย์ผู้รักษา

ถ้าข้าพเจ้าและบุตรถูกสุ่มให้อยู่ในกลุ่มการดูแลแบบแกงการ

ข้าพเจ้าจะเริ่มให้การดูแลแบบแกงการดูแลภายใน 1 วันหลังคลอด และทำอย่างต่อเนื่องจนกระทั่งถึงสัปดาห์ที่ 4 , 12 และ 24 ที่บ้าน

ข้าพเจ้าจะอุ้มลูกแบบเนื้อแนบเนื้อให้มากที่สุด และนานที่สุดเท่าที่จะทำได้

ข้าพเจ้าจะทำต่อที่บ้านจนกระทั่งลูกรู้สึกไม่สุขสบาย เมื่ออยู่ในท่าแกงการนั้นคือ ลูกจะกวนโยเย และร้องไห้ทุกครั้ง

ที่ข้าพเจ้าอุ้มลูกในท่านี้พยาบาลที่หอผู้ป่วยจะเป็นผู้ให้การดูแลข้าพเจ้าและลูก

ขกเว้นแกงการซึ่งผู้วิจัยจะเป็นผู้ให้การดูแล

ข้าพเจ้าและลูกจะอยู่ที่โรงพยาบาลจนกว่าแพทย์จะอนุญาตให้กลับบ้าน

ข้าพเจ้าเข้าใจว่า ข้าพเจ้าจะถูกขอความร่วมมือ ในการตอบแบบสอบถาม 4 ชุด

ในวันแรกภายหลังคลอดที่โรงพยาบาล และ 2 ชุดภายหลังคลอดที่บ้านในสัปดาห์ที่ 4, 12 และ 24

ซึ่งใช้เวลาในการตอบแบบสอบถามทั้งหมด ประมาณ 45-60 นาทีนอกจากนี้ข้าพเจ้ายังถูกสังเกต พฤติกรรม

ขณะที่ข้าพเจ้าให้นมลูก ในวันแรกภายหลังคลอด ประมาณ 10 นาที และถูกสังเกตต่อไปที่บ้านในสัปดาห์ที่ 4,

12 และ 24 ข้าพเจ้าจะถูกถามข้อมูลส่วนบุคคลของข้าพเจ้าและบุตร ประมาณ 10 นาที

ข้าพเจ้าจะได้รับสำเนาใบพิทักษ์สิทธิ์นี้จากผู้วิจัยจำนวน 1 ชุด

ข้าพเจ้าได้รับการแจ้งรายละเอียดเกี่ยวกับการวิจัยในครั้งนี้ และขอเข้าร่วมในการวิจัยโดยสมัครใจ

และไม่เสียค่าใช้จ่ายใดๆทั้งสิ้น

ข้าพเจ้าจะไม่ได้รับผลประโยชน์ส่วนตัวใดๆทั้งสิ้น จากการเข้าร่วมในการวิจัย ครั้งนี้

ข้อมูลและคำตอบของข้าพเจ้าจะถูกปิดไว้เป็นความลับ ผลการศึกษาจะถูกเสนอในภาพรวมเท่านั้น

ข้าพเจ้ามีสิทธิ์ที่จะถามข้อสงสัย ปฏิเสธข้อซักถาม และถอนตัวจากการวิจัย ได้ทุกเมื่อที่ข้าพเจ้าต้องการ

โดยไม่มีผลกระทบต่อการรักษาพยาบาลที่ข้าพเจ้าจะพึงได้รับต่อไป ข้าพเจ้ารับทราบว่า การดูแลแบบแกงการ

ไม่มีโทษทั้งทางด้านการแพทย์ กฎหมาย และสังคม

ผลประโยชน์จากการวิจัยอาจมีผลต่อมารดาและทารกคนอื่นๆ รวมทั้งข้าพเจ้าและบุตร ถ้าข้าพเจ้ามีข้อสงสัย

หรือมีคำถามเกี่ยวกับการวิจัย ข้าพเจ้าสามารถถาม นางธิดารัตน์ เอกศิรินิมิตร ที่โรงพยาบาล

หรือโทรศัพท์ได้ที่เบอร์ 086-2676815

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว และมีความเข้าใจดีทุกประการ และได้ลงนามในใบยินยอมนี้ด้วยความเต็มใจ

ลงชื่อ _____ ผู้เข้าร่วม โครงการวิจัย

(_____ ชื่อ นามสกุล ตัวบรรจง)

วัน _____ เดือน _____ ปี _____

ลงชื่อ _____ ผู้ดำเนิน โครงการวิจัย

(_____ ชื่อ นามสกุล ตัวบรรจง)

วัน _____ เดือน _____ ปี _____

Consent form 2



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เอกสารชี้แจงข้อมูลแก่ผู้เข้าร่วมโครงการวิจัย

การประเมินผลการดูแลแบบแก๊งการุ สำหรับทารกที่คลอดก่อนกำหนดในประเทศไทย

โครงการวิจัยนี้ต้องการอาสาสมัคร ถ้าท่านไม่ยอมเข้าร่วมโครงการวิจัยก็จะมีผลกระทบต่อท่านและทารกท่านได้ถูกเชิญให้เข้าร่วมในการวิจัยเรื่องนี้

ซึ่งต้องการศึกษาเกี่ยวกับการประเมินถึงผลกระทบของการดูแลแบบแก๊งการุ

ในทารกที่คลอดก่อนกำหนดในประเทศไทย

ผู้วิจัย

ชื่อธิดารัตน์

เอกศิรินิมิตร

เป็นอาจารย์พยาบาลและเป็นนักศึกษาที่มหาวิทยาลัยฟรินเดอร์

งานวิจัยนี้เป็นส่วนหนึ่งของการศึกษาวิจัยในระดับสูงทางการพยาบาล

ผู้วิจัยเชื่อว่าการดูแลแบบแก๊งการุเป็นวิธีการหนึ่งที่ใช้ในการดูแลทารก

ที่สนับสนุนความผูกพันระหว่างมารดาและทารก ซึ่งวิธีการนี้สามารถทำได้ในชีวิตประจำวัน

ผู้วิจัยได้ศึกษาถึงความผูกพันและการให้นมมารดา

ซึ่งสิ่งเหล่านี้ได้ส่งเสริมคุณภาพชีวิตของมารดาและทารก

ผู้วิจัยคาดว่า

การดูแลแบบแก๊งการุนี้

อาจจะช่วยส่งเสริมในเรื่องของความผูกพันและความสำเร็จในการให้นมมารดาได้

ในปัจจุบันนี้

การดูแลแบบแก๊งการุมีการใช้อย่างแพร่หลายในสังคมตะวันตก

แต่ในประเทศไทย

มีการนำแนวคิดนี้มาใช้แค่บางโรงพยาบาล นอกจากนี้อุบัติการณ์ของทารกที่คลอดก่อนกำหนดในประเทศไทย

ก็มีแนวโน้มที่สูงขึ้น

มารดาก็ไม่มีความมั่นใจที่จะดูแลทารก

เนื่องจากทารกตัวเล็กกว่าปกติ

ซึ่งอาจจะมีผลกระทบต่อความผูกพันและการให้นมของมารดาได้

การขาดถึงความผูกพัน

จะมีผลกระทบต่อพัฒนาการของเด็ก และอาจพบว่า เด็กมีปัญหาทางด้านพฤติกรรมและจิตใจได้

ถ้าท่านตกลงใจที่จะเข้าร่วมในการวิจัยครั้งนี้

ท่านจะถูกให้อ่านการยินยอมเข้าร่วมในการวิจัยและเซ็นชื่อในการเข้าร่วมในการวิจัยนี้อย่างเต็มใจ

ในการวิจัยครั้งนี้

มีการแบ่งกลุ่มมารดาและทารกออกเป็น

2

กลุ่ม

ทั้งสองกลุ่มก็จะถูกประเมินและมีการอธิบายอย่างชัดเจน

กลุ่มหนึ่งจะได้รับการดูแลแบบแก๊งการุ

ส่วนอีกกลุ่มก็จะได้รับการดูแลแบบปกติจากโรงพยาบาล

ถ้าท่านตกลงใจที่จะเข้าร่วมในการวิจัยนี้ท่านก็จะถูกสุ่มให้อยู่ในหนึ่งของสองกลุ่มนี้

ท่านจะถูกถามให้ตอบแบบสอบถามเกี่ยวกับข้อมูลทั่วไปของมารดาและทารก, ความผูกพันของมารดาและทารก

และแบบสังเกตพฤติกรรมความผูกพันที่มีต่อทารก ซึ่งใช้เวลาในการตอบแบบสอบถามทั้งหมด ประมาณ 1 ชั่วโมง ในส่วนที่สองของงานวิจัยนี้ ผู้วิจัยจะไปเยี่ยมท่านและทารกที่บ้านจำนวน 3 ครั้ง ในสัปดาห์ที่ 4 , 12 และ 24 หลังจากท่านและทารกออกจากโรงพยาบาล

ถ้าท่านถูกสุ่มให้อยู่ในกลุ่มของการดูแลแบบแคงการู ท่านก็จะมีการดูแลทารกของท่านอย่างปกติ ร่วมกับการดูแลแบบแคงการู ซึ่งการดูแลแบบแคงการูนั้น ท่านสามารถทำได้ในทุกอิริยาบถ ของชีวิตประจำวันของท่าน ทั้งในโรงพยาบาลและที่บ้าน การดูแลแบบแคงการู ไม่มีอันตรายแต่อย่างใด การเข้าร่วมในการวิจัยนี้ เป็นอาสาสมัคร และท่านสามารถถอนตัวจากการศึกษานี้ได้ตลอดเวลา ถ้าท่านไม่เข้าร่วมในการศึกษานี้ จะไม่มีผลกระทบใดๆ ต่อการรักษาพยาบาลที่โรงพยาบาลมีให้กับท่านและทารก

การวิจัยในครั้งนี้ จะไม่มีค่าใช้จ่ายใดๆทั้งสิ้น การบันทึกทุกอย่างจะเป็นความลับ โดยจะไม่มีใครรับรู้ ยกเว้นผู้วิจัยและอาจารย์ที่ปรึกษา ส่วนผลการศึกษาจะมีการเสนอในภาพรวมเท่านั้น ถ้ามารดาไม่ประสงค์ หรือคำถามก่อน, ขณะและหลังที่ร่วมในการวิจัยครั้งนี้สามารถติดต่อนางสาวธิดารัตน์ เอกศิรินิมิตร ที่เบอร์โทรศัพท์ 086-2676815 หรือ e-mail : kaml0008@flinders.edu.au

การศึกษานี้อยู่ภายใต้การดูแลของ ดอกเตอร์ลิเดีย เมเนอร์ และรองศาสตราจารย์พอร์นลิน กลอบเวอร์ที่มหาวิทยาลัยฟรินเดอร์ ท่านอาจจะติดต่ออาจารย์ทั้งสองท่านได้ โดยมีรายละเอียดดังนี้

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การศึกษานี้ได้ผ่านการพิจารณาจากคณะกรรมการที่ Flinders Clinical Research Ethics committee ท่านไม่ควรที่จะบอกกล่าวงานวิจัยนี้ กับบุคคลอื่นที่ไม่ได้เกี่ยวข้อง

ถ้าท่านมีคำถามหรือข้อสงสัยเกี่ยวกับงานวิจัยนี้ สามารถติดต่อ

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Additional information for participating mothers

การดูแลแบบแกงการู



การดูแลแบบแกงการูนั้น สามารถทำได้ในทุกอิริยาบถ เช่น การนั่ง , การหลับ หรือการเดินทางที่โรงพยาบาลและที่บ้าน ถ้าทำในช่วงเดินหรือทำงานที่บ้านต้องใช้ผ้าผืนยาว 3 หลา ผูกทารกเข้ากับอกของผู้ทำให้มันคง ซึ่งมีวิธีปฏิบัติในการทำแกงการู ดังนี้

1. ให้เลื่อนการทำแกงการู เมื่อมารดาไม่สบาย เช่น มีไข้, เป็นหวัด, ไอหรือท้องเสีย เป็นต้น ก่อนที่จะให้การดูแลแบบแกงการู ตัวมารดาต้องสะอาดแห้ง ไม่มีกลิ่นน้ำหอมใดๆทั้งสิ้น และไม่มีผื่นหรือพยาธิสภาพทางผิวหนังที่ต้องสัมผัสกับทารกระหว่างที่ทำแกงการู
2. สวมใส่เสื้อผ้าที่สะอาด ผ้าหน้ามีกระดุมติดหรือเชือกผูก ไม่ใส่เสื้อชั้นใน
3. ควบคุมอุณหภูมิในห้องที่ต้องทำแกงการูประมาณ 25 องศาเซลเซียส (หลีกเลี่ยงลมหรืออากาศเย็น และสามารถเปิดพัดลมหรือแอร์ ถ้ามารดาและทารกรู้สึกร้อนหรือไม่สบาย) หรือตั้งอุณหภูมิตามที่ต้องการไม่หนาวหรือร้อนจนเกินไป
4. ระยะเวลาปัสสาวะ ต้องว่างก่อนที่จะเริ่มและระหว่างที่ทำแกงการู
5. เตรียมทารก โดยสวมใส่ผ้าอ้อมเพื่อป้องกันการปนเปื้อนจากการขับถ่าย และให้ผิวหนังของทารกกับผิวหนังของมารดาให้มากที่สุด และสามารถใช้หมวก ถุงเท้า และผ้าห่มได้ตามต้องการ ถ้าทารกหนาว เพื่อที่จะรักษาความอบอุ่นให้ทารก โดยใช้ผ้าห่มคลุมบริเวณหลังทารก ขณะที่ให้การดูแลแบบแกงการู
6. ใช้ผ้าม่าน เพื่อรักษา ความเป็นส่วนตัวของมารดาและทารก ขณะที่ให้การดูแลแบบแกงการู
7. ช่วยเหลือมารดา โดยจัดทำทารกให้นอนคว่ำศีรษะสูงบนหน้าอกเปลือยของมารดา ตะแคงหน้าทารกไปด้านใดด้านหนึ่ง แบบเนื้อแนบเนื้อ และต้องแน่ใจว่าทารกอยู่ในท่าศีรษะสูง และหายใจได้สะดวก จากนั้นมารดาดึงเสื้อที่เปิดออกมาปิดหลังของทารกไว้ หรือใช้ผ้าอ้อมหรือผ้าห่มคลุมหลังทารกไว้ก็ได้ เพื่อไม่ให้หนาวหรือไปจนเกินไป มารดาสามารถพูดคุย ร้องเพลงกล่อมทารก หรือใช้ฝ่ามือสัมผัสลูบไล้ร่างกายทารกได้ตามความต้องการ เพื่อให้ทารกเกิดความรู้สึกอบอุ่นและสบาย
8. แจ้งให้มารดาทราบว่า ผู้วิจัยหรือพยาบาลเต็มใจที่จะให้การช่วยเหลือมารดาตลอดเวลา ในระหว่างที่ให้การดูแลแบบแกงการู และมารดาสามารถบอกผู้วิจัยหรือพยาบาลได้ตลอดเวลา ถ้ารู้สึกไม่สบาย หรือถ้ามารดาคิดว่าทารกไม่ได้รับความสบาย หลังจากนั้นทารกก็จะถูกนำกลับไปอยู่ที่เตียง หรือตู้บ เหมือนเดิม
9. การจัดที่นั่งของมารดา ต้องจัดให้มารดา รู้สึกสบาย โดยจัดให้นั่งบนเก้าอี้ที่มีพนักพิงที่แข็งแรงพอที่รับน้ำหนักทั้งมารดาและทารก ควรมีหมอนมาหนุนบริเวณหลัง และเบาะรองที่นั่ง เก้าอี้ควรมีที่พักแขนทั้ง 2 ข้าง และควรมีที่รองเท้า ซึ่งอาจจะเป็นเก้าอี้เดี่ยวๆ หรือกล่องเตี้ยๆก็ได้ เพื่อให้มารดาอยู่ในท่าที่สบายมากที่สุด ในขณะที่ทำแกงการู
10. ในระหว่างที่ให้การดูแลแบบแกงการู ต้องมีความมั่นใจว่า ทารกอยู่ในท่าที่ถูกต้องและสบาย
11. ให้มารดาได้ลุกขึ้นยืนเพื่อเปลี่ยนอิริยาบถเป็นเวลา 2-3 นาทีทุก 60-90 นาทีที่ทำแกงการู เพื่อป้องกันอาการเมื่อยหรือเหน็บชา และพยายามให้มารดาอยู่ในท่าเหยียดตรงและยกขาสูง ขณะที่มารดานั่งทำแกงการู เพื่อป้องกันเลือดคั่งที่ขาจากการนั่งนานๆ
12. สอนมารดาให้มีความรู้และมีความมั่นใจในการเปลี่ยนท่าของทารก โดยไม่ให้ทารกตื่นในขณะที่ทารกกำลังนอนหลับสนิท และประคองประคองศีรษะของทารกไม่ให้ตกหรือคอพับ และอยู่ในท่าที่ถูกต้อง มารดาสามารถจับตัว หรือเปลี่ยนอิริยาบถได้ตามความต้องการ
13. สอนมารดาให้ตระหนักถึงการรักษาความอบอุ่นทั้งต่อมารดาและทารก รวมทั้งมีการเตรียมน้ำดื่มให้เพียงพอ ในขณะที่ทำแกงการู เพราะผู้ทำอาจกระหายน้ำได้

14. ในระหว่างที่ทำแกงการ ทารกอาจจะเหยียดแขนหรือขา ออกจากผ้าห่มได้ ถ้าทารกรู้สึกร้อน ให้สังเกตว่าทารกตื่นแต่ถ้ามีอาการดังกล่าว ในระหว่างที่ให้การดูแลแบบแกงการ ผู้วิจัยจะสังเกตและวัดอุณหภูมิของทารก เพื่อควบคุมอุณหภูมิของทารกให้อยู่ในเกณฑ์ปกติ (36.5-37.4 องศาเซลเซียส) เช่นถ้าอุณหภูมิสูงมากกว่า 37.4 องศาเซลเซียส ก็จะถอดหมวกทารกออก และรออีก 15 นาที วัดอุณหภูมิทารกใหม่ ถ้าอุณหภูมิเท่ากับหรือมากกว่า 37.4 องศาเซลเซียส ให้ถอดถุงเท้า และห่มผ้าห่มที่พับเหลือเศษหนึ่งส่วนสี่ หรือเอาผ้าห่มออก

15. การให้นมมารดา

ผู้วิจัยจะกระตุ้นและให้ความรู้แก่มารดาเพื่อให้ทารกเร็วที่สุดและรู้ถึงความต้องการและพฤติกรรมของทารก ที่บ่งบอก ถึงความต้องการนมมารดาในขณะที่ทำแกงการ มารดาสามารถให้ทารกดูดนมตนเองได้ ถ้าทารกหิวนม โดยมารดาสามารถสังเกตอาการหิวนมของทารกได้ เช่น มีการเคลื่อนไหว ของปาก ลิ้น การดูดหรือเอามือสัมผัสหรือเข้าปาก มีการเคลื่อนไหวของแขนขาและลำตัว หันศีรษะเข้าหาหัวนมมารดา ทำปากขยับเหมือนจะดูดนม งอหรือร้องไห้ได้ในที่สุด หากทารกไม่ได้รับการตอบสนองความต้องการได้อย่างทันเวลาตามที่ทารกต้องการ เป็นต้น เมื่อมารดาสังเกตเห็นอาการทารกหิวนม ให้มารดาบีบน้ำนมตนเองออกมาเล็กน้อย น้ำนมจะทำให้หัวนมมารดาอ่อนตัวลง และปากทารกสามารถคาบหัวนมมารดาได้ง่ายขึ้น มารดาควรรู้วิธีหนึ่งจับศีรษะทารกไว้ ถ้าทารกยังคงสายศีรษะไปมา ทั่วทั้งปากทารกสามารถคาบหัวนมและลานนมของมารดาได้แล้ว การให้นมทารกควรให้ทารกดูดจนอิ่ม โดยสลับดูนมทีละเต้า ชั่งละประมาณ 10 นาที อาการทารกอิ่มนมได้แก่ ทารกจะสงบ ไม่มีการเคลื่อนไหวของใบหน้า แขนขาเหยียดคลาย ลดหรือหยุดการดูดนม ปล่อยมือ ร่างกายผ่อนคลาย และปากทารกจะปล่อยหัวนมมารดาโดยอัตโนมัติ

16. เมื่อทารกอิ่มนมแล้ว ให้มารดาจับทารกให้เรอในท่านั่งโดยที่มารดาใช้ฝ่ามือข้างหนึ่งประคองอกทารก นิ้วหัวแม่มือกับนิ้วชี้ของมือข้างนั้นประคองคางทารกไว้ มืออีกข้างหนึ่งลูบหลังของทารกขึ้นหรือลงก็ได้ เมื่อทารกเรอแล้ว ให้ทำแกงการต่อ โดยจัดให้ทารกอยู่ในท่านั่งศีรษะสูง 60 องศา เป็นเวลา 10-15 นาที ทั้งนี้เพื่อป้องกันการสำรอกนม

หลังจากนั้นมารดาสามารถทำแกงการในท่านั่งหรือนอนก็ได้ตามที่ต้องการภายหลังคลอด

17. มารดาสามารถทำแกงการ โดยเริ่มให้การดูแลแบบแกงการเร็วที่สุดเท่าที่จะทำได้ บ่อยครั้งที่สุดและนานที่สุดในแต่ละครั้งที่ทำ ในระยะแรกให้เริ่มทำครั้งละ 30 นาที ถึง 1 ชั่วโมง วันละ 3 ครั้ง ต่อมาเมื่อมีความชำนาญมากขึ้น ให้ทำนานตามความต้องการของมารดาและสภาพของทารก การทำแกงการที่ได้ผลอย่างมีประสิทธิภาพ ควรทำอย่างน้อย 60 นาทีต่อวัน อาการที่ทารกไม่ต้องการอยู่ในท่าแกงการ ได้แก่ ดิ้นเอาแขนขาออก ร้องไห้ งอแงทุกครั้งที่ยกขาจัดการให้อยู่ในท่าแกงการ ถ้าพบอาการเหล่านี้ให้หยุดการทำแกงการไปก่อน และหาสาเหตุพร้อมการแก้ไข เนื่องจากทารกอาจไม่สบายจากการจับถ่าย หิว หรือ ร้อนจนเกินไป เป็นต้น

18. ขณะที่ทำแกงการให้มารดาคอยเฝ้าสังเกตอาการเปลี่ยนแปลงของทารกด้วย เช่น การหายใจ การเต้นของหัวใจ อุณหภูมิ การหลับ การตื่น การร้องไห้ การเคลื่อนไหวแขนขา การดูดนม เป็นต้น



Appendix 4: Demographic data questionnaire – mother

English

Direction: Place a checkmark or fill in the blank at each demographic data question as accurately as possible.

The mother

1. Age of mother : _____
2. Maternal education (levels)
 - 12th grade or less Diploma degree
 - Bachelor degree Master degree or higher
3. Maternal occupation
 - Government Government enterprise Merchant
 - Businesswoman Gardener Farmer
 - Orchardwomen Worker Housewife
 - Other (please specify _____)
4. Religion
 - Buddhist Islam
 - Other (please specify _____)
5. Marital status
 - Single Married Widowed
 - Divorced Separated Co-habitant
6. Family income (baht/month)
 - Less than 5,000 5,000-10,000 More than 10,000
 - Government subsidy

7. Maternal pregnancy history: ____ Gravida, ____ Parity, ____
 ____ Spontaneous abortion, ____ Induced abortion
8. Indicate by ticking the box any serious illnesses, complications or conditions during this pregnancy
- Infections Bleeding disorders Diabetes
- Cardiac diseases Uncontrolled epilepsy Pre-eclampsia
- Depression Psychoses Drug addiction
- HIV/AIDS Unwanted pregnancy
- Other (please specify _____) None
9. Indicate any breast problems that might interfere with breastfeeding.
- Inverted flare nipples Breast augmentation
- Breast reduction History of other breast surgery
- Others (please specify _____) None
10. Where did you want the nurse to place your baby the first time that you and your baby were together after birth?
- A crib An Incubator Your bed
- On your chest
11. Where did the nurse place your baby?
- A crib An Incubator Your bed
- On your chest
12. What kinds of anesthesia/analgesia did you receive before and during delivery?
- General anesthesia Analgesia (Pethidine)
- Pudendal block Epidural

13. Did you have any serious complications after delivery?

- Post partum hemorrhage Shock
 - Perineal trauma
 - Others (please specify _____)
 - None
-

Thai

ลำดับที่ : _____
วัน/เดือน/ปี _____

แบบสอบถามข้อมูลส่วนตัวของมารดา

คำสั่ง โปรดถามมารดาและ/หรือดูแลพระเบ็ญนมารดา เพื่อที่จะตอบคำถามต่อไปนี้ โดยทำ

เครื่องหมาย หรือเติมคำลงในช่องว่างของแต่ละข้อคำถามให้ตรงตามความเป็นจริงมากที่สุด

ข้อมูลส่วนตัวของมารดา

1. อายุ _____ ปี

2. ระดับการศึกษา

1. ต่ำกว่าหรือเท่ากับมัธยมปีที่ 6 2. ประกาศนียบัตร/อนุปริญญา

3. ปริญญาตรี 4. สูงกว่าหรือเท่ากับปริญญาโท

3. อาชีพ

1. รับราชการ 2. รัฐวิสาหกิจ 3. แม่ค้า

4. นักธุรกิจหญิง 5. ขาวสวน 6. ขาวนา

7. ขาวไร่ 8. รับจ้าง 9. แม่บ้าน

10. อื่นๆ (โปรดระบุ _____)

ลำดับที่ : _____
วัน/เดือน/ปี _____

4. ศาสนา

1. พุทธ 2. อิสลาม 3. คริสต์
4. อื่นๆ (โปรดระบุ _____)

5. สถานภาพสมรส

1. โสด 2. แต่งงาน 3. หม้าย
4. หย่า 5. แยกกันอยู่ 6. อยู่กันเฉยๆ

6. รายได้ของครอบครัว (บาท/เดือน)

1. น้อยกว่า 5,000 2. 5,000-10,000 3. มากกว่า 10,000
4. รัฐบาลสนับสนุน

7. ประวัติการตั้งครรภ์: _____ จำนวนครรภ์, _____ จำนวนบุตรมีชีวิต,
_____ การแท้งตามธรรมชาติ, _____ การแท้งคุกคาม

8. ท่านเคยมีประวัติการเจ็บป่วยร้ายแรง ภาวะแทรกซ้อน หรือภาวะอื่นๆต่อไปนี้ ในช่วง
ตั้งครรภ์หรือไม่

1. ติดเชื้อ 2. ภาวะเลือดไหลผิดปกติ 3. เบาหวาน
4. โรคหัวใจ 5. ชักจนควบคุมไม่ได้ 6. อาการชักขณะตั้งครรภ์

ลำดับที่ : _____

วัน/เดือน/ปี _____

7. ภาวะซึมเศร้า 8. โรควิต 9. ดิคาเสพดิด เช่น เฮโรอีน

มอร์ฟีน โคเคน กัญชา เป็นต้น

10. เลือดบวก/เฮดส์ 11. ไม่ต้องการการตั้งครกันนี้

12. อื่นๆ (โปรดระบุ _____)

13. ไม่มีที่กล่าวมาทั้งหมด

9. ท่านมีปัญหาผิดปกติต่อไปนี้เกี่ยวกับเต้านม ซึ่งอาจมีผลต่อการให้นมบุตรหรือไม่

1. หัวนมบอด 2. การเสริมเต้านม

3. เต้านมเล็กหรือไม่สมบูรณ์ 4. ประวัติการผ่าตัดเต้านม

5. อื่นๆ (โปรดระบุ _____)

6. ไม่มีที่กล่าวมาทั้งหมด

10. ท่านต้องการให้พยาบาลวางบุตรของท่านที่ไหน ในครั้งแรกที่ท่านและบุตรของ

ท่านได้อยู่ร่วมกัน ภายหลังคลอด

1. เตียงเด็ก 2. ตู้อบ 3. เตียงของท่าน

4. บนหน้าอกของท่าน

ลำดับที่: _____

วัน/เดือน/ปี _____

11. ในความเป็นจริง พยาบาลวางบุตรของท่านที่ไหน ภายหลังจากคลอด

1. เตียงเด็ก 2. ตู้อบ 3. เตียงของท่าน
4. บนหน้าอกของท่าน

12. ท่านได้รับยาชาหรือยาแก้ปวด ชนิดไหนในช่วงขณะคลอด

1. ยาสลบ 2. ยาฉีดแก้ปวด(กล้ามเนื้อ/หลอดเลือดดำ)
3. ยาฉีดแก้ปวดที่ช่องคลอด 4. ยาฉีดแก้ปวดเข้าช่องไขสันหลัง

13. ท่านมีภาวะแทรกซ้อน หรือ ภาวะเจ็บป่วยร้ายแรงหลังคลอดต่อไปนี้หรือไม่

1. ตกเลือดหลังคลอด 2. ช็อค
3. มีบาดเจ็บบริเวณทวารหนัก
4. อื่นๆ (โปรดระบุ _____)

ขอขอบคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

Appendix 5: Demographic data questionnaire – infant

English

Direction: Place a checkmark or fill in the blank at each demographic data question as accurately as possible.

The Infant

1. Infant's gender

Male Female

2. Infant's gestational age _____ weeks

3. At birth, infant's weight _____ grams,

Length _____ cm

From notes (4-5)

4. Infant's Apgar score at one minute after birth = _____

5. Infant's Apgar score at five minutes after birth = _____

6. Does the infant have any birth deformities?

Birth deformities	Yes	No	Please state
Cardiovascular System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Respiratory System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Digestive System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Nervous System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Urinary System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Reproductive System	<input type="checkbox"/>	<input type="checkbox"/>	_____
Immune System	<input type="checkbox"/>	<input type="checkbox"/>	_____

7. Does the infant have any serious neonatal illnesses that had to be referred to a neonatal intensive care unit immediately after birth?

Respiratory problem needing resuscitation, intubation, or oxygen

Metabolic problems Infectious diseases

Congenital anomalies

Others (Please specify _____)

None

8. What is the postpartum ward that the mother was admitted?

Please specify Normal ward VIP ward

9. How long was your baby admitted to NICU(high risk) ? _____

10. How long was your baby admitted to NICU(low risk) ? _____

11. How many days old was your baby when discharged from the hospital? _____

12. Approximately how many hours per day did you spend in
NICU? _____

Thai

ลำดับที่ : _____

แบบสอบถามข้อมูลส่วนตัวของทารก

คำชี้แจง โปรดตามมารดาและ/หรือดูเวชระเบียนของทารก เพื่อที่จะตอบคำถามต่อไปนี้ โดยทำ

เครื่องหมาย หรือเติมคำลงในช่องว่างของแต่ละข้อคำถามให้ตรงตามความเป็นจริงมากที่สุด

ข้อมูลส่วนตัวของทารก

1. เพศ

1. ชาย

2. หญิง

2. อายุครรภ์ _____ สัปดาห์

3. แรกเกิด น้ำหนักเด็ก _____ กรัม

ความยาว _____ เซนติเมตร

ข้อมูลจากเวชระเบียนทารก (4-5)

4. ค่าคะแนนเอปการ์(Apgar score) นาทีที่ 1 หลังคลอด =

5. ค่าคะแนนเอปการ์(Apgar score) นาทีที่ 5 หลังคลอด =

ลำดับที่ : _____

6. บุตรของท่านมีภาวะพิการแต่กำเนิดต่อไปนี้หรือไม่

ความเจ็บป่วย	ใช่	ไม่ใช่	โปรดระบุ
ระบบหัวใจและหลอดเลือด	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบหายใจ	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบทางเดินอาหาร	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบประสาท	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบปัสสาวะ	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบสืบพันธุ์	<input type="checkbox"/>	<input type="checkbox"/>	_____
ระบบภูมิคุ้มกัน	<input type="checkbox"/>	<input type="checkbox"/>	_____

7. บุตรของท่านมีภาวะเจ็บป่วยร้ายแรงหลังคลอดต่อไปนี้ ที่ทำให้บุตรของท่านต้องถูกย้ายไป

หออภิบาลทารกแรกเกิดทันทีหลังคลอดหรือไม่

1. มีความผิดปกติเกี่ยวกับการหายใจที่ต้องการให้การช่วยฟื้นคืนชีพ ใส่ท่อ หรือให้

ออกซิเจน

2. มีปัญหาเกี่ยวกับระบบเมตาบอลิซึมและการเผาผลาญอาหาร

3. โรคติดเชื้อ

ลำดับที่: _____

4. ความพิการแต่กำเนิด

5. อื่นๆ (โปรดระบุ _____)

8. มารดาได้ถูกให้อยู่ในหอผู้ป่วยหลังคลอดแบบใดหลังคลอดบุตรคนนี้

โปรดระบุ _____

9. บุตรของท่านต้องถูกให้อยู่ในหออภิบาลทารกแรกเกิดที่มีความเสี่ยงสูงนาน

เท่าไร _____

10. บุตรของท่านต้องถูกให้อยู่ในหออภิบาลทารกแรกเกิดที่มีความเสี่ยงต่ำนาน

เท่าไร _____

11. แพทย์อนุญาตให้บุตรของท่านกลับบ้านได้ เมื่ออายุเท่าไร _____

12. ท่านได้ให้เวลากับบุตรของท่านในหออภิบาลทารกแรกเกิดประมาณกี่ชั่วโมงในหนึ่ง

วัน _____

ขอขอบคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

Appendix 6: Maternal Infant Bonding Questionnaire

English

Directions: This questionnaire consists of six subscales and 31 items regarding the affectionate feelings a mother has toward her infant. As accurately as possible, please make a checkmark in the column that represents how you feel toward your baby. This checklist will be completed by all mothers on Day 1, and the last days of Weeks 4, 12 and 24 postpartum.

Scale 1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly agree

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale1: Perception of Infant Features</p> <p>1. I feel that my baby is cute.</p> <p>2. I feel that my baby resembles me or his/her father.</p> <p>3. I like to see my baby's face or body.</p> <p>4. If several babies were placed together, I could tell which one is mine.</p> <p>5. I try to examine my baby's face and body as much as I can</p>					

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale 2: Attention and Connection to the Infant</p> <p>6. My baby might feel lonely because he/she did not sleep with me.</p> <p>7. I want my baby to open his/her eyes and look at me.</p> <p>8. I feel love to my baby at all time</p> <p>9. I want to stay closer with my baby.</p> <p>10. I want to nurture my baby by myself after delivery.</p> <p>11. I'm very concerned about my baby.</p>					

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale 3: Acceptance of the Infant's Individuality</p> <p>12. I feel love for my baby no matter what my baby looks like.</p> <p>13. My baby looks like all other ordinary babies.</p> <p>14. I'm preparing to name my baby.</p> <p>15. I love my baby although my baby is a girl or a boy.</p> <p>16. Delivery made me feel as if I lost some parts of my body.*</p>					

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale 4: Acceptance of the Role of Mother</p> <p>17. I feel I'm a complete mother.</p> <p>18. My baby is the most important thing in my life.</p> <p>19. I'm not sure that I can nurture my baby.*</p> <p>20. I may not be able to be a good mother.*</p>					

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale 5: Preparation for Nurturing the Infant</p> <p>21. I want to learn how to take care of my baby.</p> <p>22. I think I will prepare clothes and things for my baby before we are discharged from the hospital.</p> <p>23. I think my baby may have some special defects that a doctor still has not examined.*</p> <p>24. I can give a bath to my baby if the nurses teach me.</p> <p>25. I think it is important to breastfeed my baby as soon as possible after birth.</p> <p>26. I want to take a rest for as long as possible before breastfeeding my baby after birth.*</p> <p>27. I want to breastfeed my baby for more than three months</p>					

Items	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
<p>Subscale 6: Desire to Touch or Hold the Infant</p> <p>28. I would like to hold my baby.</p> <p>29. I would like to hug my baby.</p> <p>30. Holding and closely interacting with my baby is the important thing for me.</p> <p>31. I'm more satisfied when I watch my baby than when I hold him/her.*</p>					

Note: * Scoring Reversed

Thai

ลำดับที่: _____

การเขียนครั้งที่: _____
วัน/เดือน/ปี _____

แบบสอบถามชุดที่ 2

แบบสอบถามนี้ต้องการถามความรู้สึกและความคิดเห็นของท่านที่มีต่อบุตร โดยจะมีข้อความทั้งหมด 31 ข้อ ให้ท่านอ่านเพื่อพิจารณาว่า ท่านมีความรู้สึก ความคิดเห็น ตรงกับข้อความแต่ละข้อมากน้อยเพียงไร ดังนั้นจึงไม่มีคำตอบที่ถูกหรือผิด ขอให้ท่านตอบให้ตรงกับความคิดเห็นหรือความรู้สึก และความเป็นจริงให้มากที่สุด เท่าที่จะเป็นไปได้ คำตอบที่ได้จากท่านจะถือเป็นความลับและนำไปใช้ในการวิจัยในครั้งนี้นี้เท่านั้น ทั้งนี้เพื่อให้เกิดประโยชน์ต่อการปรับปรุงบริการพยาบาลที่ให้แก่มารดาและทารกต่อไป

คำชี้แจง โปรดอ่านข้อความแต่ละข้อความอย่างรอบคอบ แล้วทำเครื่องหมาย ในช่องที่ตรงกับความรู้สึก และความคิดเห็นของท่านให้มากที่สุด ในแต่ละข้อจะมีคำตอบเพียงคำตอบเดียว กรุณาตอบทุกข้อ การเลือกตอบคือเกณฑ์ดังนี้

หมายเลข 1 หมายถึง ไม่เป็นความจริงเลย คือ เมื่อท่านเห็นว่าข้อความนั้นไม่ตรงกับความรู้สึก ความคิดเห็นของท่านเลย

หมายเลข 2 หมายถึง เป็นความจริงบ้างเล็กน้อย คือ เมื่อท่านเห็นว่าข้อความนั้นพอจะตรงกับความรู้สึก ความคิดเห็นของท่านบ้างเล็กน้อย

ลำดับที่: _____

การเชื่อมต่อครั้งที่: _____
วัน/เดือน/ปี _____

หมายเลข 3 หมายถึง เป็นความจริงเพียงครั้งหนึ่ง คือ เมื่อท่านเห็นว่าข้อความนั้นพอจะตรงกับความรู้สึก ความคิดเห็นของท่านเพียงครั้งหนึ่ง

หมายเลข 4 หมายถึง เป็นความจริงเป็นส่วนมาก คือ เมื่อท่านเห็นว่าข้อความนั้นพอจะตรงกับความรู้สึก ความคิดเห็นของท่านเป็นส่วนมาก

หมายเลข 5 หมายถึง เป็นความจริงมากที่สุด คือ เมื่อท่านเห็นว่าข้อความนั้นพอจะตรงกับความรู้สึก ความคิดเห็นของท่านมากที่สุด

ตัวอย่าง

	ไม่เป็นความจริงเลย	เป็นความจริงบ้างเล็กน้อย	เป็นความจริงเพียงครั้งหนึ่ง	เป็นความจริงเป็นส่วนมาก	เป็นความจริงมากที่สุด
	(1)	(2)	(3)	(4)	(5)
(0) ฉันรักลูกมาก			✓		

ลำดับที่: _____

การเยี่ยมครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย	เป็นความจริงบ้างเล็กน้อย	เป็นความจริงเพียงครั้งหนึ่ง	เป็นความจริงเป็นส่วนมาก	เป็นความจริงมากที่สุด
	(1)	(2)	(3)	(4)	(5)
1. ฉันรู้สึกว่าคุณของฉันหน้าตาน่ารัก					
2. ฉันรู้สึกว่าคุณมีส่วนคล้ายฉันหรือพ่อของเขา					
3. ฉันอยากมองหน้าตาหรือร่างกายลูก					
4. ถ้าเอาเด็กอ่อนหลายๆคนมาอยู่รวมกัน ฉันบอกได้ว่าเด็กคนไหนเป็นลูกของฉัน					
5. ฉัน ได้พยายามสำรวจหน้าตาและร่างกายของลูก					

ลำดับที่: _____

การเขียนครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย (1)	เป็นความจริงบ้างเล็กน้อย (2)	เป็นความจริงเพียงครั้งหนึ่ง (3)	เป็นความจริงเป็นส่วนมาก (4)	เป็นความจริงมากที่สุด (5)
เท่าที่จะทำได้					
6. ลูกคงจะขาดความอบอุ่นทางใจ เพราะไม่ได้นอน กับฉัน					
7. ฉันอยากให้ลูกลืมนานๆ					
8. ฉันรู้สึกรักลูกตลอดเวลา					
9. ฉันต้องการอยู่ใกล้ชิดกับลูก					
10. หลังคลอดฉันต้องการเลี้ยงลูกเอง					
11. ฉันเป็นห่วงลูกมาก					

ลำดับที่: _____

การเขียนครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย	เป็นความจริงบ้างเล็กน้อย	เป็นความจริงเพียงครั้งหนึ่ง	เป็นความจริงเป็นส่วนมาก	เป็นความจริงมากที่สุด
	(1)	(2)	(3)	(4)	(5)
12.ฉันรู้สึกว่ารักลูกไม่ว่าลูกจะมีรูปร่างหน้าตาอย่างไร					
13.ลูกของฉันก็ดูเหมือนเด็กอ่อนตัวๆ ไป					
14.ฉันกำลังเตรียมตั้งชื่อให้ลูก					
15.ไม่ว่าลูกจะเป็นผู้หญิงหรือผู้ชาย ฉันก็รักลูกฉัน					
16.การคลอดลูกทำให้ฉันรู้สึก เหมือนสูญเสียอวัยวะบางส่วนในร่างกายไป					
17.ฉันมีความรู้สึกว่าฉันเป็นแม่อย่างสมบูรณ์					

ลำดับที่: _____

การเยี่ยมชมครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย (1)	เป็นความจริงบ้างเล็กน้อย (2)	เป็นความจริงเพียงครั้งหนึ่ง (3)	เป็นความจริงเป็นส่วนมาก (4)	เป็นความจริงมากที่สุด (5)
18. ลูกเป็นสิ่งที่สำคัญที่สุดในชีวิตฉัน					
19. ฉันไม่มั่นใจว่าจะเลี้ยงลูกได้					
20. ฉันคงทำหน้าที่แม่ที่ดีไม่ได้					
21. ฉันต้องการศึกษาเกี่ยวกับวิธีการดูแลลูก					
22. ฉันคิดจะเตรียมของใช้ สำหรับทารกให้พร้อม ก่อนลูกจะกลับบ้าน					
23. ฉันคิดว่าลูกอาจมีความผิดปกติที่แพทย์ยังตรวจไม่พบ					

ลำดับที่: _____

การเขียนครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย	เป็นความจริงบ้างเล็กน้อย	เป็นความจริงเพียงครั้งหนึ่ง	เป็นความจริงเป็นส่วนมาก	เป็นความจริงมากที่สุด
	(1)	(2)	(3)	(4)	(5)
24. ถ้าฉันได้รับการสอนจากพยาบาล ฉันคงอาบน้ำให้ลูกได้					
25. ฉันคิดจะเลี้ยงลูกด้วยนมแม่โดยเร็วที่สุด					
26. ฉันต้องการพักผ่อนหลังคลอดให้นานที่สุดก่อนให้ลูกดูดนม					
27. ฉันต้องการที่จะให้ลูกดูดนมตนเองนานกว่า 3 เดือน					
28. ฉันอยากอุ้มลูก					

ลำดับที่: _____

การเขียนครั้งที่: _____
วัน/เดือน/ปี _____

	ไม่เป็นความจริงเลย	เป็นความจริงบ้างเล็กน้อย	เป็นความจริงเพียงครึ่งหนึ่ง	เป็นความจริงเป็นส่วนมาก	เป็นความจริงมากที่สุด
	(1)	(2)	(3)	(4)	(5)
29.ฉันอยากจะทำออกดู					
30.การอุ้มลูกและโกนศีรษะลูก เป็นสิ่งที่สำคัญมากสำหรับฉัน					
31.ฉันพอใจที่จะมองดูลูกห่างๆมากกว่าเข้าไปอุ้มลูก					

ขอขอบคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

Appendix 7: Bonding Observation Check List

English

Bonding Observation Check List

Directions: This checklist consists of 14 behaviour regarding maternal affectionate behaviours toward Preterm infant. As accurately as possible, please make marks every 1 minute that the mother's behaviours occur during a 10 minute interval and record for 1 minute for each time. This checklist will be completed by the researcher while the mother is breastfeeding once on day 1, week 4, 12 and 24 post birth in the hospital and in their home

Bonding Observation Check List

Behaviors	Minutes									
	1	2	3	4	5	6	7	8	9	10
1. En Face										
2. Gazing										
3. Talking to baby										
4. Kissing										
5. Smiling										
6. Holding the baby close to chest										
7. Caressing										
8. Touching baby with fingertips										
9. Touching baby with whole hand										
10. Touching baby's fingertips and/or toes										
11. Touching baby's legs, trunk, body, etc.										
12. Mother just holding baby										
13. Cleans baby										
14. Straightens baby										

Note. An “en face” position = the mother and infant’s faces are on the same vertical plane with mother looking at the infant’s eye.

Following Breastfeeding

Duration of Breastfeeding	Yes	No	Hospital	Home
1 day				
4 weeks				
12 weeks				
24 weeks				

Following mother's work

Mother returns to work	Yes	No
1 day		
4 weeks		
12 weeks		
24 weeks		

Thai

ลำดับที่: _____

การเยี่ยมชมครั้งที่: _____

วัน/เดือน/ปี: _____

แบบสังเกตพฤติกรรมมารดาที่มีต่อบุตร

คำชี้แจง แบบสังเกตพฤติกรรมมารดาที่มีต่อบุตรชุดนี้ ประกอบด้วย 14 พฤติกรรมมารดาที่มีต่อบุตร

โปรดกรูณาทำเครื่องหมายถูก ลงในช่องว่าง เมื่อท่านสังเกตว่ามารดาแสดงพฤติกรรมเหล่านี้ต่อบุตรในขณะที่ให้นมบุตรและจดบันทึกทุก 1 นาที นักวิจัยจะใช้แบบสังเกตพฤติกรรมของมารดาที่มีต่อบุตร ในวันแรกหลังคลอด, สัปดาห์ที่ 4, สัปดาห์ที่ 12 และ สัปดาห์ที่ 24 ที่โรงพยาบาลและที่บ้าน

ลำดับที่: _____

การเยี่ยมชมครั้งที่: _____

วัน/เดือน/ปี: _____

แบบสังเกตพฤติกรรมมารดาที่มีต่อบุตร

พฤติกรรมมารดา	นาทีที่									
	1	2	3	4	5	6	7	8	9	10
1. โบกหน้ามารดาอยู่ในท่าที่สามารถมองทารกได้										
2. การเพ่งมองข้องูหน้าทารก										
3. การพูดคุยกับทารก										
4. การอุบทารก										
5. การอิมกับทารก										
6. การอุ้มทารกแนบชิดกับอก										
7. การกอดรัดอุ้มทารกด้วยความรักทนุถนอม										
8. การสัมผัสทารกด้วยปลายนิ้วมือ										
9. การสัมผัสทารกด้วยฝ่ามือ										
10. การสัมผัสปลายนิ้วมือและ/หรือปลายนิ้วเท้าทารก										
11. การสัมผัสขา ลำตัว และส่วนอื่นๆของร่างกายทารก										
12. มารดาเพียงแต่อุ้มทารก										
13. การทำความสะอืดทารก										
14. การจับทารกเหยียดแขนเหยียดขาให้ตรง										

ลำดับที่: _____

การเยี่ยมชมครั้งที่: _____

วัน/เดือน/ปี: _____

การติดตามมารดาในการให้นมบุตร

ระยะเวลาในการให้นมบุตร	ใช่	ไม่ใช่	โรงพยาบาล	บ้าน
1 วัน				
4 สัปดาห์				
12 สัปดาห์				
24 สัปดาห์				

การติดตามการทำงานของมารดา

มารดาต้องกลับไปทำงาน	ใช่	ไม่ใช่
1 วัน		
4 สัปดาห์		
12 สัปดาห์		
24 สัปดาห์		

ขอขอบคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

Appendix 8: Kangaroo Care Protocol

The suggested 18-item Kangaroo Care protocol is outlined below exactly as it was used in this study, and in the form in which it will be presented and recommended to the administrators of Maharat Hospital:

1. Postpone Kangaroo Care if the mother is sick with a cold, fever, flu, cough or diarrhoea. Providers of Kangaroo Care must have clean, dry skin without odorous perfumes, colognes, oils, lotions, etc. No rashes, lesions or open areas of skin should be present in case these may come in contact with the participants during Kangaroo Care.
2. The mother must wear clean clothing with front access, such as a front buttoning shirt or dress, or a hospital gown/robe with the opening at the front.
3. The room temperature should be at about 25°C (77°F). It is important to avoid blowing air which can potentially cool the mother and infant, but on the other hand the mother and infant should not feel hot and uncomfortable. A fan or air-conditioner should be used if necessary.
4. The mother should empty her bladder before starting Kangaroo Care and whenever needed during Kangaroo Care.
5. To maximise skin-to-skin contact with the mother, the infant should be prepared by folding the diaper down to expose as much of the abdomen as possible. To ensure heat is not lost from the infant, a cap, booties or blanket may be needed over the infant's back.
6. To ensure privacy for the mother and infant, screens or curtains should be used.
7. Instruct and help the mother to put the infant against her naked chest and to place the palm of her hand on her infant's body.
8. Let the mother know that the researcher in this study or the nurses will be available to her at all times during Kangaroo Care. Inform the mother that at any time she can tell the researcher or the nurses if she feels uncomfortable or if she thinks the infant is uncomfortable, and that the infant will then be returned to his/her crib or incubator.
9. The mother should sit on a comfortable chair which has good padding at the back and the seat. Extra pillows may be needed to provide enough padding for lower back support. The chair also should have wide armrests and a footrest, or a stool to elevate the legs.

10. When resting in a bed the mother should be in a semi-upright position, supported by two or three pillows. Make sure that the infant is in an upright position to facilitate his/her breathing.
11. Teach the mother to stand for 2 to 3 minutes for every 60 to 90 minutes she sits in order to prevent blood clots in her legs and to keep her legs elevated while she is sitting.
12. Teach the mother that readjusting the infant's position will not awaken him/her if he/she is in a deep sleep, and not to be afraid to talk to others or to move around and change position once the infant has been placed in position. The mother should carefully support the infant's head against her chest with her open palm to prevent the head from flopping forward and backward.
13. Teach the mother to be prepared to feel warm. This is most pronounced when the infant is too cold, especially soon after birth. Be sure to have drinking fluids available while performing Kangaroo Care.
14. Educate the mother that the infant may stretch out an arm or leg from under the blanket during Kangaroo Care. Usually, these behaviours help the infant cool an extremity so he/she does not become too warm. When these behaviours occur, the mother should notice whether the infant is squirming and sweating. The arm or leg should be put back under the blanket if the infant is not too warm. Leave the arm or leg where it is if the infant is too warm, since the researcher or the nurses will check the infant's temperature. If the temperature is 37.4°C (99.4°F) or higher, remove the cap and re-evaluate the temperature within 15 minutes. If the temperature is still 37.4°C or greater, the booties and/or cap can be taken off and a blanket can be placed across the infant's back. If the infant is still too warm, the blanket if folded can be unfolded. In some warm climates, the blanket can be removed and the mother can cover the diapered infant with her hospital gown. Normally, the mother should keep the infant's temperature between 36.8°C (98.2°F) and 37.0°C (98.6°F).
15. Assist the breastfeeding mother by: (a) teaching her to recognise the infant's early feeding cues, for example, rooting, tonguing (outward movement of tongue with mouth open), mouthing (rhythmical movement of oral muscles with mouth closed), sucking (tongue, digit, or hand), hand-to-mouth activities (hand-passing-mouth movement or hand-to-mouth movement), flexion of the arms and legs, fussing, or moving his/her head toward mother's nipple; (b) teaching her to express a few drops of milk as soon as the cues are noticed. This will soften the mother's nipple so that the infant can get the nipple

into his/her mouth more easily; (c) helping the infant to latch on by stabilising his/her head if he/she is on the nipple but allow the infant to still be able to move his/her head from side to side; and (d) teaching her to recognise satiety cues (e.g., lack of facial movement, relaxation of the arms and legs, decreasing sucking, stopping sucking, opening hands, relaxing body, and spontaneous releasing of nipple).

16. Teach the mother to continue Kangaroo Care, sitting slightly reclined (about 60 degrees) for the first 10 to 15 minutes after feeding in order to prevent the infant regurgitating. After that, the mother can recline further and assume any position she wishes.
17. Inform the mother about the length of time she will be able to do Kangaroo Care which is recommended to begin as soon as possible and continue as often as possible for as long as possible each time. In addition, Kangaroo Care duration is recommended for at least 30 minutes, however, it depends on the infant's and the mother's desire. Kangaroo Care can be done for many hours. The mother should learn the signs that the infant wants to be removed from that position for example when the infant puts his or her limbs out, cries and fusses every time the mother tries to put him/her back in the kangaroo position.
18. Terminate Kangaroo Care immediately at mother's request or if infant exhibits sustained desaturations, colour changes, respiratory distress, heart rate instability, unrelenting irritability, or other signs of intolerance noted by mothers or staff (Bell & McGrath 1996).