

CHAPTER 2

Literature Review

This chapter presents the literature related to hospitalized preterm infants, parent involvement in caring for hospitalized preterm infants, parent-infant interaction, and Thai parents' care for hospitalized preterm infants. A theoretical framework of the study is also included in this chapter.

Hospitalized Preterm Infants

This section presents a definition and classification of preterm infants, characteristics of preterm infants, health problems of preterm infants, and effects of hospitalized preterm infants on preterm infants and their parents.

Definition and Classification of Preterm Infants

A preterm infant is defined as an infant born before 37 completed weeks of gestation (ACOG, 2016; WHO, 2015).

The classification of preterm infants can be based on either body weight or gestational age. By body weight, preterm infants can be divided into three groups (Kenner & Ellerbee, 2012) as follows:

1. Low birth weight (LBW) refers to an infant who weighs less than 2,500 grams at birth.
2. Very low birth weight (VLBW) refers to an infant who weighs less than 1,500 grams at birth.
3. Extremely low birth weight (ELBW) refers to an infant who weighs less than 1,000 grams at birth.

The classification of preterm infants by gestation can be divided into three groups (WHO, 2015) as follows:

1. Moderate to late preterm refers to an infant who is born between 32 to less than 37 weeks of gestation.
2. Very preterm refers to an infant who is born between 28 to less than 32 weeks of gestation.
3. Extremely preterm refers to an infant who is born less than 28 weeks of gestation.

In addition, moderate and late preterms can be divided by gestational age. Moderate preterm is defined by birth at 32⁰⁷ through 33⁶⁷ weeks of gestation (Loftin et al., 2010), whereas late preterm is defined by birth at 34⁰⁷ through 36⁶⁷ weeks of gestation (ACOG, 2013).

Characteristics of Preterm Infants

The characteristics of preterm infants are related to gestational age, meaning that the earlier a preterm infant is born, the greater the risks that she/he would develop physical and neuromuscular prematurity. The maturity of a newborn infant is determined by using the New Ballard Score (NBS), which is widely used for estimating the gestational age of newborn baby through physical and neuromuscular characteristics of maturity. The total scores of the NBS range from -10 to 50 and the gestational range is from 20 to 44 weeks. The examination is done at postnatal ages ranging from birth to 96 hours (Ballard et al., 1991; Wheeler, 2013).

These physical characteristics and neuromuscular characteristics are described (Davidson et al., 2012; King, 2008; Zaichkin, 2008) in the following section.

Skin. An extremely preterm infants' skin is sticky, friable, and transparent while it would be smooth pink with visible veins at 28 weeks of gestational age. The skin has superficial peeling and/or rash with few veins at 34 weeks of gestational age and has cracking and pale areas with rare veins at 37 weeks.

Lanugo. A preterm infant has abundant and thick lanugo – very soft and fine hair – over his back; however, this not seen in infants with gestational age of less than 28 weeks. A preterm infant born between 28 and 30 weeks of gestational age has the most lanugo hair and it would be then shed beginning from the face, to the trunk and extremities.

Plantar surface. Plantar creases are deep folds that are present on the sole of the feet. However, the very and extremely preterm infants have invisible foot creases. At approximately 32 weeks of gestational age, one or two creases appear over the pad of the foot. For the late preterm infants, the anterior two-third of the foot is covered by the creases.

Breast tissue. The very preterm infants will not have visible nipples or areola, but they become more defined and then raised by 34 weeks of gestational age, with a small bud appearing at 36 weeks of gestational age.

Eyes and ears. The eyelids of very preterm infants may still be fused and edematous while their eye rolling may be noted with wakefulness and spontaneous eye opening. Ear formation includes the development of cartilage and the curving of pinnae. Lack of cartilage in earlier gestation results in the ear folding easily and retaining this fold. The pinnae are flat in very preterm infants. Incurving begins from the top to down toward the lobes as gestational advances.

Genital. In extremely female preterm infants, the clitoris is initially prominent and the labia majora is very small. By 36 weeks, the labia majora is larger and clitoris is nearly covered. In male infants, the testes are in the inguinal canal around 28 weeks of gestational age, and rugae are beginning to be visible. By 36 weeks, the testes are in the upper scrotum, and rugae cover the anterior portion of the scrotum.

The neuromuscular maturity characteristic of preterm infants includes posture, square window, arm recoil, popliteal angle, scarf sign, and heel to ear.

Posture. A newborn baby lies naturally and quietly on his or her back while a very preterm infant would lie with less arm and leg flexion and she/he would stay in the posture she/he is placed.

Square window. Square window or wrist flexibility results in the infant's palm flexion toward the forearm. A poor angle of flexion is seen in preterm infants' wrists while they make a 90-degree angle with the forearm. Particularly, among extremely preterm infants, they do not have flexor tone and are not able to make even 90-degree flexion.

Arm recoil. Arm recoil is tested by flexion at the elbow and extension of the arms at the newborn's side. Very preterm infants do not resist extension and respond with weak and delayed flexion in a small arc.

Popliteal angle. The popliteal angle is determined with the newborn flat on his back. The preterm infant will achieve greater extension.

Scarf sign. Scarf sign is elicited by moving the baby's arm across his chest as far toward the opposite shoulder as possible while he is lying supine. In preterm infants, their elbow possibly moves across the chest easily with less or no resistance.

Heel to ear. Heel to ear is similar to potential angle, but the knee and thigh are not held in place. The preterm infant's heel can be easily moved toward the ipsilateral ear with little or no resistance.

Health Problems of Preterm Infants

The major health problems among preterm infants stem from the immaturity of all systems and the degrees of immaturity are related to the gestational age. Physiological immaturity of preterm infants causes health problems in various systems and leads preterm infants' hospitalization. Each of these system will be described.

Respiratory system. The respiratory system is in a continuous state of development during fetal life. Alveolar ducts begin to appear approximately at 20 to 24 weeks of gestation, and followed by primitive alveoli at 24 to 28 weeks. During this time, the alveolar epithelial cells begin to differentiate into Type I cells and Type II cells. Type II cells provide the synthesis and storage of surfactant which increases more at 28 to 32 weeks of gestation and peaks at around 35 weeks and remains high until term. Lack of surfactant causes respiratory distress syndrome (RDS) that is mostly

found in extremely preterm infants and rarely found in term infants (Davidson et al., 2012). Another primary respiratory disease of preterm infants is bronchopulmonary dysplasia (BPD), resulting in lung injury, especially in extremely preterm infants. At this gestational age most require mechanical ventilation and supplemental oxygen for treating RDS (Carlo & Ambalavanan, 2016).

Cardiovascular system. In the fetus, the ductus arteriosus shunts blood away from the fluid-filled lungs, which are nonfunctional during gestation, toward the placenta for gas exchange. The ductus arteriosus usually closes soon after birth, if it remains open, a patent ductus arteriosus (PDA) will occur. In preterm infants, the muscular coat of the pulmonary blood vessels is incompletely developed and they have higher susceptibility to hypoxia. Thus, the ductus may remain open, blood flows from the aorta into the pulmonary artery which increases pulmonary blood flow, leading to left ventricular volume overload, pulmonary edema, and congestive failure (Davidson et al., 2012; Kenner & Ellerbee, 2012).

Gastrointestinal system. Preterm infants can have immature gastrointestinal systems as the gastrointestinal tract of the preterm infant has diminished gastric enzymes, decreased gut motility, weakened esophageal sphincter tone, and delayed gastric emptying (King, 2008). Preterm infants are at risk of developing necrotizing enterocolitis (NEC) which is an acute inflammatory disease of the GI mucosa, commonly complicated by bowel necrosis and perforation (Kenner & Ellerbee, 2012). In preterm infants, the capacity for ingestion and digestion of foods are not fully functioning. Although the development of infant sucking and swallowing reflexes are demonstrated before birth, coordination of these mechanism does not manifest until approximately 32-34 weeks of gestation, and both reflexes do not coordinate well until 36 to 37 weeks, resulting in easy aspiration in these infants (Askin, 2009). Preterm infants at 34 weeks of gestation or more can often be fed by bottle or at the breast. Direct breastfeeding is less likely to succeed in very preterm infants until they mature because the effort required for sucking is usually limiting factor (Carlo, 2016). However, small preterm babies are able to breastfeed if they have adequate sucking swallowing reflexes and there are no other contraindication in such respiratory complications or concurrent illness (Fraser, 2013).

Neurologic and sensory systems. Preterm infants are prone to neurologic and sensory problems such as retinopathy of prematurity (ROP), hypothermia, and intraventricular hemorrhage (IVH). Preterm infants are susceptible to injury of the delicate capillaries of the retina, causing characteristic retinal changes known as ROP (Davidson et al., 2012). Usually, at approximately 16 weeks of gestation, the retinal vessels of the fetuses begin to form and continually develop until 42 to 43 weeks. If the retina is completely vascularized, the retina vessels are not vulnerable to develop ROP (Kenner & Ellerbee, 2012). Preterm infants are prone to hypothermia because they have large body surface area in proportion to their body weight with minimal insulating subcutaneous fat, limited brown fat and glycogen stores, fragile capillaries, decreased or absent reflex control of skin capillaries and an immature thermoregulation center in the brain (Davidson et al., 2012; Kenner & Ellerbee, 2012). In addition, intraventricular hemorrhage (IVH) is the most common type of intracranial hemorrhage in small preterm infants, especially those weighing less than 1,500 grams or having less than 34 weeks of gestation. The most common site of hemorrhage is the periventricular subependymal germinal matrix in the lateral ventricles of the brain, where there is a rich blood supply and the capillary walls are thin and fragile (Davidson et al., 2012).

Renal system. An infant who is born at 34 to 36 weeks of gestation will have the full complement of functioning nephrons whereas a preterm infant's kidney is immature which poses a clinical problem in the management of fluid and electrolyte balance. The glomerular filtration rate (GFR) of preterm infant is lower due to lower gestational age. The preterm infant's kidneys have a limited ability to concentrate urine or to excrete excess amounts of fluid (Davidson et al., 2012).

Immune system. Preterm infants are at higher risk of infection, especially those born before 32 to 33 weeks of gestation (Zaichkin, 2008) because they have a shortage of stored maternal immunoglobulins and impaired ability to produce antibodies (Kenner & Ellerbee, 2012). Normally, during the last trimester of pregnancy, the fetus receives immunoglobulin G (IgG) from their mothers by crossing the placenta (Murray & McKinney, 2010).

Therefore, most preterm infants were admitted in the hospital due to their physiological immaturity.

The Effects of Hospitalized Preterm Infants on Preterm Infants and Parents

The earlier the preterm infant is born, the greater the likelihood that they will have a long hospitalization due to their immaturity. Most preterm infants are not ready to go home until around the time of their mother's due date. As a result, the hospitalization has effects for both preterm infants and their parents.

Effects of hospitalized preterm infants on preterm infants. After birth, preterm infants are separated from their mothers and exposed to a variety of stimuli in neonatal care unit which would have effects on themselves. These effects can be divided into physical aspects and psychological aspects.

Physical aspects. These include impaired brain development, negative physiologic responses, risks of hearing loss, speech and language problems and disrupted sleep and wake states. Each of these aspects will be described in the following section.

Impaired brain development. Preterm infants are fetuses whose growth is continuing outside the uterus while their brains are growing rapidly. During fetal development, the fetal brain weighs about 100 grams on average by the end of second trimester and it triples to approximately 300 grams at full term (Als & Butler, 2011; Patoine, 2010). Meanwhile, the brain and sensory systems of preterm infants can be affected by the physical environments in the neonatal unit as the infant responds to a variety of stimuli such as light, noise from monitoring equipment, and daily activities (Brown, 2009). Moreover, when immature sensory systems are stimulated by such inappropriate stimuli as environmental and medical procedures (e.g., multiple heel sticks, venipuncture, suction, arterial sticks and lumbar puncture), the sensory interference occurs (Altimier, 2007). Several studies have found that the exposure to a various number of stressors and neonatal procedural pain reduced the preterm infants' brain development (Brummelte et al., 2012; Smith et al., 2011; Vinall et al., 2014).

Negative physiologic responses. Preterm infants in the neonatal unit are often exposed to the high level of noise from various machine alarms and continuous noise levels of 45 to 85 decibels (db) are common in the neonatal care unit. The incubator

alone produces a constant noise level of approximately 60 to 80 db (Kenner & Ellerbee, 2012; Wachman & Lahav, 2011). The sound of an IV pump alarm is approximately 60 to 78 db and the pulse oximeter alarm is approximately 86 db (Altimier, 2007). The longer an infant's stay in the neonatal care unit, more they are exposed to moderate level sounds; exposure to sounds of 90 db continuously or frequent exposure to sounds above 110 db frequently can damage infants' hearing (Kenner & Ellerbee, 2012). Preterm infants receiving excessive noises for a long period are also at increased risk of hearing loss and speech and language problems (Brown, 2009). The negative physiologic responses such as apnea and fluctuations in heart rate, increased blood pressure and respiratory rate, and decreased oxygen saturation are created by excessive auditory stimulation (Brown, 2009; Wachman & Lahav, 2011).

Disrupted sleep and wake states. Most neonatal care units turn the light on all day long, so the exposure of preterm infants to continuous bright light can disrupt their sleep and wake states (Fraser, 2013), while turning on the cycled lighting helps infants at 28 weeks or older to entrain to a circadian cycle (Rizzo, Rea, & White, 2010). Several studies demonstrated that the exposure to many stimuli in the neonatal care unit interfered their sleep pattern (Bertelle, Sevestre, Laou-Hap, Nagahapitiye, & Sizun, 2007; Calciolari & Montiroso, 2011; Varvara, Effrossine, Despoina, Konstantinos, & Matziou, 2016).

Psychological aspects. The effects of hospitalization on preterm infants in terms of psychological aspects includes delayed attachment between parent and preterm infant, and preterm infant stress. Each of these aspects will be described.

Delayed attachment between parents and preterm infants. Attachment is an intense and affectionate connection developed between infants and their parents which makes infants feel safe and protected (Ainsworth, 1979; Mooney, 2010). Parent-infant bonding forms before birth and continues after birth (Klaus et al., 2013). However, prematurity and separation of the mother and baby at birth can affect the attachment process and delayed attachment may occur because the infant is not able to play his or her part in the establishment of attachment (Bialoskurski, Cox, & Hayes, 1999). To establish early attachment and bonding requires physical contact (Kenner & Ellerbee, 2012). The effects of less bonding were varied as these infants were more colicky and

disliked cuddling while mothers found them difficult to please (Mooney, 2010). Encouraging early mother-infant contact and rooming-in after birth can promote parent-infant bonding which increase the length and success of breastfeeding, and decrease failure to thrive, abuse, neglect, and abandonment of infants (Kennell & Klaus, 1998).

Preterm infant stress. Preterm infants respond to a great variety of stimuli, and the environment while the activities of the neonatal unit, including invasive procedures, pain, interruption of sleep states, temperature and noise, can cause preterm infants stress and challenge their underdeveloped coping mechanisms. Preterm infants are biologically deficient in their capacity to cope with or adapt to environmental stresses such as light and noise (Fraser, 2013; Maroney, 2003).

Effects of hospitalized preterm infants on parents. Preterm birth is an unexpected situation and stressful experience for parents as they are emotionally unprepared. They are faced with multiple crisis and overwhelming feelings of responsibility, helplessness, and frustration (Fraser, 2013). When preterm infants are hospitalized, it can have an effect on their parents in term of physical aspects, psychological aspects, spousal relationships and financial constraint.

Physical aspects. Hospitalization of preterm infants can effect parent physically. Several studies found that while parents of hospitalized preterm infants had emotional distress such as depressive symptom and stress, they also experienced sleep disturbance and fatigue (Busse, Stromgren, Thorngate, & Thomas, 2013; Lee & Kimble, 2009; Shelton, Meaney-Delman, Hunter, & Lee, 2014). Parents with a greater sleep disturbance would have more fatigue (Lee & Kimble, 2009). Anxiety, powerlessness and uncertainty about the infants' condition also had a negative influence on the sleep in the parents of preterm infant and sick infants (Edéll-Gustafsson, Angelhoff, Johnsson, Karlsson, & Mörelius, 2015).

Psychological aspects. Hospitalization of preterm infants causes psychological distress as most parents worry about their infants' condition and feel the loss of parental role (Murray & McKinney, 2010). Studies have found that most parents report psychological distress such as stress, anxiety and depression (Klaus et al., 2011; Gambina et al., 2011). Several studies found that stress of parents with preterm birth is

associated with infants' smaller gestational age, infant's appearance, infant's illness, length of infant's hospital stay, the environment in the neonatal care unit, and parental role alterations (Baía et al., 2016; Blanch D'Souza, Karkada, Lewis, Mayya, & Guddattu, 2009; Dudek-Shriber, 2004; Franck, Cox, Allen, & Winter, 2005; Tandberg, Sandtro, Vardal, & Ronnestad, 2013). Brandon et al. (2011) found that anxiety, depressive symptoms, posttraumatic stress, and worry symptoms in mothers of late preterm infants are increased by the separation from the infants, severity of infant's condition, and lack of preparation for preterm birth. Hollywood and Hollywood (2011) found that the fathers of hospitalized preterm infants suffered from anxiety, feeling of helplessness and fear of the unknown.

Spousal relationships. Hospitalization of newborn infants challenges not only the mothers and fathers individually, but also their spousal relationships. Parent relationship strain may predict parental stress and the lack of the father's involvement in direct care (Manning, 2012). Hospitalization of newborn infants may result in parental anxiety, depression, and fear. If parents cannot process these issues in timely and effective ways, psychological problems of parents may influence family harmony and stability (Kong et al., 2013). Prolonged hospitalization of preterm infants causes exhaustion, emotional strain and financial hardship for the parents. These often cause strain in the relationship between father and mother. After preterm birth, the stressed couples may be more likely to separated or divorce (Fowlie & McHaffie, 2004). However, some couples have developed a stronger relationship while undergoing strain as they dealt with their infant's situation together as a couple (Lindberg, Axelsson, & Ohrling, 2008).

Financial constraints. As advanced medical technology has increased the survival rate of preterm infants and cost of care provided to these infants, families may experience financial constraints related to extended hospitalization. Preterm infants with more severe illness require more intensive care and longer stays in the neonatal care, so the costs of their care are high. The average cost of care is estimated to be inversely related to birth weight and gestational age (Hodek et al., 2011; Tongo, Orimadegun, Ajayi, & Akinyinka, 2009). During the hospitalization, hospital service costs will increase as a consequence of the improved survival chances of the smallest infants and the use of medical technology (Kenner & Ellerbee, 2012; Petrou, 2003; Petrou & Khan,

2012). Mean hospital costs for preterm infants whose weight was less than 2500 grams and had specific complications including RDS, BPD, IVH, and NEC, were four to seven times higher than those for infants without these complications (Russell et al., 2007).

Although parents of hospitalization have the health care services of their countries or they have private health insurance, coverage is primarily focused on the medical out-of-pocket expenses. Nonmedical out-of-pocket expenses may not be covered by insurance and must be paid by the family, especially after the mother's discharge from the hospital to return home. Most parents and families must bear nonmedical out-of-pocket expenses for such items as travel, cost of meals, accommodation, and cost of childcare for siblings (DiFazio & Vessey, 2011; Hodek et al., 2011). In Thailand, universal health care is provided through three programs: the Civil Servant Medical Benefit Scheme (CSMBS) for government employees; the Compulsory Social Security Scheme (SSS) for private employees or temporary public employees; and the Universal Coverage Scheme (UCS) for Thai citizens not covered under the CSMBS or SSS (Jurjus, 2013). All these three programs cover the cost of giving birth. Thai mothers covered under the UCS are not required to pay for a normal delivery. However, if mothers have a medical condition or require a caesarean section or special medical treatment, the extra costs are covered by the UCS. Thai mothers covered under the SSS, the Social Security office are supported for medical service costs at the rate of 13,000 baht per childbirth. The UCS and SSS also support the cost of childbirth delivery with unlimited numbers of delivery (National Health Security Office, 2016; Social Security office, 2015). However, only medical out-of-pocket expenses are supported by CSMBS, SSS and UCS, except nonmedical out-of-pocket expenses.

Thus, it can be concluded that physiological immaturity and the associated hospitalization of preterm infants helps to save babies' lives, however, the hospitalization of preterm infants has important consequences for both preterm infants and their parents. Due to these situations, healthcare providers, especially nurses who mostly contacted with preterm babies and parents should support parents and preterm infants when preterm infants were admitted in the hospital in order to reduce negative effect of hospitalization.

Parent Involvement in Caring for Hospitalized Preterm Infants

This section addresses parent involvement, factors related to parent involvement in caring for hospitalized preterm infants, consequences of parent involvement, and intervention studies related to parent involvement in caring for hospitalized preterm infants.

Definition of Parent Involvement

Within the literature on parent involvement, a variety of terms have been used in relation to parental involvement such as care-by-parent, partnership in care, involvement in care, mutual participation, parent participation, and family-centered care (Coyne, 1996; Hutchfield, 1999; Power & Franck, 2008). Coyne (1996) described the evolution of parent participation that the terminology changing from “parental involvement” to “partnership in care”, to “care-by-parent” and finally to “family-centered care.”

Most literature used the terms parental involvement and parent participation as synonymous and interchangeable terms, and used a variety of definitions for parent participation as a parent staying near and being involved in decision-making related to their child’s care, to negotiation of care within a partnership and involvement of the whole family as a unit of care (Coyne, 1996); parents are close to their child, involved in decision-making and able to comfort and reassure their child (Kristensson-Hallstrom, 1999); parents or guardians perform caregiving activities, share or take part in the care for their child across the entire hospital episode; parents perform physical, psychological or social activities in order to improve health and/or psychological well-being of their child, with or without collaboration or negotiation with healthcare professionals (Power & Franck, 2008). Similarly, Neill (1996) found that parents understood their involvement as being there for their child, being able to carry out varying degrees of the child’s basic care and being informed about all aspects of their child’s care. Ygge (2004) defined parent involvement as the performance of routine physical care, and the practical functions of parents in care.

However, some scholars viewed the words “parent participation” and “parent involvement” as different. They used the terms “involvement” and “participation” to differentiate between the types of relationships and roles between parents and nurses. Nethercott (1993) described parent involvement as enabling parents to be with the child at all times, being involved in basic care activities, and extending their decision-making abilities, but the nursing staff still controlled the level of family involvement, while parent participation included the features of parental involvement, but the parents acted as partners in care. Hutchfield (1999) described parent involvement as nurses remaining the experts and directing the family involvement, or nurse-led, where parent participation was a partnership based on “equality and mutual respect,” where parents are viewed as “equal partners” in the care. Cahill (1996) described involvement as the precursor to participation.

A few studies specified different types of parent participation. Stull and Deatricks (1986) divided parental involvement activities into three groups: (1) direct involvement activities such as routine physical care and comforting, (2) indirect involvement activities such as conferences with staff, and (3) refueling activities such as spending time with other parents. Schepp (1995) identified the four components of parent participation, consisting of (1) participation in routine care (e.g., feeding, bathing, changing the child’s outfit and staying with their hospitalized child), (2) participation in technical care (e.g., checking vital signs; taking temperature, going with the child for special tests such as x-ray, and staying with the child during technical procedures), (3) participation in sharing information about their child’s condition or treatment, and (4) participation in decision-making about their child’s care (e.g., having the opportunity to make or have input into situations requiring a decision).

A review of Western literature on parent involvement in caring for hospitalized preterm infants found that parents involved in basic care such as feeding milk (Bjork et al., 2012; Stevens, Gazza, & Pickler, 2014), touching, holding, talking, cleaning (Franck & Spencer, 2003; Malakouti et al., 2013); medical care including dressing, positioning, and suctioning (Bruns & McCollum, 2002); kangaroo care (Blomqvist & Nyqvist, 2011; Leonard & Mayers, 2008); and comfort care (Skene, Franck, Curtis, & Gerrish, 2012). Moreover, parents also involved in information-sharing between parents

and healthcare professionals and/or decision-making about the preterm infant care (Bruns & McCollum, 2002; Hollywood & Hollywood, 2011; Skene et al., 2012).

In the Thai context, parents of hospitalized preterm infants engaged in caregiving activities such as touching, holding, feeding, cleaning, diapering and comforting (Pathom-aree, 2008), massaging (Chomklien & Jerapaet, 2008; Wongjarupan et al., 2007), and kangaroo care (Kruanate, Thaunnadee, & Chanthapreeda, 2006; Sangsawang et al., 2010). They also involved in information-sharing between parents and healthcare professionals, going with infants for special tests, staying with infants during technical procedures, and decision-making on infant care (Hinsilp, 2006; Pathom-aree, 2008; Tepmalapunsiri et al., 2011).

Therefore, it can be concluded that parent involvement includes the direct and indirect caregiving activities of parents who provide care for their preterm infants during the period of hospitalization.

Factors Related to Parent Involvement in Care for Hospitalized Preterm Infant

The review of literature reveals five factors related to parent involvement in caring for hospitalized preterm infants, including infant factors, parental factors, healthcare provider factors, environmental conditions and hospital policy. Details of each factor are described in the following section.

Infant factors. During visiting time, parents may wish to touch or provide care for their infants; their ability to do so is conditioned by infants' size and their physical appearance, and the infants' condition.

Infants' size and physical appearance. The unique appearance of the preterm infants may not conform to expectations associated with a full-term or healthy infants. Most parents reported that parent-infant interactions were adversely affected by their infant's size and appearance, so they were hesitant to touch their preterm infants (Fraser, 2013). Parents did not understand their infants' behaviors and therefore did not know how to interact with them. The infants' behaviors emerged as barriers to parenting, inhibiting parents from interacting with their infants (Lee et al., 2009). In addition, preterm infants looked so small and fragile, so the mothers did not see the

infants as their babies, especially at first visit; they felt a sense of alienation towards their babies (Malakouti et al., 2013).

Infant's condition. Parental interaction with their preterm infants depends on the infants' condition (Fraser, 2013). Hollywood and Hollywood (2011) demonstrated that the fathers of hospitalized preterm infants felt helpless because their preterm infants were in the glass incubator and they were really unable to do anything for their preterm infants, not even to touch their preterm infants. Moreover, the fathers indicated that they were so afraid of the medical equipment that it took them a long time to be able to participate in their infants' care. Similarly, Lee et al. (2009) found that mothers of preterm infants did not hold their baby until the conditions of the infants were very stable, because only then did they feel that it was safe for their infants. When infants became more stable medically, parents said that they were comfortable and became more actively involved in providing care for their babies (Heermann, Wilson, & Wilhelm, 2005).

Parental factors. Parental factors include parental knowledge and skills in caring for their child, parental stress and coping, and family support.

Parental knowledge and skills. Parents who have previous parenting experience may feel confident in their ability to care for their infant (Baker & McGrath, 2009), while parents who have had no experience have difficulty participating with their premature infants's care, with one of the greatest challenges being a lack of knowledge because they did not know what to do and how to do it (Lee et al., 2009). Heermann et al. (2005) found that parents engaged in caregiving activities along a continuum from passive to active, such as watching, touching, holding, feeding, bathing, positioning, and changing diapers. Parents' development toward engaged parenting is influenced by their prior experience. Parental preparation is related to their involvement. Pholanun et al. (2013) studied maternal participation in caring for preterm infants in the NICU and related factors. The findings found that maternal participation was positively related to maternal preparation in caring for their preterm infants.

Parental stress and coping. The birth of a premature infant is an unexpected situation and causes parental stress. Parents of hospitalized preterm infants had a high

level of stress related to parental role alteration (Blanch D'Souza et al., 2009). Parents were stressed by the unfamiliar hospital environment (Hall, 2005) and overwhelmed by the medical equipment (Blomqvist & Nyqvist, 2011; Fraser, 2013). Stress can interfere with the ability to focus, learn and adjust the behavior that is needed in order to achieve the desired outcome in caring for the infant. The first weeks after birth are particularly stressful for parents who have never seen a premature infant before, and have difficulty in becoming attached to their infants (Jackson, Ternstedt, & Schollin, 2003). As parents deal with stress, they will use coping strategies to reduce their stress which are related to their involvement in caring for their child. LaMontagne, Hepworth, Pawlak, and Chiafery (1992) demonstrated that parents who used problem-focused coping (e.g., seeking information and seeking social support) tended to be more involved in caring for their child than those who used emotion-focused coping (e.g., avoidance and distancing). Additionally, negative emotions of parents and experiences associated with prematurity or infant illness have led parents to have less contact their infants or leave from the units (Arockiasamy et al., 2008; Flacking, Ewald, Nyqvist, & Starrin, 2006; Malakouti et al., 2013). Therefore, they pass the infant care to the staff.

Support from family. During the babies' hospitalization, most mothers were given support by family members such as husbands, sisters, brothers, and their parents, and this support gave mothers strength and continue with what they had to do (Fernandes & Silva, 2015). Arzani, Valizadeh, Zamanzadeh, and Mohammadi (2015) found that mothers of hospitalized preterm babies needed help and support from spouse and their family. A study found that spousal support was an important factor in promoting or deterring mothers' participation in the care of their baby (Rungamornrat et al., 2012).

Healthcare provider factors. These factors include communication and support from healthcare providers, and healthcare providers' knowledge and skills.

Communication and support. The attitude and behavior of the healthcare providers (e.g., encouraging and inviting parents to participate in the care) affect the parents' conditions in caring for their hospitalized babies (Wigert, Hellstrom, & Berg, 2008). Heermann et al. (2005) and Leonard and Mayers (2008) found that the movement from passive to active caregiving of parents, could be influenced by the

nurses' actions as nurses played an essential role of supporter in helping and coaching parents to learn to provide care for their preterm infants (Kenner & Ellerbee, 2012; Lee et al., 2009). On the other hand, inadequate support from nursing staff and lack of communication act as barriers to effective parenting (Lee et al., 2009). Fenwick, Barclay, and Schmied (2008) found that the relationship between the mother and nurses affected the interactions between mothers and their infants, acting either as a barrier or a facilitator of these actions. Mothers' perceived level of success at achieving intimate knowledge of their infants, confidence, and competence is mediated by the interaction of the nursery staff. Some parents want to provide care but wait for the nurses to invite them to perform caregiving activities (Heermann et al., 2005; Leonard & Mayers, 2008; Wigert et al., 2008).

Knowledge and skills. Healthcare professionals' knowledge and skills in caring for hospitalized infants are related to parent participation. Parents learn about care for their hospitalized preterm infants from healthcare professionals, especially nurses. Nurses are mentioned as key professionals in training the parents (Martínez, Fonseca, & Scochi, 2007). Healthcare professionals need to be sufficiently skilled and experienced so that they can adequately support, teach and empower parents to participate in hospitalized child care (Higman & Shaw, 2008).

Environmental conditions. When parents visited their babies, they may feel overwhelmed with the environment in the neonatal care unit such as medical devices and staff activities. If the physical environment affects parents sufficiently, they may not provide the care for their infants like they desire to (Jackson et al., 2003). Malakouti et al. (2013) found that mothers of hospitalized preterm babies had a sense of alienation towards the neonatal care environment. This is because mothers believed that an incubator indicated a worsening condition of their babies. Watching this scene, mothers sometimes cried and left the neonatal unit.

Hospital policy. Hospital policy affects parent involvement in caring for their infants. Some hospitals have adopted family-centered care (FCC) as a philosophy of care for neonatal nursing that embraces a partnership between staff and families. Nursing staff must be able to recognize parents' needs and parents must be actively involved in care (Cockcroft, 2012; Harrison, 2010). Most hospitals now have open

visiting policies so that parents and siblings can visit their infants as often as they wish (Fraser, 2013). However, some hospitals still restrict visiting, with the parents being able to see their infants for only 30 minutes twice a day and requiring further permission for any extra access time (Lee et al., 2009).

In conclusion, it is generally accepted that parent involvement in caring for their hospitalized infants is beneficial to hospitalized infant and their parents. Meanwhile, the aforementioned parent involvement in the care for their baby is influenced by many factors which could either facilitate or hinder their involvement.

Consequences of Parent Involvement

When preterm infants are admitted to the hospital and their parents are involved in caring for their babies, there are both positive and negative consequences of this situation.

Parent involvement in caring for their infants can establish attachment between parents and preterm infants (Fernandes & Silva, 2015; Lee et al., 2009; Leonard & Mayers, 2008). Klaus et al. (2013) indicated that attachment of parent and infant began during pregnancy and continued after birth. Physical closeness is important to establishing early attachment. Infants who are separated from their parents for some time after birth may be at a greater risk of parental abuse and negligence (Kenner & Ellerbee, 2012). In addition, physical contact between parents and preterm infants can promote infants' sense of trust as they learn the feeling, sound, and smell of their parents, and learn to trust their parents to obtain comfort, while interactions between parents and preterm infants can promote cognitive and social development of preterm infants (Franck & Spencer, 2003; Kenner & Ellerbee, 2012). Moreover, parent involvement with preterm infants also promotes preterm infant outcomes such as reduced length of hospital stay, increased maternal breastfeeding rates (Gregson & Blacker, 2011), reduced infection rate, and reduced rate of re-admission (Somlaw, 2011). While parents are getting involved in the care for their babies, they receive information support and emotional support from healthcare providers which increase parent satisfaction (Russell et al., 2014).

Negative consequences of parent involvement. Parent involvement in hospitalization has negative consequences on parents in terms of negative emotions. When parents take part in caring for their hospitalized preterm infants, especially in the initial phase, they may experience anxiety, guilt, helplessness, fear, and stress. The anxiety experienced by parents may be directly linked to their experience of becoming a parent to a premature infant and being in the NICU (Hollywood & Hollywood, 2011). Such parents feel that they cannot provide care for their infants as expected, so they blame themselves, turn the failure on themselves, leading to feelings of guilt and being useless (Bjork et al., 2012). Parents may be afraid to touch and hold their infants on account of fearing to hurt them (Hall, 2005; Leonard & Mayers, 2008). Furthermore, parents can be stressed by the unfamiliar hospital environment (Hall, 2005; Pathom-aree, 2008) and overwhelmed by the medical equipment (Blomqvist & Nyqvist, 2011). However, parents' involvement brings more positive outcomes than negative one.

Interventions Related to Parent Involvement in Caring for Hospitalized Preterm Infants

The review of nursing literature on intervention studies related to parent involvement in caring for hospitalized preterm infant reveals that most of the interventions have four main foci. First, interventions that focus on enhancing parent's abilities regarding preterm infant care can divide into two groups: 1) strengthening parental knowledge and skills, and 2) promoting self-efficacy of the parents. The second group are interventions that focus on reducing parental psychological problems. Third are interventions that focus on promoting attachment and bonding between preterm infants and parents. Fourthly, there are interventions with a focus on promoting preterm infant outcomes and reducing the complications of prematurity.

In Western and other literature, intervention studies focus on strengthening parental knowledge and skills by using educational programs. These studies examined the effect of education programs on parents' abilities to perform activities such as feeding, bathing, cleaning, and measuring temperature (Browne & Talmi, 2005; Shieh et al., 2010). A study by Bracht et al. (2013) developed an education and support program to enhance parental skills and parental roles in caring for their babies in NICU. Some studies examined the effectiveness of peer group support (Preyde & Ardal, 2003)

and the Creating Opportunities for Parent Empowerment (COPE) program (Melnik et al., 2006) examined effects of maternal stress and parents' mental health outcomes. Others examined the effectiveness of kangaroo care on maternal attachment (Ahn et al., 2010; Cho et al., 2016), maternal stress (Cho et al., 2016), preterm infant outcomes such as physical growth, breastfeeding rate (Gathwala et al., 2010; Gregson & Blacker, 2011; Moniem & Morsy, 2011), length of hospital stay (Gregson & Blacker, 2011), infant's pain (Akcan, Yiğit, & Atici, 2009; Gao et al., 2015; Johnston et al., 2008).

Additionally, Western studies employed developmentally supportive care to improve a quality of neonatal care, developmentally supportive care has focused on individualized approach to caregiving. Als and her colleagues developed the most well-known early intervention program: the Newborn Individualized Developmental Care and Assessment Program (NIDCAP) (NIDCAP Federation International, 2008). The NIDCAP approach lends itself to system-based, process-oriented, attuned and responsive support of individualized developmental care for each infant and family (Als & NIDCAP Federation International, 2013). A key focus of the NIDCAP program is the educational and consultative support and assistance to NICU and special care nursery setting towards effective delivery of intensive and special care in a neurodevelopmental supportive, individualized, and family-center framework. NIDCAP is a North American training program. NIDCAP training has twenty-one centers: eleven centers in the United States, nine centers in Europe and one in South America (Als & NIDCAP Federation International, 2013). NIDCAP training involves formal training and education with the NIDCAP trainer, extensive guided independent neurobehavioral observations, and requires a multidisciplinary commitment to systems change within the hospital (Als, 2009; Als & NIDCAP Federation International, 2013).

NIDCAP has demonstrated positive impact on both preterm infants and parents. Several intervention studies have found that NIDCAPs could reduce the complications of prematurity, enhance the infant's neurobehavioral competence or improve short-term medical outcomes in preterm infants. Preterm infants in NIDCAP groups showed reduced length of hospital stay, decreased incidence of chronic lung disease, less mental delay (Peters et al., 2009), reduced medical morbidities (e.g., reduction in the number of days of ventilator support and of supplementary oxygen, lower incidence and severity of

IVH and improved neurobehavioral function (McAnulty et al., 2009), electrophysiological and neurostructural development (Als et al., 2012). In addition, Kleberg et al. (2007) found that NIDCAP was associated with enhanced relationships between parents and infants and the healthcare professionals. These researchers surveyed 20 mothers of infants with less than 32 weeks of gestation receiving NIDCAP versus standard care. The finding indicated that mothers in the NIDCAP group perceived greater closeness to their infants than mothers in standard care group ($p = 0.022$). Additionally, the mothers in the NIDCAP group rated the staff's ability to support them in their role as a mother higher than mothers in standard care group ($p = 0.066$). However, the mothers in the NIDCAP group experienced a significantly higher level of anxiety based on the three statements concerning the survival of her infant, the risk of the baby being injured, and the technical environment ($p = 0.033$).

Some studies have found that after the implementation of the NIDCAP, most healthcare professionals had positive attitude towards the use of the NIDCAP. They perceived that using NIDCAP had a positive effect on infant's development, infant's health and well-being, and parental role (Mosqueda et al., 2013; van der Pal et al., 2007). However, some healthcare professionals perceived that implementing the NIDCAP was more time-consuming and worsened job conditions (e.g., reduced light) (Van der Pal et al., 2007). Successful implementation of NIDCAP is influenced by staff and environment factors. There is empirical evidence that healthcare professionals who have positive attitudes toward using the NIDCAP have high subjective norm, high perceived behavioral control, and are of young age (less than 35 years old). These nurses had more intention to use the NIDCAP intervention during caregiving (Mosqueda et al., 2013; van der Pal et al., 2007). Conversely, a lack of coordination among different professionals and noise level in the neonatal unit demonstrate as barriers in the implementation of the NIDCAP (Mosqueda et al., 2013).

In Thai literature, several intervention studies have focused on enhancing parents' abilities regarding preterm infant care by implementing perceived self-efficacy programs (Bunmachu & Theunnadee, 2015; Sawattrakool, 2011; Srilamai & Teerarungsikul, 2015), empowerment programs (Bualuang, 2009; Chaingam et al., 2011), and educational programs (Rustina, 2005; Suknithi et al., 2012) to promote

parental self-efficacy, strengthen parental knowledge and skills, and improved preterm infants outcomes. Additionally, previous intervention studies focused on reducing psychological problems in parents of hospitalized preterm infants by using perceived self-efficacy programs (Sawattrakool, 2011), empowerment programs (Bualuang, 2009) and educational programs (Lektae, 2008). Furthermore, most intervention studies have tried to promote attachment and bonding between mothers and preterm infants by employing kangaroo care (skin-to-skin care) (Kruanate et al., 2006; Sangsawang et al., 2010), massage program (Chomklien & Jerapaet, 2008; Wongjarupan et al., 2007) and maternal role promoting program (Phanthufak, Phumonsakul, & Chareonpol, 2009).

In summary, previous intervention studies in Western literature and Thai literature were testing interventions for reducing the negative consequences of preterm birth both in parents and preterm infants, improved positive infants' outcomes, and enhancing parents' knowledge and ability in the baby's care. Particularly, NIDCAP program demonstrated as effectively program to reduce the impact of prematurity. However, in Thai context, implementation of NIDCAP program may not fit because not only does this program require training with the program at the NIDCAP center but it also needs individualized approach to each infant. In the NIDCAP, specific estimation of each individual infant's current goal strivings is derived from the direct observation of each infant's behavior in the context of ongoing care delivery. In this way, the Thai policy or system does not serve the use of the NIDCAP because of nursing workload and the need of a multidisciplinary commitment to system change within the hospitals. Therefore, Thai neonatal care units cannot adopt the NIDCAP program.

Parent-Infant Interaction

Interaction between parents and their newborn infants is key concern. The nature of the relationship that is developed between an infant and his/her parents depends on the interactional patterns that occur over time. Parents will read and respond to their infant's cues, and in a turn-taking fashion the infant responds to his or her parents. Timely cue-sensitive responses to infant's needs help an infant to develop a sense of security. Establishing effective interaction with parents is critical for newborns and this process is influenced by numerous facilitators and barriers.

Strong evidence has accumulated to support the claim that parents who feel supported, have high self-esteem, and high levels of education demonstrate positive parent-infant interaction and perceive themselves to be more responsive to their preterm infants (Amankwaa, Pickler, & Boonmee, 2007; Feeley, Gottlieb, & Zelkowitz, 2005). In a study of twenty preterm infants born at 26 to 32 weeks gestation with VLBW and twenty full-term infants, Gerner (1999) found that mother's formal education was associated with more face-to-face interactions ($p = .018$) in both preterm and full-term infants groups as measured by the new evaluation model of this study at 3 months of age. Mothers with a higher education had more face-to-face interactions with their infants than did mothers with a lower education. Benoit (2004) indicated that if parents and infants have ongoing negative interaction patterns, the infants may not develop secure attachment with their parents.

Previous studies have shown that parental distress is associated with negative parent-infant interaction. Forcada-Guex, Borghini, Pierrehumbert, Ansermet and Muller-Nix (2011) explored the link between maternal posttraumatic stress, maternal attachment representations with the infant, and mother-infant dyadic interaction in 47 preterm infants born at less than 34 weeks gestation and 25 full-term infants at 6 months corrected age. Finding demonstrated that preterm mothers with high posttraumatic stress symptoms were more likely to show a controlling dyadic pattern of interaction, with more distorted representation of attachment to the infant than full term mothers ($p < .10$). The distorted attachment included mother's mental representation of her infant; devaluing or excessively negative interaction, self-referential interpretations, or role-reversed. Full-term mothers were more likely to follow a cooperative dyadic pattern of interaction with their infants and demonstrated balanced representations of the infant ($p < .05$).

Kaitza, Maytala, Devora, Bergmana, and Mankutab (2010) studied mothers of infant's at 6 months corrected age; 34 mothers had a known anxiety disorder and 59 were healthy controls. Mother-infant interaction was observed by videotaped record and coded with the Rating Scale of Interactional Style. Finding showed that more anxious mothers showed exaggerated responsiveness with their infants during free play and teaching episode ($p < .05$). Infants of anxious mothers were less likely to show negative

affect during the still-face and stranger challenges ($p < .05$, $p < .005$, respectively). Korja, Savonlahti et al. (2008) evaluated association between maternal depressive symptoms and the quality of mother-infant interaction. The researchers selected 32 mothers of very preterm infants at 6 months corrected age from the prospective follow-up study of 125 infants with a birth weight ≤ 1500 grams or a gestational age < 32 weeks. Mother-infant interaction was measured by the parent child early relational assessment scale (PCERA) at 6 months corrected age. The researchers found that the signs of maternal depression were negatively associated with the quality of maternal interaction with their preterm infants ($p = .01$). Field (2010) reviewed the literature on postpartum depression effects on early interaction, and found consistent evidence that depressive mothers were less sensitivity and the infants were less responsive.

Several factors have been found to affect maternal-infant responsiveness, including twin birth, prematurity, early separation, and intrusive medical equipment. In a study of 17 mothers-preterm twin infant pairs and 17 mothers-singleton preterm infant pairs born at less than 32 weeks GA, Beer et al. (2013) explored quality of interaction between mothers and their preterm infants as measured by the Nursing Child Assessment Teaching Scale (NCATS). The researcher found that mothers of twins were less responsiveness ($p < .05$) than mothers of singletons at 3 months corrected age. Twin infants had less effective interaction with the mother ($p < .05$) than singletons both at discharge, and 3 months corrected age. Harrison and Magill-Evans (1996) compared parent interaction with term and preterm infants. The subjects were 54 parent-full-term infant dyads and 49 parents-preterm infant dyads. The preterm infants were born at 30 to 36 weeks of GA with birth weight at least 1,500 grams. Parent-infant interaction was measured by the NCATS at 3 and 9 months of age. The researchers found that parents had less responsive interactions with their preterm infants on response to distress, socio emotional growth fostering, and cognitive growth fostering subscales ($p < .05$) than full-term infants. Bystrova et al. (2009) found that separation during the first 2 hours after birth was related to decrease maternal sensitivity, infant's self-regulation, and dyadic mutuality and sensitivity at one year of age. Parents reported that medical equipment such as monitoring, phototherapy, and infusion used in the neonatal care unit to obstructed physical contact with their infants (Lantz & Ottosson, 2013).

Knowledge of the factors that influence interaction between parent and their infant has been incorporated in intervention studies. Interventions promoting positive parent-infant interaction have three main focuses, including 1) enhancing touch between parent and their infant by promoting holding, kangaroo care, and massage program, 2) promoting parent-infant interaction by early sucking and interaction coaching strategy, and 3) improving parental knowledge and responsiveness to infant behavioral states and cues. One example is the Hospital to home: Optimizing the infant's Environment (H-HOPE) intervention.

Korja et al. (2008) evaluated the association between holding and mother-infant interaction. The participants were 30 mothers and their preterm infants born at GA below 32 weeks or birth weight below 1,501 grams. Mother- infant interaction was measured by the Parent-Child Early Relational Assessment (the PC-ERA) scale. Longer duration of holding at 5 months of corrected age in the home environment was positively associated with better quality of mother-preterm infant interaction at 6 and 12 months corrected age ($p = .04$, $p = .06$, respectively). Mothers of preterm infants who spent more than 60 minutes per day holding their infant had good quality dyadic interaction.

Bystrova et al. (2009) studied the effect of skin-to-skin contact within the first two hours after birth on mother-infant interaction at one year of age. The sample included 176 mother-infant pairs randomly assigned to four groups: skin-to-skin group ($n=33$); mother's arms group ($n=33$); nursery group ($n=30$); reunion ($n=28$). Mother-infant interaction was assessed using videotaped recordings that were coded with the Parent-Child Early Relational Assessment (PC-ERA) at one year of age. The skin-to-skin contact group and mother's arms group demonstrated significantly more mutuality and reciprocal interaction at one year of age ($p = .025$, $p = .019$, respectively) than mother-infant dyads in reunion group. In a study of 17 father-infant pairs and 20 mothers-infant pairs after planned cesarean section at 38 to 42 weeks GA, Velandia, Matthisen, Uvnäs-Moberg, and Nissen (2010) compared parent-newborn vocal interaction with skin-to-skin contact within 25 minutes of elective cesarean section. The sample included 37 healthy newborn infants and their parents (fathers = 17 and mothers = 20) after planned cesarean section at 38 to 42 weeks GA. Parent-newborn vocal interaction was captured

by videotape and audiotape recordings, and then coded in 30-second observation periods. The investigators found that parents providing skin-to-skin cuddling immediately after elective cesarean section were more vocally communicative with their infants than fathers ($p = .003$) and mothers ($p = .009$) without skin-to-skin contact.

Feldman, Eidelman, Sirota, and Weller (2002) examined effectiveness of kangaroo care on parent-infant interaction. The participants were 146 parents and their preterm infants born at 25-34 weeks GA, randomly assigned to control and experiment groups, 73 for each. Preterm infants were enrolled at 31 to 33 weeks' GA and kangaroo care commenced between 31 and 34 weeks' GA. The control group received standard incubator care and the experimental group received kangaroo care at least for 14 consecutive days for at least one hour daily. Parent-infant interaction was observed and then coded with the mother-newborn coding system. At 37 weeks' GA, mothers providing kangaroo care, demonstrated more positive interaction ($p < .05$), specifically more positive affect, touch, and adaptation to preterm infant cues ($p < .001$). Preterm infants were more alert and had less gaze aversion ($p < .001$, $p < .05$, respectively). In further analysis (2003), mother-infant interaction was recorded by using videotape recorder, and then coded with the Coding Interactive Behavior Manual (CIB; Feldman, 1998). The researchers found that after kangaroo care, mothers of preterm infants were more sensitive and less intrusive during interaction ($p < .01$). The level of mother-infant reciprocity was higher ($M = 3.71$, $SD = 1.02$) and the infants were less negative emotionally during social play ($p < .01$).

Ferber et al. (2005) examined effectiveness of massage therapy on mother-infant interaction. Fifty-one mothers and their preterm infants were randomly assigned to three groups: mother group ($n=18$), female staff group ($n=18$), and control group ($n=19$). In the mother group mothers massaged their infants, in the staff group a trained female figure unrelated to the infant administered the massage, and the control group had no massage ($n=19$). Mother-infant interaction was video recorded at a consistent time and then coded with the Coding Interactive Behavior Manual (CIB; Feldman, 1998). Mother-infant dyads in the two massage groups were less intrusive and demonstrated more dyadic reciprocity ($p = .023$, $p = .013$, respectively). The infants in these groups were more socially involved ($p = .017$) compared to control group at 3 months of age.

Previous studies have found that promoting parent-infant interaction by early sucking and interaction coaching strategies enhanced parent-infant interaction. Bystrova et al. (2009) studied the effect of early contact and separation on mother-infant interaction one year after birth. The participants included 176 mother-infant pairs, randomly assigned to four groups; skin-to-skin group (n=33); mother's arms group (n=33); nursery group (n=30); reunion (n=28). Parent-infant interaction was recorded by videotaped recording and then coded with the Parent-Child Early Relational Assessment (PCERA). The researchers found that early sucking was associated with more positive mother-infant interaction at one year old when compared with separation between mothers and their infants. The mothers in the mother's arms group whose infants had suckled early were significantly more sensitive, and more mutual and reciprocal ($p = .033$, $p = .017$, respectively).

Horowitz et al. (2001) examined the effectiveness of an interactive coaching intervention on responsiveness between mothers with depressive symptoms and their infants. The subjects were 117 postpartum women with mild to severe depressive symptoms and their infants, randomly assigned to experimental group (n=117) and control group (n=57). Depressive mothers in experimental group and control group received standard postpartum primary care and received additional psychiatric treatment for depression as needed. Both experimental group and control group received three home visits when their infant were 4-8 weeks (Time 1), 10-14 weeks (Time 2), and 14-18 weeks old (Time 3). Mother-infant face-to-face interaction was recorded by videotaped recording and then coded with the Dyadic Mutuality Code (DMC). The researchers found that interactive coaching group and control group were significant difference in responsiveness ($p = .006$). The interactive coaching group demonstrated a significantly higher level of responsiveness in the maternal-infant relationship at Time 2 ($p = .002$) and at Time 3 ($p = .029$) than did the control group. The interactive coaching strategy was associated with a more positive interaction between mothers with depressed symptoms and their infants. Responsiveness was increased following the intervention from Time 1 to Time 2 and was maintained at Time 3.

Another study focused on improving parental knowledge and responsiveness on infant behavioral states and cues by using the Hospital to home: Optimizing the infant's

Environment (H-HOPE) intervention. White-Trauta et al. (2013) examined the impact of the Hospital to home: Optimizing the infant's Environment (H-HOPE) intervention on mother-preterm infant interaction pattern at 6 weeks corrected age. The sample included 142 preterm infants born at 29 to 34 weeks GA and their mothers with at least 2 social environmental risk factors (e.g., minority status, less than high school education, less than 18 years of age, history of current mental illness, family income less than 185% of the federal poverty guidelines, more than one child under 24 months, four or more children under 4 years of age in the home, or resided in a disadvantaged neighborhood). The participants were randomly assigned to the H-HOPE intervention group (n=66) or the Parent Education Program attention control group (n=76). H-HOPE was scheduled with (1) twice-daily infant stimulation using the ATVV (auditory, tactile, visual, and vestibular-rocking stimulation) and (2) four maternal participatory guidance sessions plus two telephone calls by a nurse-community advocate team. Mother-preterm infant interaction patterns were measured by the NCAST and the Dyadic Mutuality Code (DMC) at 6 weeks corrected age. The researchers found that the H-HOPE intervention dyads group demonstrated more positive mother-infant interaction during feeding ($p = .06$). The H-HOPE group also had significantly higher infant clarity of cues ($p < .05$) compared to the control group.

In summary, there is consistent evidence that parent-infant interaction is influenced by several factors such as feeling supported, positive self-esteem, level of parental education, parental distress, twin birth, prematurity, early separation, and medical equipment. In addition, previous interventions and strategies to enhance parent-infant interaction have three main foci: 1) enhancing touch between parent and their infant by promoting holding, kangaroo care, and massage program, 2) promoting parent-infant interaction by early sucking and interaction coaching strategy, and 3) improving parental knowledge and responsiveness on infant behavioral states and cues by using the Hospital to home: Optimizing the infant's Environment (H-HOPE) intervention.

Thai Care For hospitalized Preterm Infants

The best way to understand parent involvement in caring for hospitalized preterm infants in Thai society and culture is to focus on the basic unit of the family; therefore, the comprehension of the situation of caring for hospitalized preterm infants is important to this study. This part presents the literature related to current practice in Thai hospitals, the Thai family context, the Thai family context in caring for hospitalized infants, and the relevant researches in parents' involvement in Thailand.

Current Practice of Thai Hospitals

High risk newborns, especially premature infants, low-birth-weight infants, infants with hypoxia or congenital heart disease need to be admitted to the NICU or SNB (Ministry of Public Health, 2013). The levels of neonatal care depend on infants' conditions. In Thailand, the neonatal care can be divided into three levels; level I (newborn nursery) provided care for normal newborn infants; level II (SNB) provided care for sick newborn infants and very sick newborn infants with uncomplicated conditions; and level III (NICU) provided specialty care for critically ill newborn infants (Srisuparb, 2008). Basically, caring for ill newborn infants used the principles of newborn care following the Safe Motherhood Hospital (SMH—*Luk-Keid-Rod-Mea-Plod-Pai*) and Hospital bonds of family love (*or Sai-Yai-Ruk*). Principles of newborn care consist of seven items: 1) temperature control, 2) airway management, 3) infection control, 4) nutrition, 5) specific treatments, 6) parent-infant attachment, and 7) developmental and environmental promotion (Jirapaet & Jirapaet, 2007; Somlaw, 2011). There are practices promoting parent-newborn attachment and maternal breastfeeding by 1) well newborns and newborns with minor illnesses (e.g., neonatal jaundice, hypothermia, and preterm infant with stable condition): staying with mother at postnatal ward (Jirapaet & Jirapaet, 2007; Somlaw, 2011), 2) hospitalized newborn with discharged mother: the newborn unit provided shelter for discharged mothers. This enables mothers to bring their breast milk to their hospitalized newborn and take care of their baby during hospitalization (Somlaw, 2011).

The Thai Family Context

Located in the Southeast Asia, Thailand has around 68 million people and approximately 95 percent of Thai people are Buddhists of the Theravada tradition. Muslims are the second largest religious group in Thailand at around 4.6 percent and the majority of Thai Muslims live in the most southerly provinces near the Malaysian border, while the rest of the population believes in Christianity, Hinduism and other religions (Sakunphanit, n.d.). Buddhism has several main beliefs and the most fundamental beliefs include *Karma* (deed), *Boon* (merit) and *Babb* (sin) concepts as well as *Dhamma* (nature) which are essential to caregiving as reflected in the Buddhist practices of compassion, management and acceptance (Sethabouppha, 2002). According to the beliefs of Buddhists, one life is a part of the cycle of rebirth, and human beings are constantly reborn in human or animal form depending on their deeds or Karma of their previous lives. Every act, word or thought would affect one person's later life as reflected through the Thai proverb, "Do good deeds, receive good results; do bad deeds, receive bad result" (Choowattanapakorn, 1999).

Family is one of the smallest units of the society; however, it plays a significant role in instilling ethical conduct, social values, lifestyles, and ways of thinking (Government Public Relations Department, 2010). The structure of the Thai family has undergone socio-economic changes over time as it has rapidly changed from an agriculture-based pattern to a more urbanized or industrialized one. As the family structure has changed from an extended family to a nuclear family, an average family size has been decreasing continuously from more than five persons per household to 3.9 in 2000, 3.4 in 2010, and 3.1 in 2020. The data reflect the trend that more and more Thai families will change from an extended family to nuclear family in the future (Sakunphanit, n.d.).

The number of extended family households has declined during the last past ten years (United Nations Childre's Fund [Unicef], 2010). According to the Urban Development Cooperation Division, National Economic and Social Development (NESDB) showed that migration rates of the population from rural areas to urban areas has increased (Sakunphanit, n.d.). This indicates that employment opportunities with attractive wages had a major influence on a greater number of rural people to migrate to

urban areas. Extended families are commonly found in the rural areas of Thailand whereas nuclear families predominate in the capital city and urban areas. Generally, an extended family consists of several generations living in one household, or possibly in close proximity within the same compound (Government Public Relations Department, 2010). Often living in a single household, members in an extended family always receive additional support from their relatives and a network of community members, thus offering emotional comfort, security, and nourishment for children. However, the structure of the Thai family nowadays comprises two parents alone, and families now tend to have fewer children, becoming the typical nuclear family (Government Public Relations Department, 2010; Unicef, 2010).

In traditional Thai family, a father or husband is regarded as the head of family to whom his wife and children show due respect as he works and earns money to support his family while the wife plays a significant role in child-rearing and housekeeping (Wongsith, 1991). Currently, since the economic conditions have changed, single-parent family structure is an increasing trend with mothers as head of households. This means that mothers increasingly take on responsibility for child-rearing and housekeeping as well as being a breadwinner (Unicef, 2010).

The Thai Family Context in Caring for Hospitalized Infants

Parents are the key persons to take care of their child either in good health or in illness. In the Thai context, Thai parents' views on child care are influenced by their religious beliefs. They believe that *Karma* from the past life may be the cause of a disease or illness of their children (Jintawet, 2005; Pathom-aree, 2008). Jintawet (2005) described that parents of children in PICU demonstrate *Tam Jai* and *Plong*, as people have their own *Karma*, and children may be born to pay back his/her *Karma*. In addition, parental practices are influenced by non-western medical practice such as visiting spirit mediums or Buddhist monks to ask about the cause of a child's illness, which they believe may be influenced by the power of spirits. Parents may perform rituals to drive away the power of these spirits. Pathom-aree found that mothers of newborn infants in a neonatal intensive care unit (NICU) did many things in addition to the medical treatment provided in order to make their ill children get better. Parents want to help their infants' recovery from illness; therefore, they pray, make merits, give

offerings dedicated to the monks, make vows, and give amulets to their infants. All of these stem from mothers' belief that Karma may cause an illness to their infant. Additionally, in accordance with Thai belief and culture, fathers are expected to work while mothers are supposed to play a significant role in child-rearing and housekeeping. Pongjaturawit (2005) found that most parents of ill children who participated in the care of hospitalized young children were mothers, and a mother had a larger role in raising children than their partner. Most mothers decided to play the role of participating in taking care of the children at the hospital on belief that they can do the duty better than their partners.

In addition, Thai mothers, who are civil servants in government agencies and employees in private companies, are entitled to take a maternity leave of not exceeding 90 days with full salary. Civil servants will receive a salary from the government whereas employees will receive a salary from their employers for 45 days and from the Social Security Office for 45 days (Ministry of Labour, 2009; Ministry of Social Development and Human Security, 2016; Social Security Office, 2015). In 2012, the Thai government has approved a 15 days paternity leave for civil servants whose wives have given birth to look after the new mothers and infants. The royal decree allows civil servants to leave for 15 days with full salary within 30 days of the child's birth (Ministry of Social Development and Human Security; 2016; Stewart, 2012).

In summary, the Thai socio-cultural context has changed, resulting in the shift into the beliefs and culture, especially those of Buddhists and Thai family behavioral contexts related to parental care for their hospitalized preterm infant.

Relevant Researches on Parent Involvement in Thailand

The Thai literature related to parent involvement in caring for hospitalized newborn infants examined the level of parent participation by using the concept of Schepp (1995) as a framework for the study. Hinsilp (2006) studied maternal participation in caring for high-risk neonate. The findings indicated that most mothers participated in caring for their babies at a low level and they preferred to participate in the care for their babies more than their actual level of participation. Other studies examined level of parent participation and factors related to parent participation,

founding that parent participation related to parental preparation (Pholanun et al., 2013), parental opinion about participation (Supaporn et al., 2013), quality of nursing care as perceived by parent (Tepmalapunsiri et al., 2011). Pronlerttaveekul, Prasopkittikun, and Sangperm (2013) found that support from nurse related to parent participation.

In addition, two qualitative studies were found. Pathom-aree (2008) studied maternal participation in caring for newborns by focusing not only on the parents of preterm infants but also on parents of term infants. The findings indicated that maternal participation was continuous process composing of two phases. The first phase was the initiation of participation described as arrival at an unfamiliar world, coping with difficulties and confused feelings, and a desire to act for the babies. The second phase included engaging in the best on going actions for the sake of the baby by facing reality, feeling happy at being a mother, developing willpower, providing mutual support for the babies, and dedication to the babies. Another study on maternal participation in caring for a premature infant with respirator by Rungamornrat et al. (2012), revealed that mothers of preterm infants with respirators were uncertain of the baby's future with special care needs and they attempted to find causes of having preterm baby. Maternal participation was limited due to the baby's conditions, so they cared for their babies by following nursing guidelines such as storing their breast milk and touching baby every time of their visit and asking for information about their baby and praying to the holy idols for their baby's recovery. Moreover, the study showed that maternal participation related to support from their spouses.

In conclusion, Thai nursing literature related to parent involvement in caring for hospitalized preterm infants, most examine the levels of parent involvement and factors related to parent participation. However, little is known about how the socio-cultural factors influence on their involvement.

Theoretical Framework of the Study

Attachment theory, which is the theoretical framework of this study, is applied to describe and guide the study regarding parent involvement in hospitalized preterm infant as parents could use this period of hospitalization to establish attachment with their preterm infants through their involvement in caring for their hospitalized preterm infants.

While several theorists and researchers have contributed to the evolution of attachment theory, Bowlby was the first attachment theorist and credited as the ‘father’ of attachment theory. From Bowlby’s perspective, the foundation of all love relationships at a later time was created by the first relationship in infancy, therefore, any disruption or poor quality in this first relationship may cause trauma and troubling behaviors in adolescence and adult life (Mooney, 2010).

Bowlby’s attachment theory was developed during a period of behaviorism and focused on maternal deprivation and secure attachment. According to Bowlby, attachment was an intense and enduring affectionate bond that the infant developed with the mother or principal caregiver (Ainsworth, 1979; Mooney, 2010). Attachment was linked to the infant’s ability to feel safe and protected (Mooney, 2010). Recent work on attachment has argued that attachment is not solely a result of strong emotional ties between parent and infant, but relational aspects, cognitions and behaviors also play key roles in attachment. Social interactions and quality of parental caregiving are essential factors for developing secure attachment. Attachment is also based on the infant’s abilities to respond to maternal behavior or social interaction (Mercer, 2011). In Bowlby’s early writing, he proposed that infants could develop a selective attachment with only one person and the quality of this relationship differed from all others. Present attachment theory has argued that infants can form more than one attachment in a hierarchical fashion (Rutter, 1995). Bowlby’s early writing also suggested that poor early attachment experiences had potential to create subsequent pathology (e.g., delinquency and emotional disturbance). Current work on attachment has argued that social development and early childhood relationships are important mediators of behavior and interact with attachment in complex ways (Mercer, 2011; Rutter, 1995).

According to Bowlby's original work, attachment behavior develops through four phases with the first three phases occurring during the first year of life, and the fourth one beginning around the child's third birthday. During the first phase, beginning at birth to 2-3 months, infants respond to a variety of social stimuli and people without discrimination of attachment figure. In the second phase, which runs from 2-3 months to about 7 months, the infant continues to behave toward people as in the first phase, but can increasingly distinguish his/her mother or primary caregiver figure from strangers. In the third phase, which begins between 6 and 9 months of age throughout 2 or 3 years old, the infant develops an ability to maintain proximity to his/her mother or primary caregiver figure by means of locomotion while he or she begins to use the mother as a secure base to explore the world. During this phase, brief and unaccustomed separation from the mother or primary caregiver produced protest and distress on the child. The fourth phase, which begins at about age 3, the child is increasingly developing a goal-corrected partnership with his/her mother or primary caregiver in which the child can incorporate the goals, plans and desires of their attachment figure into negotiated activities (Bowlby, 1969; Marvin & Britner, 2008; Mercer, 2011). As a result, children receive a mental model of their parents stemming from their availability and show of love and a complementary model of children themselves as being deserving of parents' love and support (Bowlby, 2008).

Bowlby's perspectives became widely known in North America and caregivers were encouraged to promote infant attachment behavior through the infant's sensory systems, by maintaining proximity and protecting their infants (Marvin & Britner, 2008). Prior to the work on attachment theory, more emphasis was given to the physical care of infants while the emotional development of newborns was paid less attention (Mooney, 2010). The first main impact on child care came from Bowlby, WHO report on the mental health of homeless children in postwar Europe. Attachment theory informed improved child care policies in hospitals and residential institutions worldwide. Clinicians recognized that the infant and young child should experience a warm, intimate, and continuous relationship with his/her mother. Bowlby's attachment theory also played a role in the initially critical response of many academic psychologists to attachment theory. Bowlby emphasized the importance of mother-infant love relationships that develops over time; this perspective was at odds with the

traditional psychoanalytic theory that was prevalent at the time (Bretherton, 1992; Rutter, 1995, 2008).

Bowlby's work was broadened by Ainsworth through additional examination of secure attachment and maternal deprivation (Mooney, 2010). Ainsworth (1979) and her colleagues developed the "strange situation" method to assess the infant-caregiver attachment relationship among one-year-old babies and classified the attachment behaviors into three patterns. First, infants who were classified as securely attached use the mothers as a security base from which to explore. These infants were confident in their exploration but sought comfort from their mothers when being distressed. Their mothers were sensitive and responsive. Second, the behavior of keeping close contact with the mothers throughout the strange assessment was found among infants who were classified as anxious-ambivalent and insecurely attached. This group of infants showed anger and sought contact while their mothers tried to comfort them and their mothers were inconsistent in their care. Third, infants who were likely to move away from their mothers, turned away from them and diverted their attention to nearby toys were classified as anxious-avoidant with insecure attachment. Their mothers rejected the child's attachment seeking behavior (Ainsworth, 1979; Fraley & Spieker, 2003). Ainsworth's work showed that there is a relation between the sensitivity of maternal behavior during an infant's first year of life and the subsequent organization of the infant's attachment behavior at one year of age (Fraley & Spieker, 2003). Secure attachment was more likely to occur when parents were sensitive and responsive to infant's cues. The strange situation method has become widely used in practice and research for improving and sustaining the development of very young children through improving the quality of mother-infant interaction (Ainsworth, 1979). Ainsworth's work continues to influence attachment research (Bretherton, 1992).

Magda Gerber studied the first year of infant life and founded the demonstration of infant Project in California with Dr. Tomas Forrest. In this project, Gerber focused on respect for the infant, infants' processes of development, and family. She devoted herself to developing policies in early care and education that support infants and parents. Gerber also developed the Resources for Infant Educators (RIE) approach with respect being the foundation of the RIE philosophy. The basic principles of Gerber's

RIE approach were 1) active participation; infants needed to be an active participant rather than a passive recipient, 2) sensitive observation; understanding the infant needs was achieved by carefully watching and listening to infant, 3) consistency; clearly defined limits and expectations were used to develop positive discipline, 4) basic trust; the infant needed to be an initiator, an explorer, and a self-learner, 5) environment; infants needed physically safe, cognitively challenging, and emotionally nurturing environments, 6) uninterrupted play; infants needed their own space and time alone to play on their own, and 7) freedom; infants needed to explore and interact with other infants. Allowing infants to learn on their own gives infants an opportunity to have learning experiences. To feel safe and form strong attachment, infants need primary caregivers living with them and consistently responding to their needs (Mooney, 2010).

Starting in the 1970s, Kennell and Klaus studied maternal-infant bonding in both full-term and preterm infants. Kennell and Klaus argued that parent-infant bonding began during pregnancy and continued after birth. Their notion of bonding contrasted with attachment which referred to the tie from infant to parent, rather than parent to infant. Consistent with their predecessors, they argued that mother-infant bonding developed through touching, smelling, seeing, breastfeeding, and caring for the infant (Klaus et al., 2013). Based on this bonding perspective, infants are able to represent and understand the world in sophisticated ways (Mercer, 2011). Early attachment theory demonstrated that an infant could develop attachment with his/her mother or primary caregivers during a sensitive period, which occurred in the first two years of life. Current attachment theory recognizes that the sensitive period is broader than initially imagined. Infants under 6 months of age are in prepare pre-attachment period. Infants respond to human faces and voices as early as 36 hours after birth (Mercer, 2011; Rutter, 1995). Kennell and Klaus claimed that the first few hours after birth was a critical period for successful bonding; if parent-infant pairs were separated or did not establish bonding during the first few hours, any bond formed later may not be as strong. A second stage of bonding occurred over the first several months of an infant's life and gave parents continued chances to bond if the initial opportunity had been lost. According to Klaus and Kennell, many variables could contribute to a mother's failure to bond with her infant such as separation, grief, depression, competing emotions, and marital problems. The effects of non-bonding were varied. Often these infants were

more colicky, disliked cuddling, and mothers found them difficult to please (Mooney, 2010).

The work of Kennell and Klaus challenged hospitals to become more responsive to the needs of families. Their work also revolutionized the approach to family-centered labor and delivery practices (Mooney, 2010). Hospital policies aimed to enhance mother-infant bonding by promoting early physical contact and supporting family involvement (Klaus & Kennell, 1982). Encouraging early mother-infant contact after birth and rooming-in could increase the length and success of breastfeeding and decrease failure to thrive, abuse, neglect, and abandonment of infants (Kennell & Klaus, 1998).

T. Berry Brazelton was a pediatrician and among the first to promote a model of service that included the whole family and recognized the importance of working in partnership with parents after an infant was born. In 1951, he began doing research with parents and infants focusing on the complexity of newborn neurobehavioral competencies and how these competencies influenced parent-child interaction. Brazelton was the first to describe babies as having different behavioral styles: average, quiet, or unusually active. He was best known for developing the Neonatal Behavioral Assessment Scale (NBAS, 1973, 1984) to assess the newborn neurobehavioral competencies. The NBAS scale assessed newborns' response to visual, auditory, and tactile stimuli in their environment (Mooney, 2010). NBAS scale was unique in that it assessed variations in the infant's social competencies and illustrated the infant's behavior (Nugent, 2013). Brazelton demonstrated that careful observation of infants can inform parents about the nature, quality and intensity of interaction that their infant wants and needs. By identifying and explaining specific examples of their newborn's behavioral cues, parents could develop greater confidence in their parenting abilities (Mooney, 2010). The assumption was that if parents learned to observe their infant's response and understand their infant's behavior, they would respond more appropriately to the infant's needs, thereby facilitating more positive attachment to. The NBAS has been widely used by infant health practitioners and researchers worldwide as an instrument for enhancing the connection between the child and family, and the healthcare provider and family (Stadtler, Brandt, Novak, & Beauchesne, 2013).

Attachment theory has evolved to regulation theory or modern attachment theory. According to Shore's modern attachment theory, important events of the first months of life are given emphasis, particularly the experiences based on caregiver's abilities to control the infant's state of arousal. The dyadic regulation of emotion is supported by the attachment relationship in the way that the mother or primary caregiver co-regulates with the infant postnatal experiences. Consequently, infants become more self-regulated because of neurophysiological development in the central and autonomic nervous systems. Dyadic and self-regulation are important aspects of attachment (Schore & Schore 2008).

In the late 1980s, prevention and intervention programs focused on supporting early attachment security, but those programs were difficult to achieve. In 2000, Egeland and his colleagues suggested that such prevention and intervention program should emphasize on internal working models—the ability to predict and understand the actions of others, and parenting behaviors (Berlin, Zeanah, & Lieberman, 2008). In 2005, Berlin reviewed previous prevention and intervention programs. He found that prevention and intervention programs focused on improving attachment quality or maternal sensitivity were more successful than prevention and intervention programs that focused on attachment security as the primary outcome (Berlin et al., 2008).

In this study, attachment theory provides a useful framework for the understanding of parent involvement in the care of hospitalized preterm infants. According to the attachment theory, bonding begins during pregnancy and continues after birth. Parent-infant bonding and attachment are developed through physical closeness and parent-infant interactions such as holding, touching, seeing, comforting, breastfeeding, and caring for preterm infants (Klaus et al., 2013). Therefore, the attachment theory was used to guide the observation of parent-infant closeness and parent-infant interactions when parents provided care for their preterm infants. In addition, it was used to guide an interpretations of the data.