DEVELOPMENT OF THE FATHER INVOLVEMENT MODEL DURING PREGNANCY AND NEONATAL PERIOD

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ABSTRACT

A fathers' involvement has an impact on the child cognitively, emotionally, and socially as well as on the family relationships. This study is based on the Neuman Systems Model and was designed to examine the factors influencing a fathers' involvement in order to develop a father involvement intervention model to be implemented during the pregnancy and neonatal period to increase fathers' involvement in the family. Fathers were selected from antenatal care and postnatal care units in an Eastern community hospital in Thailand. The research and development design consisted of four phases: 1) Situation Analysis: the quantitative data were collected from self-administered questionnaires with 90 fathers-to-be and 116 fathers and qualitative data were collected from in-depth interviews with 12 stakeholders. Pearson's product-moment correlation, Spearman' s rank correlation coefficient, point-biserial correlation coefficient and backward multiple regression were used for quantitative analysis and content analysis was used for qualitative analysis; 2) Planning of Model Development: the process consisted of the identification of problems, construction of the nursing intervention instruments, and refinement of the nursing intervention instruments; 3) Model Implementation: 28 fathers and their partners and stakeholders participated in solving problems and responding to the needs of fathers and their partners; and 4) Model Evaluation: the nursing intervention was provided to 26 fathers and their partners and outcomes analyzed using repeated measures ANOVA.

The findings in the first phase showed two predictors (prenatal and postnatal care knowledge and attitude toward fatherhood) together, accounted for 31.5% of the variance for the fathers-to-be and three predictors (prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment) together, accounted for 33.2% of the variance for the fathers. Next, the father involvement model that emerged consisted of inputs, process, and outputs. First, the inputs of the model consisted of human resources, materials, time, and management. Second, in the process of this model, the nursing intervention was revised via the process of action for implementation, re-assessment, and re-planning to fit within the context of fathers and their families. Final, the outputs were evaluated for the effectiveness of the father involvement model. The results showed the mean score of prenatal and postnatal care knowledge significantly increased at one week after delivery while the mean scores of attitude toward fatherhood and marital relationship significantly increased at one month after delivery, and the mean scores of father competence, father involvement, and father-child attachment significantly increased at one week and one month after delivery.

The study suggests this model was successful in promoting fathers' involvement in the family. The key successes were derived from the collaboration between fathers, mothers, and health care providers which makes the model possible and sustainable.

KEY WORDS: FATHER INVOLVEMENT/ FATHERS/ PREGNANCY/ NEONATAL PERIOD/ NEUMAN SYSTEMS MODEL

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การพัฒนารูปแบบการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิด

DEVELOPMENT OF THE FATHER INVOLVEMENT MODEL DURING PREGNANCY AND NEONATAL PERIOD

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บทคัดย่อ

การมีส่วนร่วมของบิดามีผลต่อพัฒนาการของบุตรทั้งด้านสติปัญญา อารมณ์ และสังคม รวมทั้งสัมพันธภาพภายในครอบครัว การศึกษาครั้งนี้ภายใต้รูปแบบทฤษฎีระบบของนิวแมน เพื่อศึกษาปัจจัยที่ทำนายการมีส่วนร่วมของบิดา และพัฒนารูปแบบการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิด เก็บข้อมูลจากบิดาและคู่สมรสที่แผนกฝากครรภ์และหลังคลอดของโรงพยาบาลแห่งหนึ่งในภาคตะวันออก รูปแบบการศึกษาเป็นการวิจัยและพัฒนา โดยแบ่งเป็น 4 ระยะคือ 1) การประเมินสถานการณ์ เก็บข้อมูลจากการตอบแบบสอบถามด้วยตนเองของบิดาที่คู่สมรสอยู่ในระยะตั้งครรภ์ 90 ราย และบิดาที่คู่สมรสอยู่ในระยะหลังคลอด 116 ราย สัมภาษณ์ผู้มีส่วนเกี่ยวข้อง 12 ราย วิเคราะห์ข้อมูลเชิงปริมาณใช้สัมประสิทธิ์สหสัมพันธ์เพียร์สัน สัมประสิทธิ์สหสัมพันธ์สเปียร์แมน สัมประสิทธิ์สหสัมพันธ์แบบพอยท์ไบซีเรียน และการวิเคราะห์การถดถอยเชิงพหุ ข้อมูลเชิงคุณภาพใช้การวิเคราะห์เชิงเนื้อหา; 2) การวางแผนพัฒนารูปแบบประกอบด้วยการระบุปัญหา การสร้าง และการปรับปรุงเครื่องมือที่ใช้ในการจัดกิจกรรมการพยาบาล; 3) การดำเนินงานพัฒนารูปแบบ บิดาและคู่สมรส 28 คู่ และผู้มีส่วนเกี่ยวข้อง ร่วมกันหาแนวทางในการแก้ไขปัญหาและตอบสนองความต้องการของบิดาและคู่สมรส; และ 4) การประเมินรูปแบบ เก็บข้อมูลจากบิดาและคู่สมรส 26 คู่ และวิเคราะห์ข้อมูลโดยการวัดความแปรปรวนแบบวัดซ้ำ

ผลการศึกษา ในระยะที่ 1 พบว่า ความรู้เกี่ยวกับการดูแลก่อนและหลังคลอดและทัศนคติต่อบทบาทของบิดา สามารถร่วมกันอธิบายการมีส่วนร่วมของบิดาที่คู่สมรสอยู่ในระยะตั้งครรภ์ได้ร้อยละ 31.5 และความรู้เกี่ยวกับการดูแลก่อนและหลังคลอด ทัศนคติต่อบทบาทของบิดา และสัมพันธภาพระหว่างบิดาและบุตร สามารถร่วมกันอธิบายการมีส่วนร่วมของบิดาที่คู่สมรสอยู่ในระยะหลังคลอดได้ร้อยละ 33.2 การพัฒนารูปแบบการมีส่วนร่วมของบิดาประกอบด้วย 1) ปัจจัยนำเข้า ได้แก่ บุคคล อุปกรณ์การสอน เวลา และการบริหารจัดการ; 2) กระบวนการ โดยกิจกรรมการพยาบาลจะถูกปรับปรุงผ่านกระบวนการดำเนินงาน ประเมินผล และวางแผนการดำเนินงานอย่างต่อเนื่อง เพื่อให้เหมาะสมกับบริบทของบิดาและครอบครัว; และ 3) ผลที่เกิดขึ้น เป็นการประเมินประสิทธิภาพของรูปแบบการมีส่วนร่วมของบิดา ผลการศึกษาพบว่า คะแนนเฉลี่ยของความรู้เกี่ยวกับการดูแลก่อนและหลังคลอดเพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติในระยะ 1 สัปดาห์หลังคลอด ขณะที่ทัศนคติต่อบทบาทของบิดาและสัมพันธภาพระหว่างคู่สมรสเพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติในระยะ 1 เดือนหลังคลอด ส่วนสมรรถนะการเป็นบิดา การมีส่วนร่วมของบิดา และสัมพันธภาพระหว่างบิดาและบุตรเพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติทั้งในระยะ 1 สัปดาห์ และ 1 เดือนหลังคลอด

รูปแบบการมีส่วนร่วมของบิดานี้สามารถใช้เพื่อส่งเสริมการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิดได้ โดยปัจจัยความสำเร็จที่ทำให้รูปแบบการมีส่วนร่วมของบิดาเป็นไปได้จริงและยั่งยืน คือ ความร่วมมือระหว่างบิดา มารดา และบุคลากรทางการสาธารณสุข

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LIST OF ABBREVIATION

AS	Appraisal Support
ATF	Attitude Toward Fatherhood
ES	Emotional Support
FC	Father Competence
FCA	Father-Child Attachment
FI	Father Involvement
HA	Household Activities
IA	Infant Care Activities
IFS	Information Support
IFS-F	Functional Status–Fathers
IS	Instrumental Support
MR	Marital Relationship
OA	Occupational Activities
PA	Personal Care Activities
PCK	Prenatal and Postnatal Care Knowledge
PIAQ	Paternal Infant Attachment Questionnaire
PSOC	Parenting Sense of Competence
RDAS	Revision Dyadic Adjustment Scale
ROFQ	Role of the Father Questionnaire
SCA	Social and Community Activities

CHAPTER I
INTRODUCTION

1.1 Background and Significance

The transition to fatherhood is acknowledged as a crucial period in the family life cycle (Duvall, 1967; Genesoni & Tallandini, 2009; Wandersman, Wandersman, & Kahn, 1980). Because this period presents various challenges and pressures to fathers, it can shape the fathers' attitude and behaviors about their parent role (Buston, 2010). The transition to fatherhood refers to the period from the beginning of pregnancy through 6 weeks after the birth of a baby (Robinson & Barret, 1986). Although short in length, the transition period is long on responsibilities and tasks as married pairs develop their marriage relationship and parent role concurrently. In order to be a good parent, the fathers must undergo changes and adaptations during this period (Knox & Schacht, 2010). However, if an unsuccessful transition occurs, the fathers, their partners, and other members of families such as siblings will be confronted with maladaptation and negative behaviors such as leaving or ignoring their child, family violence, and divorce.

Empirical evidence has consistently supported the importance of quality and style of fathers' care and interaction in the development of children and well-being of family (Castillo & Fenzl-Crossman, 2010; Fägerskiöld, 2008; Premberg, Hellström, & Berg, 2008). Research studies show a positive relationship with the father's involvement can enhance the cognitive abilities (Nettle, 2008; Poehlmann & Fiese, 2001; Yogman, Kindlon, & Earls, 1995) and emotional responsiveness (Harper, 2010) of a child, good maternal role adaptation (Mamark, 2007; Promneramit, 2005), and ultimately healthy family relationships (Doherty, Erickson, & LaRossa, 2006; Harper, 2010; McVeigh, Baafi, & Williamson, 2002; Poehlmann & Fiese, 2001). In other words, if the fathers separate from their children, it will impact the children in the future as they may feel lonely, lack self confidence and lack the warmth felt in

families, as well as grow to be a problematic adult (Biller, 1970). These studies support the significant of fathers' involvement in parenting activities.

In order to increase the fathers' involvement, several complex factors have been associated with the fathers' involvement during pregnancy and neonatal period. Stress is one of those factors. The stressor concept in the Neuman Systems Model (Neuman & Fawcett, 2002; 2011) is composed of the intrapersonal stressors, interpersonal stressors, and extrapersonal stressors which recognizes the important of stressors on human behaviors. First, intrapersonal stressors of fathers such as age (Gavin et al., 2002; McVeigh et al., 2002; Sevil & Özkan, 2009), knowledge (Cabrera, Fagan, & Farrie, 2008; Hoza, et al., 2000; Nirach, 1999), and attitude (Buston, 2010; McVeigh et al., 2002; Raojutitham, 2006) are considered to be the important factors. For the interpersonal stressors, the number of children in their families (Harper, 2010; McVeigh et al., 2002), family relationships (Carter, 2002; Coley & Hernandez, 2006; Raojutitham, 2006) and social support (Castillo & Fenzl-Crossman, 2010; Crummette, Thompson, & Beale, 1985; Mc Bride & Rime, 1997) are found to be factors. Finally, the extrapersonal stressors are related to how much the fathers are involved with seeking occupational status (Gavin et al., 2002; Sevil & Özkan, 2009), educational level (Harper 2010; Sevil & Özkan, 2009), economic status (Nettle, 2008; Sevil & Özkan, 2009), health care services (Ahldén et al., 2008), and the impact of the normative social culture (Cabrera et al., 2008; Carter & Speizer, 2005).

Worldwide, there is recognition that father preparation programs help fathers and pregnant women through the transitional process by decreasing their anxiety about their ability to support and care for their partners and babies. If the transition of their family goes well, the chances of normal outcomes of pregnancy and the immediate time period after birth will improve (Imle, 1990). Thus, the transition to fatherhood requires good role models to perform as a good parent. Recently, several studies have shown the importance of father preparation programs for fathers and their families. Studies have shown the impact of programs on the outputs such as knowledge (Doherty et al., 2006; Kongnguen, 2002; Naunboonruang, 2002), attitude (Klunketrgit, 2006; Mendez-Baldwin & Busch-Rossnagel, 2003; Wagner & Clayton, 1999), and competence (Gibaud-Wallston, 1977; Mendez-Baldwin & Busch-Rossnagel, 2003; Pisterman et al, 1992) and fathers' involvement in caring for their

partners and babies (Doherty et al., 2006; Turan, Nalbant, Bulut, & Sahip, 2001). Furthermore, the interventions also encourage the outcomes such as healthy family relationships (Cabrera, Shannon, Mitchell, & West, 2009; McVeigh et al., 2002) and father-child attachment (Mamark, 2007; Promtong, 2007).

From the above evidence, health care professionals should give guidance, support, and preparation to prospective parents, both fathers and mothers, regarding maternal and child care during pregnancy, childbirth, and after childbirth. From the review, the active participation should be conducted specifically for fathers. Lamb and colleagues (2004) suggested that the intervention outcomes for fathers were influenced by their motivation to be involved, perceived parental skill level, and support from others to be involved as fathers such as mothers, relatives, and friends. On the other hand, the barriers to fathers' involvement included no models of father nurturers, no needs to care their babies, negative feedback from their own parents, and exclusion from health services. However, high involvement is likely to occur when fathers are more motivated to be involved, have more opportunities to participate in child care, and have approval and support for family activities from their families and community, especially their workplace. Therefore, an effective nursing intervention for increasing the fathers' involvement should rely on the fathers' readiness, opportunity, and satisfaction in the participation.

1.2 Statement of the Problem

Nowadays, there has been a drastic change in Thai society as a result of the successful implementation of national development focusing on the industrial development. The family livelihood and family structure have changed from an extended family to a nuclear family. The empirical evidence shows the family size is shortened from the average of 5.2 persons/family in 1980 to 3.4 persons/family in 2004 (Ministry of Public Health: MOPH, 2007). Furthermore, the mothers' role has changed from the primary caregivers for childrearing to the role of financial providers. As can be seen from the urban community situation, many mothers need to work outside of the home to financially support their families and fathers must also work hard. From Families Network Foundation and Referendum Centre, Ramkhamhaeng

University (2003), a report on 1,066 parents in Bangkok revealed that 43% of the parents participated in their family activities only 1 to 3 hours per day; therefore, they might feel estranged from their children.

These lifestyle changes impact family relationships negatively; there is less time for the family to congregate together, and less assistance from fathers for childrearing. As can be seen from the report by MOPH (2007), the divorce rate increased from 10.5% in 1994 to 25.1% in 2006. Furthermore, the fathers' participation rate in encouraging child development (such as playing, reading, drawing, and painting) in the whole Kingdom of Thailand was only 57.5%. The lowest rate (43.6%) of fathers' participation was in the Northeastern area. The National Statistical Office of Thailand (2010) also indicated that only 34.1% of the fathers participated in a group of education class to receive maternal child health information from health care providers, with rural respondents having slightly higher father participation than urban (35.7% versus 28.8%). The fathers' participation was highest in the north region (46.4%) and lowest in the central region (31.7%), especially in Bangkok (13.7%). For children; however, both fathers and mothers should jointly care for them with affection, safety, and thoughtfulness. Thus, these reports support the low involvement of fathers in parenting activities in Thailand.

In Chon Buri Province, a part of Eastern Sea Board focusing on the industrial development, families are affected by this focus and results in the high rate of divorce. From the database in 2010, the number of divorces in Chon Buri Province was the highest in the eastern region and the second highest in the whole Kingdom of Thailand (Department of Provincial Administration, 2010). Ban Bueng District, the setting of this study, located in the center of Chon Buri Province is significantly impacted by these social changes. Like other parts of Chon Buri Province, the rapid expansion of industry has shifted the labor force from agricultural to industrial activities. There are 499 factories and 38,198 workers in the factories (Chonburi Commercial Institution, 2008). In addition, there is the increasing rate of migration from provinces in the North and Northeast regions of Thailand for employment by the industrial sector. Therefore, the nuclear family is a characteristic of most municipality population in Ban Bueng District. It can be stated that the level of father involvement is similar to that in the urban community of Thailand.

According to an interview with 10 pregnant women in the third trimester of pregnancy in March 2011 and 10 mothers 1 month after delivery in June 2011, all of both pregnant women and mothers indicated that the fathers-to-be/fathers should reduced time for going or drinking with their friends. During pregnancy, all of them needed support from the fathers both physiologically and psychologically in the last trimester of pregnancy (such as staying at home, relieving common discomforts, and caring for them at night). They (80%) also needed their partners to participate in the household chores (such as financial management, house cleaning, and meal planning). However, they (60%) did not need their partners leave their jobs to attend a health education at the hospital due to a time limit of stopping work which affected their bonus in each month. Furthermore, all mothers thought that pregnancy, childbirth, childrearing and household chores were the roles and functions of mothers (100%) and 70% of them thought that they could care for babies better than fathers because the fathers lacked self confidence in baby care. However, 70% of them needed their partners to help them to care for their babies and do household chores (50%) and they also needed them to work hard to increase in family income (100%). Therefore, fathers should increase in their baby care, household and occupational activities, while personal, social, and community activities (listening to music, watching television, and socialization with their friends) should be reduced.

Under these pressured conditions, both fathers and mothers experience greater parent role stress, especially the first time parent. Mothers not only have responsibility for the family's economic status, but also for child care and other household responsibilities. On the other hand, the fathers have changed their role from only breadwinners or financial providers and do not participate extensively in childrearing nor provide involved support of their partners and children. Hence, the transition to fatherhood under these conditions is more difficult and sophisticated because it is expected that the fathers will fulfill their responsibilities as a good parent and appropriately integrate the activities that they did in the past with the father role (McVeigh et al., 2002; Tulman, Fawcett, & Weiss, 1993). Therefore, the characteristics and degree of fathers' involvement during the last trimester of pregnancy and neonatal period in Thai culture should be identified to promote the fathers involvement in the care of their partners and babies.

The review of existing literature shows that most of the father involvement programs are provided in a variety of settings including hospital based programs, community based programs, and both. Most of them are often reported as a hospital based program but there are a few community based program. In Thailand; however, most of such interventions have been conducted in clinical settings as hospital based approaches. Unfortunately, these interventions have been used for a short period time such as pregnancy (Porntragoonthub, 2008; Promtong, 2007), childbirth (Mamark, 2007; Nungkla, 2003), and childrearing (Kongnguen, 2002; Naunboonruang, 2002; Promneramit, 2005). Moreover, most studies do not analyze the factors influencing the fathers' involvement and the needs or problems of fathers, families, and health care providers to create the intervention or program in promoting the fathers' involvement. To date; therefore, there is limited evidence to indicate how the father involvement interventions are based on the problems and needs of the involved parties.

Based on the aforementioned literature, the Neuman Systems Model (Neuman & Fawcett, 2002; 2011) as the contextual framework via the research and development process can prove helpful in promoting the fathers' involvement. This study was conducted in four phases including situation analysis, planning of model development, model implementation, and model evaluation. First, in the situation analysis, the stressor concept of the Neuman Systems Model as the environment of family system was used to explore the factors influencing the fathers' involvement with the participation of stakeholders including fathers-to-be/fathers, pregnant woman/ mothers, nurses, and village health volunteers. This phase was applied via the quantitative and qualitative methods. Second, the strategies of nursing intervention were identified in the planning of model development phase to deal with the situation that encompassed the fathers-to-be/fathers and their families. The primary and secondary prevention concepts were used to explain the process of nursing intervention in order to increase the ability to function as a good father and maintain the family wellbeing. Third, in the model implementation, three main steps of research and development including action for implementation, re-assessment, and re-planning were used to improve the nursing intervention with a real situation. A specific advantage of research and development is that it engages stakeholders to solve and resolve the gaps among the actual problems. Finally, the last phase evaluated the

outputs and outcomes of the father involvement model in the third trimester of pregnancy and neonatal period. This process will assist nurses and other health care providers to understand the actual problems of fathers and their families. Therefore, the Neuman Systems Model as the theoretical framework and the research and development as a methodology are well suited for the current study.

1.3 Research Questions

This study examined the following research questions:

1. What are the factors influencing the fathers' involvement during pregnancy and neonatal period?

2. What is a father involvement model during pregnancy and neonatal period?

3. How does a father involvement model during pregnancy and neonatal period influence the change of fathers after completing the nursing intervention?

1.4 Research Objectives

General objective:

To develop the father involvement model during pregnancy and neonatal period.

Specific objectives:

The specific aims of this study were as follows:

1. To examine influencing factors on the fathers' involvement during pregnancy and neonatal period.

2. To develop the father involvement model for promoting the fathers' involvement during pregnancy and neonatal period.

3. To evaluate the outputs and outcomes of the father involvement model during pregnancy and neonatal period after completing the nursing intervention.

1.5 Research Hypotheses

The hypotheses to the study were as follows:

1. During pregnancy and neonatal period, the intrapersonal stressors (including age, educational level, prenatal and postnatal care knowledge, attitude toward fatherhood, and father competence), interpersonal stressors (including maternal relationship, father-child attachment, and family characteristics), and extrapersonal stressors (including occupational status and economic status) will be predictors of the father involvement.

2. After participating in a nursing intervention, the fathers will have higher score levels of output variables (including prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement) and outcome variables (including maternal relationship and father-child attachment) than before participation in a nursing intervention.

1.6 Operational Definitions

"Father involvement model" referred to the model which was developed to promote the fathers' involvement during pregnancy and neonatal period based on the Neuman Systems Model (Neuman & Fawcett, 2002; 2011) via a process of the research and development. The model components were created based on the situation analysis that the stakeholders in the research setting including fathers-to-be/fathers, pregnant women/mothers, nurses, and village health volunteers participated in the model development. The musing intervention as the primary and secondary prevention covered the care for their partners and babies in the third trimester of pregnancy and neonatal period. The father involvement intervention model was conducted and revised through three steps including the action for implementation, re-assessment, and re-planning process. Therefore, the outputs and outcomes of the father involvement model presented the stability of fathers' involvement in the third trimester of pregnancy and neonatal period.

"Father involvement" referred to the fathers-to-be/fathers' activities during their partners' pregnancy and postnatal period. The father involvement was measured by using the Inventory of Functional Status–Fathers (IFS-F) (Tulman et al., 1993). In this study, this scale consists of five subscales including personal care activities, household activities, infant care activities, occupational activities, and social and community activities. This variable is measured as a sum score of fathers' involvement. The high scores indicate favorable father involvement.

"Prenatal and postnatal care knowledge" referred to the fathers-to-be/ fathers' knowledge related to maternal and child care during pregnancy, childbirth, and after birth. The prenatal and postnatal care knowledge was measured by using the Prenatal/ Postnatal Care Knowledge Scale (Ickovics, 2003). The scale was used to assess knowledge of prenatal and postnatal maternal and infant care on the main content areas such as nutrition, labor, and baby care. This variable is measured as a sum score of fathers' knowledge. The higher scores indicate adequate prenatal and postnatal care of the fathers-to-be/fathers.

"Attitude toward fatherhood" referred to the fathers-to-be/fathers' attitude based on feelings, opinions, and belief of the fathers-to-be/fathers towards fatherhood. The attitude toward fatherhood was measured by using the Role of the Father Questionnaire (ROFQ) (Palkovitz, 1984). The scale was used to measure the fathers-to-be/fathers' feelings, opinions, and belief that the father's role is important to child development. This variable is measured as a sum score of fathers' attitude. Higher scores are indicative of attitude that the fathers-to-be/fathers are capable and should be involved with and sensitive to their children.

"**Father competence**" referred to perception of the fathers-to-be/fathers on competence as a good parenting. The father competence was measured by using the Parenting Sense of Competence (PSOC) (Gibaud-Wallston & Wandersman 1978). The scale consists of two subscales including skill/knowledge and valuing/comfort. This variable is measured as a sum score of father competence. The higher scores indicate adequate perceived parenting competence of the fathers-to-be/fathers.

“Marital relationship” referred to the feelings and expressive behaviors that show the relationship between the fathers-to-be/fathers and their partners. The marital relationship was measured using the Revision Dyadic Adjustment Scale (RDAS) (Busby, Christensen, Crane, & Larson, 1995). The scale has three subscales including consensus, satisfaction, and cohesion. This variable is measured as a sum score of marital relationship. The higher the scores, the better adjusted the couple is.

“Father-child attachment” referred to the feelings and expressive behaviors that show the relationship between the fathers-to-be/fathers and their babies. The father-child attachment was measured by using the paternal infant attachment questionnaire (PIAQ) (Condon, Corkindale, & Boyce, 2008). The scale has three subscales including patience and tolerance, pleasure in interaction, and affection and pride. This variable is measured as a sum score of father-child attachment. Higher scores indicate higher the father’s attachment to the child.

1.7 Conceptual Framework

The conceptual framework for the study of the development of father involvement model during pregnancy and neonatal period was based on the Neuman Systems Model which created by Betty Neuman and literature review. The environment of family system influencing the fathers’ involvement refers to the stressor concept including intrapersonal, interpersonal, and extrapersonal stressors. According to the literature on the father involvement, the intrapersonal stressors consisted of fathers’ age and educational level, prenatal and postnatal care knowledge, attitude toward fatherhood, and father competence. The interpersonal stressors were composed of marital relationship, father-child attachment, and family characteristics). Final, the extrapersonal stressors comprised occupational and economic status. In the situation analysis of the research setting, the stressors surrounding the family system play a role in the ability of the father to function adequately.

Since the identified factors were used to create the intervention strategies in encouraging the father involvement, the primary and secondary prevention concepts were explicated. As a primary prevention, the nursing intervention was conducted to

prepare the fatherhood readiness for fathers-to-be. This intervention helped fathers-to-be to increase knowledge and understand the father role and function for strengthening belief system, life style, and socioculture of family system as a flexible line of defense. Then, an increasing ability to function as a good father such as appropriate activities in their daily life and social life, budget preparation, and care for the pregnant women indicated an intact normal line of defense for family system. After that, the nursing intervention was conducted as the secondary prevention. This intervention helped to increase the fathers' skills in the care for their partners and babies after delivery as strengthening the lines of resistance in order to maintain the family wellbeing.

Finally, the outputs and outcomes of implementation were examined the effectiveness of the father involvement model during pregnancy and neonatal period. The outputs were evaluated by using prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement while the outcomes were evaluated by using marital relationship and father-child attachment. The conceptual application in this study offers a clearer understanding of comprehensive process of the father involvement model development as shown in Figure 1-1.

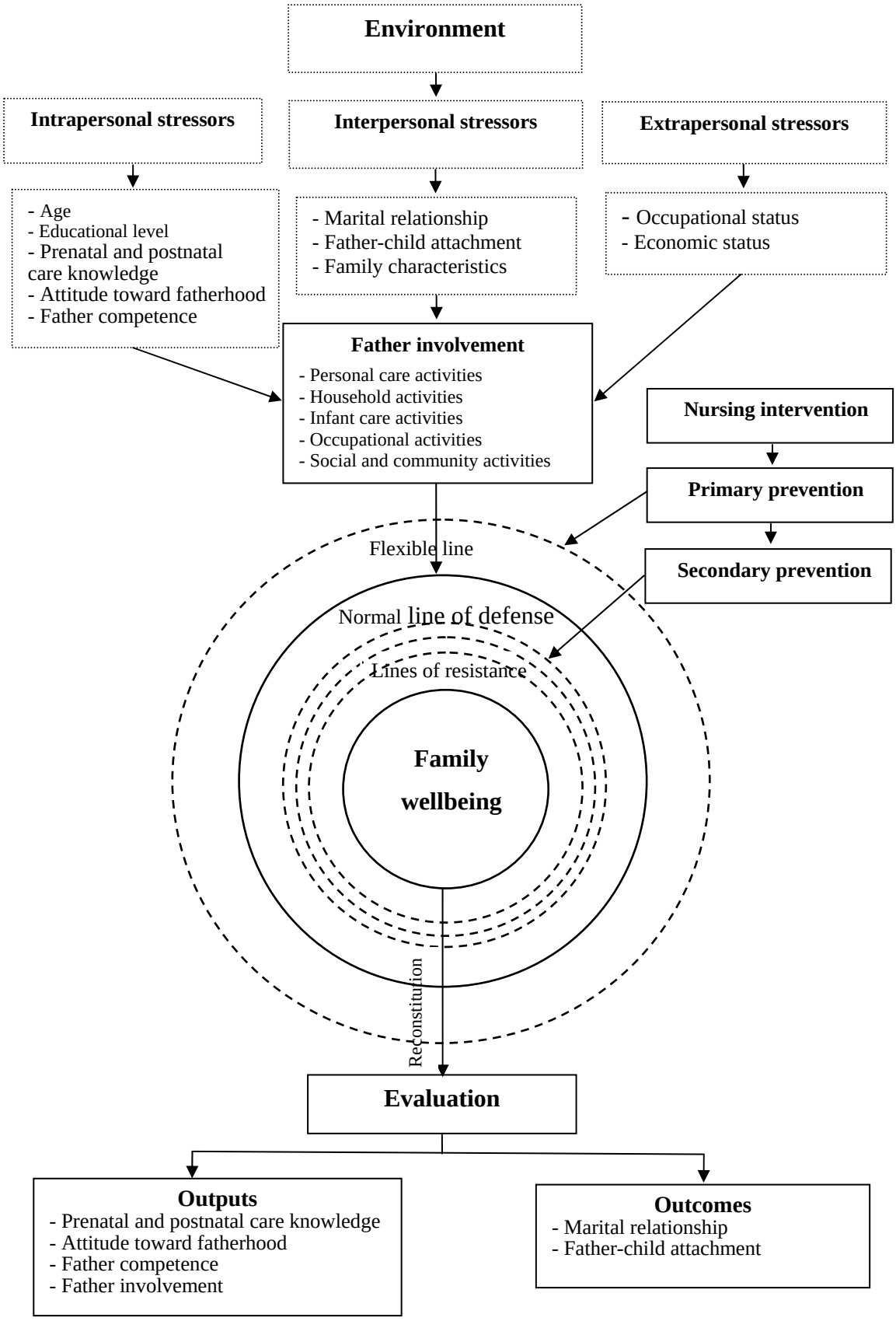


Figure 1-1 The conceptual framework for this study

CHAPTER II
LITERATURE REVIEW

An extensive review of the literature regarding the father's involvement during pregnancy and neonatal period was completed. This chapter is a review of literature focusing on developing a model to promote the fathers' involvement during pregnancy and neonatal period. The research articles included in this literature review was conducted by using a search of four electronic databases including Science direct, CINAHL, Pubmed, and JSTOR. Keywords used in database searches consisted of "father", "paternal", "pregnancy", "childbirth", "infant", and "neonatal". Furthermore, the textbooks served as background information on the fathers' involvement. In this chapter, the English-language and Thai-language articles and textbooks were considered. Therefore, the theories, concepts, and several studies are organized into seven sections as follows:

1. Fathers' involvement during pregnancy and neonatal period
2. The Neuman Systems Model
3. Factors influencing the fathers' involvement
4. Impact of fathers' involvement on development of families
5. Health education program to promote the fathers' involvement
6. The study context

2.1 Fathers' Involvement during Pregnancy and Neonatal Period

Nowadays, the father involvement is an interesting issue of study for researchers, not only because of the lack of previous evidences, but also because the perceptions of types or style and expectations for the fathers' involvement have changed according to the culture in each society over the years (Pleck & Masciadrelli, 2004). Several studies have described the responsibilities and developmental tasks for fathers in relation to the pregnancy, childbirth, and after birth. The characteristics of

fathers' involvement are consisted of three aspects including behavioral, cognitive, and emotional involvement (Flouri, 2005; Palkovitz, 2002). The involved fathers should participate in the daily tasks of child rearing and nurturing and share equally in their family responsibilities such as household chores (Gerson 1997). However, it needs to understand the other idea of fathers in order to enhance them to be as a good involved father. The other characteristics of fathers consist of bystander, supporter of partner, and head of the family (Kaila-Behm & Vehviläinen-Julkunen, 2000). Firstly, the bystander is not willing to take care of the baby and do the household chores. Secondly, the supporter of partner shares the baby care and household chore tasks with their partners when the help is needed. Finally, head of the family is interested in the work to increase the family income but takes a less active part in the care of the baby.

Father involvement is a behavior pattern, responsibility, or developmental task of fathers, like mothers' role attainment. Historically, parents in two families occupy the traditional gender role while the mothers also fulfill the role as the primary caregiver for their babies and the fathers fulfill the role of breadwinner. Recently, both fathers and mothers in many families are both working to support their families; thus meaning the mothers should be more than caregiver of their babies. With mothers working not only part-time but also full-time, there is greater demand for fathers to be involved in childbearing, childrearing, and household chores, especially in the period of pregnancy, childbirth, and after birth.

The function status of father is used for measuring the fathers' role behaviors during their spouses' pregnancy and after birth with a first time and working (Tulman et al., 1993). The function status of father based on the need for social integrity consists of 1) primary role behaviors including personal care activities, 2) secondary role behaviors including infant care activities, household activities, and occupational activities, and 3) tertiary role behaviors including social and community activities as described below.

1. Primary role behaviors

The primary role behaviors are the focus of the personal care activities. The personal care activities are the term to refer to daily self-care activities of the fathers including eating, bathing, shaving, exercising, watching television, listening to music, etc. The study in Australia reported over 50% of fathers reduced the leisure time to spend the

exercising, watching television, listening to music and reading during their spouses' pregnancy and the postnatal period (McVeigh, St John, & Cameron, 2005). Furthermore, the study in Turkey revealed that the educational level and income of fathers affected the personal care activities (Sevil & Özkan, 2009). The mean score in personal care activities of fathers with a high level of education was higher than that of fathers with low level of education but there was no difference with respect to the partners' educational level. While the mean scores in this subscale of the fathers with an average or good level of income were higher than that of the fathers with a low income.

2. Secondary role behaviors

The secondary role behaviors are composed of the infant care activities, household activities, and occupational activities as described below.

2.1 Household activities

During pregnancy and after birth, the mothers and babies have changed both physical and psychological aspects. The fathers need to increase the household chores by sharing the household activities such as financial planning and management, house shopping, house cleaning, cooking, dish washing, laundry and ironing. Roopnarine, Brown, Snell-white, and Riegra (1995) reported that a gender of parent was a significant main effect indicating that the mothers were more likely to be involved in the household activities than the fathers were (spending 2.73 hours/day for mothers and 1.13 hours/day for fathers). However, the study in Australia reported that most of the fathers (66%) involved in household chores, 30% of them managed around the home and with their families to increase in their involvement, and 12% of them were working their job for a long time outside the home but only 1.5% of them provided their household chore tasks in the postnatal period (McVeigh et al., 2002). While another study in Australia revealed that 66% of the fathers maintained their usual work hours and 17% of them were working for a long time outside their home since becoming a father (McVeigh et al., 2005).

2.2 Infant care activities

The infant care activities are a major role of the fathers' involvement to care, protect, and promote the physical and emotional child development in the early period after childbirth. These activities are the term of the daily care activities of infants including the physical care (such as daytime and

nighttime feeding, changing the diaper, bathing, dressing their babies, holding and playing with their babies), and the emotional care (such as hugging and kissing their babies, and soothing their babies at day and night time when they cried). Roopnarine, and colleagues (1995) presented that the mothers spent more time in feeding, washing, bathing, and holding or playing with the babies than the fathers. The study in Australia reported that 37% of the fathers had assumed their desired level of involvement in the infant care activities (McVeigh et al., 2002) while in 2005 only 10% of them had assumed their desired level of involvement in this responsibility with the lowest mean score for all of aspects (McVeigh et al., 2005). In addition, the study in Turkey revealed the infant care mean score was different in each occupational status of the fathers; for example, in this subscale the mean score of fathers who were the civil servants was higher than that of fathers with tradesmen (Sevil & Özkan, 2009).

2.3 Occupational activities

The occupational activities such as achieved work goals, worked usual number of hours, and accomplished usual amount of work at my job are viewed as the principle function of fathers to earn money for their families. The study in Australia reported that 66% of the fathers maintained their usual work hours and 17% of them were working longer hours for their job outside the home since being a father (McVeigh et al., 2005). Furthermore, the study in Turkey revealed that the educational level and income of the fathers had an effect on the occupational activities (Sevil & Özkan, 2009). The mean score in occupational activities of the fathers with a high educational level was higher than that of fathers with a low level; however, there were no mean score differences of the mothers in each educational level. Inspection of effect of fathers' income on the occupational responsibilities was found that the mean scores of fathers with average or good levels of income were higher than those of fathers with a low income.

3. Tertiary role behaviors

The tertiary role behaviors are captured in the social and community activities. For adjustment to changes as a good parent, the fathers need to learn the appropriate social and community responsibilities and balance the needs of their work, society, and family. Although the social and community responsibilities are relied on understanding between the fathers and their partners in each couple, during pregnancy

and childrearing period, most mothers require the changes of fathers' behaviors in social activities and lifestyle and the priority setting in each activities in their family life such as normal work, earning of wages, entertaining in family, stay home or travel with their partners and children or reducing socialization with friend. The study in Australia reported that 36% of the fathers involved in social and community activities and almost 60% of them socialized less with their friends and a similar number reduced the amount of time spent at clubs or pubs (McVeigh et al., 2002). Thus, it can conclude that the fathers should reduce the time and activities in the social and community responsibilities.

Summary of the fathers' involvement

The fathers' involvement during pregnancy and neonatal period can be assessed by using the concept of function status of fathers. For the first time fathers, this concept consists of personal care activities, infant care activities, household activities, occupational activities, and social and community activities. Several studies support that the fathers should increase in some activities of household chores, infant care, and occupational responsibilities. At the same time, a decrease in some activities should be identified in the personal care activities and social and community activities to increase the involvement in household work, baby care, and occupational activities with their partners. Therefore, in the transitional period, the fathers should reorganize and balance between the father function and the activities that they did in the past to increase the involvement during pregnancy and neonatal period as a good parent.

2.2 The Neuman Systems Model

The Neuman Systems Model was created to understand the nursing variables in a course emphasizing breadth rather than depth by Betty Neuman. The unique focus of the Neuman Systems Model is the wellness and illness of client/client system associating with environment and stressors (Neuman & Fawcett, 2002). This model is useful in all areas of nursing, especially the wellness of client/client system (Neuman, 1995). To clarify the relationship of variables affecting a client, the Neuman Systems Model is explained in terms of five concepts as below (Figure 2-1).

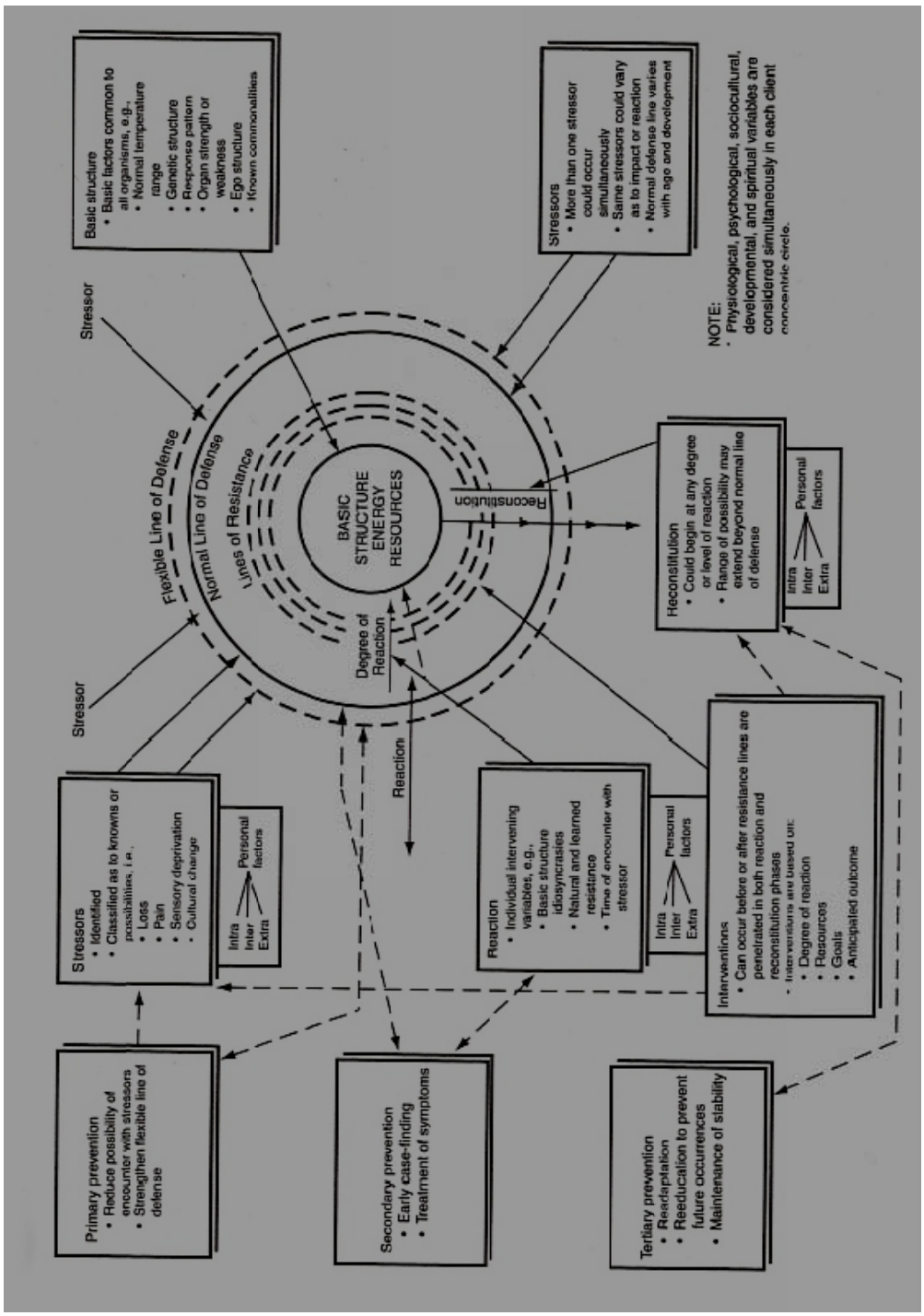


Figure 2-1 Original diagram of the Neuman Systems Model (Neuman & Fawcett, 2011)

2.2.1 Stressors

Stressors are tension-producing stimuli occurring within both the internal and external environmental boundaries of the client/client system. They may penetrate both the flexible and normal lines of defense, resulting in either a positive or negative outcome. Moreover, they have potential for reaction with the client and influence reconstitution after treatment. In the Neuman Systems Model, the stressors are classified as follows (Neuman, 1995; Neuman & Fawcett, 2011).

1) Intrapersonal stressors: they are internal environment forces occurring within the boundary of the client/client system (such as conditioned response).

2) Interpersonal stressors: they are external environment interaction forces occurring outside the boundaries of the client/client system at the proximal range (such as role expectations or communication patterns).

3) Extrapersonal stressors: they are external environment interaction forces occurring outside the boundaries of the client/client system at the distal range (such as social policies and financial concern).

2.2.2 Client or client system

A client/client system is viewed as the person and composed of individual, family, community, and social issue. The client/client system is represented by a series of concentric ring or circles surrounding a basic structure. The concentric circles including flexible line of defense, normal line of defense, and lines of resistance function essentially as protective mechanisms for the basic structure to preserve client system integrity. Furthermore, the client/client system contains protective element related to the five variables including physiological, psychological, developmental, sociocultural, and spiritual. The details of client/client system components are described as follows (Neuman, 1995; Neuman & Fawcett, 2002; 2011).

1) Basic structure

The core structure is shown by the central including basic survival factors such as normal temperature, response pattern, organ strength or weakness, ego structure and known commonalities.

2) Flexible line of defense

The flexible line of defense shown by the outer, broken circle surrounding the normal line of defense acts as a protective system for the client's normal by preventing stressor invasions. Some examples are coping patterns, life-style, and developmental, sociocultural, and belief system influences.

3) Normal line of defense

The normal line of defense, the solid boundary line that encircles the internal lines of resistance, defines as the ability to maintain stability and integrity of the client/client system. The normal defense line is the standard against determining any variance from wellness.

4) Lines of resistance

The lines of resistance are shown as the series of concentric broken circles surrounding the basic structure. They act as protection factors activated when stressors have penetrated the normal line of defense to stabilize the client system as the wellness level. An example of lines of resistance to support the client's basic structure and normal line is the activation of immune system mechanisms.

2.2.3 Environment

The environment is defined as internal and external influences surrounding the identified client system. This model identifies three relevant environments. Firstly, internal environment exists within the client system and correlates with intrapersonal stressors. The external environment exists outside the client system and correlates with inter and extrapersonal stressors. Finally, created environment represents an open system exchanging energy with both the internal and external environment.

2.2.4 Health

Health is views as a manifestation of living energy available to preserve and enhance system integrity. It is envisioned as being at various, changing level within a normal range, rising or falling throughout the life span because of satisfactory or unsatisfactory adjustment by the client/client system to environment stressors. The wellness-illness continuum implies that energy flow is continuous between the client system and the environment. The wellness is the condition in which all system part

and subparts are in harmony with the hold system of the client and then the variances from wellness are caused by stressor invasion of the normal line of defense. On the other hand, the illness is a state of insufficiency with disrupting needs unsatisfied and the reconstitution is defined as the return and maintenance of system, following treatment of stressor reaction, which may result in a higher or lower level of wellness.

2.2.5 Nursing

The major concern for nursing is in keeping the client systems stable through accuracy in assessing the effects and possible effects of stressors and assisting client adjustments required for an optimal wellness level. To keep the stable system, nursing actions are initiated to best retain, attain, and maintain optimal client health via the preventions. Three preventions of the model are described as follows.

1) Primary Prevention

Primary prevention as intervention is to protect the normal line of defense or usual wellness state by strengthening the flexible line of defense. This prevention is aimed at promoting client wellness by stress prevention and reduction of risk factors. Thus, it includes a variety of strategies for health promotion.

2) Secondary Prevention

Secondary prevention as intervention is to protect the basic structure by strengthening the lines of resistance and reducing the reaction. This prevention is aimed at providing appropriate treatment of symptoms to attain optimal client system stability or wellness and energy conservation.

3) Tertiary Prevention

Tertiary prevention as intervention is used as wellness maintenance that is to protect client system reconstitution or return to wellness following treatment. This prevention is aimed at maintaining an optimal wellness level by supporting existing strengths and conserving client system energy.

Summary of the Neuman Systems Model

The Neuman Systems Model is useful for understanding the nursing variables in a course emphasizing breadth. This model is based on the concepts of stress and the reaction to stress. The unique focus of the model is the wellness and

illness of client/client system which associates with the environment and stressors. According to the applicable metaparadigm, the human being is the client/client system including basic structure, flexible line of defense, normal line of defense, and lines of resistance. The environment includes the internal, external, and created environment and stressors (intrapersonal, interpersonal, and extrapersonal stressors). The health consists of wellness, variances from wellness, illness, and reconstitution. Finally, the nursing are the primary, secondary, and tertiary preventions as interventions.

2.3 Factors Influencing the Fathers' Involvement

Based on the Neuman Systems Model (Neuman & Fawcett, 2002; 2011), the factors influencing the fathers' involvement from literature review are described according to three stressors including intrapersonal stressors, interpersonal stressors, and extrapersonal stressors as follows.

2.3.1 Intrapersonal stressors

Intrapersonal stressors, a crucial factor, have been reviewed that they affect on the fathers' involvement such as maternal and child care knowledge, attitude toward fatherhood, and father competence as follows.

1) Maternal and child care knowledge

The knowledge is commonly used to measure for both fathers and mothers in the nursing intervention program. The research evidences have consistently supported that the knowledge in care of their partners and children influences the fathers' involvement (Cabrera et al., 2008; Hoza, et al., 2000). The fathers who have opportunities in learning about maternal and child care such as physiological and psychological changes, common illness and care management can adapt and act their father role and function easier. Several studies in other countries revealed that the interventions were significantly effective in increasing the knowledge after completing the health education programs (Dickerson, 1982; Hillier & Slade, 1989; Svensson, Barclay, & Cooke, 2009; Wagner & Clayton, 1999).

In Thailand, Nirach (1999) reported that the fathers' knowledge of child development and role perception had a positive association with the father's role

performance. There are associated with the results of study by Klunketrgit (2006) revealing that the mean scores of knowledge, attitude, and skill practices during labor of experimental group were significantly increased more than those of control group after attending in the health education program. However, some study reported there was no significant relationship between the fathers' knowledge and participation in child care (Ouichareon, 2005)

2) Attitude toward fatherhood

Attitude which is a perception of each person based on the beliefs and social cognitions is linked to the behavior expression. Thus, attitude toward fatherhood is the significant factor which is used as the strategy to improve the behaviors for both fathers and mothers in several programs. According to the review with fatherhood, the traditional gender attitude influences on feeling and perception of the fathers toward fatherhood (Sanderson & Thompson, 2002) and the fathers' involvement (Singh & Ram, 2009). The assumptions of traditional value regarding the father and mother responsibilities include 1) the fathers are the head of family unit and must support financially for their families, and 2) the mothers are responsible in child care and household tasks (Strong, DeVault, & Cohen, 2008). In addition, the assumptions of traditional gender role attitude also reflect the parental role and function of both fathers and mothers. From the review, the research studies have presented that the attitude toward fatherhood is the crucial factor which affected the fathers' involvement (Buston, 2010; McVeigh et al., 2002).

In Thailand, Srisuwat (1998) presented that there was a positive significant relationship between the fathers' attitude toward the baby care and the nurturing role of fathers. The results are consistent with the study by Raojutitham (2006) founding that the attitude toward sex role was positively correlated to the fathers' involvement and two significant factors influencing on the fathers' involvement in child care were the attitude toward sex roles and marital relationship. These two factors could explain 15.6% of the variance on the fathers' involvement in child care. In addition, several studies revealed that the health education programs were significantly effective for improving the fathers' attitude after completing the programs (Klunketrgit, 2006; Wagner & Clayton, 1999).

3) Father competence

Empirical evidences have consistently supported the significance of the father role by using a competence concept to identify families at risk and evaluate the effectiveness of parenting interventions (Mendez-Baldwin & Busch-Rossnagel, 2003; Pisterman et al., 1992; Wandersman et al., 1980). The perception of competence is widely used for measuring parental abilities of both fathers and mothers (Gilmore & Cuskelly, 2008). Fathers who perceive themselves competence in the father role are likely to be more effective in the care of children (Gibaud-Wallston, 1977; Sanderson & Thompson, 2002). On the other hand, the fathers who have a lower perception level of their parenting competence not only display inadequate parental skills but they also tend to avoid interactions with their children (Ohan, Leung, & Johnston, 2000). Furthermore, several research studies support that the health education programs are significantly effective for increasing the parental skills after completing the programs (Klunketrgit, 2006; Wagner & Clayton, 1999). As can be seen from the study by Hess, Teti, and Hussey-Gardner (2004), the parenting competence is a positive relation to the development of parental knowledge. Therefore, strengthening the perception of father competence can improve their performance as a parent and can be used as a predictor of the fathers' involvement and outcomes of the health education programs.

2.3.2 Interpersonal stressors

Interpersonal stressors affecting the father involvement such as family relationship and social support can be described as follows:

1) Family relationship

Because the relationship with their partners in marital life and children is the first developmental tasks to be a father, the good relationship in families is a basic principle to the fathers' involvement, especially the father-child relationship. The research findings support that the marital relationship and parental and child attachment are a critical factor in predicting the fathers' involvement (Carter, 2002; Coley & Hernandez, 2006; Gavin et al., 2002; Garfield & Chung, 2006; Johnson, 2001; Raojutitham, 2006). There is associated with the study by Ouichareon (2005) reporting that the father-child relationship was positively associated with the fathers' involvement and was one of predictors affecting on the fathers' involvement. It means

that the fathers with a low level of involvement with their partners and children have a conflict family quality and do not reside in the same home. However, some studies found that the couple relationship was not related to the fathers' involvement (Cabrera et al., 2008; Feldman, 2000). Moreover, McVeigh and colleagues (2002) found that the number of children was a significant inverse relationship with the fathers' function. Therefore, the quality of family relationship has both direct effects for participation of the fathers and indirect effects for the child development outcomes. As a result, the family relationship is a crucial context within which to encourage and continue the fathers' involvement behaviors.

2) Social support

The social support, a contextual factor, affects the adjustment of fathers to fatherhood in transition period, especially first time (Wandersman et al., 1980). To increase the fathers' involvement, the partner is a primary source of pregnancy, childbirth, and after birth information as a link to information from health care providers to the fathers. Several researcher findings reported that the mothers had a powerful influence in assisting the fathers to participate in baby care with the best predictor of the fathers' involvement (Anderson**,** 1996; McBride & Rime, 1997), especially information support (Castillo & Fenzl-Crossman, 2010). Furthermore, some studies reported that other contextual support including relationship, emotional, and information supports influenced the fathers' involvement (Crummette et al., 1985; Ouichareon, 2005). Therefore, the social support can increase the fathers' confidence to perform their role and satisfaction during pregnancy and child rearing.

2.3.3 Extrapersonal stressors

Extrapersonal stressors affecting the father involvement such as health care services, economic status, and social culture can be described as follows:

1) Health care services

The health education programs for fathers-to-be/fathers are important parts of prevention of the health care services for care of their partners and babies during pregnancy and postnatal period (Ahldén, Göransson, Josefsson, & Alehagen, 2008). Several existing programs for the fathers have been particularly unsuccessful in meeting at the hospital or clinic (Dickerson, 1982) because they feel uncomfortable for

attending in these programs (McKellar, Pincombe, & Henderson, 2008). In order to be successful, these programs should provide on the fathers' needs and their families. Regarding improving the programs, the nurses or health care providers are the primary sources of pregnancy, childbirth, and after birth information and education for the fathers (McKellar et al., 2008). Thus, if the fathers participate in the health education programs, their involvement in child care is presumed to increase from receiving support in their role as a father.

Nowadays, the father participation in the maternal and child care activities is the new opportunity to educate and support the fathers in both their own health and families' health. Therefore, the paternity policy has led to government funding for the father initiatives by providing the information and intervention programs for the fathers, shifting in family law toward joint custody of their babies, and supporting for paternity leave with baby care.

2) Economic status

Recently, the economic status of family and country is the most common factor to motivate the fathers' involvement, especially the family income status. The previous research studies in developed country have found that the fathers become more participated with their children if they are of high socioeconomic status (SES) than if they are of low SES (Nettle, 2008). There is associated with the study by Sevil and Özkan (2009) reporting that the mean scores in occupational subscale of fathers with average or good income levels were higher than those of fathers with a low income and the study by Johnson (2001) revealing that the fathers' income was significantly associated with the fathers' involvement but was not significantly related to the financial support for their families.

According to economic pressures in Thailand, the father role and function are changed from their history culture to the father involvement as a new social expectation because both fathers and mothers contribute to the financial support in the dual-earner family (Klunketrgit, 2006). Thus, the fathers need to participate in the responsibilities of child care and household chores although the mothers are commonly still responsible for childrearing. However, some study reported that fathers' income had no relation to the father role in childrearing (Tangvoraphongchai & Sedtapommirine, 1996).

3) Social culture

According to the culture in family and society regarding the traditional gender role, the modeling of parenting role from generation to generation in family of origin influence on the fathers' involvement. There is associated with the study by Carter and Speizer (2005) suggesting that norms in society of the fathers affected to act positive or negative roles of the fathers in care of their partners and babies. In Thai culture, when asked about the idea of traditional gender role in parenthood such as primary caregivers for babies and house task, it is believed that the mothers' job is to respond to the needs and wants of their children and do the household responsibilities while the main job of fathers is the breadwinners assuming responsibility for earning money to support a family. These ideas affect the opinion and expression of Thai people, especially in the family which mothers do not work outside the home. However, some studies found that the father involvement was not related to the culture of family origin (Cabrera et al., 2008; Johnson, 2001). Therefore, the family traditions and values in their society are the contextual factors to shape the attitude toward fatherhood and involvement behaviors of the fathers for actively sharing the responsibilities of baby care and household chores and balancing the personal, occupational, and social activities.

Furthermore, the socio-demographic information such as age, educational level, income, occupational status, and characteristics of family are the components of three stressors. Several studies reported that the socio-demographics were significantly associated with the fathers' involvement (Castillo & Fenzl-Crossman, 2010; Gavin et al., 2002; Glidden, Bamberger, Turek, & Hill, 2010; Harper, 2010). The research study in Turkey reported that the mean scores in four aspects of the fathers' function during pregnancy and postnatal period (including household activities, infant care activities, occupational activities, and social and community activities) with a higher educational level were significantly higher than those of fathers with a lower level. Inspection of effect of occupational status was found that the mean score in household activities of fathers with civil servants was higher than that of fathers with laborers and tradesmen (Sevil & Özkan, 2009). The results are consistent with the study by McVeigh and colleagues (2002) founding that the fathers' age was identified as correlations of the fathers' function during pregnancy and postnatal period. The fathers' age was also a

predictor of involvement, with young fathers less likely to maintain the participation with their children, and older fathers showing particularly high levels of involvement. However, some studies found that there were no effect of the fathers' age, educational level, (Johnson, 2001), and employment status (Sanderson & Thompson, 2002) on the fathers' involvement.

In Thailand, the study by Tangvoraphongchai and Sedtapommirine (1996) examined the relationship of some basic conditioning factors including age, education level, occupational status, income, the number of children, and family characteristics with the father role for promoting emotional health of children. The results were revealed that the fathers' age and family characteristics were positively correlated with the father role for promoting the emotional health of their children whereas the educational level, occupational status, income, and the number of children had no association with the father role.

Summary of the factors affecting on fathers' involvement

Based on the literature review and the stressor concept in the Neuman Systems Model, some factors associating with the fathers' involvement during pregnancy and neonatal period have selected into aspects of stressors including intrapersonal, interpersonal, and extrapersonal stressors. Firstly, the intrapersonal stressors include age, educational level, maternal and child care knowledge, attitude toward fatherhood, and father competence. Secondly, the family characteristics, family relationship, and social support are selected into the interpersonal stressors. Finally, the occupational status, economic status, health care services, and social culture are selected into the extrapersonal stressors. However, all factors in three aspects of stressors have direct and indirect effects on the fathers' involvement during pregnancy and neonatal period.

2.4 Impact of Fathers' Involvement on Development of Families

Fathers' involvement behaviors have influenced on the wellbeing of their children, families, and society. There is now a substantial literature that the fathers' involvement has effects on the child development including cognitive, emotional, and

social aspects and the family relationship among father, mother, and children as described below.

2.4.1 Child development

The research literature has indicated that the increased levels of fathers' involvement can be beneficial for children including cognitive, emotional, and social development aspects (Fägerskiöld, 2008). Benefits of fathers' involvement for the child development are presented as follows.

1) Cognitive development

The children of fathers' a high involvement in child care responsibilities tend to present more cognitive ability and better academic accomplishment such as better decision making skills and higher level of grade on the educational tests (Biller, 1970; Nettle, 2008; Yogman et al., 1995). Nettle (2008) reported that the fathers' involvement in child care had a positive relation to the IQ of children. There is associated with the study by Yogman and colleagues (1995) revealing that mean IQ of children for the high-involvement fathers was higher than that of children for the low-involvement fathers after controlling the age, income, neonatal health, and treatment. Therefore, the greater the degree of fathers' involvement, the more time fathers spent to increase the cognitive competence of their children.

2) Emotional development

The research evidences have supported the fathers' involvement is positively associated with the emotional outcomes of their children including high overall family life satisfaction, low emotional stress, anxiety, and depression, and fewer expressions of negative emotions such as anger, fear, frustration, and guilt (Boyce et al., 2006; Harper, 2010). Harper (2010) found that the increasing involvement of fathers was associated with decreased externalizing problems of children, especially the problems for sons. On the other hand, previous studies have indicated the effects of father with a low involvement on the mental health symptoms (Boyce et al., 2006) and the personality development of the children such as aggressive behavior (Biller, 1970). Therefore, the children whose fathers presented a high involvement in child care responsibilities tend to show the healthy emotion and

better capabilities to manage the frustration and tension situation when they attached with a problem.

3) Social development

Fathers' involvement in child care responsibilities is positively associated with the social competence and maturity of their children (Biller, 1970; Nettle, 2008). The children of fathers with high involvement in child care tend to be more positive behaviors which lead to be popular in a positive group of friends or collegues such as more reciprocity, generosity, and positive relationship with their friends. On the contrary, if the fathers separate from their children, it will impact on the negative social development in aspect of interpersonal relationships such as aggressive behavior and negative relationship with their friends and relatives (Biller, 1970). Thus, the fathers' warmth and nurturance are significantly affected positive social maturity and moral behaviors of their children such as good moral and values judgment, conformity to accurate rules in the society, and high degree of social skill.

2.4.2 Family well-being

The transition to parenthood for care their babies is a period of stress and developmental change of their families. Both fathers and mothers are highly adaptive to maintain the relationship in their families that influence on the well-being of their families. The important indicators of family well-being include the family stress and adaptation and family relationship or satisfaction as described below.

1) Family stress and adaptation

The transition to parenthood is a significant period that both fathers and mothers all undergo changes and adaptations to be a good patent. The role of parent may conflict with the role of partner and working and lead to role conflict of parent, especially a first-time (Knox & Schacht, 2010). The parental role adaptation is the response of each person to a family change. The fathers with more involved in childrearing often may get stress from the parent role and need to adapt to the changing role as a good parent. However, if the fathers cannot adapt to their father role, the well-being of the family may be negatively affected. In the other words, the pregnant women or mothers need to adapt to a dramatic shift in their life-style as they change from the individual responsibilities to a parent responsibilities for their family

life. The empirical evidences have shown that the ability to adapt to new role depends on the personal factors (such as age, education level, economic status, etc.), social support, knowledge, attitude, and parent child attachment (Hoko, 1997; Promneramit, 2007; Tengtrisorn, 2001). Thus, both fathers and mothers should be started to adapt in the parenting role via understanding in parenting role and functions, maintain the past responsibilities, and built up family relationship with all family members.

2) Family relationship

Quality of the family relationship is the goal of most family and is often used in a sense including marital relationship and parent child attachment that can be described as being warm, friendly, and comforting. The literature reviews have indicated that the family relationship is positively associated with the fathers' involvement. The healthy family relationship is also associated with less drug abuse, less alcohol drinking, and a lower frequency of psychological symptoms such as depression, and sadness (Carter, 2002; Coley & Hernandez, 2006; Johnson, 2001; Raojutitham, 2006). It means that if the fathers are supportive with their partners and children, the family relationship is of higher level of quality as well. Therefore, the family relationship is one of measurement for evaluating the effectiveness of the father training program.

Summary of impact of fathers' involvement

This study examined the perception of impact of fathers' involvement during pregnancy and neonatal period in the situation analysis by means of qualitative research method. According to the literature reviews, several studies have emphasized the impact of fathers' involvement consist of the child development including cognitive (such as academic achievement), psychological adjustment (such as life skills) and social competence and the family well-being such as the family stress and adaptation and family relationship. Thus, if the fathers support their partners in the family life changes, they are more likely to continue with actions for positive effects on them, their partners, and children.

2.5 Health Education Program to Promote the Fathers' Involvement

Beginning in the mid 1990s, the father involvement concept was appeared on a number of books and research and become a source of increasing society concern. Several evidences have presented that the programs can increase knowledge, positive attitude, healthy behaviors, and positive other outcomes. World Health Organization (2002) has suggested the health care providers should provide the parenting education for both fathers and mothers via the discussion process with the knowledge and experience. Thus, in the prenatal and postnatal periods, just as with mothers, the fathers' health education programs are very important to encourage the fathers' involvement for supporting their partners and babies (Carter & Speizer, 2005; Gungor & Beji, 2007). The health education programs are presented as follows:

2.5.1 Prenatal education programs for fathers

Several studies have identified the effectiveness of prenatal education program to promote the fathers' involvement for supporting their partners and babies can increase the knowledge, attitude, and skill practices (Doherty et al., 2006; Turan et al., 2001) as well as the ability to adaptation to the father role and the perception of attachment between the fathers and fetuses (Promtong, 2007). Most of the prenatal education programs are provided on only hospital based programs and a few programs are provided on both a hospital and community based programs (Doherty et al., 2006; Turan et al., 2001). Turan and colleagues (2001) reported that the education programs had positive effects on the knowledge, attitude and behaviors of both the fathers and mothers. In the hospital based program, the positive effects among fathers were mainly in the topic of family planning while in the community based program, they were also presented in three topics including baby health, baby feeding, and partner communication and support. There is associated with the study by Doherty and colleagues (2006) founding that the education programs were positively effective on the fathers' practice skills in interaction with their babies and participation in baby care with their partners.

From these studies, the common topics in the prenatal health education program for the fathers-to-be include the state of fatherhood and adjustment, nutrition during pregnancy, fetal development and how to promote the paternal fetal bonding,

delivery process and support for their partners, breastfeeding support, and basic care methods of the infant. In addition, the techniques in these programs consists of lectures, group discussion, skill demonstration, game, role playing, parenting role model, and self study by using booklets, brochures, and videotapes.

2.5.2 Intrapartum education programs for fathers

The research studies on childbirth education programs have consistently supported the positive effectiveness of programs. The childbirth education programs are measured with the stress and coping strategies (Diemer, 1997; Li et al., 2009), self-efficacy (Rungsiyanond, 1997), childbirth experience, delivery outcomes (Gungor & Beji, 2007; Nungkla, 2003), family relationship (marital relationship and parent infant attachment) (Mamark, 2007), and ability to take care of their mothers such as knowledge, attitude, and practice on childbirth (Klunketrgit, 2006). All of these programs are provided on only hospital based program. The results of these study revealed that the programs had significantly increased the fathers' use of reasoning during conflicts and their housework activities (Diemer, 1997), more positive experiences in all aspects of childbirth (Gungor & Beji, 2007), a positive perceived self-efficacy in coping with labor pain (Rungsiyanond, 1997), and healthy father-child attachment (Mamark, 2007) while they had decreased in the fathers-to-be' anxiety (Li et al., 2009). However, there are no effect of the programs on the length of labor, using the drug for relieving pain, and using the obstetric interventions in childbirth (Gungor & Beji, 2007), and marital relationship (Mamark, 2007).

From these studies, the common topics from intrapartum health education programs for fathers-to-be include labor and delivery process, technique to support and assist with their partners' labor pain and relax by themselves such as breathing and relaxation exercises, how to promote parent infant attachment and newborn care. In addition, the techniques in these programs consist of lectures, group discussion, skill demonstration, and self study by using booklets and videotapes.

2.5.3 Postnatal education programs for fathers

The empirical studies on postnatal education program have demonstrated that the positive effectiveness of programs to promote the fathers' involvement in care

of mothers during postnatal period and childrearing. These program are measured with the childrearing behavior, family relationship (such as marital relationships and parent infant attachment) (Chaekuntod, 1996), parental role adaptation (Promneramit, 2005), perceived self-efficacy or self confidence, and ability to take care of their mothers and babies such as knowledge and skill practices (Naunboonruang, 2002). All of these programs are provided on only hospital based program. The results of them revealed that the programs had significantly increased the fathers' knowledge about infant behaviors, self-confidence (Naunboonruang, 2002), a positive perceived self-efficacy and role partner of parents in newborn care (Kongnguen, 2002), a good father-infant attachment and father role adaptation at one month after delivery (Promneramit, 2005), and a good role and participation in child rearing (Sukparin, 2002).

From these studies, the common topics from postnatal health education program for fathers include the becoming a father, infant behaviors, communicating with infants and infant care such as bathing, changing diapers, holding, clothing, and soothing the infants. In addition, the techniques in these programs consist of lectures, group discussion, skill demonstration, and self study by using booklets and videotapes.

Summary of health education program to promote the fathers' involvement

Even though pregnancy and childbirth can be viewed as the natural period in the family life cycle, both fathers and mothers need to support from different sources such as relatives, friends, supervisors, and health care providers. The health care professionals should give the guidance and preparation for the prospective parents/parents regarding care during pregnancy, childbirth, and after child birth. Although most previous programs for the fathers have significantly increased the ability to take care of their mothers and babies such as knowledge, attitude, and skill practice on childbirth, as well as family relationship, there are barriers of the fathers to participate in these programs such as traditional gender role, access and engagement with maternal and child services of fathers. Based on the needs and problems of fathers, mothers, and health care providers in real situation, there is a need to develop an active education program in order to increase the opportunities for fathers to participate in the program. Therefore, this active program via both hospital and

community based approaches is a new innovation to improve the positive father involvement.

2.6 The Study Context

This topic introduces the characteristics of Ban Bueng District, Chon Buri Province, Thailand where this study was conducted. The main aspects of the study context are described in these topics including the scope of setting, the population characteristics, the general health care service system and the maternal and newborn care in Ban Bueng Hospital.

2.6.1 The scope of setting

The setting in this study is conducted in Ban Bueng District, Chon Buri Province, Thailand. Chon Buri Province is in the eastern part of Thailand and is located approximately 81 kilometers from Bangkok on the coast at the bay of Bangkok and the northern end of the gulf of Thailand which constructed the modern industrial complexes as the Eastern Seaboard Region. The Eastern Seaboard Region is heavily industrialized and underpinned by transportation and tourism and second to Bangkok. Therefore, Chon Buri Province is also significantly changed to the manufacturing and has long been a center of industry, business, trade, and transport for the Eastern Thailand Region. However, Ban Bueng District, located on the center of Chon Buri Province is affected by the changes the same as other districts in Chon Buri Province.

2.6.2 The population characteristics

2.6.2.1 General characteristics of population

Ban Bueng District's total population was changed from 85,868 persons: 42,172 men and 43,696 women in 2000 to 95,770 persons: 47,085 men and 48,685 women in 2008 (Annual Report of Ban Bueng Hospital, 2010). Ban Bueng District had 38,198 workers who worked in 499 factories (Chon Buri Commercial Institution, 2008). In 2008, the crude birthrate, the statistics reflecting the number of births per every 1,000 people in the population was 16.82 and the population growth rate, the statistics reflecting the number of births per every 100

people was 13.08 (Annual report of Ban Bueng Hospital, 2010). Thus, most population in this area is workers and children.

2.6.2.2 Economic characteristics of population

Chon Buri Province is a part of Eastern Sea Broad focusing on the industrial development including Ban Bueng District. It is rapidly developing into a center of Thai industry, transportation, and commercial operations. Ban Bueng District is the same as other areas of Chon Buri Province. In the past, agriculture was the primary occupation of people in Ban Bueng District but in the later, 1987 Ban Bueng District was the area for promoting fund in manufacturing. In 2010, the total of factories in Chon Buri Province was 2,768 and the total of workers was 168,767 persons. The highest number of industries was in Mueang Chon Buri District (736 factories) and the second and the third were in Si Racha District (585 factories) and in Ban Bueng District (499 factories)**,** respectively. Thus, worker from approximately 85% of the total population and merchant ranks were the first and second in terms of occupation (Ban Bueng Hospital, 2010).

2.6.2.3 Ways of life of population

In the ways of life, there are rural and urban lifestyles in Ban Bueng District. The rural lifestyle is in non-municipal area characterized by significant family member interaction and interdependence. Regarding urban lifestyle, **t**he changing community influences the family likelihood in all areas of Chon Buri Province, especially in municipal area**.** Nowadays, the family structure of population is increasingly changed from an extended family to a nuclear family. In Regard to family structure, the reducing family size in Chon Buri Province is associated with that in whole country. As can be seen from report of Ministry of Public Health (MOPH) (2007), the family size in whole country was changed from average of 5.2 in 1980 to 3.4 in 2004. Furthermore, in 2009, the number and rate of divorce in Chon Buri Province was the highest of the eastern region and the second level of whole Kingdom of Thailand (4,446 persons or 4.07% of the total of divorce person) (Department of Provincial Administration, 2009).

2.6.3 The general health care service

For the health care service in Ban Bueng District, there is a public hospital, a community medical unit (CMU), three health promoting hospitals, eleven primary care units (PCU), and several private clinics. The public hospital is located in Ban Bueng Subdistrict and each tambon has a health centre at the primary care level to promote health and prevent and control disease of population in this community such as prenatal and postnatal care, family planning, and immunization. To date, Ban Bueng Hospital becomes the community hospital, where the size of Ban Bueng Hospital is a 90-bed. The number of health personnel is 17 doctors with 3 obstetricians, 80 professional nurses, 2 technical nurses and other technical and paramedical staff (Ban Bueng Hospital, 2010). The services of Ban Bueng Hospital include OPD and special clinics such as diabetes mellitus, asthma, tuberculosis, AIDS, obstetrics and gynecology and dental. The main responsibilities are services for providing health promotion, preventive, curative, and rehabilitation health service and for the overall supervision and technical support of health center activities in Ban Bueng District.

2.6.4 The Maternal and newborn care in Ban Bueng Hospital

2.6.4.1 Maternal and newborn care policy

Maternal and newborn care policy in Ban Bueng Hospital relies on the Family Bonding (“Sai Yai Rak Project”), a main project initiated by the Royal Highness Princess Srirasm. The main purpose of Sai Yai Rak Project is to promote the good health of maternal and child and strengthen the family bonding. The MOPH has conveyed this project through various stakeholders such as “The Family Love Bonding Hospitals”, “Caravan Sai Yai Rak Hang Krobkrua”, and “The breastfeeding promotion and development of child development center” (Ministry of Public Health & Ministry of Social Development and Human Security, 2008).

Presently, the Family Love Bonding Hospitals project covers in the health care services in antenatal, intrapartum, and postnatal period to promote an essential safety care and monitor the well-being of both mothers and babies. The health education in this project is defined as a series of health education during pregnancy and postnatal period. The pregnant women and their partners are prepared

for care during pregnancy, labor and childbirth, and after birth as well as parenting role through the transmission of information and practice skills. The topics include prenatal care, signs and stages of labor and delivery, medical interventions, care management during labor by using the technology of pain control, baby feeding and care, and postnatal care as well as a tour of the birth place.

2.6.4.2 Maternal and newborn care service

For maternal and newborn care service in Ban Bueng Hospital, there are three periods of care including antenatal care, delivery care, and postnatal care. The care guidelines for mothers and children during pregnancy and neonatal period developed and improved by Maternal Child health Board of Ban Bueng Hospital are used by collaboration between health professionals in Ban Bueng Hospital and health centers at primary level: CMU and PCU.

1) Antenatal care

During October 2009-September 2010, the data from a health report of Ban Bueng Hospital revealed that the number of pregnant women at all antenatal care clinics was 1,034 persons per year and the average number of pregnant women per month was 86.2. The rate of women with 12 weeks of gestational age at the first time of antenatal care, four times of antenatal care, and teenage pregnancy– less than 20 years old was 32.6% (criteria: more than 50%), 88.7% (criteria: more than 90%), and 12.9% (criteria: less than 10%), respectively. The complications during pregnancy were anemia (20.2*%),* pregnancy-induced hypertension (2.1%), and abortion (1.3%). These figures indicate most pregnant women have a low risk and get the antenatal care at the first time when having more than 12 weeks of gestational age.

The antenatal care (ANC) is necessary to observe maternal health and fetal wellbeing. In Ban Bueng District, the antenatal care services for normal pregnancy is started at the health center at primary care level to screen health assessment and laboratory test, and provide physical examination, health education and medical care by nurses. There are 15 antenatal care units at primary level to provide care for normal pregnancy according to area of responsibility of health care centers and has three obstetricians who provide care for high risk pregnancy at the hospital. Every health care centers provide care for normal pregnant women and refer to a higher level of care including Ban Bueng Hospital and Chon Buri Hospital,

respectively if having the pregnant women with high risk such *as* pregnancy-induced hypertension, preterm labor, and placenta previa. At each visit at ANC unit, the nurses in the CMU or PCU examine the pregnant women by using a systematic approach of Ban Bueng hospital including health assessment, physical examination, laboratory testing, providing medication, ultrasound scan (at least one time if it is normal), and health education.

2) Delivery care

During October 2009-September 2010, the data from a health report of Ban Bueng Hospital revealed that the number of women with normal delivery was 1,583 persons per year and the average number of pregnant women per month was 131.9. The rate of women with cesarean section, forceps extraction, and vacuum extraction was 28.1% (447 persons), 5.4% (86 persons), and 1.3% (21 persons), respectively. The complications during childbirth period were postpartum hemorrhage (.8*%)*, retrained placenta (.7%), and PROM (.3%). Moreover, the rates of stillbirth, birth asphyxia, and low birth weight were 5.0 per 1,000 persons (criteria: less than 9 per 1,000 persons), 7.5 per 1,000 person (criteria: less than 30 per 1,000 persons), and 8.1% (criteria: less than 7%), respectively. These figures indicate that most women have normal delivery.

Although the onset of labor and delivery is usually at 38 to 42 weeks of pregnancy, it can be occurred at any stage of pregnancy. The childbirth commitment to pregnant women and their partners begin at admission and continue until all stages of labor and delivery are complete. The intrapartum care in Ban Bueng District is provided only at Ban Bueng Hospital. If having severe complications of pregnant women/mothers and babies, they will be referred to Chon Buri Hospital. For the labor and delivery care guideline, the nurses examine the pregnant women/mothers by using a systematic approach. It includes health assessment, physical examination, laboratory testing, pain management in labor, observations to assess progress in labor, care for childbirth and repair of the perineum, care of early after childbirth and transfer of the mothers and/or mothers and babies to the postnatal care department.

3) Postnatal care

The postnatal care is the period of care after the childbirth when the physiological and psychological aspects of the mothers' bodies return to the

pre-pregnant state and lactation period becomes established. It is a very important period for the mothers, babies, and their families. The postnatal changes usually take up to 6-8 weeks after childbirth, although some organs can take much longer to recover from the effects of pregnancy. These changes will be most marked in the first to the second weeks after childbirth. During the first week, the foundations for good recovery, health, and adaptation of among the fathers, mothers, and their babies to their new parenting role are established. For the postnatal care guidelines, the nurses provide care for mothers (such as maternal assessment, care for prevention of postnatal complications and health education for taking care of babies including breast feeding, sponge baths, and vaccine), and for babies (such as infant assessment, prophylactic procedures including vitamin K, ocular prophylaxis–1% tetracycline ointment, and BCG and Hepatitis B vaccination).

Summary of the study context

The setting in this study is conducted in Ban Bueng District which is affected by the changes of Chon Buri Province to a center of the manufacturing and industry of the Eastern Thailand Region. Nowadays, the family structure of population is increasingly changed from an extended family to a nuclear family. For the maternal child care services, there are three periods of care including antenatal care, delivery care, and postnatal care. All services are provided by collaboration between health care providers in Ban Bueng Hospital and health center at primary level depended on the care guidelines by maternal child health board of Ban Bueng Hospital. Every health care centers provide care for normal pregnant women and refer them to a higher level of care if they have complications. The intrapartum care and early postnatal care period are provided only at Ban Bueng Hospital but if the mothers and babies have severe complications, they will be referred to Chon Buri Hospital. After that, all health care centers follow and take care of mothers and babies in the community.

CHAPTER III
RESEARCH METHODOLOGY

The purpose of this chapter is to describe the research methods of this study used to develop the father involvement model during pregnancy and neonatal period. The descriptions include as follows:

1. Research setting
2. Duration of study
3. Research design and procedure
    - 3.1 Situation analysis
    - 3.2 Planning of model development
    - 3.3 Model implementation
    - 3.4 Model evaluation
4. Protection of human subject rights

3.1 Research Setting

The selected setting was Ban Bueng District, Chon Buri Province, Thailand. Ban Bueng District has one community hospital (90-bed), fifteen health care centers, and three obstetrical clinics. The care guidelines for mother and newborn during pregnancy and neonatal period were developed and approved by Maternal Child health Board of Ban Bueng Hospital and practiced by health professionals collaboratively in Ban Bueng Hospital and health care centers: community medical unit (CMU) and primary care units (PCU). From October 2009 to September 2010, data from a health report of Ban Bueng Hospital revealed that the number of pregnant women at antenatal care clinic was 1,034 persons per year and the number of women with a normal delivery was 1,583 persons per year. Moreover, the rate of women with a cesarean section, forceps extraction, and vacuum extraction was 28.1% (447 persons), 5.4% (86 persons), and 1.3% (21 persons), respectively.

3.2 Duration of Study

The research study was conducted from May 2012 to January 2013. The researcher began to collect data with quantitative and qualitative methods in the situation analysis in May 2012. After that the researcher and team followed all steps of each phase and finished the last phase (evaluation phase) in January 2013. The total period of time to complete the research was 9 months.

3.3 Research Design and Procedure

The design of the current study was based on the research and development procedure. The research and development process is divided into three categories of activity: program planning, program management, and program evaluation (Wirt, Lieberman, & Levie, 1974). First, the program planning includes all the actions taken to determine the program priorities and also to foster, detect, and formulate the new program. Second, the program management consists of managing the continual process of generating, selecting, and supporting the projects within the research and development program. Finally, program evaluation is the management activity of assessing what a program has accomplished.

The current study was mainly aimed at developing the father involvement model during pregnancy and neonatal period. Consistent with the research and development model (Wirt et al., 1974), this study consisted of four phases including 1) situation analysis, 2) planning of model development, 3) model implementation, and 4) model evaluation. In the first phase, it was an important approach to explore the existing characteristics of the fathers' involvement during pregnancy and neonatal period, what factors encourage or inhibit the involvement of fathers-to-be/fathers, and what problems or barriers exist for fathers-to-be/fathers to participate in the program. The second phase was constructing the nursing intervention instruments based on the results from the situation analysis. The third phase was implementation of the nursing intervention constructed in the second phase for the fathers-to-be/fathers and their partners. Finally, the last phase was performed to evaluate the outputs and outcomes of the model. All research procedures were presented in Figure 3-1.

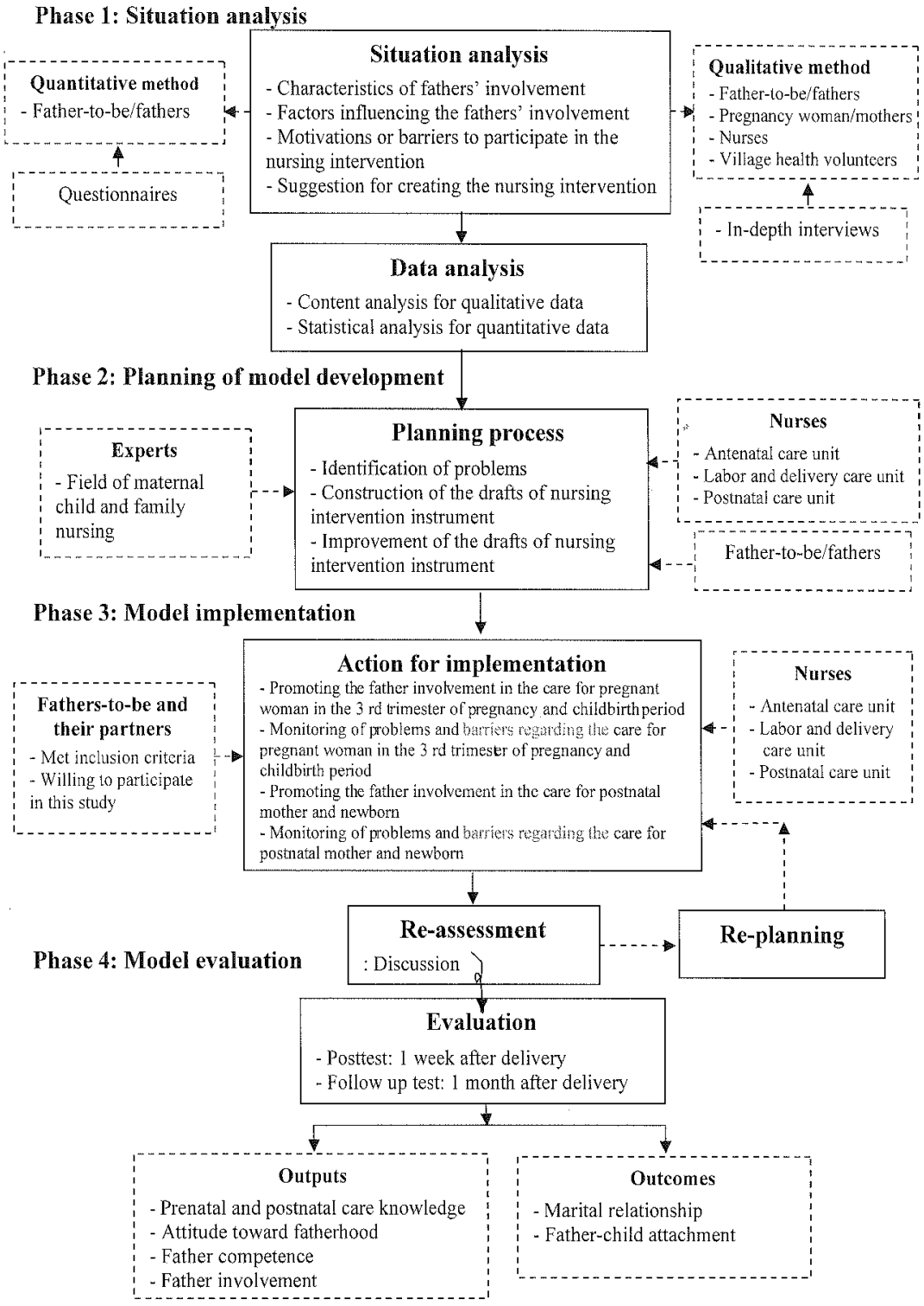


Figure 3-1 The diagram of the research design and procedure

In each phase, the participants, instruments, data collection, and data analysis are described in the detail. The four phases are presented as follows

Phase 1: Situation analysis

The initial phase explored the existing characteristics of father involvement, what factors encourage or inhibit the fathers-to-be/fathers' involvement, what motivations or barriers promote or obstruct the fathers-to-be/fathers to participate in the nursing intervention, and how to create the appropriate intervention for promoting the fathers' involvement during pregnancy and neonatal period. The situation analysis used both quantitative and qualitative methods for data collection as described below.

1. Quantitative method

To determine the factors influencing the fathers' involvement, the cross-section study design was done based upon the stressor concept in the Neuman Systems Model (Neuman & Fawcett, 2002; 2011). In this study, the stressors influencing the fathers' involvement during pregnancy and neonatal period were composed of 1) intrapersonal stressors such as age, educational level, prenatal and postnatal care knowledge, attitude toward fatherhood and father competence, 2) interpersonal stressors such as marital relationship, father-child attachment, and family characteristics, and 3) extrapersonal stressors such as economic and occupational status. The procedures for collecting the quantitative data are explained as below.

1.1 Preparation of data collection instruments

Self-administered questionnaires in this study consisted of six scales including Inventory of Functional Status–Fathers (IFS-F), Prenatal/Postnatal Care Knowledge Scale, Role of the Father Questionnaire (ROFQ), Parenting Sense of Competence (PSOC), Revision Dyadic Adjustment Scale (RDAS), and Paternal Infant Attachment Questionnaire (PIAQ). All of them were translated from English version into Thai version by using a forward and back translation technique. First, two bilinguals who were experts in maternal and child nursing translated the original scales from English version to Thai version. Second, after Thai version of the scales was completed, a third bilingual translator blinded from the English version was asked to translate the Thai version back into English. Finally, both the original English versions and Thai versions of the scales were re-examined and compared in terms of the conceptual equivalence between the original and back-translation versions focusing on conceptual meanings.

For the content validity, all of the original and translated instruments scales were evaluated by five bilingual expert health professionals in the field of maternal and child nursing. All the experts were asked to rate the relevance of the content of all the scales in Thai by using the content validity index (CVI) rated on a 4-point scale (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = very relevant). After adjustments as suggested by the experts, a pilot test was conducted among 10 fathers to ensure understanding of wording and 20 fathers to complete the scale. Furthermore, the construct validity and reliability was tested by using factor analysis and Alpha Cronbach's Coefficient, respectively. For factor analysis, the recommended minimum sample size was 5-10 cases for each item (Hair et al., 2010). All values were calculated and presented in each part.

Therefore, all fathers-to-be/fathers were asked to complete the self-administered questionnaires as follows (Appendix B).

1) Father and mother characteristics: This questionnaire contained the basic personal data of the fathers and mothers as follows.

Father characteristics: This part was obtained the personal data such as age, religion, educational level, occupation, economic status, duration of marriage, experience in infant care, family characteristics, and paternity leave.

Mother characteristics: This part was obtained the personal data such as age, educational level, occupation, economic status, and delivery leave.

Social support: This part based on the social support concept (House, 1981) was obtained the source of support (including informal source such as parent, partner, relatives, and friends, and formal source such as doctor, nurse and public health personnel) and the type of supportive behaviors (including emotional support, instrumental support, information support, and appraisal support)**.**

2) Father involvement: The father involvement was measured by the Inventory of Functional Status–Fathers (IFS-F) (Tulman et al., 1993). This questionnaire for the fathers-to-be/fathers with first time and working includes 34 items with a 4-point scale (1-4 score) with the total score range of 34-136 with the higher the score, the greater the involvement behaviors. This scale has 5 subscales that measure the involvement in personal care activities (7 items), household activities (11

items), infant care activities (6 items), occupational activities (5 items), and social and community activities (5 items).

To establish content validity of the 34 items of IFS-F scale, there were 33 items rated 3 to 4 by the five experts. The CVI of the Thai IFS-F scale was .97 (CVI = 33/34). Because it cannot test for 5 subscales among fathers-to-be; therefore, the construct validity was tested by confirmatory factor analysis in a study among 195 fathers. Several goodness of fit indices improved significantly with acceptable and good fit (χ^2 = 646.65, *df* = 515, $p < .001$; χ^2/df = 1.25; RMSEA = .04; GFI = .83; TLI = .93; CFI = .94; AGFI = .80) (Appendix C). All factor loadings were significant and had factor loadings above the cut-off point of .20 (Ngai, Wai-Chi Chan, & Holroyd, 2007) (ranged from .20 to .91). Moreover, the 34-item scale was tested for reliability with Alpha Cronbach's Coefficient of .75.

The father involvement scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level (Ketusingh, 1995). The meaning of the scale score is as follows:

Total score with 4 subscales for fathers-to-be

84.01-112.00 points: Father is involved at a high level.

56.01-84.00 points: Father is involved at a moderate level.

28.00-56.00 points: Father is involved at low level.

Total score with 5 subscales for fathers

102.01-136.00 points: Father is involved at a high level.

68.01-102.00 points: Father is involved at a moderate level.

34.00-68.00 points: Father is involved at a low level.

3) Prenatal and postnatal care knowledge: The prenatal and postnatal care knowledge was measured by the Prenatal/Postnatal Care Knowledge Scale (PCK) (Ickovics, 2003). The questionnaire has 15 items with a 5-point scale (0="definitely false", 1="probably false", 2="don't know", 3="probably true", and 4="definitely true"). The 7 items to be scored as given are: 3, 8, 9, 12, 13, 14, and 15. The 8 items to be reversed scored are: 1, 2, 4, 5, 6, 7, 10, and 11. The total score range from 0 to 60 with the higher mean score indicating more care knowledge.

To establish content validity, the 15 items of PCK scale were rated 3 to 4 by the five experts. The CVI of the Thai PCK scale was 1.00 (CVI =

15/15). Then, the construct validity was tested by using confirmatory factor analysis in a study among 195 fathers-to-be/fathers. The results presented that several goodness of fit indices for 15-item model had a poor and acceptable fit (χ^2 = 161.37, *df* = 89, $p <$ .001; χ^2/df = 1.81; RMSEA = .06; GFI = .89; TLI = .61; CFI = .67; AGFI = .86) (Appendix C). Only item 5 had factor loading below the cut-off point of .20 (ranged from .12 to .57). Therefore, several goodness of fit indices for 14-item model improved significantly with better goodness of fit (χ^2 = 134.61, *df* = 76, $p <$ .001; χ^2/df = 1.77; RMSEA = .06; GFI = .91; TLI = .65; CFI = .71; AGFI = .87). All factor loadings were significant and ranged from .21 to .55. Moreover, the revised 14-item scale was tested for reliability with Alpha Cronbach's Coefficient of .65.

In the actual study, the PCK used the 14 items with a 5-point scale (0-4 score) with the possible range of 0-56. The prenatal and postnatal care knowledge scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level (Ketusingh, 1995). The meaning of the scale score is as follows:

37.33-56.00 points:	High level of knowledge
18.67-37.32 points:	Moderate level of knowledge
0.00-18.66 points:	Low level of knowledge

4) Attitude toward fatherhood: The attitude toward fatherhood was assessed by using the Role of the Father Questionnaire (ROFQ) (Palkovitz, 1984). The ROFQ is the scale for assessing the attitude about the father's role and contains 15 items with a 5-point scale (1 = disagree strongly to 5 = agree strongly). Total scores on this scale can be ranged from 15 to 75. The 12 items to be scored as given are: 1, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, and 15. The 3 items to be reversed scored are: 2, 5, and 10. Higher scores are indicative of a more positive attitude by the fathers about being involved in care of the baby.

To establish content validity, the 15 items of ROFQ scale were rated 3 to 4 by the five experts. The CVI of the Thai ROFQ scale was 1.00 (CVI = 15/15). Then, the construct validity was tested by exploratory factor analysis in a study among 195 fathers-to-be/fathers. The results revealed that 15 items were rotated into four components by using principal components analysis with Varimax accounted for 54.33% of the explained variance on the attitude toward fatherhood. All factor

loadings in this scale were ranged from .52 to .78 (Appendix C). Moreover, the 15-item scale was tested for reliability with Alpha Cronbach's Coefficient of .70.

In the actual study, the ROFQ Scale was used 15 items with a 5-point scale (1-5 score) with the possible range of 15-75. The attitude toward fatherhood scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level (Ketusingh, 1995). The meaning of the scale score is as follows:

55.01-75.00 points: High level of attitude
35.01-55.00 points: Moderate level of attitude
15.00-35.00 points: Low level of attitude

5) Father competence: The father competence was measured using the Parenting Sense of Competence (PSOC) (Gibaud-Wallston & Wandersman, 1978). The PSOC scale contains 17-item with a 6-point scale (1 = disagree strongly to 6 = agree strongly). The PSOC scale has 2 subscales: skill/knowledge (8 items) and valuing/comfort (9 items). Nine items (2, 3, 4, 5, 8, 9, 12, 14, and 16) are reverse scored. Total scores on this scale can be ranged from 17 to 102 with higher total scores indicating a father's higher level of competence.

To establish content validity of the 17 items of PSOC scale, there were 14 items rated 3 to 4 by the five experts. The CVI of the Thai PSOC scale was .82 (CVI = 14/17). Then, the construct validity was tested by using confirmatory factor analysis in a study among 195 fathers-to-be/fathers. The results presented that for 17-item model, the goodness of fit indices had a poor and acceptable fit (χ^2 = 262.96, df = 118, $p < .001$; χ^2/df = 2.23; RMSEA = .08; GFI = .88; TLI = .79; CFI = .82; AGFI = .84) (Appendix C). Only item 17 did not have factor loading above the cut-off point of .20 (ranged from .17 to .77). Therefore, several goodness of fit indices for the 16-item model clearly improved significantly with acceptable and good fit (χ^2 = 168.23, df = 103, p = .001; χ^2/df = 1.63; RMSEA = .06; GFI = .91; TLI = .90; CFI = .91; AGFI = .88). All factor loadings were significant and had factor loadings above the cut-off point of .20 (ranged from .21 to .77). Moreover, the revised 16-item scale was tested for reliability with Alpha Cronbach's Coefficient of .78.

In the actual study, the PSOC Scale used had 16 items with a 6-point scale (1-6 score) with the possible range of 16-96. The father competence

scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level of competence (Ketusingh, 1995). The meaning of the scale score is as follows:

69.33-96.00 points:	High level of competence
42.67-69.32 points:	Moderate level of competence
16.00-42.66 points:	Low level of competence

6) Marital relationship: The marital relationship was assessed by using the Revision Dyadic Adjustment Scale (RDAS) (Busby et al., 1995). The RDAS has 14 items with the possible range of 0-67 with higher scores indicating a more positive marital relationship as reported by the couple. This scale has 3 subscales: 1) consensus is the measure of the degree of agreement by couples on matters of importance to their relationship and consists of a 6-item with a 6-point scale (0-5 score), 2) satisfaction is the measure of satisfaction reported by the couple about their relationship and consists of 4-items with a 6-point scale (0-5 score), and 3) cohesion if the measure of the degree of closeness and shared activities reported by the couple and consists of 3-items with a 5-point scale (0-4 score) and 1-item with 6-point scale (0-5 score).

To establish content validity, the 14 items of RDAS scale were rated 3 to 4 by the five experts. The CVI of the Thai RDAS scale was 1.00 (CVI = 14/14). Then, the construct validity was tested by using confirmatory factor analysis in a study among 195 fathers-to-be/fathers. The results revealed that several goodness of fit indices in the model with 14-item clearly improved significantly with acceptable and good fit ($\chi^2 = 133.27$, $df = 74$, $p < .001$; $\chi^2/df = 1.80$; RMSEA = .06; GFI = .91; TLI = .88; CFI = .91; AGFI = .87) (Appendix C). All factor loadings were significant and had factor loadings above the cut-off point of .20 (range from .42 to .92). Moreover, the 14-item RDAS scale was tested for reliability with Alpha Cronbach's Coefficient of .80.

In the actual study, the 14 items RDAS Scale was used with the possible range of 0-67. The marital relationship scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level (Ketusingh, 1995). The meaning of the scale score is as follows:

44.67-67.00 points: High level of marital adjustment
22.34-44.66 points: Moderate level of marital adjustment
0.00-22.33 points: Low level of marital adjustment

7) Father-child attachment: The Father-child attachment was measured by the Paternal Infant Attachment Questionnaire: PIAQ (Condon et al., 2008). The PIAQ contains 19 items with 1-5 score and has 3 subscales: 1) patience and tolerance (8 items), 2) pleasure in interaction (7 items), and 3) affection and pride (4 items). Total scores on this scale ranged from 19 to 95 with the higher the score, the greater the father's attachment to the child.

To establish content validity, the 19 items of PIAQ scale were rated 3 to 4 by the five experts. The CVI of the Thai PIAQ scale was 1.00 (CVI = 19/19). Then, the construct validity was tested by using confirmatory factor analysis in a study among 195 fathers-to-be/fathers. The results revealed that for the 19-item model, the goodness of fit indices had a poor and acceptable fit (χ^2 = 232.53, *df* = 149, $p < .001$; χ^2/df = 1.56; RMSEA = .05; GFI = .89; TLI = .76; CFI = .79; AGFI = .86). Only one item (item 19) did not have factor loading above the cut-off point of .20 (ranged from .11 to .57) (Appendix C). Therefore, several goodness of fit indices for the 16-item model clearly improved significantly with acceptable and good fit (χ^2 = 204.17, *df* = 132, $p < .001$; χ^2/df = 1.55; RMSEA = .05; GFI = .90; TLI = .78; CFI = .81; AGFI = .87). All factor loadings were significant and had factor loadings above the cut-off point of .20 (ranged from .23 to .57). Moreover, the revised 18-item scale was tested for reliability with Alpha Cronbach's Coefficient of .76.

In the actual study, the 18 items PIAQ scale was used with the possible range of 18-90. The father-child attachment scores were grouped into 3 levels by using the formula: (maximum score – minimum score) / 3 including high, moderate, and low level (Ketusingh, 1995). The meaning of the scale score is as follows:

66.01-90.00 points: High level of attachment
42.01-66.00 points: Moderate level of attachment
18.00-42.00 points: Low level of attachment

1.2 Identification of participants

In this step, the participants were the fathers-to-be/fathers who met the inclusion criteria and the number of participants was estimated as follows.

Inclusion criteria

1) were 18 years old or above

2) volunteered to be the participants when their partners were pregnant in the third trimester , or two to three days after delivery, or one month after delivery who had no complications

3) lived with their partners

4) could read and write Thai.

Exclusion criterion

The exclusion criterion was that the participants were unable to participate in this step.

The number of participants

In this step, the number of participants was estimated in order to utilize multiple regression analysis. For the generalizability of results, the sample size should concern the ratio of observations to independent variables. A general rule is that the ratio should never fall below 5:1, meaning that five observations are made for each independent variable. Although the minimum ratio is 5:1, Hair, Black, Babin, and Anderson (2010) recommended at least 15 observations for each independent variable. In current phase, the independent variables consisted of 6 predictors. At 90 least subjects whose partners were in pregnancy and postnatal period was required for analyzing in each period. Therefore, the total sample size was required at 180 least subjects for two period of participant group.

1.3 Data collection

Before starting the data collection, the fathers-to-be/fathers completed their written consent forms. The questionnaires were then distributed to all consenting fathers-to-be/fathers to complete the self-administered questionnaires. After that, the researcher gathered the questionnaires and checked the completion of all questionnaires received.

1.4 Analysis of quantitative data

The results were analyzed by using the statistic methods. All questionnaires were described and explored the father involvement characteristics and the factors influencing the fathers' involvement based on characteristics of data.

1) The father and mother characteristics of the sample and all variables of this study were described by using descriptive statistics including percentages, mean, and standard deviations.

2) According to the characteristics of variables, the association between the independent variables and father involvement were examined by using Pearson's product moment correlation coefficient, Spearman's rank correlation coefficient, and Point-biserial correlation coefficient.

3) The predictive factors were examined by using multiple regression analysis.

2. Qualitative method

The qualitative method clarified the details of the father involvement characteristics, what stressors encourage or inhibit the involvement of fathers-to-be/fathers, what motivations or barriers promote or obstruct the fathers-to-be/fathers to participate in the nursing intervention, and how to create the appropriate intervention for promoting the fathers' involvement during pregnancy and neonatal period. The stakeholders who participated in this part included the father-to-be/fathers, pregnant woman/mothers, nurses, and village health volunteers. The researcher invited the participants to mutually assess and share information with regard to the father involvement during pregnancy and neonatal period.

2.1 Preparation of data collection instruments

The in-depth interview guideline was an instrument to assess data in the situation analysis. In-depth interview method aimed at understanding the views of stakeholders including the father-to-be/fathers, pregnant woman/mothers, nurses at antenatal care unit, delivery care unit, and postnatal care unit, and village health volunteers. In this study, a framework and literature reviews regarding the father involvement during pregnancy and neonatal period were used to develop the in-depth interview guideline to explore the perception of stakeholders. The guideline was also examined by experts, nurses, and fathers as well as their suggestions incorporated.

2.2 Identification of participants

The key informants including the father-to-be/fathers, pregnant woman/mothers, nurses at antenatal care, labor and delivery care, and postnatal care units, and village health volunteers were invited to participate in this part. They were purposefully selected from target subjects who met the inclusion criteria as follows.

Inclusion criteria for father-to-be/fathers

1) were 18 years old or above

2) volunteered to be the participants when their partners were pregnant in the third trimester, or two to three days after delivery, or one month after delivery who had no complications

3) lived with their partners

4) could read and write Thai.

Inclusion criteria for pregnant woman/mothers

1) were 18 years old or above

2) volunteered to be the participants when they were pregnant in the third trimester, or two to three days after delivery, or one month after delivery with no complications

3) lived with their partners

4) could read and write Thai.

Inclusion criteria for nurses

1) responding to antenatal care, or labor and delivery care, or postnatal care in Ban Bueng Hospital

2) were willing to participate in this study.

Inclusion criteria for village health volunteers

1) responding to the maternal and child health care in the community of Ban Bueng District, Chon Buri Province

2) were willing to participate in this study.

Exclusion criterion

The exclusion criterion was that the participants were unable to participate in this step.

The number of participants

For qualitative data collection, the sample size of participants was estimated to be 12 persons. However, participants were added to the sample until data saturation was reached; participants had become redundant and no new information is being added during the data collection process (Lobiondo-Wood & Haber, 2010; Rebar, Gersch, Marcnee, & McCabe, 2011). Initially and in the end, the participants group consisted of three persons from each group including the father-to-be/fathers, pregnant woman/mothers, nurses, and village health volunteers.

2.3 Data collection

Prior to the in-depth interview, the researcher met the selected participants and clarified the objectives and method of this step to invite them into this study. Then, the researcher made the appointment with each participant for an in-depth interview. The in-depth interviews were conducted in a private place at the primary health center or hospital or community unit and each interview lasted between 30 to 45 minutes. Before the researcher started the interviews, all participants stated they understood the objectives and method of this interview and signed the consent forms. All data were recorded on the audiotape; field notes were also taken.

2.4 Analysis and interpretation of qualitative data

The results were also analyzed and interpreted by using content analysis method. All qualitative data were explored and categorized by the researcher as the significant themes.

Phase 2: Planning of model development

After the situation analysis, the second part of the study was the planning process of model development to develop nursing intervention instruments. The aim of this phase was to design a method for promoting the fathers' involvement during pregnancy and neonatal period based on the findings in the situation analysis and the Neuman Systems Model. The procedures of this phase are explained as below.

2.1 Preparation of nursing intervention instruments

The nursing intervention instruments in this study consisted of the nursing intervention plan and fathers' booklet for encouraging the fathers' involvement during

pregnancy and neonatal period. The details of nursing intervention instruments were described as follows:

1) Nursing intervention plan

The main objective of the nursing intervention plan was to increase the fathers' involvement during pregnancy and neonatal period. The contents in this plan were developed by the researcher based upon the principles, literatures, and the quantitative and qualitative results from the situation analysis. The main topics were composed of the importance of fathers' involvement, care for mothers during pregnancy, childbirth, and afterbirth, and care for babies in the neonatal period. The intervention is organized into two main sections of intervention: prenatal and postnatal health education. The strategies and activities in the nursing intervention plan were created to reduce actual stressors of the fathers-to-be/fathers and their partners in each period. The nursing intervention was primary, secondary, and tertiary prevention. The primary prevention was conducted to increase the knowledge and enhance a positive attitude by fathers by strengthening a flexible line of defense for the fatherhood readiness. Then, the secondary and tertiary prevention was conducted to increase the fathers' ability to care of their partners and babies after training as the lines of resistance to maintain or reconstitute the fathers' involvement as the basic structure. Then, the draft of this plan was examined by the five experts and revised by the researcher according to the recommendations of experts. After revision, it was also examined by the nurses and fathers-to-be/fathers in the setting and revised by the researcher according to the recommendations of nurses and fathers-to-be/fathers.

2) Fathers' booklet

The fathers' booklet is a manual for health education and self study for the fathers-to-be/fathers to increase their involvement during pregnancy and neonatal period. The content in this manual was created by the researcher based on the principles, literatures, and the quantitative and qualitative results from the situation analysis. The manual for the fathers described the importance of fathers' involvement, care for mothers during pregnancy, childbirth, and after childbirth, and care for babies in the neonatal period. The three main topics were organized into the first part of the manual as the fathers' handbook and the second part as his record of the events. The fathers' booklet was also examined by the five experts and revised by the researcher

according to the recommendations of experts. It was also examined by the nurses and fathers-to-be/ fathers and revised by the researcher according to the recommendations of nurses and fathers-to-be/fathers.

2.2 Identification of participants

The key persons at the Ban Bueng Hospital including nurses and father-to-be/fathers were invited to participate in this phase. They were purposefully selected from target subjects who met the inclusion criteria as described below.

Inclusion criteria for nurses

1) responding to parenting health education in section of antenatal care, or labor and delivery care, or postnatal care

2) were willing to participate in this study.

Inclusion criteria for father-to-be/fathers

1) volunteered to be the participants when their partners were pregnant in the third trimester, or two to three days after delivery, or one month after delivery

2) were willing to participate in this study.

Exclusion criterion

The exclusion criterion was that the participants were unable to participate in this phase.

The number of participants

The key persons from the hospital included three heads of nursing from the antenatal care unit, labor and delivery care unit, and postnatal care unit. Then, three nurses (from antenatal care, labor and delivery care, and postnatal care units) who have responsibilities in the parenting health education and three father-to-be/fathers were also invited to participate in this phase.

2.3 Data collection

The data collection activities in this phase were composed of three steps: 1) identification of problems; 2) construction of nursing intervention instrument; and 3) modification of the nursing intervention instrument as proposed. The details of data collection are described as follows:

1) Identification of problems

Problems were identified by reflecting the preliminary findings. The researcher reconsidered the quantitative and qualitative results from the situation

analysis phase and then concluded the characteristics of fathers' involvement, the factors influencing the father's involvement, and the motivations or barriers promoting or obstructing the fathers-to-be/fathers to participate in the nursing intervention. Additionally, the suggestions by the nurses in the field were considered when creating an appropriate nursing intervention to promote the fathers' involvement during pregnancy and neonatal period.

2) Construction of the drafts of nursing intervention instrument

The nursing intervention instrument was developed by the researcher and included the nursing intervention plan and fathers' booklet. The intervention was based upon the findings in the situation analysis, the literature review, and the Neuman Systems Model. To solve the problems and needs of fathers and their partners in the real situation, the researcher needed to improve the original draft of nursing intervention instrument by using the integrated quantitative and qualitative results in the situation analysis phase.

3) Improvement of the drafts of nursing intervention instrument

In order to be useful in the real situation, the five experts in maternal and child nursing field, nurses, and fathers-to-be/fathers participated in this phase. The draft of the nursing intervention instrument was examined by the five experts and improved by the researcher according to the suggestions of experts. Before starting the discussion with nurses, the researcher established relationships with the nurses who were responsible for antenatal care, labor and delivery care, and postnatal care. Then, the researcher presented the findings in the situation analysis and the draft of nursing intervention plan and fathers' booklet. The researcher shared ideas and experiences with the nurses and fathers-to-be/fathers and the draft was improved by the researcher according to the suggestions of nurses and fathers-to-be/fathers.

2.4 Data analysis and summarization of the planning of model development

For appropriate nursing intervention instruments in the real situations, the data from the discussions with nurses were analyzed by using content analysis. Then, the important results were summarized and utilized to revise the drafts of nursing intervention instrument for promoting the fathers' involvement in the next phase.

Phase 3: Model implementation

The model implementation phase for promoting the fathers' involvement during pregnancy and neonatal period focused on the nursing intervention plan from the phase 2. Based on the Neuman Systems Model, the projects in this plan were implemented as the prevention for fathers-to-be/fathers to increase their involvement during pregnancy, childbirth, and postnatal period. The projects for caring for the pregnant women in the third trimester and childbirth period acted as the primary prevention to protect the normal line of defense by strengthening the flexible line of defense. Then, the projects for caring for the postnatal mothers and babies acted as the secondary prevention to protect the basic structure by strengthening the lines of resistance. The procedures in this phase are explained as below.

3.1 Preparation of nursing intervention instruments

For readiness in the implementation phase, the researcher prepared the nursing intervention instruments including the nursing intervention plan and fathers' booklet for promoting the fathers' involvement during pregnancy and neonatal period.

3.2 Identification of participants

The sample in this phase was composed of the fathers-to-be and their partners and selected from target subjects who met the inclusion criteria as follows.

Fathers-to-be

1) were 18 years old or above

2) volunteered to be the participants when their partners were the 32-36 weeks of gestation age with normal pregnancy

3) lived with their partners

4) had access to a telephone

5) could read and write Thai.

Pregnant women

1) were 18 years old or above

2) volunteered to be the participants when they were the 32-36 weeks of gestation age with normal pregnancy.

Exclusion criterion

The exclusion criterion in this phase was that the fathers-to-be/fathers did not completely attend the activities in the nursing intervention of model.

The number of participants

Estimation of the sample size of fathers-to-be and pregnant women needed to demonstrate the impact of the intervention was calculated. The formula used to calculate the sample size is illustrated as follows (Twisk, 2003: 281):

$$n = \frac{(Z_{(1-\alpha/2)} + Z_{(1-\beta)})^2 \sigma^2 (r+1) [1+(T-1)\rho]}{v^2 rT}$$

Where n = sample size

$Z_{(1-\alpha/2)}$ = the $(1-\alpha/2)$ percentile point of the standard normal distribution with a significant level of 5% is 1.96.

$Z_{(1-\beta)}$ = the $(1-\beta)$ percentile point of the standard normal distribution with a power of 80% is 0.84.

σ = the standard deviation of the outcome variable

ρ = the correlation coefficient of the repeated measurements

r = the ratio of the number of subjects in the compared group

v = the difference in mean value of the outcome variable between groups

T = the number of follow-up measurements

From the study by Naunboonruang (2002), the mean and variance of self-confidence for the fathers in the first-time could calculate as follows:

σ = 10.8

v = 109.3 – 102.5 = 6.8

$$n = \frac{(1.96+ 0.84)^2 (10.8)^2 (1+1) [1 + (2-1) 0.50]}{(6.8)^2(1)(2)}$$

$$= 19.78$$

Therefore, the minimum sample size which was estimated in this phase was 20 couples. In order to ensure a sufficient sample, the researcher increased 30% of the sample size to ensure adequate numbers in the event that someone would not be able to join all the activities. A sample of at least 26 couples was planned.

3.3 Data collection

The data collection in this phase consisted of thee main steps including action for implementation, re-assessment, and re-planning as described below (Figure 3-2).

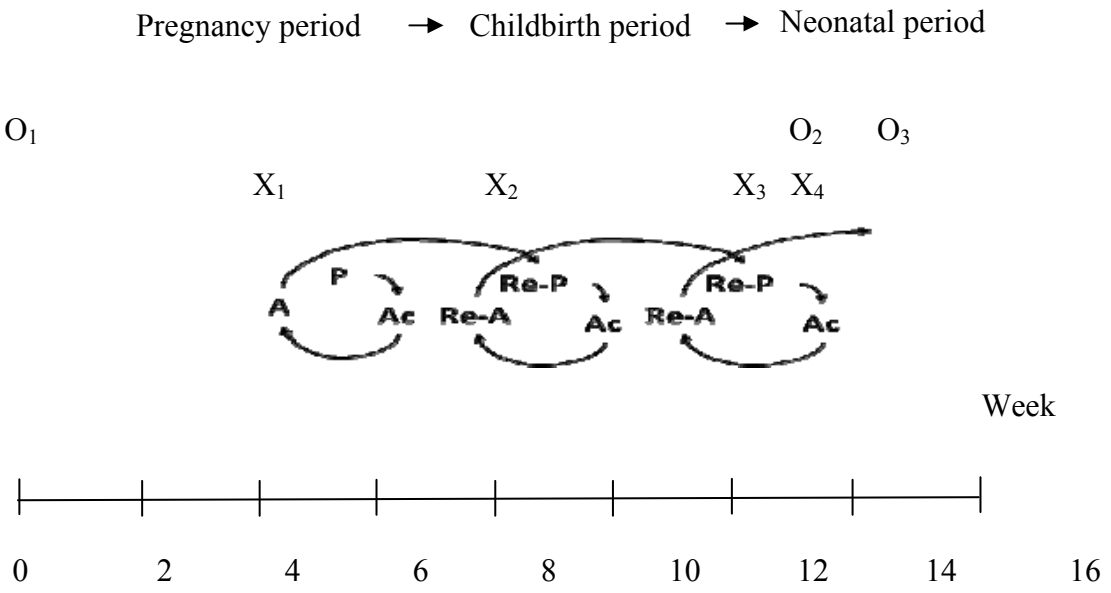


Figure 3-2 The research procedure in the model implementation

Note: O_1: refers to baseline data collection of fathers-to-be for assessment section.

X_1: refers to the promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period.

X_2: refers to the monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period.

X_3: refers to the promoting the father involvement in the care for postnatal mother and newborn.

X_4: refers to the Monitoring of problems and barriers regarding the care for postnatal mother and newborn.

O_2: refers to data collection of fathers at one week after delivery for evaluation.

O_3: refers to data collection of fathers at one month after delivery for follow-up evaluation.

P = Planning, Ac = Action, Re-A = Re-assessment, Re-P = Re-planning

Step 1: Action for implementation

The main objective of this step was to enhance the fathers' involvement during pregnancy and neonatal period via the father involvement intervention model. Before beginning the nursing intervention, the fathers-to-be were assessed at 28-36 weeks' gestation by using the self-administered questionnaires (O_1). The step of action for implementation had four sections including 1) promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period (X_1), 2) monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period (X_2), 3) promoting the father involvement in the care for postnatal mother and newborn (X_3), and 4) monitoring of problems and barriers regarding the care for postnatal mother and newborn (X_4). The researcher and team acted as a teacher and facilitator for the fathers-to-be/fathers and their partners, and the fathers' booklet was provided as self-study materials.

Step 2: Re-assessment

The researcher and team discussed the actual problems, needs, and barriers of the fathers-to-be/fathers and their partners in each section of nursing intervention to plan the nursing activities to solve emerging problems or needs. Then, the re-planning was occurred to initiate a new spiral process for next sections.

Step 3: Re-planning

The re-planning step was started as the new spiral loop for next section of the intervention. The main objective of re-planning process was to create the activities in the nursing intervention plan for solving the emerging problems or needs of the fathers-to-be/fathers and their partners during pregnancy and neonatal period. In this process, the researcher and team discussed the most appropriate ways for solving the problems or needs of the fathers-to-be/fathers and their partners. The researcher then improved the activities of the nursing intervention plan in the father involvement model. Thus, to improve the nursing intervention in the father involvement model, the new spiral loop consisted of the step of re-planning, action for implementation, and re-assessment. In this study, the three spiral processes were occurred in the third trimester of pregnancy, childbirth, and neonatal period, respectively.

3.4 Data analysis and summarization of the implementation model

For appropriate nursing intervention in real situations, the data from the discussion with nurses were analyzed by using content analysis. Then, the important results were utilized to improve and summarize the nursing intervention instruments in the father involvement model during pregnancy and neonatal period.

Phase 4: Model evaluation

This phase was aimed at evaluating the outputs and outcomes of the father involvement model during pregnancy and neonatal period. The evaluation consisted of two times including one week after delivery (O_2) and one month after delivery for follow-up (O_3) by using the self-administered questionnaires (Figure 3-2). The procedures in this phase are described as below.

4.1 Preparation of data collection instruments

The instruments assessing the output and outcome indicators were the self-administered questionnaires. They included the Inventory of Functional Status–Fathers (IFS-F), Prenatal/ Postnatal Care Knowledge Scale, Role of the Father Questionnaire (ROFQ), Parenting Sense of Competence (PSOC), Revision Dyadic Adjustment Scale (RDAS), and Paternal Infant Attachment Questionnaire (PIAQ). The translation and validation method of all questionnaires were described in the situation analysis phase.

4.2 Identification of participants

The participants involved in this phase were the fathers who participated in phase 3: model implementation and attended all sessions of the nursing intervention in the father involvement model.

4.3 Data collection

The method used for collecting the data was distribution of the self-administered questionnaires. The output variables consisted of prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement while the outcome variables included marital relationship and father-child attachment. All evaluation indicators were measured twice for follow-up; one week after delivery (O_2) and one month after delivery for follow-up (O_3) (Figure 3-2).

4.4 Data analysis

The results in this phase were analyzed by using the statistic methods based on characteristics of data. All questionnaires were described the characteristics of the sample and evaluated the outputs and outcomes of the father involvement model twice when compared with before the intervention as follows.

1) The father and mother characteristics of the sample and all variables were described using descriptive statistics including percentages, mean, and standard deviations.

2) The score differences of output variables including prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement and outcome variables including marital relationship and father child attachment at different time points (before the intervention, one week after delivery, and one month after delivery for follow-up) were examined by using Repeated measures analysis of variance.

In conclusion, the study design was the research and development and was organized into four phases. First, the situation analysis was created through the stressor concept of the Neuman Systems Model. This phase used both quantitative and qualitative methods for data collection. The participants were assessed by using the self-administered questionnaires for colleting the quantitative data while the stakeholders were interviewed for colleting the qualitative data. To solve the problems in real situation, the nursing intervention instruments for promoting the father involvement was developed in phase 2: planning of model development. Then, the nursing intervention was implemented for fathers-to-be/fathers following the nursing intervention plan in phase 3: model implementation. Finally, the outputs and outcomes of the father involvement model were evaluated by using the self-administered questionnaires in phase 4: model evaluation. The methods can be summarized by the research procedure, participants, instruments, methods of data collection, and data analysis as shown in Table 3-1.

Table 3-1 Conclusion of methods according to the research procedure, participants, instruments, methods of data collection, and data analysis

Research procedure	Research participants	Research instruments	Methods of data collection	Data analysis
1) Situation analysis	- Fathers-to-be/fathers, pregnant woman/mothers, nurses, and village health volunteers	- Self-administered questionnaires and in-depth interview guidelines	Distribution of the self-administered questionnaires and in-depth interview	- Integration of quantitative and qualitative results
1.1 Quantitative study	- Fathers-to-be/fathers	- Self-administered questionnaires: Father and mother characteristics, IFS-F, PCK, ROFQ, PSOC, RDAS, and PIAQ	- Distribution of the self-administered questionnaires	- Percentages, mean, median, and standard deviations - Correlation - Multiple regression
1.2 Qualitative study	- Fathers-to-be/fathers - Pregnant woman/mothers - Nurses - Village health volunteers	- In-depth interview guidelines	-An in-depth interview	- Content analysis
2) Planning of model development	- Nurses at antenatal care unit, labor and delivery care unit, and postnatal care unit	- Nursing intervention plan - Fathers' booklet	-A group discussion with note taking	- Content analysis
3) Model implementation	- Fathers-to-be/fathers and their partners	- Nursing intervention plan - Fathers' booklet	-A group discussion with note taking	- Content analysis
4) Model evaluation	- Fathers	- Self-administered questionnaires	- Distribution of the self-administered questionnaires	
4.1 Demographics		1. Father and mother characteristics		- Percentages, mean, median, and standard deviations
4.2 Outputs		2. Questionnaires: PCK, ROFQ, PSOC, and IFS-F		- Repeated measures ANOVA
4.3 Outcomes		3. Questionnaires**:** RDAS and PIAQ		- Repeated measures ANOVA

3.4 Protection of Human Subjects Rights

This study received Institutional Review Board (IRB) approval by the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University (MUPH 2012-129, 2012 April 25). The permission letter for data collection was sent from the Faculty of Graduate Study to the Director of Ban Bueng Hospital. Prior to initiation of this project, a summary of this study (such as the objectives, time frame, activities, expected outputs and outcomes) was described for the participants including fathers-to-be/fathers, pregnancy women/mothers, nurses, and village health care volunteers. Additionally, it was explained that the interviews would be recorded but no names would be used, only pseudonyms. The participants could refuse to participate or withdraw from the study at anytime. Their decision to participate or discontinue participating in the study would not affect their relationship between the participants and researcher or nurses or other staff and their health care services. Once the study volunteers agreed to be participants in the study, the informed consent document was signed verifying that they were volunteering to participate in the study.

CHAPTER IV
RESULTS

This chapter presents the results of development of the father involvement model to promote the fathers' participation of during pregnancy and neonatal period which were guided by the Neuman Systems Model as the conceptual framework via the process of research and development. The scope of this study is limited to the involvement of fathers-to-be/fathers in period of the third trimester of pregnancy until one month after delivery. This chapter is divided into four parts as follows:

Part 1: Situation analysis
- The results of the quantitative study
- The results of the qualitative study
- Integration of the quantitative and qualitative results

Part 2: Planning of model development
- Process of planning of the model development
- Results of planning of the model development

Part 3: Model implementation
- Recruitment of participants
- The results of the process of implementation

Part 4: Model evaluation
- Background characteristics
- Comparisons of the mean scores of outputs and outcomes
- Summary of the father involvement model

Part I: Situation Analysis

The main purpose in the situation analysis phase was to explore the factors influencing the fathers' involvement during pregnancy and neonatal period by using both quantitative and qualitative methods. The results of this phase are presented as the following:

The results of the quantitative study

The quantitative data were assessed the factors influencing the fathers' involvement during pregnancy and neonatal period by using the self-administered questionnaires. The data were collected from the fathers-to-be/fathers in Ban Bueng District, Chon Buri Province, Thailand. Of 206 participants, they included 90 fathers-to-be and 116 fathers. The results of quantitative study are presented as follows:

1. Background characteristics

1.1 Demographics of participants

As far as the demographics of the participants are concerned, the findings revealed that the participant's age for fathers-to-be ranged from 18 to 35 years old with an average of 25.62 years old (*SD*=3.78) and from 18 to 38 years old with an average of 27.71 years old (*SD*=5.45) for fathers. Most of them (97.8% of fathers-to-be and 95.7% of fathers) were Buddhist. About 40% (38.9%) of fathers-to-be and 57.8% of fathers had completed at least senior high school or equivalent level. The duration of marriage was an average of 2.52 years (*SD*=1.46) for fathers-to-be and 2.72 (*SD*=1.72) for fathers and over 90% was less than 5 years. Most of them (86.7%, 75.0%) had no experience in infant care and about half of them were nuclear families (52.2%, 50.9%) and extended families (47.8%, 49.1%). Of their working condition, more than three fourth in both groups were employee and less than 5% of them were government officer. The fathers-to-be had an average income of 12,228.67 baht per month (*SD*=6,422.72) and 12,489.74 baht per month (*SD* =6,679.04) for fathers. Over 80% in both groups was less than 20,000 baht per month and below 5% was more than 30,000 baht per month. About 90% did not have the paternity leave. The other profiles of participants are presented in Table 4-1.

Table 4-1 Demographics of participants

Items	Fathers-to-be (*n*=90)		Fathers (*n*=116)		Total (*n*=206)	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Age (years)						
< 20	13	14.4	19	16.4	32	15.5
21 - 30	72	80.0	55	47.4	127	61.7
> 30	5	5.6	42	36.2	47	22.8
$\overline{X}$ +*SD*	25.62 + 3.78		27.71 + 5.45		26.79 + 4.89	
Range	18-35		18-38		18-38	
Religion						
Buddhist	88	97.8	111	95.7	199	96.6
Christian	2	2.2	3	2.6	5	2.4
Islam	0	0.0	2	1.7	2	1.0
Educational level						
Primary school	19	21.1	15	12.9	34	16.5
Junior high school	36	40.0	34	29.3	70	34.0
Senior high school	17	18.9	30	25.9	47	22.8
Primary vocation certificate	7	7.8	12	10.3	19	9.2
High vocation certificate	8	8.9	11	9.5	19	9.2
Bachelor degree	3	3.3	14	12.1	17	8.3
Occupation						
Company employee	41	45.6	62	53.5	103	50.0
Employee	27	30.0	26	22.4	53	25.7
Business/Trader	14	15.6	15	12.9	29	14.1
State enterprise employee	3	3.3	5	4.3	8	3.9
Agriculture	3	3.3	3	2.6	6	2.9
Government officer	2	2.2	5	4.3	7	3.4
Income (baht/month)						
< 10,000	43	47.8	45	38.8	88	42.7
10,000 – 19,999	30	33.3	54	46.6	84	40.8
20,000 – 29,999	14	15.6	12	10.3	26	12.6
> 30,000	3	3.3	5	4.3	8	3.9
$\overline{X}$ +*SD*	12,228.67 + 6,422.72		12,489.74 + 6,679.04		12,375.68 + 6,553.69	
Range	5,000-40,000		5,000-50,000		5,000-50,000	
Duration of marriage (years)						
< 2	50	55.6	65	56.0	115	55.8
3 - 5	37	41.1	40	34.5	77	37.4
> 5	3	3.3	11	9.5	14	6.8
$\overline{X}$ +*SD*	2.52+1.46		2.72+1.72		2.63+1.61	
Range	1-6		1-7		1-7	

Table 4-1 Demographics of participants (cont.)

Items	Fathers-to-be (*n*=90)		Fathers (*n*=116)		Total (*n*=206)	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Experience in infant care						
No	78	86.7	87	75.0	165	80.1
Yes	12	13.3	29	25.0	41	19.9
Family characteristics						
Nuclear	47	52.2	59	50.9	106	51.5
Extended	43	47.8	57	49.1	100	48.5
Paternity leave						
No	82	91.1	109	94.0	191	92.7
Yes	8	8.9	7	6.0	15	7.3
The number of paternity leave (days)						
< 5	3	3.3	3	2.6	6	2.9
5 – 10	4	4.5	1	.8	5	2.4
> 10	1	1.1	3	2.6	4	2.0
$\overline{X}$ +*SD*	7.63+4.81		8.29+6.60		7.93+5.51	
Range	3-15		1-15		1-15	

1.2 Demographics of participant' partners

As shown in Table 4-2, the pregnant women ranged in age from 18 to 35 years with an average age of 23.22 years old (*SD*=4.49) and the mothers ranged in age from 18 to 31 years with an average age of 24.23 years old (*SD*=3.39). Most of them (100% of pregnant women and 97.4% of mothers) were Buddhist. About 40% (36.7%) of pregnant women and 52.6% of mothers had completed at least senior high school or equivalent level. More than 50% of them were employed (55.6%, 69.8%) in which over half of woman workers was employee (36.7%, 50.8%) and followed by business/trader (11.1%, 14.7%). The pregnant women had an average income of 9,076.60 baht per month (*SD*=4,468.46) and 10,330.31 baht per month (*SD*=5,375.37) for the mothers. Less than 5% of them were above or equal 20,000 baht per month (4.4%, 4.3%). Approximately one third of them had the maternity leave (27.8%, 40.5%) and most of them had 3-months delivery leave.

Table 4-2 Demographics of participant' partners

Items	Pregnancy women (*n*=90)		Mothers (*n*=116)		Total (*n*=206)	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Age (years)						
< 20	32	35.6	26	22.4	58	28.1
21 - 30	50	55.6	89	76.7	139	67.5
> 30	8	8.9	1	.9	9	4.4
$\overline{X}$ +*SD*	23.22 + 4.49		24.23 + 3.39		23.79 + 3.93	
Range	18-35		18-31		18-35	
Religion						
Buddhist	90	100.0	113	97.4	203	98.5
Christian	0	0.0	2	1.7	2	1.0
Islam	0	0.0	1	.9	1	.5
Educational level						
Primary school	20	22.2	18	15.5	38	18.5
Junior high school	37	41.1	37	31.9	74	35.9
Senior high school	15	16.7	25	21.6	40	19.4
Primary vocation certificate	11	12.2	8	6.9	19	9.2
High vocation certificate	2	2.2	15	12.9	17	8.3
Bachelor degree	5	5.6	13	11.2	18	8.7
Occupation						
Unemployment	40	44.4	35	30.2	75	36.4
Employment	50	55.6	81	69.8	131	63.6
Company employee	25	27.8	41	35.3	66	32.0
Employee	8	8.9	18	15.5	26	12.6
Business/Trader	10	11.1	17	14.7	27	13.1
State enterprise employee	5	5.6	0	0.0	5	2.5
Agriculture	2	2.2	1	.9	3	1.5
Government officer	0	0.0	4	3.4	4	1.9
Income (baht/month)						
No income	40	44.4	35	30.2	75	36.4
< 10,000	33	36.8	40	34.5	73	35.4
10,000 – 19,999	13	14.4	36	31.0	49	23.8
20,000 – 29,999	4	4.4	3	2.6	7	3.4
> 30,000	0	0.0	2	1.7	2	1.0
$\overline{X}$ +*SD*	9,076.60 + 4,468.46		10,330.31 + 5,375.37		9,851.79 + 5,067.66	
Range	2,400-25,000		3,000-30,000		2,400-30,000	
Delivery leave						
No	65	72.2	69	59.5	134	65.0
Yes	25	27.8	47	40.5	72	35.0
The number of delivery leave (months)						
1 - 2	5	5.6	9	7.8	14	6.8
> 3	20	22.2	38	32.7	58	28.2

1.3 Social support of participants

The social support of participants came from partners (94.4%), parents (62.2%) and relatives (55.6%) for the fathers-to-be and from partners (99.1%), partner's parents (68.1%) and partner's relatives (55.2%) for fathers. Most of them received all types of support from partners while the informational and appraisal support came from nurses and parents, respectively. The data of social support of participants are presented in Table 4-3.

Table 4-3 Social support of participants

Source of support	Group	Type of supportive behaviors								Total	
		ES		IS		IFS		AS			
		n	%	n	%	n	%	n	%	n	%
Informal sources											
Partner	1	71	78.9	47	52.2	44	48.9	12	13.3	85	94.4
	2	96	82.8	87	75.0	65	56.0	19	16.4	115	99.1
	3	167	81.1	134	65.0	109	52.9	31	15.0	200	97.1
Parent	1	16	17.8	38	42.2	42	46.7	13	14.4	56	62.2
	2	22	19.0	55	47.4	49	42.2	19	16.4	62	53.4
	3	38	18.4	93	45.1	91	44.2	32	15.5	118	57.3
Partner's parent	1	10	11.1	29	32.2	35	38.9	7	7.8	47	52.2
	2	23	19.8	70	60.3	59	50.9	19	16.4	79	68.1
	3	33	16.0	99	48.1	94	45.6	26	12.6	126	61.2
Relatives	1	6	6.7	24	26.7	37	41.1	7	7.8	50	55.6
	2	12	10.3	39	33.6	33	28.4	12	10.3	56	48.3
	3	18	8.7	63	30.6	70	34.0	19	9.2	106	51.5
Partner's relatives	1	3	3.3	29	32.2	32	35.6	5	5.6	45	50.0
	2	16	13.8	45	38.8	39	33.6	13	11.2	64	55.2
	3	19	9.2	74	35.9	71	34.5	18	8.7	109	52.9
Friends	1	1	1.1	14	15.6	18	20.0	0	0.0	24	26.7
	2	5	4.3	39	33.6	27	23.3	4	3.4	55	47.4
	3	6	2.9	53	25.7	45	21.8	4	1.9	79	38.3
Partner's friends	1	0	0.0	11	12.2	13	14.4	1	1.1	20	22.2
	2	4	3.4	38	32.8	27	23.3	3	2.6	53	45.7
	3	4	1.9	49	23.8	40	19.4	4	1.9	73	35.4

Table 4-3 Social support of participants (cont.)

Source of support	Group	Type of supportive behaviors								Total	
		ES		IS		IFS		AS			
		n	%	n	%	n	%	n	%	n	%
Supervisor	1	2	2.2	17	18.9	13	14.4	1	1.1	25	27.8
	2	3	2.6	33	28.4	17	14.7	3	2.6	41	35.3
	3	5	2.4	50	24.3	30	14.6	4	1.9	66	32
Formal sources											
Doctors	1	0	0.0	0	0.0	10	11.1	0	0.0	10	11.1
	2	0	0.0	0	0.0	61	52.6	0	0.0	61	52.6
	3	0	0.0	0	0.0	71	34.5	0	0.0	71	34.5
Nurses	1	0	0.0	0	0.0	28	31.1	0	0.0	28	31.1
	2	0	0.0	0	0.0	87	75.0	0	0.0	87	75.0
	3	0	0.0	0	0.0	115	55.8	0	0.0	115	55.8
Public health	1	0	0.0	0	0.0	5	5.6	0	0.0	5	5.6
personnel	2	0	0.0	0	0.0	29	25.0	0	0.0	29	25.0
	3	0	0.0	0	0.0	34	16.5	0	0.0	34	16.5

Group of participants: 1= Fathers-to-be, 2 = Fathers, 3 = Total

One person could select more than one choice

ES=Emotional Support, IS=Instrumental Support, IFS=Informational Support, AS=Appraisal Support

1.4 Characteristics for father involvement, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment of participants

Table 4-4 illustrates a moderate level of the father involvement, prenatal and postnatal care knowledge, and father competence and a high level of attitude toward fatherhood, marital relationship and father-child attachment in both fathers-to-be and fathers. However, the mean scores of father involvement (comparing with four subscales), prenatal and postnatal care knowledge, father competence, marital relationship, and father-child attachment of the fathers were higher than those of the fathers-to-be.

Table 4-4 Descriptive statistics of father involvement, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment

Variables	Possible range	Fathers-to-be (*n*=90)			Fathers (*n*=116)		
		Mean (*SD*)	Actual range	Level	Mean (*SD*)	Actual range	Level
FI	28-112 [a]	71.77 (7.10)	56-86	Moderate	75.07 (10.64)	50-101	Moderate
	34-136 [b]				88.14 (12.16)	63-118	Moderate
- PA	7-28	17.67 (2.30)	10-23	Moderate	18.07 (2.81)	12-26	Moderate
- HA	11-44	25.88 (4.45)	17-40	Moderate	27.26 (7.47)	13-43	Moderate
- IA	6-24	-	-	-	13.07 (3.82)	6-22	Moderate
- OA	5-20	15.01 (1.60)	11-19	Moderate	14.91 (2.07)	11-19	Moderate
- SCA	5-20	13.21 (2.25)	8-19	Moderate	14.83 (2.44)	9-20	Moderate
PCK	0-56	34.20 (5.06)	21-46	Moderate	35.08 (6.31)	20-51	Moderate
ATF	15-75	59.99 (5.48)	45-71	High	59.62 (6.16)	45-73	High
FC	16-96	62.72 (8.23)	45-81	Moderate	69.16 (11.21)	42-91	Moderate
MR	0-69	46.23 (7.12)	31-64	High	48.41 (7.95)	30-65	High
FCA	18-90	70.61 (8.08)	50.50-85.60	High	74.06 (7.84)	51.40-90.00	High

[a] For four subscales, [b] For five subscales

FI = Father Involvement, PA = Personal Care Activities, HA = Household Activities, IA = Infant Care Activities, OA = Occupational Activities, SCA = Social and Community Activities, PCK = Prenatal and postnatal Care Knowledge, ATF = Attitude toward Fatherhood, FC = Father Competence, MR = Marital Relationship, FCA = Father-Child Attachment

2. Relationships among independent variables and father involvement

As seen in Table 4-5, correlations were used to determine the relationship among continuous independent variables (including fathers' age and income, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, father-child attachment) and father involvement. Where the variables were normally distributed, Person's correlation was used, and where the variables were not normally distributed, Spearman's rank correlation was used (Appendix I). Because one subscale of father involvement (infant care activities) did not assess by the fathers-to-be, total score of the fathers-to-be is less than that of the fathers. The data were analyzed for the fathers-to-be and fathers. The father involvement for both fathers-to-be and fathers had a positive relationship to prenatal and postnatal care knowledge (r=.474, p-value<.001 and r=.486, p-value<.001), attitude toward fatherhood (r=.475, p-value<.001 and r=.459, p-value<.001), father competence (r=.282, p-value=.007 and r=.403, p-value<.001), marital relationship (r=.284, p-value=.007 and r=.274, p-value=.003), father-child attachment (r=.279, p-value=.008 and r=.315, p-value=.001), and fathers' age (r=.213, p-value=.043 and r=.191, p-value=040). However, the fathers' income had no relationship with father involvement (r=.156, p-value=.141 and r=.173, p-value=.063). The details of all relationship are presented in Appendix J.

For category independent variables, point-biserial correlation coefficient was used for testing. There were no significant association between the father involvement and fathers' educational level: junior high school or below and senior high school or above, fathers' occupational status: business/trader/agriculture and employee/other, mothers' occupational status: unemployment and employment, and family characteristics: nuclear and extended families.

Table 4-5 Correlation coefficients among independent variables and father involvement

Variables	Father involvement			
	Fathers-to-be (*n*=90)		Fathers (*n*=116)	
	r	***p*-value**	***r***	***p*-value**
Intrapersonal stressors				
Fathers' age [b]	.213*	.043	.191*	.040
Fathers' educational level [c]	.185	.082	.010	.917
Prenatal and postnatal care knowledge [a]	.474***	<.001	.486***	<.001
Attitude toward fatherhood [a]	.475***	<.001	.459***	<.001
Father competence [a]	.282**	.007	.406***	<.001
Interpersonal stressors				
Marital relationship [a]	.284**	.007	.274**	.003
Father-child attachment [a]	.279**	.008	.315**	.001
Family characteristics [c]	-.110	.301	-.164	.079
Extrapersonal stressors				
Fathers' income [b]	.156	.141	.173	.063
Fathers' occupational status [c]	.137	.198	.080	.395
Mothers' occupational status [c]	.078	.464	.043	.645

*p < .05, **p < .01, ***p < .001

[a] By Pearson's product moment correlation coefficient, [b] By Spearman's rank correlation coefficient, [c] By point-biserial correlation coefficient

In terms of screening for the candidate predictors, some variables whose correlation test has *p*-value less than .05 were determined to analyze in multiple regression. In current study, six variables including fathers' age, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment were selected as the candidate predictors.

3. Predictors of father involvement

To find the best model, the multiple regression analysis with backward regression technique was used to examine predictors of the father involvement. Prior to multiple regression analysis, the data were cleaned and examined the assumptions for linear multiple regression and all assumptions were met (Appendix I). Therefore, six factors which associated with the father involvement including fathers' age,

prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment were entered into multiple regression analysis to indicate predictors of the father involvement.

3.1 Predictors of father involvement for fathers-to-be

Six factors were entered into analysis for predicting the father involvement of the fathers-to-be as shown in Table 4-6.

Table 4-6 The model for backward multiple regression analysis of predicting factors and father involvement for fathers-to-be (*n*=90)

Variables	B	SE.	Beta	*t*	*p*-value
Full model					
Age	.191	.175	.102	1.094	.277
Prenatal and postnatal care knowledge	.356	.147	.255	2.423	.017*
Attitude toward fatherhood	.374	.129	.289	2.903	.005**
Father competence	.080	.082	.092	.977	.332
Marital relationship	.099	.095	.099	1.037	.301
Father-child attachment	.071	.085	.081	.844	.407
Constant = 17.670, R^2 = .357, R^2_{adjust} = .310, F = 7.670, p-value < .001					
Final model					
Prenatal and postnatal care knowledge	.464	.138	.331	3.371	.001**
Attitude toward fatherhood	.432	.127	.333	3.397	.001**
Constant = 29.988, R^2 = .315, R^2_{adjust} = .299, F = 20.025, *p-value* < .001					

*p < .05, **p < .01, ***p < .001

For the full model of predicting factors of father involvement, six variables including the fathers' age, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment together explained 35.7% of the variance in the father involvement (R^2 = .357, F = 7.670, p-value < .001). There were two significant variables: prenatal and postnatal care knowledge and attitude toward fatherhood while four non-significant variables including the fathers' age, father competence, marital relationship, and father-child attachment were removed from the next model if they were not significant (see Appendix J).

From Table 4-6, it can be summarized that the final model including two variables (prenatal and postnatal care knowledge and attitude toward fatherhood) was statistically significant factors that could predict the father involvement. Regarding the overall of father involvement found that prenatal and postnatal care knowledge and attitude toward fatherhood together explained 31.5% of the variance (R^2 = .315, F = 20.025, p-value < .001).

Therefore, the best regression equation of father involvement for the fathers-to-be was presented as follows:

Father involvement = 29.988 + .464(Prenatal and postnatal care knowledge) + .432(Attitude toward fatherhood)

From this equation, it meant that an increase of one score of prenatal and postnatal care knowledge would increase the father involvement by .464 score, by controlling attitude toward fatherhood. An increase of one score of attitude toward fatherhood would increase the father involvement by .432 score, by controlling prenatal and postnatal care knowledge.

For example, the sample had the score of perceived prenatal and postnatal care knowledge and attitude toward fatherhood at 46 with highest score and 64, respectively, and then the score of father involvement was calculated at 78.98 as follows:

$$\begin{aligned} \text{Father involvement} &= 29.988 + .464(46) + .432(64) \\ &= 29.988 + 21.344 + 27.648 \\ &= 78.98 \end{aligned}$$

From this equation, the score of father involvement is similar to the real score of this sample at 82. For the fathers-to-be, it can conclude that this equation explained the variance in the father involvement nearly with that score in the real situation. However, the results obtained that perceived prenatal and postnatal care knowledge and attitude toward fatherhood together explained the variance in the father involvement with 78.98, meaning the fathers-to-be did the activities of father involvement with moderate level. Therefore, there are other factors that affected the increasing score of father involvement such as father competence, marital relationship, and father-child attachment.

3.2 Predictors of father involvement for fathers

Six factors were entered into analysis for predicting the father involvement of the fathers as shown in Table 4-7.

Table 4-7 The model for backward multiple regression analysis of predicting factors and father involvement for fathers (*n*=116)

Independent variables	B	SE.	Beta	*t*	*p*-value
Full model					
Age	.210	.176	.094	1.195	.235
Prenatal and postnatal care knowledge	.492	.177	.255	2.779	.006**
Attitude toward fatherhood	.460	.183	.233	2.508	.014*
Father competence	.141	.100	.130	1.415	.160
Marital relationship	.112	.128	.073	.894	.373
Father-child attachment	.186	.125	.120	1.455	.149
Constant = 8.700, R^2 = .360, R^2_{adjust} = .325, F = 10.208, p-value < .001					
Final model					
Prenatal and postnatal care knowledge	.596	.171	.309	3.478	.001**
Attitude toward fatherhood	.575	.170	.292	3.386	.001**
Father-child attachment	.236	.127	.152	1.858	.066
Constant = 15.473, R^2 = .332, R^2_{adjust} = .314, F = 18.554, *p-value* < .001					

*p < .05, **p < .01, ***p < .001

For the full model of predicting factors of father involvement, six variables including age, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment together explained 36.0% of the variance in the father involvement (R^2 = .360, F = 10.208, p-value < .001). There were two significant variables: prenatal and postnatal care knowledge and attitude toward fatherhood while three non significant variables including age, father competence, marital relationship, and father-child attachment were removed from the next model if they were not significant (see Appendix J).

From Table 4-7, it can be summarized that the final model including three variables (prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment) was statistically significant factors that could

predict the father involvement. Regarding the overall of father involvement found that prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment together explained 33.2% of the variance (R^2=.332, F = 18.554, p-value < .001).

The best regression equation of the father involvement for the fathers was presented as follows:

Father involvement = 15.473 + .596 (Prenatal and postnatal care knowledge) + .575 (Attitude toward fatherhood) + .236 (Father-child attachment)

From this equation, it meant that an increase of one score of prenatal and postnatal care knowledge would increase father involvement by .596 score, by controlling attitude toward fatherhood and father-child attachment. An increase of one score of attitude toward fatherhood would increase the father involvement by .575 score, by controlling prenatal and postnatal care knowledge and father-child attachment Then, an increase of one score of father-child attachment would increase the father involvement by .236 score, by controlling prenatal and postnatal care knowledge and attitude toward fatherhood.

For example, the sample had the score of perceived prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment at 51, 61, and 75, respectively, and then the score of father involvement was calculated at 98.644 as follows:

Father involvement = 15.473+.596 (51)+.575 (61)+.236 (75)
= 15.473 + 30.396 + 35.075 + 17.7
= 98.644

From this equation, the father involvement score is low than that of real score of this sample at 111. For the fathers, an error only has occurred about 9.08%; therefore, this equation can explain the variance of father involvement nearly with that score in the real situation. However, the results obtained that perceived prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment together explained the variance in the father involvement with 98.644, meaning the fathers did the activities of father involvement with moderate level. In conclusion, other factors such as father competence, marital relationship, and father-child attachment affected the increasing score of father involvement.

In conclusion, based on the stressor concept of the Neuman Systems Model, the model of factors influencing the fathers' involvement was summarized according to the quantitative results as below figure.

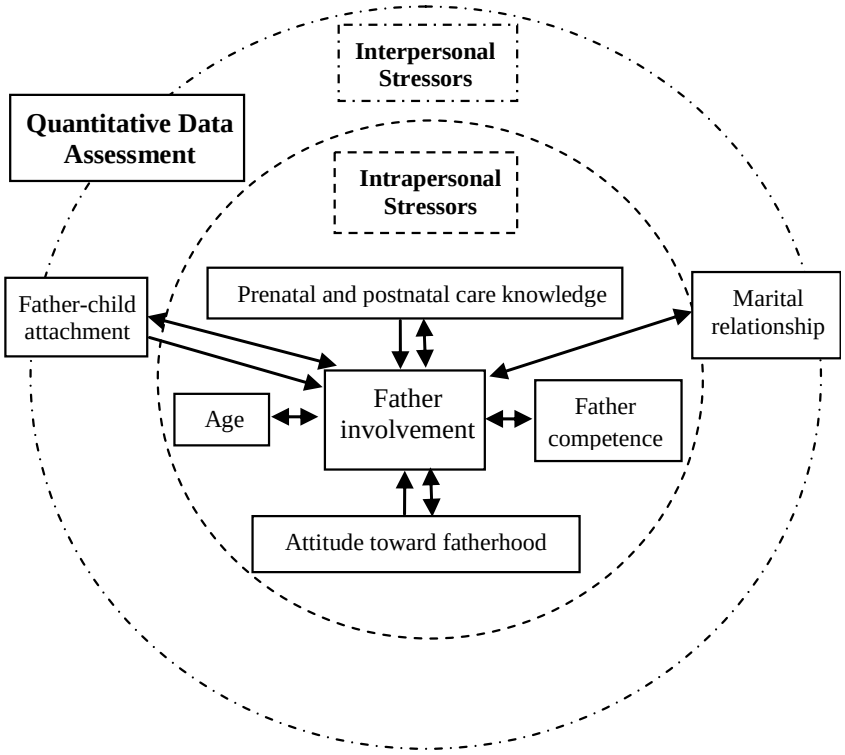


Figure 4-1 Summary of the factors from the quantitative results

The results of the qualitative study

The specific purposes of the qualitative study were to clarify the details of the father involvement characteristics, what factors encourage or inhibit the fathers' involvement, what motivations or barriers promote or obstruct the fathers to participate in the nursing intervention, and how to create the appropriate intervention for promoting the fathers' involvement during pregnancy and neonatal period. The data were collected by in-depth interviews with 12 stakeholders who met the selection criteria including father-to-be/fathers, pregnant woman/mothers, nurses, and village health volunteers. Content analysis was used to describe the results of qualitative data. These findings are presented in each perspective of stakeholders.

1. The results of qualitative study: Father-to-be/fathers' perspective

Three father-to-be/fathers were invited to share information with regard to the father involvement during pregnancy and neonatal period. The results are presented according to the important purposes with five predominant themes as below.

1. Characteristics of the fathers' involvement

Regarding characteristics of the fathers' involvement, the opinion of father-to-be/fathers are presented as follows.

1.1 Main earners

Fathers perceived that the main responsibility of fathers was working to increase the family income and plan to use the money in their lives and families appropriately. For example,

"During their partners' pregnancy and after childbirth, both fathers-to-be and fathers need to work normally in each day and save the money in order to use in the care for their babies" (Father 3).

"It may be difficult to keep up the regular work schedule and find time to spend with their partners and babies. For me, although I would like to work hard, I could not do it because I worried about my partner and baby's health as well as childbirth. Thus, the fathers need to pay money parsimoniously to save for childbirth and childcare rather than the heavy job. During and after childbirth, I needed to leave from work to care my partner and baby. Moreover, although my partner gave childbirth, I could not do the extra job because of no relatives to take care of my partner and baby. However, in order to get a good job, I plan to employ neighborhood who had a baby care experience in order to care for my partner and baby as well as house work" (Father 2).

1.2 Responding to needs of pregnant women/mothers

Two fathers expressed that the fathers should response for the pregnant women/mothers' needs such as proper nutrition. For example,

"The fathers should provide anything when their partners want or desire to eat special food such as fish and fruit and try to do everything for them if the fathers can do such as accompanying with her to do shopping, to go to clinic, and to do house work" (Father 1 and 2).

1.3 Difficulty to do baby care

Because of the constant and careful activities of baby care, the caregivers need to dedicate their time and energy into their babies. This can be stressful for fathers who are used to a more carefree or independent life style. Thus, the fathers perceived that caring for the baby was frustrated. For example,

"*It is difficult for the fathers to take care of their babies because the baby care is complicated and needed to be done very carefully by caregivers*" (Father 1 and 3).

"For me, I like to do the heavier job rather than take care of baby. I can only play with my baby but I cannot do other activities such as holding, feeding, and bathing for the baby. Because of a small baby, I fear that my baby may be dropped if I hold him or her. On the contrary, I think that my partner and mother could take care of my baby better than I do. Moreover, someone with baby care experience could take care of the baby better than me such as my mother and aunt. Thus, if my partner gives birth, my mother will take care of her and my baby and I will be responsible for all tasks rather than my mother and partner such as house work" (Father 1).

However, two fathers would like to learn about baby care with their partners. For example, *"I would like to participate in childbirth preparation class so that I could take care of my partner and baby. Recently, if I do not go to work, I will help her to care for my baby such as holding and playing with the baby*" (Father 3).

"After childbirth, I tried to learn and help my partner to care for my baby from nurses and experienced persons such as holding, feeding, bathing, cleaning, and changing the baby's clothes both day and night time" (Father 2).

1.4 Sharing responsibility of household chores

Fathers perceived that the household chores should be a duty of both fathers and mothers. For example,

"I and my partner are a seller at the caravan market (called "Talat Nut"); therefore, we need to help to do everything in our home every day. I do not think that the household chores are a main duty of women. Normally, if I finish my work, I will do the household chores such as washing, cooking, and cleaning. I think that I do around 50 percent of all household chores" (Father 1).

"For me, because I wanted my partner to rest, I tried to do the household chores as much as I did. As soon as I went back home, I would do cooking, dishes, and cleaning the house. However, if she has the free time after working, she will do something of house chores" (Father 2).

"Normally, I help my partner to do the house work when I have free time from my work. I would not like her to work hard because it might be dangerous to my baby. I tried to help her everything at our home such as cleaning house, cooking, and preparing our home for the baby" (Father 3).

1.5 Normal activities in their daily life

Fathers reflected that the fathers to be/fathers should have the free time to do normal activities in their daily life such as watching TV, reading magazines, and listening to music. For example,

"*During pregnancy, the fathers-to-be can do normal activities in their daily life such as watching TV* and listening to music *because the pregnant women can do anything by themselves. After they give birth, if having no support from the relatives, the fathers will have less free time for their daily activities because they need to take care of their partners and babies*" (Father 2).

"*The daily life activities of fathers should not be different from their normal life. They can spend time normally for their daily life such as eating, bathing, exercising, watching TV, listening to music and reading"* (Father 1 and 3).

1.6 Managing in their social life

Some fathers perceived that in Thai culture the social activities were essential for working and relaxing of the fathers such as drinking and going to the pub or bar or participating in the night life. For example,

"For working, it is significant that the fathers need to socialize with their friends. Some social activities are provided to work or relax for the fathers. For me, normally after I quit my job each day, I will talk and drink with my friends in the evening. However, I do not drink a lot. Around 7.00 pm., I have already gone back home" (Father 1).

"Although socializing with the friends is important for the fathers, they should reduce time to hang out with their friends after their partners are pregnant" (Farther 3).

"I think that the fathers need to have high responsibilities; therefore, they need to manage free time in order to take care of their partners and babies. For me, when my partner was pregnant, I stopped going to the party with my friends" (Farther 2).

2. Factors influencing the fathers' involvement

The essential factors influencing the fathers' involvement were identified by the father-to-be/fathers as follows:

2.1 Responsibility of the fathers toward their babies

Fathers reflected that the responsibility to care the baby was a significant factor which related to the feelings or needs to practice as a good father. For example,

"I feel that when having a baby, I need to have a greater responsibility to be a good father. Although previously, I had not been taken care from my father and had not accustomed to take care of the baby, I tried to find out and learn how to raise a baby from nurses and friends in order to get a good information" (Father 2).

"The feelings toward fatherhood seem to be related to the fathers' participation in care of their children. For me, I think that I can do some jobs as the father's task such playing with the baby and preparing some things for baby care" (Father 1).

"I think that a good father is depended on his needs to practice with his partner and baby as a parent. If he knows that he should do something for his baby, he will try to learn and take care of him or her" (Father 3).

2.2 Receiving prenatal and postnatal health information

Fathers felt that the fathers normally seemed to be excluded from their partners and babies during pregnancy, childbirth, and after childbirth since most health care providers and relatives will provided the information to their partners. Therefore, the fathers may lack the prenatal and postnatal health information which strive them to support or take care of their partners and babies. For example,

"I think that health information from nurses and doctors is a crucial point for both fathers and mothers but most fathers are stayed outside the care unit for their partners and babies. As the results, most fathers do not get the important

information about their partners and babies. Therefore, if fathers have the information about prenatal and postnatal care, they will be interested in the care of their partner and babies" (Father 1 and 3).

2.3 Social support for the fathers

Fathers had a consensus agreement that they received the support from the relatives, especially woman relatives such as grandmothers, aunts, and sisters such as house work, budget, and care model, and from nurses such as health information. For example,

"After childbirth, my mother and relatives help me to do several activities such as care for my partner and baby, baby appliance, budget and household chores. Now, I can do something for my baby such as daytime feeding, holding the baby and changing diapers" (Father 3).

"I have never gotten care from my father because he left me since I was a baby… Nowadays, in my family I have only my partner to support anything such as house work, care, and budget; even though she must work outside the home as well. We have done in daily life together with love and understanding. After childbirth, we leant about baby care techniques from nurses and patients' relatives such as feeding, bathing, and changing diapers and clothes, while our friends and bosses gave us the baby appliance, money, and some care information for woman and baby" (Father 2).

"I think that if my partner gives birth, my mother will help me to care for her and my baby as well as house work. However, if someone teaches me, I may do some baby care activities such as holding and playing" (Father 1).

2.4 Accessibility to prenatal health education

Fathers viewed that the date and time of prenatal health education for the fathers were not available and there was no proactive project for care of fathers and mothers who visited at the private obstetrician clinic. For example,

"My partners and I do not know that it has the prenatal education class for both fathers and mothers in the governmental hospital. Because the antenatal care clinics of the governmental health care services provide the care services on the working time (08.30 a.m. to 04.30 p.m.) and working day (Monday to Friday) and the staff in these health care centers do not distribute the information of

this program to the community or the private clinic. Moreover, my partners cannot leave from her job to visit at antenatal care clinics of the governmental hospital, especially in the last period of pregnancy which she was followed up with a doctor every 2 weeks or 1 week, respectively. Thus, my partner and I visited at private clinic by obstetrician for caring during pregnancy. Normally, when my partner visited to obstetric clinic, I waited outside the room or clinic" (Father 2).

2.5 No paternity leave

Fathers viewed that it should have the paternity leave both before and after childbirth to care for their partners and babies. For example,

"For the company employees, they may not participate in the health education because they cannot leave from their job" (Father 1).

"I will enjoy participating in the prenatal education class on Sunday because I need to keep my vacation for childbirth" (Father 2 and 3).

3. Consequences of the fathers' involvement

According to the father views, the consequences of fathers' involvement included the impacts on the fathers' lifestyle and family relationship as below.

3.1 Impact on the fathers' lifestyle

A voice of father regarding the impact on their lifestyle viewed that as a good father, the fathers should spend more time to take care of their partner and babies and work hard than before their partners was pregnant. As the results, they have limit time to do their own activities in both diary life and social life. For example,

"When my partner was pregnant, I did not go to the party with my friends.... I think that I must have more responsibility to take care of the baby for good health. After childbirth, I needed to do everything for her and my baby until I did not have time to care myself such as eating, exercising, and personal hygiene care" (Father 2).

3.2 Impact on the family relationship

Fathers viewed the impact on the family relationship included the spousal relationship and father-child relationship. For example of the spousal relationship, the fathers said similarly that *"I think if a father helps his partner do anything as a good father during pregnancy and after childbirth, she will feel him in love, compassion, and understanding so much. As the result, everybody in the family*

are happy and do not fight" (Father no 3). *"On the other hand, if a mother does everything alone both works, house chores, and baby care without a break, she will be stressed and exhausted lead to family quarrel and divorce…"* (Father 2).

For example of the father-child relationship, the fathers said similarly that *"… I got only love from my mother but did not get something from my father… As the result, I wanted to be a good father and tried to do the good things for him. I think that the baby will love and become more attached to the father as well as no inferiority complex"* (Father 2). *"Moreover, when the children grow up, they are familiar and close to their fathers, as well as obedient to the teachings of their parents"* (Father 3).

4. Barriers for the fathers' participation in the program of father involvement model

Two main barriers for the fathers' participation in the program included the fathers' perception of baby care task and prenatal and postnatal health care system.

4.1 Fathers' perception of baby care task

A father viewed that an equal of gender role was the internal barriers of the father that affect the participation in the program. For example,

"Most fathers will not be interested to participate in the prenatal and postnatal health education class because they may think that it is not task of a man and maybe feel embarrassed to take care of baby" (Father 3).

4.2 Prenatal and postnatal health care system barriers

Fathers had a consensus agreement that the time and date for the prenatal education class were not available and there was a lack of the information about prenatal education class in the case of visiting at private clinics. For example,

"I think that generally, the prenatal education class of the government health care services is provided on the working time (08.30 a.m. to 04.30 p.m.) and working day (Monday to Friday). As the result, most fathers who work at the company cannot participate in this section because they have a time limit for leave" (Father no 1 and 3). "*For me, I think that I can attend in the prenatal health education because I and my partners start to do our jobs around afternoon"* (Father 1).

"I did not know that it had the prenatal health education class for both fathers and mothers at the hospital. Normally, when my partner visited to the

obstetric clinic, I waited outside and had not attended in the prenatal education class at this clinic… For me, if I know the time and date for this class, I think I can leave my job for attending this class" (Father 2).

5. Suggestions for further plan in the father involvement model

Fathers suggested about the contents, activities, time, and location of class in the prenatal and postnatal period as follows.

5.1 Contents of health education

Fathers' suggestion was described this program should touch on the prenatal and postnatal education such as nutrition, signs preceding labor and management, complications during childbirth, and baby care. For example,

"I would like to get some information for taking care of my partner during pregnancy such as food, discomfort and care, signs that the birth is staring, documents to use for childbirth, and care for my partner with labor pain". (Father 2).

"Furthermore, the topics should add in the postnatal period such as problems of infant and management (such as baby crying) and basic care of infant (such as bathing, eye care, and cord care)" (Father 2 and 3).

"I would like to know that how to help my partner and baby if there is probably uncertain situation, for example; if she cannot give normal birth" (Father 1).

5.2 Implementation activities

According to difficulty of the baby care, all fathers focused on the practice with the babies. For example, *"I think that because most fathers do not have experience with baby care, the skill from the practice with the baby will help the fathers to take care of the baby with self-confidence"* (Father no 2).

5.3 Time and location of class

Fathers emphasized the importance of time and location where the fathers could participate in the prenatal education class. For example,

"I can participate in the group meeting both on the working day and holiday. If it is on the working day, it will be appointed before meeting date to prepare for stopping my job... The ANC unit is appropriated for this group more than the hospital because the hospital is very busy and is not convenient" (Father 1).

"I will enjoy participating in the prenatal education class on Sunday at both hospital and my home; so that I can keep my vacation for childbirth. However, if it is necessary, I can leave to enjoy this meeting" (Father 2 and 3).

However, all fathers stated that they could participate in the postnatal education class. For example, a father said that *"I think that I can attend in the class of the postnatal period because my partner stay at the hospital and I have already stopped my job. Now, I and my partner have learned about the baby care such as holding, bathing, and feeding from nurses and patients' relations at the bedside"* (Father 2).

2. The results of qualitative study: Pregnant woman/mothers' perspective

Three pregnant woman/mothers were invited to share information with regard to the father involvement during pregnancy and neonatal period. The results are presented according to the important purposes with five predominant themes as described below.

1. Characteristics of the fathers' involvement

Regarding characteristics of the fathers' involvement, the opinion of the pregnant woman/mothers are presented as follows.

1.1 Plan to collect the budget

Two mothers viewed that some fathers did not concern to save the budget for childbirth and after childbirth and to use the money appropriately each day as well as to work hard. For example,

"*Each day, the fathers should work normally but they need to know how to save money for using in their lives when giving birth such as paying for grocery from allowance that they get in each day or week and saving from the monthly income*" (Mother 2).

"*Nowadays, my family income is enough in each month but the money is not collected for our baby. I would like my partner to work hard and plan to save money for childbirth and after childbirth"* (Mother 1).

1.2 Participation in baby care

Mothers stated that some fathers felt that the mothers or female caregivers could take care of the babies more nationally and carefully than the fathers or male caregivers. It is interested to note that nowadays some fathers are not still interested in the baby care with their partners and willing to involve in the parenting health education program but they can give the free time to other preference interest. For example,

"Most men think that the mother is a good baby caregiver than the father. For my partners, he thought that he was not appropriated to take care of the baby. Thus, I had a main responsibility to take care of my baby after childbirth" (Mother 1).

"For me, I think that my partner do not concede about the well-being of his baby. He said that he did not have a responsibility to take care of baby because he made money for everyone in family. He wanted to rest and drinking with his friends after working and on vacation. Moreover, he said that I did not work outside now; thus, I should get a responsibility to take care of my baby. He did not help me to take care of baby including feeding, cleaning and changing diaper, and holding the baby although I needed him to care of the baby as well" (Mother 3).

1.3 Sharing responsibility of household chores

Mothers reflected that in Thai culture, some fathers and mothers believed that some household chores should be a duty of the mothers or female caregivers such as cooking, washing, and cleaning because some mothers do not work full-time or outside. For example,

"I think most men perceive that the household chores are not duty of the men or fathers. For my partner, he thought that the women performed the household chores better than the men. Although I have worked a full-time job, the household chores are my duty to do them. I told him that he should do some household shares but he said that he was tired after his work. Sometimes, I think that he does not have time to do the chores but he has time to talk and drink with his friends. So, I think that these behaviors are provided as a habit" (Mother 1).

"My partner helped me to do some householder chores. His main chore is cooking. He has done it since dating. Usually, I do some other chores such as doing laundry, washing, and tidying the house" (Mother 2).

On the other hand, a mother stated that "I do not need my partner to help in the housework. I can do it alone with a little time but I need him to help me take care of our baby more than do household chores" (Mother 3).

1.4 Reorganizing their daily life

According to the mothers' needs from the fathers to take care of them and their babies, the mothers would like the fathers to organize the free time in their daily life with their partners and babies. For example,

"*I think that the fathers should reduce their free time that they spent in daily life such as watching TV,* reading magazines, *and listening to music in order to take care of their partners and babies, especially in the last of pregnancy and the early postnatal period. For me, I would like my partner to spend more time for caring of the baby rather than watching TV*" (Mother 3).

"*For my partners, when I was pregnant, my partner had little time to do some activities in the daily life including exercising, watching TV, and listening to music. He said that I needed to work hard to prepare the money for childbirth. However, most activities were done together with me such as watching TV"* (Mother 2).

1.5 Reducing time for social activities

Mothers stated that the fathers should reduce the free time for their social activities such as drinking and going to the pub or bar or participating in the night life to take care of the babies with their partners or work hard for increasing the family income. For example,

"My partner said that his work was needed to have a group of friends or socialization with his friends. So, he had to drink and go with his friends every night. Normally, he did not go back to home if it was dark. He thought that he gave me the money; therefore, I should have duty to take care of my baby and do house work. I think that if he goes to the party with his friend only once or twice a week, I can accept for his social activities" (Mother 3).

"For me, I think that my partner like to go to the party with his friends. Therefore, after quitting his job, he talks and drinks with his friends every evening. I would like him to work with the over time for increasing the family income rather than to go the party" (Mother 1).

"I think that the partner is a good model for the other fathers. After I was pregnant, he was interested in his work and rarely went to the party and drank with his friends" (Mother 2).

2. Factors influencing the fathers' involvement

The essential factors influencing the fathers' involvement were identified by the mother-to-be/mothers as follows:

2.1 Parenting responsibility of the fathers

Mothers reflected that the parental responsibility of the fathers influenced the participation in the baby care. It can change the father behaviors from negative to positive. For example,

"If the fathers have a responsibility as the parent, they can change the negative behaviors such as go to the party and drinking to participate in baby care" (Mother 2).

"The fathers' behaviors depend on the responsibility of person or individual as a good parent. However, it is difficult to change the behaviors from negative aspect to positive aspect for the baby if the fathers are not interested in the baby care" (Mother 3).

2.2 Receiving prenatal and postnatal health information

A mother viewed that the training or health education could motivate the fathers to participate in baby care. For example,

"I think that if the fathers receive the care information via the training or health education from the health care providers such as nurses and doctors, it can motivate the fathers to involve in care of baby" (Mother 1).

2.3 Non-acceptance for an equal of gender roles

According to the traditional gender roles in Thailand, mothers stated some fathers perceived that the baby care and household task were the primary responsibility of mothers. It is interested to note that some fathers do not still interested to participate in the baby care with their partners. For example,

"For my partner, he said that he did not have a responsibility to take care of baby because he made money for everyone in family. He wanted to rest and drinking with his friends after working and on vacation... He did not help me to take care of baby and do house work" (Mother 3).

2.4 Positive feeling toward baby

Mothers described that the fathers' positive feeling toward their babies changed from negative to positive behaviors of the fathers such as no drinking, no party with his friends, and working hard. For example,

"I think that because of love for the baby, the fathers may change from negative to positive behaviors such as no drinking and no party with his friends" (Mother 1 and 2).

In addition, a mother said that *"The fathers who loved the baby also are more responsible to work hard and to take care of their children. For my partner, he said that he had done everything now for his baby"* (Mother 2).

2.5 The role model for the fathers

Mothers had a consensus agreement that the role model for the fathers, especially from the friends was an important factor for changing behaviors of the fathers. For instance,

"Behaviors of their friends are an important factor for changing both positive and negative behaviors" (Mother 1, 2, and 3).

"For me, my partner got a role model from one of his friends who loved his family very much. He did the activities as a good father followed his friends such as taking care of the baby, working hard, saving money, and no drinking and going to the party with his friends at night" (Mother 2).

3. Consequences of the fathers' involvement

Mothers expressed that consequences of the fathers' involvement included the impacts on psychological development of the children and family relationship.

3.1 Impact on psychological development of the children

A mother stated that the father involvement in childrearing could enhance psychological development of the children. For example,

"… When the children grow up, they are familiar and close to his father, as well as obedient to the teachings of their parents" (Mother 3).

3.2 Impact on the family relationship

Mothers viewed that the impact on the family relationship included the spousal relationship and father-child relationship.

For example of the family relationship, two mothers said similarly that *"If the fathers participate in the childrearing, the family members will be happy and warm"* (Mother 2 and 3).

Furthermore, a mother said that *"… the children will love and become more attached to their fathers"* (Mother 1).

For example, of the spousal relationship, a mother said that *"When I was pregnant, I feel very happy because my partner has taken care of me and our baby more often than before. If I want something, he tries to find out them for me and my baby… Moreover, when I had labor pain, he just touched my hand. I felt warmth that it reflected to me…"* (Mother 2).

Furthermore, a mother said *"… if the fathers are interested in the care of their partners and babies, the mothers will be less stress and will not fight with their fathers"* (Mother 1).

4. Barriers for the fathers' participation in the program of father involvement model

The mothers viewed two main barriers for participation in the program including the fathers' needs and occupational barriers as follows.

4.1 Fathers' needs

A mother viewed that an important problem of the fathers depended on the needs to participation in the program. For example,

"…It depends on the needs of the fathers for participation in the health education. For my partner, I think that he does not attend in this education class because he has not spent time for me and my baby. Although he said that he loved me and his baby, I did not known that why he did not take care.... He may say that he cannot stop working. But if he wants to leave for attending in this class, his boss will allow him... Although it will be done on holiday (Sunday), he will say that he has worked on all week and want to have time for rest" (Mother 3).

4.2 Occupational barriers

Mothers pointed out that the occupational problems affected the fathers' participation in the prenatal education class such as reducing the family income, over workload, and no paternity leave. For example,

"I think that during pregnancy, my partner cannot attend in the prenatal education class because he does not get the allowance in each day if leaving from work. However, if it is in the postnatal period, he may attend in the postnatal education class because he plans to leave from work after childbirth" (Mother 1).

"My partner has over workload and cannot leave for attending in the prenatal education class... In addition, we want to keep the leave days when giving childbirth" (Mother 2).

5. Suggestions for further plan in the father involvement model

Mothers suggested about the contents, activities, time, and location of class in the prenatal and postnatal period as follows.

5.1 Contents of health education

Mothers had a consensus agreement that this section should touch on the prenatal and postnatal education such as father role and function, care in the last period of pregnancy and baby care. For example,

" … It is important for the fathers to talk about the father role and function such as help to do house work, no drinking and dating at night with their friends, the care in the last period of pregnancy and childbirth, especially care for relieving labor pain, and baby care such as bathing" (Mother 1, 2, and 3).

5.2 Implementation activities

A mother suggested the implementation activities included teaching demonstration and return demonstration method. For example,

"I think that the lecture and teaching demonstration and return demonstration method will help the fathers to take care of the baby by themselves" (Mother 2).

5.3 Time and location of class

Mothers emphasized the importance of time and location where the fathers could participate in the prenatal education class. For example,

"I think that my partner may participate in the prenatal education class on the holiday (Sunday) or after work (around 06.00 p.m.) at the ANC unit" (Mother 1 and 2).

3. The results of qualitative study: Nurses' perspective

The nurses who responded to antenatal care, or labor and delivery care, or postnatal care in Ban Bueng District were invited to share information with regard to the father involvement during pregnancy and neonatal period. The results are presented according to the important purposes with five predominant themes as below.

1. Characteristics of the fathers' involvement

Regarding characteristics of the fathers' involvement, the opinion of the nurses are presented as follows.

1.1 Budget preparation

Nurses viewed that because some mothers got less salary or leaved from the full-time work during the last period of pregnancy and early postnatal period, the budget preparation for childbirth and after childbirth was an essential task of the fathers. For example:

"*Because the mothers cannot work well during pregnancy and need to leave for childbirth, the family income may be decreased. Although all families have a universal health care card (30-baht card), the fathers need to find out the financial information to prepare the budget for childbirth and childrearing via doing the heavy job"* (Nurse 1 and 3). However, a nurse stated that"*Before having a child, the fathers should prepare the financial aspect with a good work for the family strengthening"* (Nurse 1).

1.2 Caring for pregnant women/mothers

Nurses stated that the father was the most significant person of family for caring during pregnancy, childbirth, and after birth. The fathers should support both physiological and psychological aspects such as labor support and care management to reduce the pressure for their partners. For example,

"*The father is an important person for his partner during pregnancy, childbirth, and after childbirth. He should involve in the care of his*

partners in physiological aspect such as care of discomforts, labor support, participation in the parenting class, and psychological support..." (Nurse 2).

1.3 Learning to take care of the baby with their partners

Similarly, nurses also agreed that the fathers should be actively involved in the maternity and child health care service to learn in baby care with their partner (such as feeding, changing diaper, and bathing) and to find out the needed information for responding their baby needs such as common causes of infant sickness and care management. For example,

"Recently, because both fathers and mothers work together outside the home, the baby care is not only task of mothers but also both fathers and mothers to learn how to take care of the baby, especially a first time parent in the nuclear family" (Nurse 2).

"When the mothers give birth, the fathers are a significant person to support the mothers in childrearing. The fathers should increase the responsibilities as a good father and find out the needed information from any source such as booklet, magazine, and internet and learn how to take care of the baby such as feeding, changing diaper, and bathing and adapt as parents together with their partners" (Nurse 1 and 3).

1.4 Sharing responsibility of household chores

Nurses had a consensus agreement that the household task was one of the parenting functions of both fathers and mothers. In order that the mothers rest in the last period of pregnancy and after taking care of their babies, the fathers should increase the household activities as one of function of father. For example,

"Nowadays, most mothers work full-time with their partners; therefore, everyone want their partners to take some home work. The fathers should help to do some house works so that the women can relax, especially in the last period of pregnancy and the early postnatal period" (Nurse 1, 2, and 3).

However, a nurse said that *"It does not mean that the mothers do not work everything at home because it is looked that the mothers are burden of their families"* (Nurse 2).

1.5 Reorganizing their daily life

Similarly, nurses also agreed that the fathers needed to reduce time for some activities in their daily life such as watching TV, reading magazines, and listening to music to spend time with their partners and babies. For example,

"Because the mothers during the last period of pregnancy and early postnatal period need to take care for their partners, the fathers do not spend time for their daily life activities for a long time such as watching TV, listening to music, and playing game but they should manage the time for these activities appropriately." (Nurse 1, 2, and 3).

However, a nurse said that *"The fathers should do some activities in their daily life together with their partners"* (Nurse 2).

1.6 Managing in their social life

Because becoming a father is the great responsibility for care of their babies, all nurses described that the fathers should concern the free time for supporting their partners and babies with reducing time for the social and community activities, especially drinking and going to the party. For example,

"The fathers should reduce time to socialize with their friends such as drinking, going to the party in order to spend time for taking care of their partners and babies. As the result, the mothers' workload is reduced" (Nurse 1 and 2).

However, a nurse said *"If it is essential to socialize with their friends, the fathers should take the mothers to party with them"* (Nurse 2 and 3).

2. Factors influencing the fathers' involvement

The essential factors influencing the fathers' involvement were identified by the nurses as follows:

2.1 Positive feeling toward fatherhood

Nurses reflected that a positive feeling toward fatherhood was the most significant factor affecting the fathers' involvement during pregnancy and neonatal period such as taking care of baby and changing some inappropriate behaviors such as drinking and going to the pub or bar or party. For example,

"The feeling toward fatherhood is the most important factor for the fathers' participation in baby care. If the fathers have a good feeling toward

the fatherhood, they will do everything for children and change some inappropriate behaviors such as drinking and going to the pub or bar or party" (Nurse 1).

On the other hand, a nurse said that *"If the fathers have negative aspect, they will do their own interests rather than the functions of father for their families… Moreover, nurses need to improve some perception of the fathers to accept an equal of gender role and participate in care of their babies"* (Nurse 2).

2.2 Receiving prenatal and postnatal health information

Nurses described that prenatal and postnatal health information was a basic for changing the attitude and adapting to a good father. For example,

"The health care information from health care providers, relatives, and other supporters such as book and internet is also a basic for changing an attitude of the fathers and adapting to serve a good father. Because they receive less social support such as health education and role model, most fathers become to parenthood with less health care information than mothers. However, some fathers are not interested in the health education class with their mothers" (Nurse 3).

2.3 Love and bonding with their partners and babies

A nurse reflected that the fathers' positive feeling with their partners and babies influenced on the positive interaction of fathers with their partners and babies. For example,

"… If the fathers are in love and bonding with their partners and babies, they will do everything for their partners and babies with out of their mind" (Nurse 2).

2.4 Health care service policy for the father participation

Nurses stated that the health care service policy for the father participation could motivate the nurses to invite the fathers in the parenting class to take care of their partners and babies. For instance,

"Normally, most health care providers provide the prenatal and postnatal care knowledge and baby care practice for the mothers more than the fathers. As the result, most fathers do not participate in the practices with the baby" (Nurse no 3). However, two nurses stated that *"Nowadays, because the concept of father participation in maternal and child care was interesting, the fathers were*

motivated in the health education class to take care of their partners and children" (Nurse 1 and 2).

3. Consequences of the fathers' involvement

Nurses expressed that consequences of the fathers' involvement consisted of the impacts on the mothers' emotional health, fathers' lifestyle, family relationship, and community capacity as follows.

3.1 Impact on the emotional health of mothers

A nurse stated that the fathers with a good care for their partners could improve the emotional health of the mothers. For example,

"If the fathers provide a good care for their partners, the mothers will be good emotional health during pregnancy, childbirth, and afterbirth. It brings about good physical health of mothers as well" (Nurse 2).

3.2 Impact on the fathers' lifestyle

Two nurses described that the fathers with high involvement would have less time to do their activities in diary life and social life. For example,

"Because of doing a good function of the father, the fathers do not have enough time to do their own interested activities such as watching TV, listening to music, playing games, dating parties, and drinking" (Nurse 1 and 2).

3.2 Impact on the family relationship

As stated earlier, a nurse viewed that the love and bonding in their family was increased from the fathers with high involvement. For example,

"*If the fathers are interested in care of their partners and babies, the family relationship was improved for love and bonding in their family"* (Nurse 2).

3.3 Impact on the community capacity

A nurse described that a good involvement of the fathers could enhance the family relationship and led to improve a capacity building in their community. For example,

"If the fathers do the activities as a good model including taking care of the mothers and children, doing the household chores, working hard, and reducing the socialization, the mothers and babies have a good mental health and

keep a better family relationship as well. As a result, the rate of divorce is decreased while the happiness of the people in their community is increased" (Nurse 2).

4. Barriers to provide the program in the father involvement model

The main barriers in the health care services are a shortage of health care providers in the hospital, especially nurses and no policy to allow the fathers to take care of their partners in the labor and delivery care unit. Thus, there is no main coordinator in the parenting class. Furthermore, there are no coordination and reference system of this project and a limit of the education room size. However, the problem of fathers is the important barrier for this program. For example,

"The first of the problems is that a shortage of nurses in the hospital and PCU. Everybody have the several responsibilities in health care services. Thus, there is no someone who fully coordinates all of project with nurses at ANC, delivery care, and postnatal care unit... Sometimes, if some educator in parenting class is very busy, some content may not have been taught in this class" (Nurse 1 and 2).

"Secondly, there is no coordination and reference system of this project to increase the number of fathers for participation in this class and do not promote this project for the fathers and mothers who visited at the private clinics" (Nurse 2 and 3).

"Thirdly, the training room is too small and enough for about 5-6 persons; therefore, some men cannot participate in this class if the room is full. However, this problem can be solved by changing to the meeting room with medium and big room if it is a big group and the rooms are available… In the last problem, there are the unsuitability of delivery room and no policy to allow the fathers to take care of their partners in the labor and delivery care unit. Because the labor and delivery care unit and operating care unit is a connecting area, the hospital needs to use the sterile technique in both areas. Generally, we try to provide information for the fathers or relatives; however, we allow the fathers to take care of some cases in the labor unit" (Nurse 2).

However, a nurse stated the important problem for this program was the barrier from the fathers. For example, *"Most fathers did not participate and cooperate in the health education class that the nurses provided for the mothers"* (Nurse 3).

5. Appropriate model for promoting the father' involvement

To create successfully the father involvement model, the further plan in each session needed to use the views by the nurses in the real situation. This plan was composed of two main plans including the plan in the prenatal and postnatal period as follows.

5.1 Further plan in the prenatal period

The further plan in the prenatal period was identified into three categories, as described below.

1) Contents of prenatal health education

To increase awareness of the fathers for participating in the program, the topics should be included in this section such as the introduction to fatherhood and maternal and child care in period of pregnancy and childbirth which focused on the real problem of both fathers and mothers. For example,

"… Firstly, the significance of the father involvement should be provided to increase awareness of the fathers in the father role and function. Secondly, it should provide the care for pregnancy women in each trimester and in the last period of pregnancy with preparing the fathers and mothers for childbirth and childrearing" (Nurse 3).

Furthermore, a nurse stated that *"To increase the participation of fathers, the content in this program should focus on the real problem of both fathers and mothers"* (Nurse 2).

2) Implementation activities

Similarly, the nurses also agreed that the group discussion with sharing their opinion and experience, positive reinforcement, and practice should be provided in this session to successfully promote the father participation. For example,

"Although the policy of this hospital is depended on the parenting class, most content in the prenatal education class is appropriated for the pregnant women. Some men maybe feel that why they will attend in this class because they do not participate anything for their partners. Therefore, this class needs to add the fathers in group discussion, work shop for practice with pregnant women, and visiting to labor and delivery department or watching the VDO about childbirth

situation and use the process of positive reinforcement to strive the fathers' need of participation" (Nurse 2).

3) Time and location of class

Nurses emphasized the importance of time and location where fathers can participate in this class. They suggested that if needing the success of prenatal education class, it should be arranged in the time and place which were depended on the needs of each father. For example,

"To success this program, the prenatal education class should be provided for the fathers at ANC unit or hospital both on the working day or holiday that they were easy to access. However, a shortage of nurses and over workload should be determined for providing this program in the real situation" (Nurse 1).

5.2 Further plan in the postnatal period

The further plan in the postnatal period was identified into three categories, as described below.

1) Contents of postnatal health education

To strengthen the self-confidence in the fathers' capability of baby care, the key issues to cover in the postnatal health education should include the maternal and child care in the postnatal and neonatal period, especially baby care practices. For example,

"The main content in the postnatal health education are the basic care and things to be careful for the postnatal mothers and babies in the neonatal period, especially baby care practices such as feeding, clothing, bathing, and changing diapers" (Nurse 3).

2) Implementation activities

The implementation activities to increase the involvement of fathers in the postnatal education class should include the couple discussion and practice. For example:

"Although the postnatal education is focused on the teaching and demonstration in the baby care for the fathers and mothers, most mothers and women relatives will practice and take care of the babies. Therefore, this class should motivate and provide the fathers to express their opinion and practice with their babies..." (Nurse 3).

3) Time and location of class

Nurses suggested that the postnatal education class should provide both hospital and home via home visit to strive the fathers' involvement at home. For example,

"… Only one postnatal class at hospital may be enough for the fathers to involve in baby care. It should add the home visit to evaluate the problems and teach some practice that they cannot do for their babies in order to increase the fathers' involvement" (Nurse 3).

4. The results of qualitative study: Village health volunteers' perspective

Three village health volunteers (VHV) who responded to the maternal and child health care in the community of Ban Bueng District were invited to share information with regard to the father involvement during pregnancy and neonatal period. The results are presented according to the important purposes with five predominant themes as described below.

1. Characteristics of the fathers' involvement

Regarding characteristics of the fathers' involvement, the opinion of the village health volunteers are presented as follows.

1.1 Head of family

To prepare the finance in the family, village health volunteers described that the fathers were a head of family assuming responsibility for earning money. For example,

"The fathers are a head of family that they have a main function to make money for the members in their families, especially for the non-working mothers" (VHV 1 and 2).

1.2 Supportive of the pregnant women/mothers

The village health volunteers stated that the father was the most significant person in the family who support according to the pregnant women/ mothers' needs. For example:

"Because usually the pregnant women are moody easily, the fathers should love and provide something for them willingly when they want..." (VHV 2 and 3).

"In labor period, the fathers should support psychological aspect of their partners at both home and hospital. It is a good idea if it is possible that the fathers can go to support their partners in the labor room. As the results, the pregnant women are not afraid and feel safe during childbirth…" (VHV 3).

1.3 Participation in baby care

Village health volunteers reflected that most fathers thought that the baby care was difficult and they could not take care of the baby well. However, the fathers needed to support their partners for baby care. For example,

"I think that the baby care is difficult for the fathers but they need to support their partners for baby care. For me, I am not sure that I can take care of the baby because I have never taken care of any babies. When my partner was pregnancy, I tried to find out someone who helped me to reduce this debit such as my mother, partner's mother, and relatives in the postnatal period. Fortunately, the partner's mother accepted me to prepare everything for my babies and take care of my partner and baby as well" (VHV 2).

"If the fathers help their partners to take care of their babies such as feedings, cleaning, changing the clothes, and playing with the baby, it will be a role model for other fathers who led to the warm family" (VHV 1 and 3).

1.4 Sharing responsibility of household chores

Similarly, the village health volunteers also agreed that the household task was one of the parenting functions of both fathers and mothers but some fathers did not share these activities. For example,

"The household chores are not only a duty of the fathers or mothers but also a duty of both, especially for working mothers. If the fathers can help the mothers to do some housework until their partner can do by herself after childbirth, I think that they are a good role model for the family man" (VHV 3).

"In the early postnatal period, the fathers are a major duty to do household chores or they need to find out the relatives or someone to help the mothers in this task" (VHV 2).

However, a village health volunteer said that *"Although the fathers and mothers should do the household chores together, most fathers do not still share these activities"* (VHV 1).

1.5 Reorganizing their daily life

Village health volunteers had a consensus agreement that the fathers needed to reduce time for some activities in their daily life to take care of the mothers and babies. For example,

"*The fathers should reduce time for some hobbies and free time activities such as watching TV, listening to music, and reading magazine or newspaper in order to take care of their partners and babies"* (VHV 1, 2, and 3).

1.6 Reducing time for social activities

Village health volunteers perceived the fathers should concern the free time for supporting their partners and babies with reducing time for the social and community activities such as drinking and going to party at night. For example,

"Although it is essential to reduce time or hang out some social activities that they do in the past when their partners are pregnant and after childbirth… However, most fathers in this community still do in the same social activities with their friends such as drinking and party at night" (VHV 1 and 2).

2. Factors influencing the fathers' involvement

The essential factors influencing the fathers' involvement were identified by the village health volunteers as follows.

2.1 Positive feeling toward fatherhood

Two village health volunteers reflected that a positive feeling toward fatherhood could stimulate the fathers for changing some negative behaviors such drinking and going to the party. For example,

"Feeling toward fatherhood which love their babies will stimulate the fathers to do everything for their babies and change some negative behaviors such as drinking and going to the pub or party at night" (VHV 1 and 3).

2.2 The role model for the fathers

A village health volunteer stated that the role model for the fathers, especially from their fathers could be used to do the function and role as a good parent. For instance,

"*The good model which was derived from their old families will help the men to do all activities as a good parent*" (VHV 3).

2.3 Non-acceptance for an equal of gender roles

When asked about the idea about traditional gender roles in parenthood in Thailand such as primary caregivers for babies and house task, some village health volunteers stated that these ideas affected the opinion and expression of Thai fathers, especially non-working mothers. For example,

"Because mothers have been viewed to assume as primary responsibility for babies and house work, the commitment to babies of mothers is more likely to be influenced on feelings and beliefs of the fathers. Most fathers think that the baby care and house chores are not duty of the father but also as mother. This culture affects the fathers' involvement, especially family that the mothers do not work outside the home. However, if working together, the fathers will share both baby care and house chores with their partners" (VHV 1).

2.4 Healthy couple relationship

Some village health volunteers described that the conflict in the family influenced the negative interactions of fathers with their partners and babies such as socializing with their friends. For example,

"The couple relationship may affect the function of fathers. If having the couple conflict, it tends to do the negative behaviors; for instance, do not be interested in taking care of their partners and babies and socializing with their friends" (VHV 2).

2.5 Social support for the fathers

Similarly, the village health volunteers also agreed that the major supporters for increasing the fathers' involvement in the care of their partners and babies were the relatives, especially woman cousins. For instance,

"Most families will receive the support from their woman cousins such as grandmothers, aunts, and sisters. The other supports include grandfathers, friends, boss, and heath care providers such as doctors and nurses. If the fathers are interested in care of their partners and babies, they will lean from these supports" (VHV 2 and 3).

"Most fathers do not still participate in prenatal and postnatal health education because they cannot leave from their work" (VHV 1 and 3).

2.6 Financial status

Village health volunteers viewed that the financial status of family and country was important to function of the fathers. For improving family well-being, the fathers needed to work hard to adequately support their families and to do other function such as baby care and household chores. For example,

"In the present day, because of the weakness of Thailand's economic, the current expense of family is more increased such as the cost of food, grocery, rental fee, gasoline, and etc. The fathers who are as the breadwinners need to work hard in order to adequately support their partners and children. As the result, the fathers do not have time for doing other function such as care for their babies and house work during pregnancy and after childbirth unless the mothers participate in the labour force in order to increase the family income" (VHV 2).

2.7 Accessibility to prenatal health education

Village health volunteers viewed that the date and time of prenatal health education for the fathers was not available. For example,

"Because antenatal care service of the government hospital provided on the working day (Monday to Friday) with 8.00 a.m. to 4.00 p.m., most fathers-to-be cannot participate in the prenatal health education with their partners at the hospital. As the result, some fathers may loss the necessary information for taking care of their partners and babies" (VHV 1).

3. Consequences of the fathers' involvement

Village health volunteers expressed that consequences of the fathers' involvement included the impact on the fathers' lifestyle, family relationship, and the community capacity as below.

3.1 Impact on the fathers' lifestyle

A village health volunteer viewed that the fathers needed to spend more time to work hard than before being pregnancy. As the results, they had less time for social activities. For example,

"The fathers with high involvement will work hard or change some behaviors by using sufficiency economy such as using more expensive things, maintaining a balanced budget, not going to pubs or bars, and no drinking in order to save money for their families" (VHV 2).

3.2 Impact on the family relationship

Village health volunteers had a consensus agreement that the family problem would be occurred if the fathers did not involve in baby care and house work as a good function of father. For example,

"I think that if the mothers do anything alone both works, house chores, and baby care without a break, they will be stressed and exhausted lead to family quarrel and divorce…" (VHV 2).

3.3 Impact on community capacity

As stated earlier, a village health volunteer stated that *"If the fathers are set as a good parent including taking care of their partners and children, doing household chores, and reducing the socialization, it help them to keep a better family relationship for building the capacity of family and community"* (VHV 2).

4. Barriers for the fathers' participation in the program of father involvement model

Three main barriers of the fathers for participating in the program were pointed out by village health volunteers as described below.

4.1 Negative perception of the fathers

Village health volunteers viewed that the important barrier was the negative perception of the fathers such as no duty to take care of the baby and no needs to participate in the program. For example,

"By human nature, a man always thinks he will get something from attending the class such as appliance or money. But if telling him that he will get the knowledge for take care of his partner and baby, has warmth of the family, and the trust from his partner, he does not go to this class... On the other hand, if he feels that it is important to attending this class, he will have no condition for participation; for instance, making on holiday and not leaving from work. Most fathers may think that their duty is to make the money for the family but does not take care of the baby and do the household task..." (VHV 2).

"Normally, the postnatal education focuses on the knowledge and practice of mothers. Although the fathers can attend with their partners, they do not involve in the practice for take care of their babies. Therefore, they may think that he is not necessary to participate in the class." (VHV 1).

4.2 Occupational barriers

Two village health volunteers point out that the occupational problems included time conflicts, over workload, and no paternity leave for the prenatal education class. For example,

"I think that during pregnancy, the fathers may not attend in the prenatal education class because they will not get the allowance in each day if leaving from work... After childbirth, most fathers can participate in the postnatal education class because they will plan to leave from work" (VHV 2 and 1).

5. Suggestions for further plan in the father involvement model

Village health volunteers suggested about implementation activities, time and location of class in the father involvement model as follows.

5.1 Motivation activities into the program

Village health volunteers suggested the active distribution of this program information for the fathers and families. For example,

"*One of the important activities is the distribution of this program information. The* village health volunteers *can walk in the house to motivate the fathers in their communities for participating in this program"* (VHV 1 and 3).

"…The village health volunteers can coordinate between the health care providers and the factory owners to give the ways for the fathers who participate in this program" (VHV 2).

5.2 Implementation activities

Village health volunteers suggested implementation activities focused on the discussion and practice and should add the phone consultation to call some problems at home. For example,

"During pregnancy, the program should focus on the group discussion and practice for taking care of the pregnant women such as care of the discomfort problems from pregnancy and labor pain. Because the pregnant women stay at home, a telephone consultation is important method to call some problems for caring by themselves before going to the hospital… Normally, the postnatal education focuses on the knowledge and practice of mothers. Therefore, if the fathers can practice with their babies, they will feel that they are proud and want to do something for them" (VHV 1).

In conclusion, the qualitative results were summarized by clarifying the congruent and incongruent results among the father-to-be/fathers, pregnant woman/ mothers, nurses, and village health volunteers. This part is presented as below.

Table 4-8 Comparison of qualitative congruent and incongruent results

Congruent results	Incongruent results
1. Characteristics of the father involvement during pregnancy and neonatal period	
1. Budget preparation - Working hard to increase the family income. - Plan to use the money in their lives and families appropriately. - Plan to collect the budget for childbirth and after childbirth. **2. Sharing responsibility of household chores** - The household chores are a duty of both fathers and mothers such as cleaning the house and washing. **3. Caring for pregnant women/mothers** - Responding to needs of pregnant women/mothers such as proper nutrition and emotional support. - Supporting both physiological and psychological aspects of their partners at both home and hospital. **4. Managing in their social life** - Reducing the social activities such as drinking and going to the party at night. - Doing the social activities with their partners and babies.	**Father-to-be/fathers:** **1. Difficulty to do baby care** - The baby care is the constant and careful activities such as holding and bathing. **2. Normal activities in their daily life** - Having the free time for normal activities in daily life such as watching TV and listening to music. **Pregnancy woman/mothers:** **1. Participation in baby care** - Supporting their partners for baby care such as feeding, cleaning and changing diaper, and holding the baby. **2. Reorganizing their daily life** - Reducing the free time for daily life activities**.** - Organizing the free time for daily life activities with their partners and babies. **Nurses:** **1. Learning to take care of the baby with their partners** - Learning in baby care with their partner such as feeding and bathing. -Finding out the needed information for baby care. **2. Reorganizing their daily life** - Reducing time for some daily life activities such as watching TV, reading magazines, and listening to music. **Village health volunteers:** **1. Participation in baby care** - Supporting their partners for baby care **2. Reorganizing their daily life** - Reducing the free time for daily life activities.

Table 4-8 Comparison of qualitative congruent and incongruent results (cont.)

Congruent results	Incongruent results
2. Factors influencing the fathers' involvement	
1. Parenting responsibility of the fathers - The fathers' behaviors depend on the responsibility of person as a good parent. **2. Receiving the prenatal and postnatal health information** - The health education can help to change the fathers' attitude and to adapt for the fatherhood via training or teaching from the health care providers such as nurses. **3. Social support for the fathers** - Supporting from the relatives and friends, especially woman cousins such as house work, budget, and care model. - Receiving the health care information from the nurses. - Learning the role model from their friends and fathers in the original family. **4. Non-acceptance for an equal of gender roles** - The baby care and household task are the primary responsibility of mothers, especially non-working mothers. **5. Accessibility to father training program** - Date and time of prenatal health education are not available. - No project for the fathers and mothers who visited at the private clinic.	**Fathers-to-be/fathers:** **1. Health policy** - No paternity leave before and after child birth. **Pregnant woman/mothers:** **1. Feeling toward baby** - Positive feeling toward baby can change from the negative to positive behaviors of the fathers such as no drinking, no party, and working hard. **Nurses:** **1. Feeling toward the baby care** - Positive feeling the baby care of fathers affects the positive involvement in childrearing**.** **2. Love and bonding with their partners and babies** - Increasing the positive interaction of fathers with their partners and babies. **3. Health care policy for the father participation** - Motivating the nurses to invite the fathers in the parenting class. - No father involvement policy in labor and delivery care unit **Village health volunteers:** **1. Feeling toward fatherhood** - Positive feeling toward fatherhood can change some negative behaviors such drinking and going to the party. **2. Couple relationship** - The conflict in the family influences the negative interactions of fathers with their partners and babies. **3. Financial status** - No time for doing other function of father such as care for their babies and household chores.

Table 4-8 Comparison of qualitative congruent and incongruent results (cont.)

Congruent results	Incongruent results
2. Consequences of the fathers' involvement	
1. Impact on the fathers' lifestyle - Time limit to do their activities in both daily life and social life. - Spending more time to work hard. **2. Impact on the family relationship** - Healthy spousal relationship - Good father-child relationship. - Less stress and no fight in the family. - Love and bonding in their family **3. Impact on the community capacity** - Decreased the rate of divorce. - Increased the happiness of the people in their community	**Pregnant woman/mothers:** **1. Impact on psychological development of the children** - Enhancing psychological development of the children. **Nurses:** **1. Impact on the emotional health of mothers** - Improving emotional health of the mothers
3. Barriers for the fathers' participation in the program of father involvement model	
1. Internal barriers of the fathers **1.1 Fathers' perception of baby care task** - No responsibility of a man for baby care. **1.2 Fathers' needs** - No needs to attend in the prenatal and postnatal education class. **2. Occupational barriers** - Decreased the family income - Time conflicts - Over workload - No paternity leave	**Fathers-to-be/fathers:** **1. Health care system barriers** - Date and time for the father training project are not available. - Lack of the information about prenatal education class in the case of visiting at private clinics.

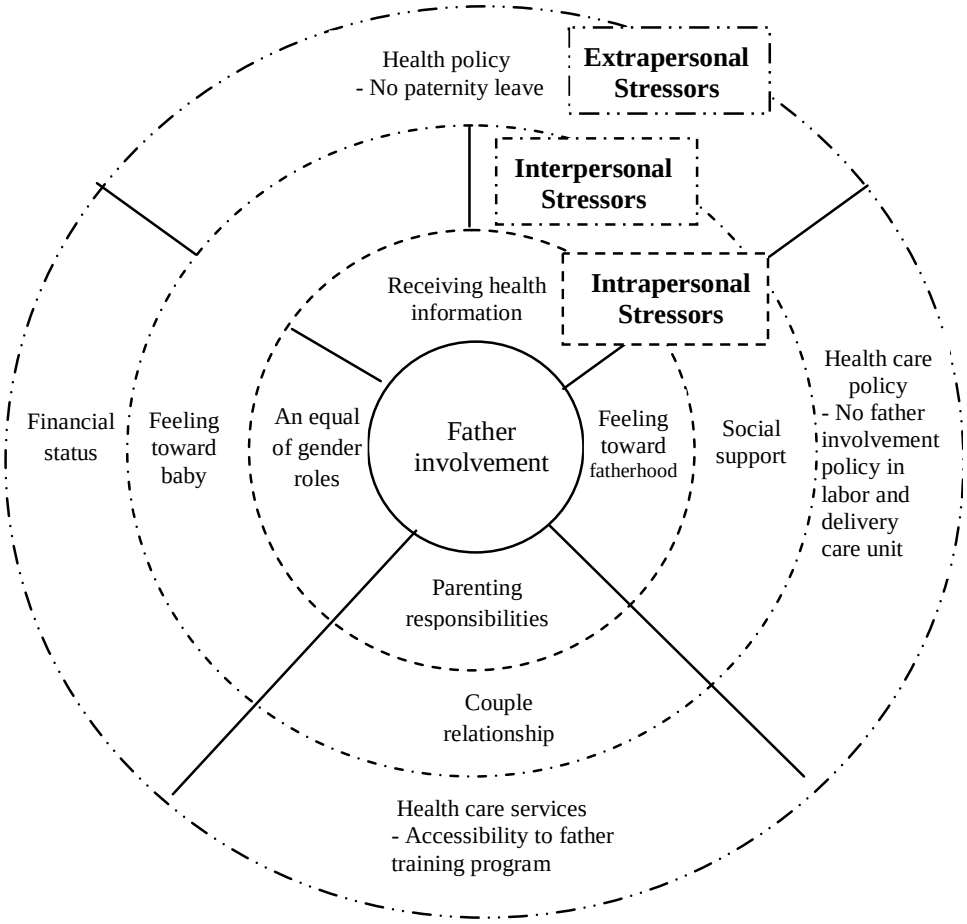


Figure 4-2 Summary of the main factors from the qualitative results

Integration of the quantitative and qualitative results

According to quantitative and qualitative data, the researcher compared both results assisted the researcher to more understand the current situation. The qualitative results described more details of the characteristics and factors influencing the father involvement during pregnancy and neonatal period. The integration of both results was showed in the Table 4-9.

Table 4-9 Integration of the quantitative and qualitative results

Quantitative results	Qualitative results	Integration of results
1. Characteristics of the father involvement during pregnancy and neonatal period		
1. **Personal care activities** - The average scores of personal care activities were at a moderate level (17.67 and 18.07 for the fathers-to-be and fathers, respectively). From the itemized information, it had a high mean score such as exercising and engaging in sexual activity while the lowest mean score consisted of eating more, watching television, and listening to music.	**1. Activities in their daily life** **Father-to-be/fathers:** - Normal activities in their daily life such as watching TV and listening to music. **Other perceptions:** - Reorganizing their daily life activities by reducing and organizing the free time for daily life activities with their partners and babies.	**1. Personal activities in their daily life** - Reorganizing their daily life activities such as exercising and engaging in sexual activity while the lowest mean score consisted of eating more, watching television, and listening to music.
2. Household activities - The average scores of household activities were at a moderate level (25.88 and 27.26 for the fathers-to-be and fathers, respectively). From the itemized information, it had a high mean score such as shopping and doing errands while the lowest mean score consisted of doing ironing, doing dishes, and cooking.	**2. Household responsibility** **All perceptions:** - The household chores are a duty of both fathers and mothers by sharing the activities such as cleaning the house and washing.	**2. Household responsibility** - Sharing the household chores such as cleaning the house, cooking, shopping, and washing**.**
3. Infant care activities - The average scores of infant care activities were at a moderate level (13.07 for the fathers). From the itemized information, it had a high mean score such as playing with the baby and changing the baby's diapers while the lowest mean score consisted of night feeding, bathing the baby, and changing the baby's clothes.	**3. Baby care responsibility** **Father-to-be/fathers:** - Difficulty to do baby care practices because the baby care is the constant and careful activities such as holding and bathing **Other perceptions:** - **Participation in baby care** • Supporting their partners for baby care such as feeding, cleaning and changing diaper, and holding the baby**.** • Learning in baby care with their partner such as feeding and bathing. Finding out the needed information for baby care.	**3. Baby care responsibility** - Learning and supporting in baby care with their partner such as feeding, cleaning and changing diaper, holding the baby, and bathing**.**

Table 4-9 Integration of the quantitative and qualitative results (cont.)

Quantitative results	Qualitative results	Integration of results
4. Occupational activities - The average scores of occupational activities were at a moderate level (15.01 and 14.91 for the fathers-to-be and fathers, respectively. From the itemized information, it had a high mean score such as doing my job carefully and accurately and accomplished usual amount of work at my job while the lowest mean score consisted of participated in professional organization activities.	**4. Budget preparation** **All perceptions:** - Working hard to increase the family income. - Planning to use the money in their lives and families appropriately. - Planning to collect the budget for childbirth and after childbirth.	**4. Occupational activities for budget preparation** - Working hard and planning to use and collect the money in their life and families**.**
5. Social and community activities - The average scores of social and community activities were at a moderate level (13.21 and 14.83 for fathers-to-be and fathers, respectively. From the itemized information, it had a high mean score such as participating in community service organization and in religious organization while the lowest mean score consisted of socialization with friends and relatives.	**5. Activities in their social life** All perceptions: - Managing activities in their social life • Reducing time for the social activities such as drinking and going to the party at night. • Doing the social activities with their partners and babies.	**5. Social activities in their life** - Managing activities in their social life such as socialization with friends and relatives.
	6. Caring for pregnant women/mothers **Father-to-be/fathers:** - Responding to needs of the pregnant women/mothers such as proper nutrition and emotional support. **Other perceptions:** - Supporting both physiological and psychological aspects of their partners at both home and hospital.	**6. Caring for pregnant women/mothers** - Supporting both physiological and psychological aspects of their partners.

Table 4-9 Integration of the quantitative and qualitative results (cont.)

Quantitative results	Qualitative results	Integration of results
2. Factors influencing the father involvement		
1. Fathers' age - Fathers' age had a positive relationship to the father involvement while fathers' education, income, and occupation, mothers' occupation, and family characteristic had no relationship to the father involvement.	**1. Financial status** **Perception of village health volunteers:** - No time for doing other function of father such as care for their babies and household chores because the fathers need to work hard to adequately support their families.	
2. Prenatal and postnatal care knowledge (PCK) - The average scores of PCK were at a moderate level (34.20 and 35.08 of the total score of 56 for the fathers-to-be and fathers, respectively). - It had a positive relationship to father involvement in both group and could together predict the father involvement with ATF for the fathers-to-be (31.5% of the variance) and with ATF and FCA for the fathers (33.2% of the variance).	**2. Receiving the prenatal and postnatal health information** **All perceptions:** - The health information can help to change the fathers' attitude and to adapt to fatherhood via training or teaching from the health care providers such as nurses.	**1. Prenatal and postnatal care knowledge** - The health care knowledge can help the fathers to change the attitude and to adapt to fatherhood**.**
3. Attitude toward fatherhood (ATF) - The average scores of ATF were at a high level (59.99 and 59.62 of the total score of 75 for the fathers-to-be and fathers, respectively). - It had a positive relationship to the father involvement in both group and could together predict the father involvement with PCK for the fathers-to-be (31.5% of the variance) and with PCK and FCA for the fathers (33.2% of the variance).	**3. Positive feeling toward fatherhood** **Perception of nurses and village health volunteers:** - Affecting the positive involvement in baby care**.** - Changing from negative behaviors to positive behaviors such as no drinking and going to the party.	**2. Attitude toward fatherhood** - The fathers' attitude can increase the positive involvement and change from negative behaviors to positive behaviors**.**

Table 4-9 Integration of the quantitative and qualitative results (cont.)

Quantitative results	Qualitative results	Integration of results
4. Father competence (FC) - The average scores of FC were at a moderate level (62.72 and 69.16 of the total score of 96; for the fathers-to-be and fathers, respectively). - It had a positive relationship to the father involvement in both group.	**4. Parenting responsibilities of the fathers** **Perception of fathers-to-be/fathers and pregnant woman/mothers:** - The fathers' behaviors depend on the responsibility of person as a good parent.	**3. Father competence** - The fathers' competence can increase positive interaction of the fathers with their babies.
5. Marital relationship (MR) - The average scores of MR were at a high level (46.23 and 48.41 of the total score of 69 for the fathers-to-be and fathers, respectively). - It had a positive relationship to the father involvement in both group.	**5. Couple relationship** **Perception of nurses and village health volunteers:** - Love and bonding with their partners can increase positive interaction of the fathers with their partners and babies.	**4. Couple relationship** - Love and bonding with their partners can increase positive interaction of the fathers with their partners and babies and change the negative to positive behaviors.
6. Father-child attachment (FCA) - The average scores of FCA were at a high level (70.61 and 74.06 of the total score of 90 for the fathers-to-be and fathers, respectively). - It had a positive relationship to the father involvement in both group and could together predict the father involvement with PCK and ATF for the fathers (33.2% of the variance).	**6. Feeling toward baby** **Perception of pregnant woman/mothers, nurses and village health volunteers:** - Positive feelings toward baby can change the negative to positive behaviors of fathers such as no drinking, no party, and working hard.	**5. Father-child attachment** - Love and bonding with their babies can increase positive interaction with their babies and change the negative to positive behaviors.
	7. An equal of gender roles **Perception of pregnant woman/mothers and village health volunteers:** - The baby care and household task are the primary responsibility of mothers, especially non-working mothers.	**6. Social support for the fathers** - Receiving to help in term of the health care information and role model from relatives, friends, and health care providers can motivate fathers to involvement in care for their partners and babies.

Table 4-9 Integration of the quantitative and qualitative results (cont.)

Quantitative results	Qualitative results	Integration of results
	8. Social support for the fathers **Perception of fathers-to-be/fathers, pregnant woman/mothers and village health volunteers:** - Receiving to help in term of the house work, budget, care and role model from friends and relatives. - Supporting the health care information from the nurses. **9. Health care services** **Perception of fathers-to-be/fathers and village health volunteers:** - Accessibility to father training project. **10. Health care policy** **Perception of nurses** - The father involvement policy in labor and delivery care unit **11. Health policy** **Perception of fathers-to-be/fathers** - No paternity leave.	**7. Accessibility to the father training project** - The father training project can help fathers to increase the involvement in care for their partners and babies.

In conclusion, the model in the situation analysis was created based on the results of quantitative and qualitative methods. The main factors of father involvement based on the stressor concept of the Neuman Systems Model were summarized as below figure.

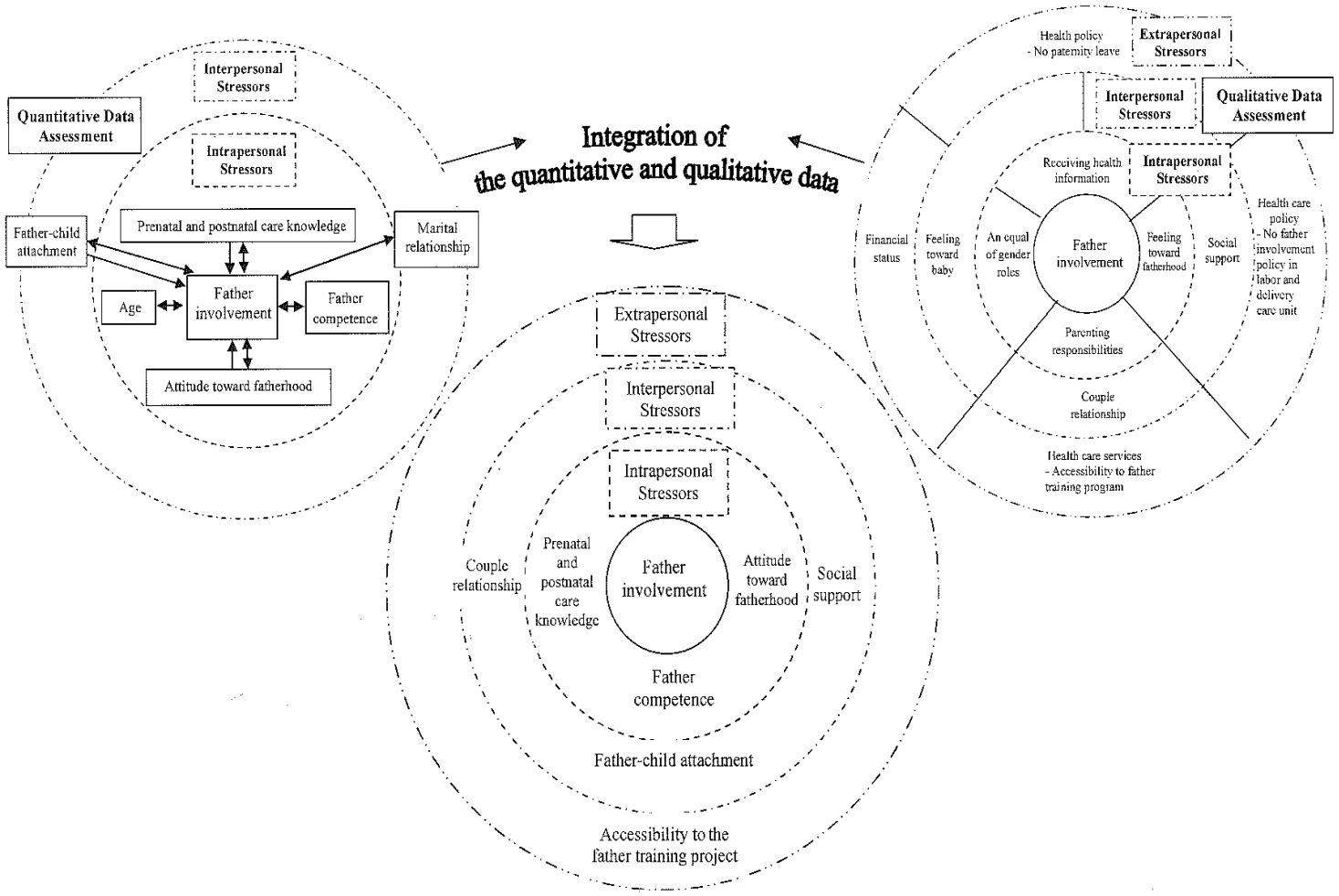


Figure 4-3 Summary of the integration of factors of father involvement

Part II: Planning of Model Development

The second part of study was a statement of the planning process of model development to emerge the draft of the nursing intervention instruments. This part included the process of planning of model development and results of planning of model development. All of them are described as follows.

Process of planning of the model development

The planning of model development was based on the Neuman Systems Model and results of situation analysis. The findings led to three steps including 1) the identification of problems, 2) construction of nursing intervention instruments, and 3) improvement of nursing intervention instruments.

1. Identification of problems

The researcher reconsidered the results of integration of quantitative and qualitative results which came from the situation analysis. The results were identified into two dimensions including the characteristics of father involvement and factors influencing the father involvement during pregnancy and neonatal period as follows.

1.1. The characteristics of father involvement

According to the assessment of father involvement from the questionnaire, the results presented that all average scores in all aspects were at a moderate level. The findings are described as follows:

1) Personal care activities**:** The average scores of these activities were at a moderate level (17.67 and 18.07 for fathers-to-be and fathers, respectively). From the itemized information, the highest mean scores consisted of exercising and engaging in sexual activity while lowest mean scores included eating more, watching television, and listening to music indicating the fathers also did more these activities.

2) Household activities**:** The average scores of household activities were at a moderate level (25.88 and 27.26 for fathers-to-be and fathers, respectively). From the itemized information, it had a high mean score such as shopping and doing errands while the lowest mean score consisted of doing ironing, doing dishes, and cooking.

3) Infant care activities: The average scores of infant care activities were at a moderate level (13.07 for the fathers). From the itemized

information, it had a high mean score such as playing with the baby and changing the baby's diapers while the lowest mean score consisted of night feeding, bathing the baby, and changing the baby's clothes.

4) Occupational activities**:** The average scores of occupational activities were at a moderate level (15.01 and 14.91 for the fathers -to-be and fathers, respectively). From the itemized information, it had a high mean score such as doing my job carefully and accurately and accomplished usual amount of work at my job while the lowest mean score consisted of the participation in organization activities.

5) Social and community activities: The average scores of social and community activities were at a moderate level (13.21 and 14.83 for the fathers-to-be and fathers, respectively). From the itemized information, it had a high mean score such as participating in community service organization and in religious organization while the lowest mean score consisted of socialization with friends and relatives indicating the fathers also did more these activities.

In addition, the results from the interviews of 12 stakeholders demonstrated that their opinions about the characteristics of father involvement during pregnancy and neonatal period. The findings included six themes. Firstly, reorganizing their daily life activities, the fathers should reduce the free time and organize the time for daily life activities with their partners and babies. Secondly, sharing the household responsibility with their partners, the fathers should do the house work with their partners. Next, there was participation in baby care responsibility by learning in baby care, supporting their partners for baby care, and finding out the needed information. Then, there was budget preparation by working hard and planning to use and collect the money for childbirth and after childbirth appropriately. After that, the fathers should manage activities in their social life by reducing time for the social activities and doing these activities with their partners and babies. Finally, caring for pregnant women/mothers, the fathers should respond to needs of the pregnant women/mothers and support both physiological and psychological aspects.

1.2 The factors influencing the father involvement

The results of the factors influencing on the father involvement were divided into three dimensions based on the stressors concept of the Neuman Systems Model. The factors in each dimension are described as follows.

1) Intrapersonal stressors

The quantitative results presented the father involvement had a positive relationship to prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and fathers' age. The fathers' education had no relationship to the father involvement. The findings revealed the average scores of prenatal and postnatal care knowledge were at a moderate level (34.20 and 35.08 of the total score of 56; *SD* = 5.06 and 6.31 for the fathers-to-be and fathers, respectively), the average scores of attitude toward fatherhood were at a high level (59.99 and 59.62 of the total score of 75; *SD* = 5.48 and 6.16 for the fathers-to-be and fathers, respectively), and the average scores of father competence were at a moderate level (62.72 and 69.16 of the total score of 96; *SD* = 8.23 and 11.2 for the fathers-to-be and fathers, respectively).

Inspection of each item of the prenatal and postnatal care knowledge was found that twelve items of the mean scores with below three. They were identified in four concepts including 1) care for pregnant women in the third trimester of pregnancy such as main food of pregnant women, care of discomfort, sexual intercourse, teratogen, and complications during pregnancy (preterm labor and pregnancy induced hypertension); 2) care for women in the labor and delivery period: signs preceding labor and ways to relieve pain during labor; 3) care for women in the postnatal period: care of emotional distress; and 4) care for babies in the neonatal period: baby sleep positions and effects of teratogen on the baby.

Three items of the lowest score of attitude toward fatherhood consisted of 1) "Mothers are naturally more sensitive caregivers than fathers are."; 2) "Fathers are able to enjoy children more when the children are older and don't require so much care."; and 3) "It is difficult for men to express tender and affectionate feelings toward babies" ($\overline{X}$ = 1.89, *SD* = 1.18; $\overline{X}$ = 2.53, *SD* = 1.29; $\overline{X}$ = 3.38, *SD* = 1.47, respectively). All of them presented the negative attitude toward baby care of fathers which were the task of mothers.

Three items of the father competence with the lowest mean score consisted of 1) making father tense and anxious; 2) no motivation to do a better job as a parent; and 3) my talents and interests are not in being a parent." ($\overline{X}$ = 3.38,

SD = 1.70; $\overline{X}$ = 3.50, *SD* = 1.69; $\overline{X}$ = 3.53, *SD* = 1.73, respectively). All of them presented the negative sense of father competence with the baby care.

The in-depth interviews with 12 stakeholders demonstrated that the intrapersonal stressors of fathers as a parent were an important factor to positive or negative accessibility to their partners and babies. The positive aspect of intrapersonal stressors were composed of 1) receiving the prenatal and postnatal health information via training or teaching from the health care providers such as nurses; 2) positive feeling toward fatherhood; 3) parenting responsibilities of the fathers as a good parent; and 4) acceptance for an equal of gender roles in the parenthood.

2) Interpersonal stressors

The quantitative results presented the marital relationship and father-child attachment had the positive relationship to the father involvement while the family characteristic had no relationship to the father involvement. The findings revealed the average scores of marital relationship and father-child attachment were at a high level in both groups. The average scores of marital relationship were 46.23 of the total score of 69 (*SD* = 7.12) and 48.41 (*SD* = 7.95) for the fathers-to-be and the father-child attachment were 70.61 (*SD* = 8.08) and 74.06 (*SD* = 7.84) of the total score of 90 for the fathers. Furthermore, most social support of fathers/fathers-to-be came from their partners, their parents, partners' parents and relatives. Most of them were supported all type of support from their partners while the information and appraisal support came from nurses and their parents, respectively.

Inspection of each item of the marital relationship was found that three items with the lowest mean score. It consisted of 1) working together on a project; 2) engaging in outside interests together; and 3) getting on each other's nerves ($\overline{X}$ = 2.20, *SD* = 1.25; $\overline{X}$ = 2.23, *SD* = .87; $\overline{X}$ = 2.79, *SD* = 1.14, respectively). All of them presented the low level of social activities with together and the high level of family stress during pregnancy and neonatal period.

Three items of the lowest score of father-child attachment consisted of 1) understanding the needs of baby; 2) talking about the baby; and 3) feeling proud of the baby ($\overline{X}$ = 3.32, *SD* = .99; $\overline{X}$ = 3.39, *SD* = 1.43; $\overline{X}$ = 3.59, *SD* = 1.24, respectively). All of them presented the activities of father with baby should be added in the program to promote fathers' involvement.

The in-depth interviews with 12 stakeholders demonstrated that the positive of interpersonal stressors could change the negative to positive behaviors of the fathers. They consisted of 1) couple relationship with love and bonding with their partners; 2) positive feeling toward baby; and 3) social support for the fathers such as house work, budget, care, information, and role model from parent, relatives, friends, and nurses.

3) Extrapersonal stressors

Quantitative results presented the fathers' income and occupational status as well as mothers' occupational status had no relationship to the father involvement while the qualitative results could describe the other stressors in the real situation. The in-depth interviews with 12 stakeholders demonstrated that the important factors in dimension of the extrapersonal stressors included financial status and health care services. Firstly, financial status, the fathers with low income needed to work hard to adequately support their families and might have time limit for doing other function of father such as care for their babies and household chores. Secondly, the health care services, the prenatal and postnatal education and father involvement policy can motivate the fathers' involvement during pregnancy and neonatal period.

To summarize the main factors affecting the father involvement, the prenatal and postnatal care knowledge and attitude toward fatherhood could predict the father involvement and together explained 31.5% of the variance (R^2= .315, F = 20.025, p-value < .001) for the fathers-to-be while for the fathers, the prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment together explained 33.2% of the variance (R^2=.332, F = 18.554, p-value < .001). Although some factors such as father competence, marital relationship, social support, and accessibility to the father training project were not the main effect, they influenced the increasing level of father involvement that health care providers needed to concern as the strategies of the program.

2. Construction of the drafts of nursing intervention instrument

Based on the primary and secondary prevention of the Neuman Systems Model, the drafts of nursing intervention plan and fathers' booklet were created to promote the fathers' involvement by the participation of nurses in the area of antenatal care, labor and delivery care, and postnatal care. To appropriate with the real situation,

the findings from step of problem identification on both quantitative and qualitative results led to the step of construction of the drafts of nursing intervention instrument. The procedures for construction of the nursing intervention instruments are described as follows:

2.1 Constructing the draft of nursing intervention plan for promoting the involvement of fathers

Based on the Neuman Systems Model, the draft of nursing intervention was developed by using the integrated quantitative and qualitative results in the situation analysis via the participation of nurses to solve all problems of the fathers-to-be/fathers. The concepts of prenatal and postnatal care knowledge, attitude toward fatherhood, father competence and practice, marital relationship, and father-child attachment were created as the strategies to promote the fathers' involvement in both primary and secondary prevention of the nursing intervention. All of them are presented as following:

1) Goal setting of the nursing intervention plan

Ultimate goal:

The ultimate goal of this nursing intervention plan was to increase the fathers' involvement during pregnancy and neonatal period through the primary and secondary prevention.

Strategic goals:

The strategic goals of this nursing intervention plan for strengthening the flexible line of defense and lines of resistance of the family system in the third trimester of pregnancy and neonatal period were to:

- Enhance the fathers' positive attitude toward fatherhood,
- Increase the fathers' prenatal and postnatal care knowledge,
- Increase the father competence and skills for care for their partners and babies during pregnancy and neonatal period,
- Promote the closer marital relationship and father-child attachment.

2) Identification of strategies and activities

Strategy 1: Raising awareness and enhancing the fathers' positive attitude toward fatherhood.

According to the quantitative results, the attitude toward fatherhood was a high level of average scores and could predict the father involvement in both fathers-to-be and fathers with the prenatal and postnatal care knowledge. The researcher planned to solve the negative attitude about the father involvement. For instance, the infant care activities are difficult and the fathers do not have a responsibility to taking care of babies and do the household chore and do the normal activities about social and community, especially drinking and going to the party with their friends. The activities which raise positive attitude of the fathers consist of as follows:

1. Self assessment of the father involvement by rating score.

2. Group discussion of the essence of father involvement on their babies and families and the problems and barriers to involvement to care for their partners and babies.

3. Discussion with the researcher and team about the problems and barriers to involvement to care for their partners and babies.

Strategy 2: Educating prenatal and postnatal care knowledge for the fathers

According to the quantitative results, the prenatal and postnatal care knowledge was a moderate level of average scores and could predict the father involvement in both fathers-to-be and fathers with the attitude toward fatherhood. The researcher planned to educate the fathers about prenatal and postnatal care knowledge by using these activities as follows:

1. Self assessment of the health problems of their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period.

2. Group discussion of the health problems and how to solve in each problem of their partners and babies in the third trimester of pregnancy and childbirth period.

3. Couple discussion of health problems and how to solve the problems of their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period.

4. Telephone consultant and education about how to solve the problem of their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period.

5. Lecture of the prenatal and postnatal care in each section of the nursing intervention.

Strategy 3: Developing the father competence and skills for care their partners and babies

According to the quantitative results, the findings revealed the father role competence was a moderate level of average scores and was positively associated with the father involvement in both fathers-to-be and fathers. The activities which planed to increase the fathers' competence and skills composed of as follows:

1. Self assessment of ability to care for their partners in the third trimester of pregnancy, childbirth, and postnatal period and their babies in the neonatal period.

2. Group discussion of the care for their partners in the third trimester of pregnancy and childbirth period.

3. Couple discussion of the care for their partners in the third trimester of pregnancy, childbirth, and neonatal period.

4. Training the fathers about the care for their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period with demonstrations and return demonstrations such as massage for relieving labor plain, baby bathing, and changing the baby's clothes and diapers.

Strategy 4: Enhancing a good marital relationship and father-child attachment

According to the quantitative results, the findings revealed the marital relationship and father-child attachment were a high level of average scores and were positively associated with the father involvement in both fathers-to-be and fathers. Some stakeholders purposed that the couple conflict affected the function of fathers such as no interest in taking care of their partners and babies, non-intention to their over time of work, and party with their friends. The researcher planned to promote the family relationship by using these activities as follows:

1. Couple assessment and discussion of health problems and how to solve these problems of their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period.

2. Participation in the training activities for their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period such as massage for relieving labor pain, bathing the baby, changing the baby's clothes, and changing the baby's diapers.

Moreover, some activities suggested in qualitative study were added in the draft of nursing intervention plan such as discussion, training, telephone consultation, and home visit. Some barriers of the fathers about the problems of health care services in each section of the nursing intervention (including no invitation for the fathers, a shortage of nurses, no coordination and reference system of parenting project, too small of the training room, and the unsuitability of delivery room) were concerned for preparation of the nursing intervention. Furthermore, other barriers of the fathers to participate in each section of the nursing intervention including the occupational factors of fathers (such as over work load, no paternity leave for attending in the health education class, and to keep the leave days for childbirth) were concerned to improve the ways to revise the nursing intervention plan in the stage of re-plan because some fathers described that if the fathers got the exactly date of the health education class, they could leave from their work.

3) Expected outcomes

The expected outcomes of this nursing intervention plan which showed the strength of the flexible line of defense in the third trimester of pregnancy and childbirth period and strength of the lines of resistance in the neonatal period included as follows:

- Fathers concerned on the father involvement and felt positive attitude toward fatherhood.

- Fathers increased their prenatal and postnatal care knowledge.

- Fathers could perform the father involvement and practice for their partners and babies in the third trimester of pregnancy, childbirth, and neonatal period.

- Fathers felt more understanding, trusting, and accepting with their partners.

- Father felt more bonding with their babies.

2.2 Constructing the draft of fathers' booklet

Based on the Neuman Systems Model, the draft of fathers' booklet was created by using the integrated quantitative and qualitative results in the situation analysis. The fathers' booklet was used as the learning instrument of the primary and secondary prevention for promoting the fathers' involvement in the third trimester of pregnancy, childbirth, and neonatal period. All of them are presented as follows.

1) Goal setting of the fathers' booklet

Ultimate goal:

The ultimate goal of the fathers' booklet was to increase knowledge of the fathers about the father involvement and prenatal and postnatal care via the method of self assessment and self study to strengthen the flexible line of defense and lines of resistance in the third trimester of pregnancy and neonatal period.

2) Identification of the content in the fathers' booklet

Firstly, the main contents in the fathers' booklet were created from literature reviews and the findings in situation analysis. The main contents in the draft of fathers' booklet include 1) the significant of involvement of fathers; 2) care for pregnant women in the third trimester of pregnancy; 3) care for women in the childbirth period; 4) care for women in the postnatal period; 5) care for babies in neonatal period; and 6) father record. The contents supported the primary prevention were the care for pregnant women in the third trimester of pregnancy and childbirth period, the secondary prevention were the care for women in the postnatal period and care for babies in neonatal period and both consisted of the significance of fathers' involvement and self record. Furthermore, the part of question and answer ("question top hit") in the draft of booklet would solve some problems of the fathers about the care for mothers in the third trimester of pregnancy, childbirth, and postnatal period and care for babies in the neonatal period.

The contents in this part were created by using the findings in the prenatal and postnatal care knowledge with low score and qualitative findings.

There were three concepts from the prenatal and postnatal care knowledge assessment including nutrition, discomfort in the third trimester of pregnancy and care of discomfort, and complication during pregnancy and childbirth period and three concepts from qualitative findings including signs preceding labor, requested documents for childbirth, and care for their partner with complication in childbirth. The low score of attitude toward fatherhood and father competence were created as the concepts of highlight or tip for father to take care in each part of the draft of booklet to increase the fathers' involvement during pregnancy and neonatal period.

3) Expected outcomes

The expected outcomes of the fathers' booklet which showed the strength of the flexible line of defense and lines of resistance during pregnancy and neonatal period included as follows:

- Fathers concerned on the father involvement in the third trimester of pregnancy, childbirth, and neonatal period.

- Fathers increased their prenatal and postnatal care knowledge

3. Improvement of the drafts of nursing intervention instrument

In order to be appropriated with the real situation, the experts, nurses, father-to-be/fathers were participated with this step. The procedures to improve the drafts of nursing intervention instrument are described as follows:

3.1 The first drafts of the nursing intervention plan and booklet developed by the researcher was proposed and examined by the five experts in the field of maternal, child, and family nursing.

3.2 After the researcher adjusted the first drafts of nursing intervention instrument according to the recommendations of five experts, the second drafts of nursing intervention plan and booklet were confirmed by the representatives of four nurses in the area of antenatal care, delivery care, postnatal care, and home visiting. All of them agreed with time, duration, and methods for organizing in the hospital campaign as well as the content of both nursing intervention plan and fathers' booklet and suggested the readers might not understand some sentences of the booklet.

3.3 After the researcher adjusted the second drafts of nursing intervention instrument according to the recommendations of nurses, the third drafts of nursing intervention plan and booklet were confirmed by the representatives of three

father-to-be/fathers. All of them were interested in this nursing intervention and this booklet was also easy to read.

3.4 After the researcher adjusted the third drafts of nursing intervention instrument according to the recommendations of fathers, the final drafts of nursing intervention instrument were prepared for the phase of model development.

Results of planning of the model development

According to the process of the planning of the model development, the researcher concluded the results of planning of the model development including the components of the final draft of nursing intervention plan and fathers' booklet. All of them are presented as follows:

1. The components of the final draft of nursing intervention plan

The ultimate goal of nursing intervention was to increase the fathers' involvement in the third trimester of pregnancy and neonatal period. The final draft of nursing intervention plan for promoting the fathers' involvement during pregnancy and neonatal period was composed of the primary and secondary prevention with four sections. The primary prevention included promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period and monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period. The secondary prevention included promoting the father involvement in the care for postnatal mother and newborn and monitoring of problems and barriers regarding the care for postnatal mother and newborn. The details of nursing intervention plan are presented in Table 4-10

Table 4-10 The components of the nursing intervention plan for the fathers

Section	Program methods/ Objectives	Strategies and activities	Time
1. Primary prevention			
1 (32-36 wks of GA)	Promoting the father involvement in the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period. **Objective**: To increase the fathers' involvement in the 3 rd trimester of pregnancy and childbirth period by strengthening the flexible line of defense via group discussion.	- Raising awareness and enhancing the fathers' positive attitude toward fatherhood**.** • Self assessment of the father involvement. • Group discussion of the essence of father involvement on their babies and families and the problems and barriers to involvement to care for their partners and babies. - Educating the care knowledge in the 3 rd trimester of pregnancy and childbirth period. • Self assessment of the health problems of their partners in the 3 rd trimester of pregnancy and childbirth period • Group discussion of the health problems and how to solve in each problem of their partners and babies in the 3 rd trimester of pregnancy and childbirth period. • Lecture of the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period. - Developing the father competence and skills for care their partners in the 3 rd trimester of pregnancy and childbirth period. • Self assessment of ability to care for their partners in the 3 trimester of pregnancy and childbirth period. • Group discussion about the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period such as relieving discomfort. • Training the fathers about the care for pregnant woman to relieve discomfort in the 3 rd trimester of pregnancy and childbirth period with demonstrations and return demonstrations. - Enhancing a good marital relationship and father-child attachment**.**	60 min

Table 4-10 The components of the nursing intervention plan for the fathers (cont.)

Section	Program methods/ Objectives	Strategies and activities	Time
		• Couple assessment and discussion of the health problems and how to solve the problems of their partners in the 3 rd trimester of pregnancy and childbirth period. • Participation in the training activities for their partners in the 3 rd trimester of pregnancy and childbirth period.	
2 (> 36 wks of GA)	Monitoring of problems and barriers regarding the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period. **Objective**: To increase the fathers' involvement in the 3 rd trimester of pregnancy and childbirth period by strengthening the flexible line of defense via the telephone consultant and education.	- Educating the care knowledge in the 3 rd trimester of pregnancy and childbirth period. • Self assessment of the health problems of their partners in the 3 rd trimester of pregnancy and childbirth period. • Discussion with the researcher about how to solve the health problems of their partners in the 3 rd trimester of pregnancy and childbirth period. • Describing the information in each problem about the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period.	10-30 min

Table 4-10 The components of the nursing intervention plan for the fathers (cont.)

Section	Program methods/ Objectives	Strategies and activities	Time
2. Secondary prevention			
3 (2-3 days after birth)	Promoting the father involvement in the care for postnatal mother and newborn. **Objective**: To increase the fathers' involvement in the neonatal period by strengthening the lines of resistance via couple discussion and training.	- Raising awareness and enhancing the fathers' positive attitude toward fatherhood**.** • Self assessment of the father involvement. • Discussion with the researcher and team about the problems and barriers to involvement to care for their partners and babies. - Educating the care knowledge for postnatal mother and newborn. • Self assessment of the health problems of their partners in the postnatal period and babies in the neonatal period. • Discussion with the researcher and team about the health problems and how to solve the health problems of their partners and babies. • Lecture of the care for postnatal mother and newborn. - Developing the father competence and skills for care their babies with their partners • Self assessment of ability to care for their babies in the neonatal period. • Discussion with researcher and team about the care for babies in the neonatal period. • Training of fathers about the newborn care with demonstrations and return demonstrations. - Enhancing a good marital relationship and father-child attachment. • Couple assessment and discussion of the health problems and how to solve the problems of their partners and babies. • Participation in the training activities for their babies in the neonatal period.	60 min

Table 4-10 The components of the nursing intervention plan for the fathers (cont.)

Section	Program methods/ Objectives	Strategies and activities	Time
4 (1 week after birth)	Monitoring of problems and barriers regarding the care for postnatal mother and newborn **Objective**: To increase the fathers' involvement in the neonatal period by strengthening the lines of resistance via home visiting.	- Raising awareness and enhancing the fathers' positive attitude toward fatherhood**.** • Self assessment of the father involvement. • Discussion with the researcher and team about the problems and barriers to involvement to care for their partners and babies. - Educating the care knowledge for postnatal mother and newborn. • Self assessment of the health problems of their partners in the postnatal period and babies in the neonatal period. • Discussion with the researcher and team about the health problems and how to solve the health problem of their partners and babies. • Lecture of the care for postnatal mother and newborn in each problem. - Developing the father competence and skills for care their babies with their partners. • Self assessment of ability to care for their babies in the neonatal period. • Discussion with researcher and team about the care for babies in the neonatal period. • Training of the fathers about the newborn care with demonstrations and return demonstrations in some activities that the fathers cannot do for their babies. - Enhancing a good marital relationship and father-child attachment. • Couple assessment and discussion of the health problems and how to solve the health problems of their partners and babies. • Participation in the training activities that the fathers cannot do for their babies.	30-50 min

2. The components of the fourth draft of the fathers' booklet

Based on the primary and secondary prevention of the Neuman Systems Model, the components of the final draft of the fathers' booklet consisted of seven sections including the objectives and contents in each section as follows:

Table 4-11 The components of the fathers' booklet

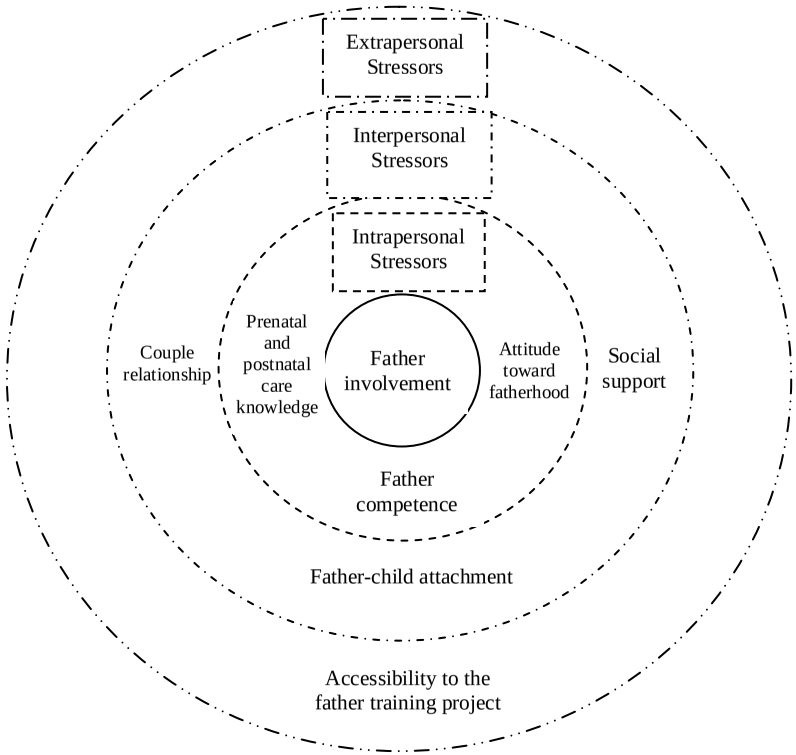
Concept of NSM [a]	Section	Objectives	Contents
Primary and secondary prevention	1	To strengthen the flexible line of defense and lines of resistance by increasing knowledge about the father involvement via the process of nursing intervention and self study.	1. The significance of fathers' involvement - Benefits of fathers' involvement during pregnancy and neonatal period - The principle of fathers' involvement during pregnancy and neonatal period
Primary prevention	2	To strengthen the flexible line of defense by increasing knowledge about care for pregnant women in the 3 rd trimester of pregnancy via the process of nursing intervention and self study.	2. Care for pregnant women in the 3 rd trimester of pregnancy - Discomfort and management of discomfort in the 3 rd trimester of pregnancy - Care management of the pregnant women in the 3 rd trimester of pregnancy - Preparation for childbirth
Primary prevention	3	To strengthen the flexible line of defense by increasing knowledge about care for mothers in the childbirth period via the process of nursing intervention and self study.	3. Care for mothers in the childbirth period - Signs preceding labor - Stages of labor - Care management of discomfort in the labor and childbirth period
Secondary prevention	4	To strengthen the lines of resistance by increasing knowledge about care for mothers in the postnatal period via the process of nursing intervention and self study.	4. Care for mothers in the postnatal period - Discomfort and management of discomfort of women in the postnatal period - Care management of the women in the postnatal period

Table 4-11 The components of the fathers' booklet (cont.)

Concept of NSM [a]	Section	Objectives	Contents
Secondary prevention	5	To strengthen the lines of resistance by increasing knowledge about care for babies in the neonatal period via the process of nursing intervention and self study.	5. Care for babies in the neonatal period - Common newborn problems and managements for babies - Care management of the newborn
Primary and secondary prevention	6	To strengthen the flexible line of defense and lines of resistance by increasing necessary knowledge about the maternal and child problems via self study.	6. Question top hit (including questions in the 3 rd trimester of pregnancy, childbirth, and postnatal period)
Primary and secondary prevention	7	To strengthen the flexible line of defense and lines of resistance by assessing the father involvement during pregnancy and neonatal period by the fathers-to-be/fathers via the process of nursing intervention.	7. Father record - Father involvement assessment record - The problem assessment record in pregnancy and childbirth period - The problem assessment record in the postnatal period - The practice assessment record for the babies in the neonatal period

a = The Neuman Systems Model

In conclusion, the process of the planning of model development phase was summarized as below figure.



Nursing Intervention

- Primary prevention

- Promoting the father involvement in the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period
- Monitoring of problems and barriers regarding the care for pregnant woman in the 3 rd trimester of pregnancy and childbirth period

- Secondary prevention

- Promoting the father involvement in the care for postnatal mother and newborn
- Monitoring of problems and barriers regarding the care for postnatal mother and newborn

Figure 4-4 Summary of the planning process of model development

Part III: Model Implementation

The primary and secondary prevention with four sections of the nursing intervention were implemented during August 2012 to January 2013. The process of model implementation in this study consisted of three main steps including step of action for implementation, re-assessment, and re-planning. The statement of model implementation described the recruitment of participants and outcomes of the process of implementation. The details of results are presented as follows.

Recruitment of participants

In model implementation phase, the inclusion criteria of participants were used for selection to the study. Of the 90 fathers-to-be in situation analysis phase, 31 fathers-to-be were completed consent to participate into the intervention group of the primary and secondary prevention. Fifty four fathers-to-be/fathers did not meet inclusion criteria such as their partners were over 36 weeks of gestation age or in the postnatal period or plan to move away from this setting area to go back their original families. Five fathers-to-be did not wish to participate in the study because of limitation of working leave. For the primary prevention, of the 31 fathers-to-be, three fathers-to-be did not participate on the working day in the section 1: Promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period. Although this section was changed for some fathers-to-be on Sunday (holiday), three fathers-to-be dropped out in this section. In the section 2: Monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period via telephone consultant and education, one father-to-be was excluded because his partner moved away this area to give birth with her original family in the northeast region of Thailand.

For the secondary prevention, one father was excluded from the section 3: Promoting the father involvement in the care for postnatal mother and newborn because his baby with complication was dead at 1 day after delivery. Finally, the 26 fathers completed all sections of the primary and secondary prevention. The details of recruitment of participants are presented as below figure.

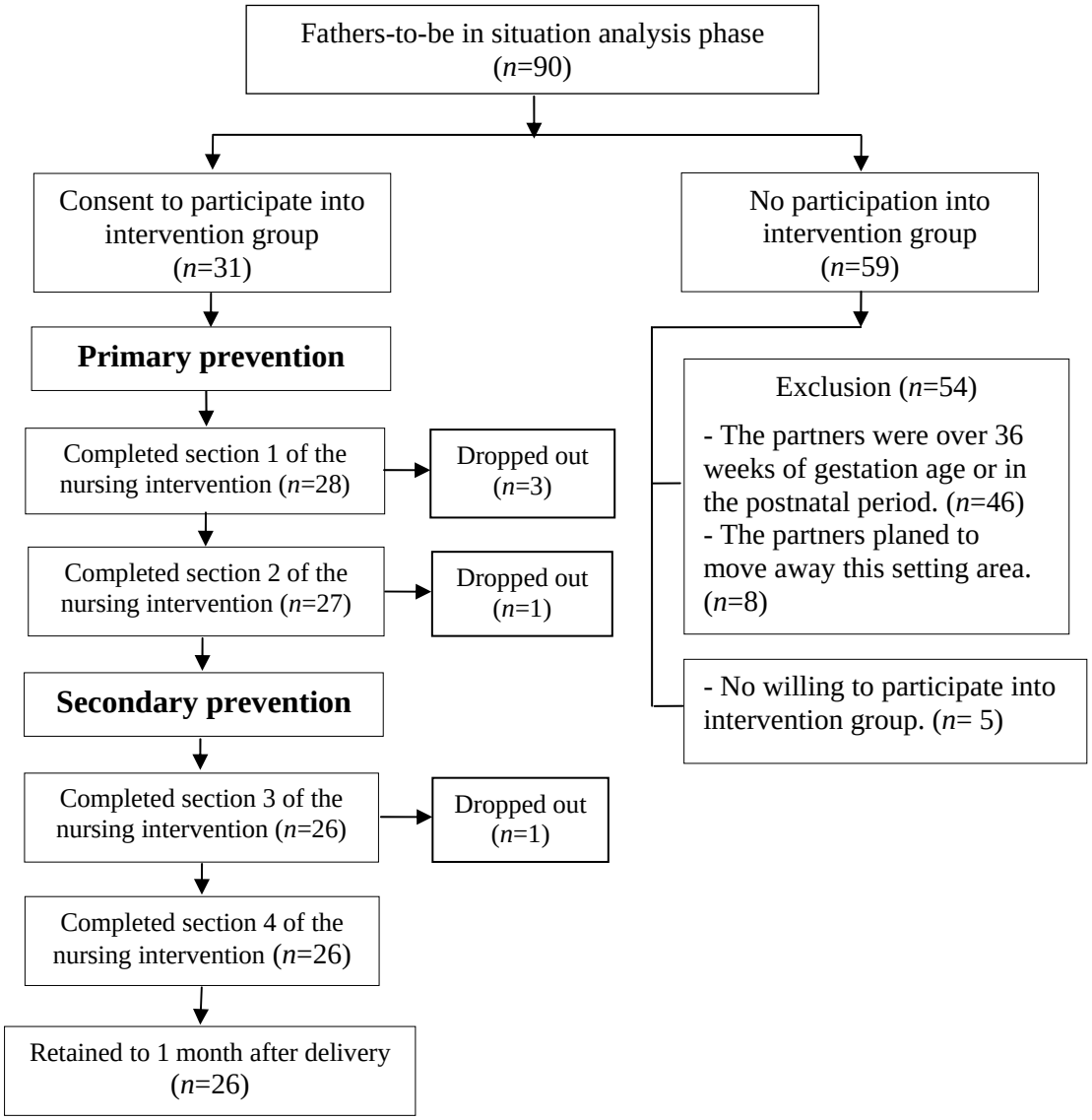


Figure 4-5 Sample flowchart of nursing intervention

The results of the process of implementation

In this phase, the primary and secondary prevention with four sections were implemented step by step. The activities in each section were little modified to response needs of the fathers and their families by the nurses' participation. In each processes, the nurses from antenatal care, labor and delivery care, and postnatal care helped the researcher to find out the ways to solve the problems and needs of fathers-to-be/fathers and their families and also facilitate for the meeting which related to their responsibilities. The results of the implementation process are described as follows.

1. The primary prevention

The first and second spiral processes were occurred in the third trimester of pregnancy and childbirth period, respectively. The nursing intervention of primary prevention was conducted according to the plan from the phase 2: planning of model development. Then, the results were described in each section of the primary prevention for promoting the father involvement as follows.

Section 1: Promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period

The objective of this section was to increase the fathers' involvement in the third trimester of pregnancy and childbirth period by strengthening the flexible line of defense via group discussion. The group education took around one hour. To increase the success of the program, this section was done at antenatal care clinic on Monday, Tuesday, and Sunday depended on the needs of fathers-to-be and their families, especially the fathers-to-be who could not leave from their work. Since the findings from the situation analysis indicated that the fathers who visited at private obstetrical clinics needed to participate in the childbirth preparation, three fathers-to-be and their partners were invited to participate in this section on Sunday. From 31 fathers-to-be and their partners, there were 28 fathers-to-be and their partners participating in this session. However, three pregnant women and their partners were unavailable to attend in this section because of the occupational problems. For example, a pregnant woman said that *"My partner is interested in this program but he cannot leave from his work. It is possible if this section is done on Sunday."* The results of this section were collected by the researcher's observing and fathers and their partners expressing.

Fathers' lessons learned from this section

Because of discussion and training, fathers-to-be realized the significance of father involvement and new knowledge about care for their partners in the third trimesters of pregnancy and childbirth period by themselves. Fathers' lessons learned from these activities are described below.

1. Fathers-to-be learned the father role and function and concerned on the significance of father involvement, especially baby care activities. A father-to-be reflected that *"If the fathers do the activities as a good father such as increasing the*

household chore, baby care, and occupational responsibilities and reducing the time for personal care activities and social activities, there are healthy family relationship and family well-being".

2. Fathers-to-be learned the ways to solve or manage the problems of pregnant women in the third trimester of pregnancy and childbirth period by discussing with other fathers and practicing with their partners. Most of them sought the information regarding the signs of labor and childbirth process. They were willing to be more active participation in group discussion and enjoyed to practice with their partners in this training and felt satisfaction. For example, a father-to-be said that *"I attended this class and I knew the details of labor pain and childbirth that I did not know. This class is useful for me and my partner because it help me to practice to care for her, especially massage for relieving labor pain"*. Moreover, a pregnant woman said that *"I felt well and comfortable when my partner gave me back massage"*.

Satisfaction with the nursing intervention

During this section, most fathers-to-be and their partners were interested in the content of the care for their partners in the third trimester of pregnancy and childbirth period, especially assessment of the health problems for their partners and training of fathers to deal with pregnancy discomfort for their partners. Most of them intended to listen and were willing to respond and discuss with the researcher. When finishing this session, they were satisfied and gave a big hand for the researcher and team. For example, a father-to-be said that *"This section is very good and completed. It also helps me a better understanding regarding process of labor and childbirth and care for my partner."*

Problems and needs in this section

In the real situation, although the fathers-to-be had a better understand about the care for their partners in the third trimester of pregnancy and childbirth period, they were also worried and had low self confidence about the care for their partners when having the problems at home. For example, a father-to-be said that *"At home, although I got the father training, I am also worried about the care for my partner. I think that I cannot take care of my partner when she has labor pain or other problems because her grandmother cannot go to stay with her in the last period of pregnancy"*. However, the nursing shortage and over work load of nurses in the

hospital are needed to concern by the researcher and team when providing the health education on Sunday or holiday.

Section 2: Monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period

The objective of this section was to increase the fathers' involvement in the third trimester of pregnancy and childbirth period by strengthening the flexible line of defense via the telephone consultant and education. Before this session, the researcher provided the cell phone number for consulting their problems and educating the care information to solve the problems. The telephone consultant and education took around 10-30 minutes per each case. In this section, there were 27 fathers-to-be and their partners participating in this session. One fathers-to-be was left out this program because his partner changed about childbirth plan and went back home in the north east region. The results of this section were collected by the fathers expressing.

Modification of the nursing intervention

According to the section 1, most fathers-to-be were also worried and had low self confidence about the care for their partners when having the problems in the third trimester of pregnancy and childbirth period. The activities in this section were little modified to solve the problem and needs of fathers and their families. Thus, the recall back to health education and training was included via telephone consultant and education to increase ability to manage the problems of pregnant women in the third trimester of pregnancy in the real situation.

Fathers' lessons learned from this section

According to the telephone consultant and education, the fathers-to-be realized the new knowledge about care for their partners in the real situation by themselves. Fathers' lessons learned from these activities are described below.

1. To increase the self confidence, the fathers-to-be learned the ways to solve or manage the problems of pregnant women in the third trimester of pregnancy and childbirth period by themselves via the telephone consultant and education. In the real situation, when staying at home, they had some problems of their partners such as labor pain and amniotic fluid leak. The telephone consultant and education helped the fathers-to-be to manage their problems at home about care for their partners in the third trimester of pregnancy and childbirth period. For example,

"My partner with 38 weeks of gestation age had the frequent urination. Although the booklet provided me that it is normal in the last period of pregnancy, I am still worry and need to confirm with health care providers that is normal in order to increase my confidence to care for my partner".

2. Fathers-to-be concerned on the importance of father that involved in the care for their partner when staying at home. They needed to eliminate the fear of childbirth and change some daily life activities. A fathers-to-be reflected that his partner was satisfied when he supported her or sought the health care information for her and our babies.

Satisfaction with the nursing intervention

According to discussion, the fathers-to-be reflected that this section was very useful to manage the problems of their partners at home. The problems in this section that the fathers-to-be consulted with the researcher and team consisted of the ways to relieve discomfort in the third trimester of pregnancy and signs preceding labor. In this time, they needed to answer or find out the care information for solving these problems before going to the hospital. Then, these problem were managed by the fathers-to-be and their partners. For example,

"I think the telephone consultation help me to manage the problems when we stay at home. For instance, when my partner had the labor pain, I knew how to care before going to the hospital for childbirth via telephone with researcher and nurse".

Moreover, most of them were willing to be more active conference via telephone and alert to find out the information for taking care of their partners and babies. However, one pregnant woman and her partner could not attend in the next sections because she moved away this area to give birth with her original family in the northeast region of Thailand. Thus, this case was excluded from this study.

2. The secondary prevention

The third spiral process which was occurred in the neonatal period that the nursing intervention of secondary prevention was conducted according to the plan from the phase 2: planning of model development. The results were described in each section of secondary prevention for promoting the father involvement after childbirth as follows.

Section 3: Promoting the father involvement in the care for postnatal mother and newborn

The objective of this section was to increase the fathers' involvement in the neonatal period by strengthening the lines of resistance via couple discussion and training. The couple discussion and training took around one hour. From 27 fathers and their partners, there were 26 fathers and their partners participating in the health education and practice in the neonatal period. The results of the section were collected by the researcher's observing and fathers and their partners expressing.

Fathers' lessons learned from this section

Regarding of the father training and discussion, the fathers realized the knowledge about care for their partners in the postnatal period and babies in the neonatal period. Fathers' lessons learned from these activities are described below.

1. Fathers concerned on their limitation of baby care knowledge and skill. Fathers reflected that they did not know and have experience about baby care, so they did not feel confident to talk and do several care activities for their babies with their partners. For example,

"I try to learn about baby care in this training. I am afraid that my baby may fall out of my hand so I need the long time for practices".

In this training section, although the fathers felt worry to do some activities, especially baby bathing and had the time limitation, they also tried to practice the baby care with their partners.

2. Fathers learned that the father involvement in the baby care was significance for the family well-being. Fathers reflected that the father training could improve their abilities to baby care practices and reduce the stress of both fathers and mothers after childbirth.

Satisfaction with the nursing intervention

During this session, most fathers and mothers were interested and willing to discuss with the researcher and team. They were more active participation to practice in some baby care activities with their partners such as holding the baby and care for eye and umbilical cord of the baby. After training, the researcher and team provided the reinforcement for fathers to increase the positive perception of their involvement in the baby care. Thus, fathers had a better understand and enjoyed to

practice about the care for their partners in the postnatal period and babies in the neonatal period.

Problems and needs in this section

After this nursing intervention was implemented, the fathers and their partners had some problems and needs as described follows.

1. The difficulty of the baby bathing for new fathers

Most fathers reflected that some baby care activities were difficult for a first time father such as baby holding and bathing although implementing in this section helped to increase ability to care for their babies and they were interested in baby care practices. Thus, they needed to have time for baby practice. For example,

"I feel that the baby bathing is difficult for me now and I think that if I have more time to practice with my baby such as holding the baby, I may do it by myself".

Moreover, the paternity leave after childbirth affected on their learning, especially baby care practices. For example, a father who did not have the paternity leave also expressed that *"I may do a better baby care if I have a long time for this training"*.

2. Needs to know about some health information for care after childbirth

The fathers and their families needed to include two new topics for taking care of their partners and babies. First, according to Thai culture, some fathers and their families (6 cases) would like to know about the traditional Thai herbal healing (called Yuu Fai). Second, some fathers and mothers (5 cases) who worked in the factory suggested that the researcher should add the topic about how to store the breast milk for their babies when the mothers needed to go to work around 1 month after childbirth.

Section 4: Monitoring of problems and barriers regarding the care for postnatal mother and newborn

The objective of this section was to increase the fathers' involvement in the neonatal period by strengthening the lines of resistance via home visiting. The home visiting took around 30-50 minutes per each case and some cases called back the researcher to consult their problems. During this section, there were 26 fathers and their partners participated in this session. The fathers needed to help their partners to

manage two main health problems. Firstly, most baby health problems included baby constipation in the first week after birth (1 case), fever (2 cases), heat rash (2 cases), and dermatitis (1 case). Secondly, the problems of the mothers consisted of the less breast milk for feeding (7 cases) and breast abscess (1 case). In the case of health problem of mothers and babies, the fathers, mothers, researcher, and team jointly assessed and discussed to solve the problems. However, some fathers called back to the researcher more than one time to consult their severe problems such as baby constipation in the first week after birth, dermatitis, and breast abscess. The results of this section were collected by the researcher's observing and fathers and their partners expressing.

Modification of the nursing intervention

According to the section 3, most fathers concerned about their ability to care for their babies and needed to know some information, especially "Yuu Fai" that associated with Thai culture. The modification of the nursing intervention is described below.

1. Raising self confidence of fathers for baby practice

To increase the self confidences of new fathers for practice in the real situation, the baby practice such as baby bathing needed to be included for training at home in the section 4: monitoring of problems and barriers regarding the care for postnatal mother and newborn provided.

2. Including the health information for increasing ability to care for their partners and babies

Since the fathers needed to know some health information such as Yuu Fai and way to store breast milk, the new topics were created for fathers and their partners. The details of the new topics are described as follows.

Topic 1: Traditional Thai herbal healing (Yuu Fai): Care for postnatal mothers

To respond the needs of the fathers and their families in Thai context, this topic was included to discuss in the section 4: monitoring of problems and barriers regarding the care for postnatal mother and newborn via home visiting. The elements of this topic are presented as below.

Objective: To improve a better understand about the traditional Thai herbal healing in the postnatal period.

Activities:

1. Discussing about how to use the Thai herbal healing for the mothers in the postnatal period.

2. Summarizing the method of Thai herbal healing for the mothers in the postnatal period to lead to application with their partners in real situation.

Expected outcomes:

1. Fathers and their families increased their knowledge of Thai herbal healing in the postnatal period.

2. Fathers and their families could apply Thai herbal healing for the postnatal mothers.

Topic 2: How to store the breast milk for their babies

To respond the needs of the fathers and their families in each context, this topic was created to discuss in the section 4: monitoring of problems and barriers regarding the care for postnatal mother and newborn via home visiting. This topic was provided for some fathers and their partners who worked in the factory after childbirth. The elements of this topic are presented as below.

Objective: To improve a better understand about the methods to store the breast milk for their babies.

Activities:

1. Discussing about how to store the breast milk for their babies after the mothers needed to work normally.

2. Training the methods of manual expression for fathers and their partners with demonstration and return demonstration

3. Summarizing the methods to store the breast milk for their babies in order to apply in real situation.

Expected outcomes:

1. Fathers and their families increased their knowledge of the method to store the breast milk for their babies.

2. Fathers and their families could apply the methods to store the breast milk for their babies.

Fathers' lessons learned from this section

According to the home visiting, the fathers realized the knowledge about care for their partners and babies in the real situation. Fathers' lessons learned from these activities are described below.

1. Fathers learned that the baby care activities were an interaction process between father and child which helped them to have a better understand about the feelings and needs of the babies. In this section, fathers were willing to be more active participation to practice with their babies at home, especially baby bathing. Moreover, the fathers, mothers, and relatives suggested that the nurses or health care providers should normally visit all mothers and babies with fathers to increase the ability of fathers and mothers to take care of their babies.

2. After childbirth, the fathers learned to involve in the management of the problems of their partners and babies and plan with their partners. Fathers expressed that this program triggered them to be more concerned about the well-being of their partners and babies and participate in several responsibilities in their families such as household tasks and baby care.

Satisfaction with the nursing intervention

During this session, most fathers, mothers, and relatives intended to listen and were willing to respond and discuss with the researcher and team. The baby care activities that the fathers did not do in the previous section were done by themselves. The mothers, relatives, researcher, and term helped the fathers to take care of their babies such as baby bathing, changing diaper and cloth, eye care, and umbilical cord care and provided reinforcement for positive perception of the fathers. All fathers and mothers said thank you to invite them to participate in this program. They reflected that the home visit was useful to help them to do all activities for their babies and consult some baby problems at home. Furthermore, the fathers, mothers, and relatives suggested that the nurses or health care providers should normally visit all mothers and babies at home to assess and educate them to take care of the baby.

In each spiral process, the process of implementation was concluded in Table 4-12 to summarize program activities, problems and barriers, and modification of the nursing intervention plan.

Table 4-12 Conclusion of nursing intervention on program activities, problems and needs, and modification of the nursing intervention

Spiral process	Program activities	Problems and needs	Modification of the nursing intervention
1	- Promoting the father involvement in the care for pregnant woman in the 3 rd trimester of pregnancy. - Monitoring of problems and barriers regarding the care for pregnant woman in the 3 rd trimester of pregnancy.	- Fathers-to-be were also worried about the care for their partners when having the problems in the 3 rd trimester of pregnancy.	- Including recall back to health education and training in order to increase ability to manage the problems of pregnant women in the 3 rd trimester of pregnancy in the real situation.
2	- Promoting the father involvement in the care for pregnant woman in the childbirth period. - Monitoring of problems and barriers regarding the care for pregnant woman in the childbirth period.	- Fathers-to-be were also worried about the care for their partners in the childbirth period.	- Including recall back to health education and training in order to increase ability to manage the problems of pregnant women in the childbirth period in the real situation.
3	- Promoting the father involvement in the care for postnatal mother and newborn. - Monitoring of problems and barriers regarding the care for postnatal mother and newborn.	- Some baby care activities such as baby bathing were difficult to do for a first time father. - Fathers needed to know some health information such as Yuu Fai and way to store breast milk**.**	- Including baby practice at home to raise self confidence of fathers. - Including the new topics: Traditional Thai herbal healing (Yuu Fai): Care for postnatal mothers and How to store the breast milk for their babies.

For the model implementation phase, the model was described into two aspects including inputs and process of implementation.

The inputs of implementation consisted of human resources (fathers-to-be/fathers and their partner and nurses), materials (nursing intervention plan and fathers' booklet), time (the period used to participate in the nursing intervention), and management (the strategies for increasing the successfulness of the model) that were put into the father involvement model.

The process of implementation required transforming the inputs into the outputs and outcomes. This process consisted of a primary and secondary prevention with four sections of nursing intervention. The nursing intervention of primary prevention including promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period and monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period was conducted to prepare the fatherhood readiness for fathers-to-be. The intervention helped fathers-to-be to increase knowledge and understand the father role and function for strengthening belief system, life style, and socioculture of family system as a flexible line of defense. An increasing ability to function as a good father such as appropriate activities in their daily life and social life, budget preparation, and care for the pregnant women indicated an intact normal line of defense for family system. After that, the secondary prevention including promoting the father involvement in the care for postnatal mother and newborn and monitoring of problems and barriers regarding the care for postnatal mother and newborn were conducted. The intervention helped to increase the fathers' skills in care for their partners and babies after delivery as strengthening the lines of resistance in order to maintain the family wellbeing. Then, the nursing intervention was revised via three main steps including action for implementation, re-assessment, and re-planning. The parts of father involvement model in this phase were summarized as below figure.

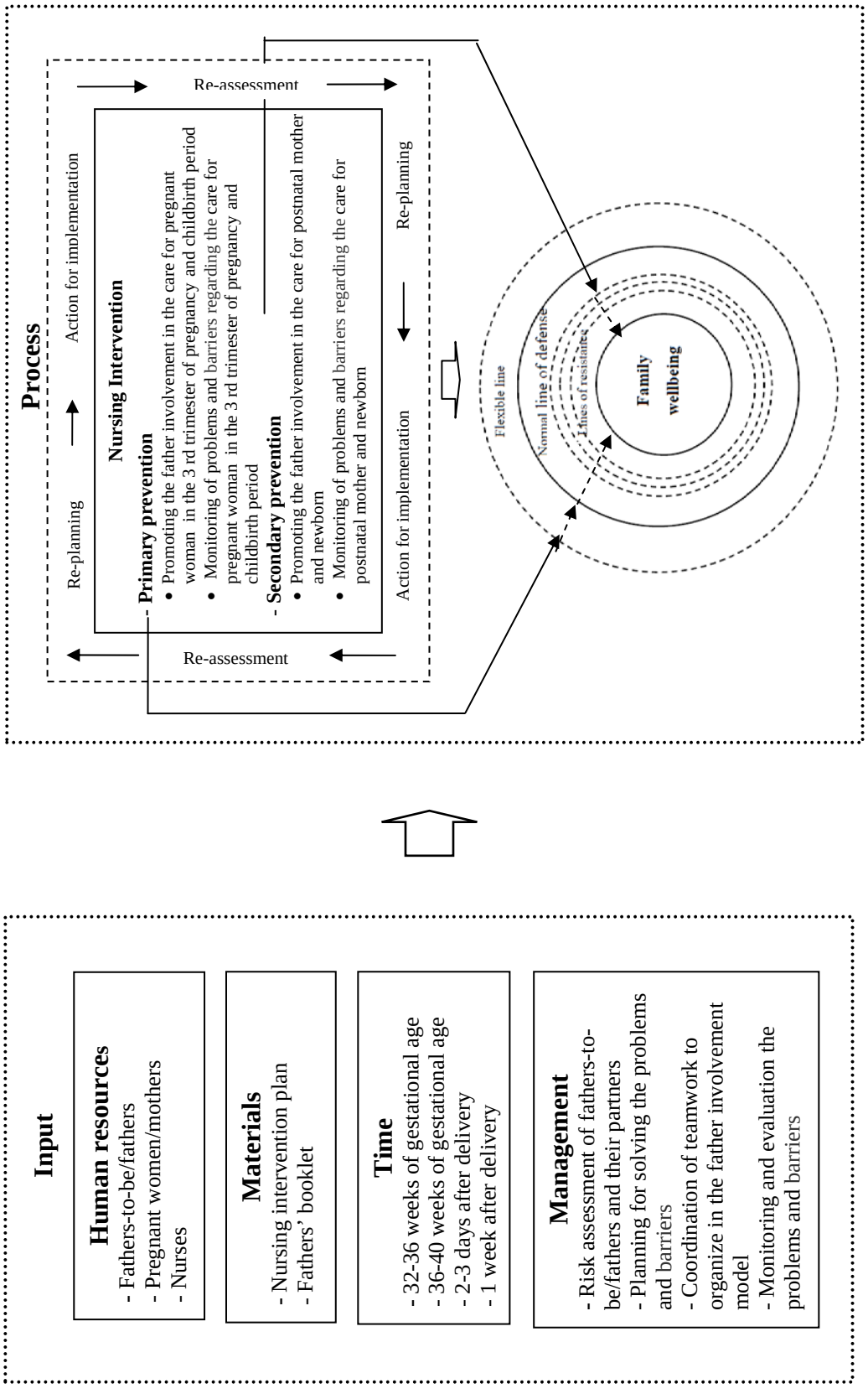


Figure 4-6 Summary of father involvement model in the model implementation phase

Part IV: Model Evaluation

The main purpose of the model evaluation phase was to examine the outputs and outcomes of the father involvement model during pregnancy and neonatal period indicated by significant changes of variables including prenatal and postnatal care knowledge, attitude toward fatherhood, perception of father competence, marital relationship, father-child attachment, and father involvement. There are 26 couples of the fathers-to-be/fathers and pregnant women/mothers collaborating throughout this research project. Then, all fathers were asked to complete the same self-administered questionnaires that they answered them before participating in this project. The results in this part had been conducted at one week and one month after delivery as described below.

1. Background characteristics

1.1 Demographics of participants

Table 4-13 shows the number and percentage of participants classified by demographic characteristics. All most of the participants aged between 21-30 years old (65.4%) with an average of 24.23 years old (*SD*=4.23). All of them were Buddhist. Around one thirds (30.7%) of them had completed senior high school or equivalent level. The duration of marriage average 2.35 years (*SD*=1.60), over 90% was less than 5 years. All of them had no experience in infant care and about half of them were nuclear family and extended family (46.2% vs. 53.8%). Of their working condition, around eighty percent (80.8%) were employee. The participants had an average income of 10,722.69 baht per month (*SD*=5,361.33). Approximately 50% of them were less than 10,000 baht per month and below 10% were more than 20,000 baht per month. All of them did not have the paternity leave.

1.2 Demographics of participant' partners

As shown in Table 4-14, the participant' partners ranged in age from 18 to 31 years with an average age of 21.69 years old (*SD*=4.05). All of them were Buddhist. Approximately one thirds (34.5%) of them had completed at least senior high school or equivalent level. Around fifty percent (53.8%) of them were employed in which majority of them was employee (46.1%) and 7.7% of business or trader. They had an average income of 8,292.14 baht per month (*SD*=3,087.83).

Approximately one fourths (26.9%) of them had the maternity leave with one to three months.

Table 4-13 Demographics of participants (*n*=26)

Items	Number	Percent
Age (years)		
< 20	8	30.8
21 - 30	17	65.4
> 30	1	3.8
$\overline{X}$ +*SD*= 24.23 + 4.23, min= 19 years, max= 35 years		
Religion		
Buddhist	26	100.0
Educational level		
Primary school	7	26.9
Junior high school	11	42.3
Senior high school	5	19.2
Primary vocation certificate	3	11.5
Occupation		
Company employee	14	53.9
Employee	7	26.9
Business/Trader	5	19.2
Income (baht/month)		
< 10,000	14	53.9
10,000 – 19,999	10	38.5
20,000 – 29,999	1	3.8
> 30,000	1	3.8
$\overline{X}$ +*SD*= 10,722.69 + 5,361.3, min =5,000, max=30,000		
Duration of marriage (years)		
< 2	17	65.4
3 - 5	7	26.9
> 5	2	7.7
$\overline{X}$ +*SD*= 2.35 +1.60, min = 1 year, max = 6 years		
Experience in infant care		
No	26	100.0
Family characteristic		
Nuclear	12	46.2
Extend	14	53.8
Paternity leave		
No	26	100.0

Table 4-14 Demographics of participant' partners (*n*=26)

Items	Number	Percent
Age (years)		
< 20	13	50.0
21 - 30	12	46.2
> 30	1	3.8
$\overline{X}$ +*SD*=21.69 + 4.05, min= 18 years, max=31 years		
Religion		
Buddhist	26	100.0
Educational level		
Primary school	6	23.1
Junior high school	11	42.3
Senior high school/	3	11.5
Primary vocation certificate	4	15.4
High vocation certificate	1	3.8
Bachelor degree	1	3.8
Occupation		
Unemployment	12	46.2
Employment	14	53.8
- Company employee	9	34.6
- Employee	3	11.5
- Business/Trader	2	7.7
Income (baht/month)		
No income	12	46.2
< 10,000	9	34.6
10,000 – 19,999	5	19.2
>20,000	0	0.0
$\overline{X}$ +*SD*= 8,292.14 + 3,087.83, min=2,400, max=14,000		
Maternity leave		
No	19	73.1
Yes	7	26.9
The number of delivery leave (months)		
1 - 2	3	11.5
> 3	4	15.4

1.3 Social support of participants

The social support of participants came from the partners, parents, and relatives in three periods including during pregnancy, one week after delivery, and one month after delivery. Most of them received all types of support from their partners while the information came from the parents and nurses, respectively. The data of social support of participants are presented in Table 4-15.

Table 4-15 Social support of participants (*n*=26)

Source of support	Period*	Type of supportive behaviors								Total	
		ES		IS		IFS		AS			
		n	%	n	%	n	%	n	%	n	%
Informal source											
Partner	1	20	76.9	7	26.9	16	61.5	3	11.5	22	84.6
	2	24	92.3	2	7.7	12	46.2	3	11.5	26	100.0
	3	23	88.5	1	3.8	3	11.5	4	15.4	25	96.2
Parent	1	1	3.8	13	50.0	19	73.1	2	7.7	21	80.8
	2	3	11.5	16	61.5	17	65.4	2	7.7	20	76.9
	3	3	11.5	10	38.5	19	73.1	3	11.5	20	76.9
Partner's parent	1	0	0.0	8	30.8	12	46.2	0	0.0	12	46.2
	2	2	7.7	12	46.2	19	73.1	3	11.5	14	53.8
	3	1	3.8	8	30.8	11	42.3	2	7.7	13	50.0
Relatives	1	0	0.0	7	26.9	15	57.7	1	3.8	17	65.4
	2	0	0.0	16	61.5	12	46.2	0	0.0	19	73.1
	3	0	0.0	8	30.8	11	42.3	0	0.0	14	53.8
Partner's relatives	1	0	0.0	9	34.6	11	42.3	1	3.8	14	53.8
	2	1	3.8	13	50.0	13	50.0	0	0.0	18	69.2
	3	0	0.0	5	19.2	9	34.6	0	0.0	8	30.8
Friends	1	0	0.0	1	3.8	3	11.5	0	0.0	4	15.4
	2	0	0.0	14	53.8	6	23.1	0	0.0	17	65.4
	3	0	0.0	2	7.7	3	11.5	0	0.0	5	19.2
Partner's friends	1	0	0.0	1	3.8	3	15.4	0	0.0	5	19.2
	2	0	0.0	13	50.0	3	11.5	0	0.0	14	53.8
	3	0	0.0	1	3.8	2	7.7	0	0.0	3	11.5
Supervisor	1	0	0.0	2	7.7	5	19.2	0	0.0	6	23.1
	2	0	0.0	8	30.8	1	3.8	0	0.0	8	30.8
	3	0	0.0	5	19.2	0	0.0	0	0.0	5	19.2
Formal source											
Doctors	1	0	0.0	0	0.0	3	11.5	0	0.0	3	11.5
	2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	3	0	0.0	0	0.0	1	3.8	0	0.0	1	3.8
Nurses	1	0	0.0	0	0.0	4	15.4	0	0.0	4	15.4
	2	0	0.0	0	0.0	18	69.2	0	0.0	18	69.2
	3	0	0.0	0	0.0	4	15.4	0	0.0	4	15.4

Table 4-15 Social support of participants (*n*=26) (cont.)

Source of support	Period*	Type of supportive behaviors								Total	
		ES		IS		IFS		AS			
		n	%	n	%	n	%	n	%	n	%
Public health	1	0	0.0	0	0.0	1	3.8	0	0.0	1	3.8
personnel	2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	3	0	0.0	0	0.0	2	7.7	0	0.0	2	7.7

* Period 1= Pregnancy period, 2 = 1 week after delivery, 3 = 1 month after delivery
One person could select more than one choice
ES = Emotional Support, IS = Instrumental Support, IFS = Information Support, AS = Appraisal Support

2. Comparisons of the mean scores of outputs and outcomes

Comparison of mean scores of outputs and outcomes at each time point (including before the intervention, one week after delivery, and one month after delivery) were analyzed by using one way repeated measures ANOVA.

2.1 Comparisons of the mean scores of outputs at each time point

1) Prenatal and postnatal care knowledge

The prenatal and postnatal care knowledge (PCK) mean score increased from before the intervention ($\overline{X}$ =34.42) both at one week after delivery ($\overline{X}$ =39.65) and one month after delivery ($\overline{X}$ =37.84). The results revealed that the PCK mean scores were statistically significant difference in at least one pair of the three time points (*F*=7.486; *df*=2, 50; *p*-value=.001) (see Table 4-16). Comparison of mean scores of PCK before the intervention, one week after delivery, and one month after delivery were presented that there were significant difference between the first and the second time (Time 1 vs. Time 2, *p*-value=.005), and the first and the third time (Time 1 vs. Time 3, *p*-value=.071); but the second and the third time were not significantly different (Time 2 vs. Time 3, *p*-value=.440) (see Table 4-17). The line graph represented the changes of PCK mean scores at three time periods indicating the increased PCK mean scores from Time 1 to Time 2 and Time 3 (Figure 4-7). Therefore, it can be concluded that the nursing intervention in this model improved the PCK score after the intervention, more specifically at one week after delivery.

Table 4-16 Repeated Measures ANOVA of prenatal and postnatal care knowledge

Sources of variation	SS	*df*	MS	*F*	*p*-value
Within subject					
Time	367.000	2	182.50	7.486	.001
Within subject error	1225.667	50	24.51		

Table 4-17 Pairwise comparisons of PCK mean scores

		T1		T2	
	$\overline{X}$ +*SD*	Mean difference	*p*-value	Mean difference	*p*-value
Before the intervention (T1)	34.42+6.15				
One week after delivery (T2)	39.65+7.22	5.23	.005		
One month after delivery (T3)	37.84+7.11	3.42	.071	-1.81	.440

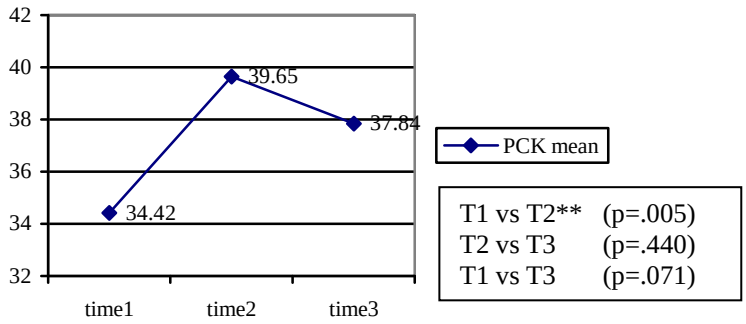


Figure 4-7 Comparison of the PCK mean scores

2) Attitude toward fatherhood

The attitude toward fatherhood (ATF) mean score increased from before the intervention ($\overline{X}$ =59.57) both at one week after delivery ($\overline{X}$ =61.34) and one month after delivery ($\overline{X}$ =62.42). The results revealed that the ATF mean scores were statistically significant difference in at least one pair of the three time points (*F*=4.864; *df*=2, 50; *p*-value=.012) (see Table 4-18). Comparison of mean scores of ATF before the intervention, one week after delivery, and one month after delivery were presented that there was significant difference between the first and the

third time (Time 1 vs. Time 3, *p*-value=.021); but there were not significantly different the first and the second time (Time 1 vs. Time 2, *p*-value=.116), and the second and the third time (Time 2 vs. Time 3, *p*-value=.840) (see Table 4-19). The line graph represented the changes of ATF mean scores at three time periods indicating the increased ATF mean scores from Time 1 to Time 2 and Time 3 (Figure 4-8). Therefore, it may be inferred that the nursing intervention in the father involvement model can improve the ATF score after the intervention, more specifically at one month after delivery, but cannot improve the ATF score at one week after delivery when compared with before the intervention.

Table 4-18 Repeated Measures ANOVA of attitude toward fatherhood

Sources of variation	**SS**	***df***	**MS**	***F***	***p*-value**
Within subject					
Time	107.385	2	53.692	4.864	.012
Within subject error	551.949	50	11.039		

Table 4-19 Pairwise comparisons of ATF mean scores

		T1		**T2**	
	$\overline{X}$ +***SD***	**Mean difference**	***p*-value**	**Mean difference**	***p*-value**
Before the intervention (T1)	59.57+5.37				
One week after delivery (T2)	61.34+5.26	1.77	.116		
One month after delivery (T3)	62.42+5.31	2.85	.021	1.08	.840

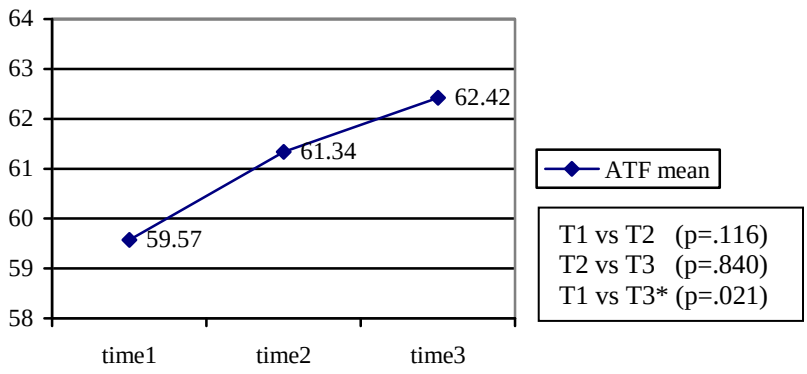


Figure 4-8 Comparison of the ATF mean scores

3) Father competence

The mean score of father competence (FC) increased from before the intervention ($\overline{X}$ =60.61) both at one week after delivery ($\overline{X}$ =64.69) and one month after delivery ($\overline{X}$ =67.30). The results revealed that the FC mean score were statistically significant difference in at least one pair of the three time points (*F*=14.175; *df*=1.298, 32.454; *p*-value<.001) (see Table 4-20). Comparison of mean scores of FC before the intervention, one week after delivery, and one month after delivery were statistically significant difference at the .05 level (Time 1 vs. Time 2, *p*-value=.033; Time 1 vs. Time 3, *p*-value=.001; and Time 2 vs. Time 3, *p*-value<.001) (see Table 4-21). The line graph represented the changes of FC mean scores at three time periods indicating the increased FC mean scores from Time 1 to Time 2 and Time 3 (Figure 4-9). Therefore, it may be inferred that the nursing intervention in the father involvement model can improve the FC score after completing the intervention.

Table 4-20 Repeated Measures ANOVA of father competence

Sources of variation	SS	*df*	MS	*F*	*p*-value
Within subject					
Time	591.487	1.298	455.642	14.175	<.001
Within subject error	1043.179	32.454	32.144		

Table 4-21 Pairwise comparisons of the FC mean scores

	$\overline{X}$ +***SD***	**T1**		**T2**	
		Mean difference	***p*-value**	**Mean difference**	***p*-value**
Before the intervention (T1)	60.61+8.12				
One week after delivery (T2)	64.69+7.11	4.08	.033		
One month after delivery (T3)	67.30+7.24	6.69	<.001	2.61	.001

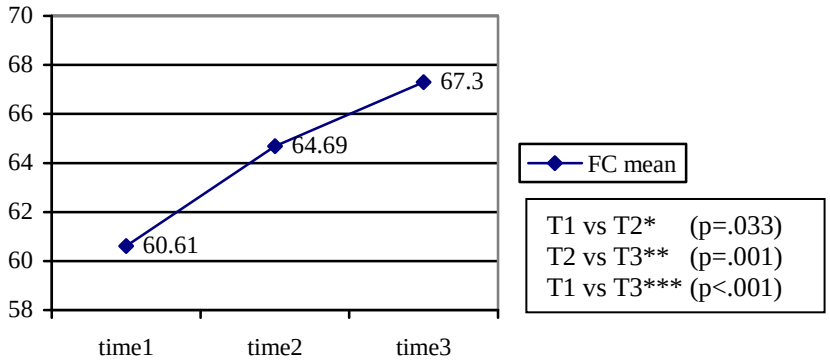


Figure 4-9 Comparison of the FC mean scores

4) Father involvement

The mean score of father involvement (FI) with four subscales (personal care activities, household activities, infant care activities, occupational activities, and social and community activities) and baby care subscale of FI increased from before the intervention ($\overline{X}$ =72.54 and 11.31) both at one week after delivery ($\overline{X}$ =88.85 and 13.58) and one month after delivery ($\overline{X}$ =86.89 and 19.15). The results revealed that the FI mean scores were statistically significant difference in at least one pair of the three time points (F=58.346; df=2,50; p-value<.001 for four subscales of FI and F=209.938; df=2,50; p-value<.001 for baby care subscale of FI) (see Table 4-22).

For four subscales of FI**,** comparison of mean scores before the intervention, one week after delivery, and one month after delivery were presented that there were significant difference between the first and the second time (Time 1 vs. Time 2, p-value<.001), and the first and the third time (Time 1 vs. Time 3, p-

value<.001); but the second and the third time were not significantly different (Time 2 vs. Time 3, *p*-value=.620) (see Table 4-23). The line graph represented the mean score changes of FI with four subscales at three time periods indicating the increased mean scores from Time 1 to Time 2 and Time 3 (Figure 4-10).

For the baby care subscale of FI, comparison of mean scores at 2-3 days after delivery, one week after delivery, and one month after delivery were statistically significant difference at the .05 level (Time 1 vs. Time 2, *p*-value<.001; Time 1 vs. Time 3, *p*-value<.001; and Time 2 vs. Time 3, *p*-value<.001) (see Table 4-23). The line graph represented the mean score changes of baby care subscale of FI at three time periods indicating the increased the mean scores from Time 1 to Time 2 and Time 3 (Figure 4-10).

Therefore, it can be concluded that the nursing intervention in the father involvement model can improve the FI score after completing the intervention.

Table 4-22 Repeated Measures ANOVA of father involvement

Sources of variation	SS	*df*	MS	*F*	*p*-value
FI with 4 subscales					
Within subject					
Time	4121.872	2	2060.936	58.346	<.001
Within subject error	1766.128	50	35.323		
Baby care subscale					
Within subject					
Time	847.718	2	423.859	209.938	<.001
Within subject error	100.949	50	2.019		

Table 4-23 Pairwise comparisons of the FI mean scores

	$\overline{X}$ +*SD*	T1		T2	
		Mean difference	***p*-value**	**Mean difference**	***p*-value**
FI with 4 subscales					
Before the intervention (T1)	72.54+6.63				
One week after delivery (T2)	88.85+6.30	16.31	<.001		
One month after delivery (T3)	86.89+6.68	14.35	<.001	-1.96	.620
Baby care subscale					
2-3 days after delivery (T1)	11.31+2.29				
One week after delivery (T2)	13.58+1.88	2.27	<.001		
One month after delivery (T3)	19.15+2.19	7.84	<.001	5.57	<.001

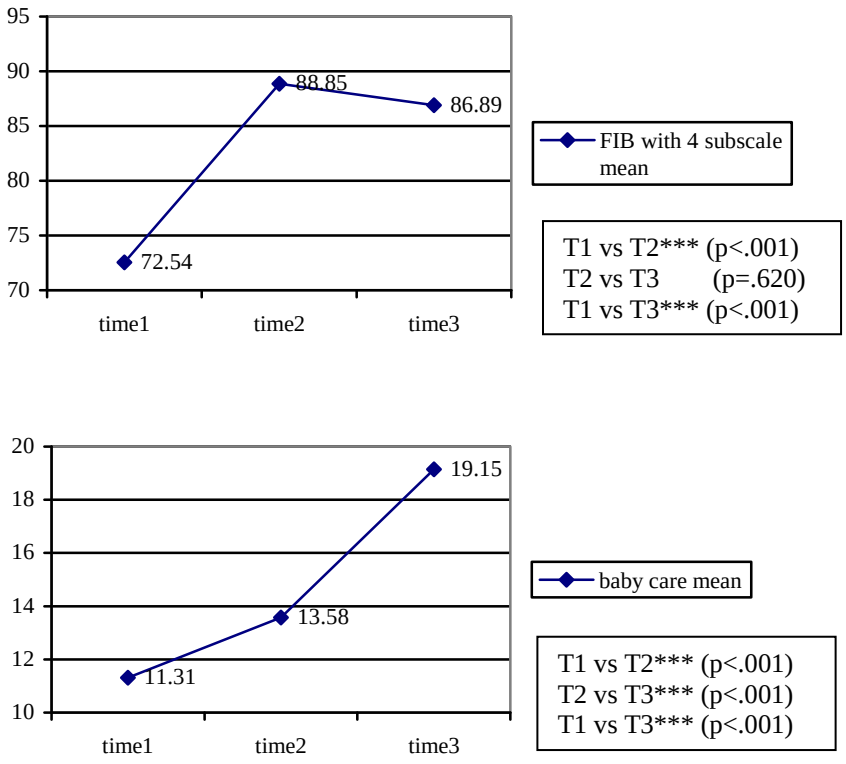


Figure 4-10 Comparison of the FI mean scores

2.2 Comparisons of the mean scores of outcomes at each time point

1) Marital relationship

The marital relationship (MR) mean score increased from before the intervention ($\overline{X}$ =48.00) both at one week after delivery ($\overline{X}$ =50.57) and one month after delivery ($\overline{X}$ =51.88). The results revealed that the MR mean scores were statistically significant difference in at least one pair of the three time points (*F*=8.596; *df*=2, 50; *p*-value=.001) (see Table 4-24). Comparison of mean scores of MR before the intervention, one week after delivery, and one month after delivery were presented that there was significant difference between the first and the third time (Time 1 vs. Time 3, *p*-value=.002) but the first and the second time (Time 1 vs. Time 2, *p*-value=.057), and the second and the third time (Time 2 vs. Time 3, *p*-value=.409) were not significantly different (see Table 4-25). The line graph represented the changes of MR mean scores at three time periods indicating the increased MR mean scores from Time 1 to Time 2 and Time 3 (Figure 4-11). Therefore, it may be inferred that the nursing intervention in father involvement model can improve the MR score after completing the intervention, more specifically at one month after delivery, but did not improved the MR score at one week after delivery when compared with before the intervention.

Table 4-24 Repeated Measures ANOVA of marital relationship

Sources of variation	SS	*df*	MS	*F*	*p*-value
Within subject					
Time	203.154	2	101.577	8.596	.001
Within subject error	590.847	50	11.817		

Table 4-25 Pairwise comparisons of the MR mean scores

	$\overline{X}$ +*SD*	T1		T2	
		Mean difference	***p*-value**	**Mean difference**	***p*-value**
Before the intervention (T1)	48.00+5.75				
One week after delivery (T2)	50.57+6.09	2.57	.057		
One month after delivery (T3)	51.88+5.19	3.88	.002	1.31	.409

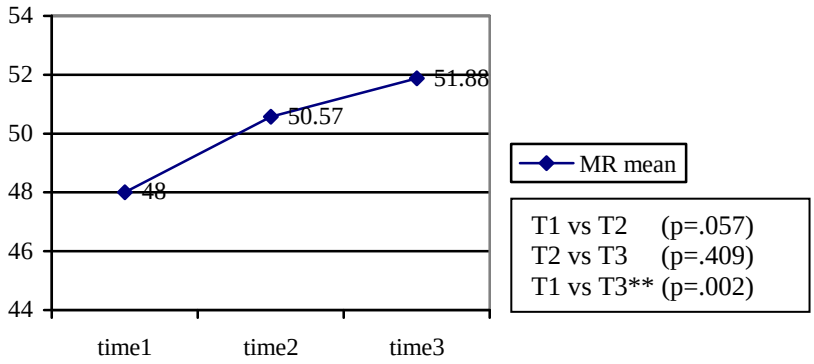


Figure 4-11 Comparison of the MR mean scores

2) Father-child attachment

The father-child attachment (FCA) mean score increased from before the intervention ($\overline{X}$ =67.80) both at one week after delivery ($\overline{X}$ =77.71) and one month after delivery ($\overline{X}$ =80.00). The results revealed that the FCA mean scores were statistically significant difference in at least one pair of the three time points (*F*=30.944; *df*=1.387, 34.664; *p*-value<.001) (see Table 4-26). Comparison of mean scores of FCA before the intervention, one week after delivery, and one month after delivery were presented that there were significant difference between the first and the second time (Time 1 vs. Time 2, *p*-value<.001), and the first and the third time (Time 1 vs. Time 3, *p*-value<.001); but the second and the third time was not significantly different (Time 2 vs. Time 3, *p*-value=.955) (see Table 4-27). The line graph represented the changes of FCA mean scores at three time periods indicating the increased FCA mean scores from Time 1 to Time 2 and Time 3 (Figure 4-12).

Therefore, it may be inferred that the nursing intervention in the father involvement model can improve the FCA score after completing the intervention when comparing with before intervention.

Table 4-26 Repeated Measures ANOVA of father-child attachment

Sources of variation	**SS**	***df***	**MS**	***F***	***p*-value**
Within subject					
Time	2187.702	1.387	1577.789	30.944	<.001
Within subject error	1767.485	34.664	50.989		

Table 4-27 Pairwise comparisons of the FCA mean scores

		T1		**T2**	
	$\overline{X}$ +***SD***	**Mean difference**	***p*-value**	**Mean difference**	***p*-value**
Before the intervention (T1)	67.80+7.40				
One week after delivery (T2)	77.71+6.05	9.91	<.001		
One month after delivery (T3)	80.00+7.18	12.20	<.001	2.29	.955

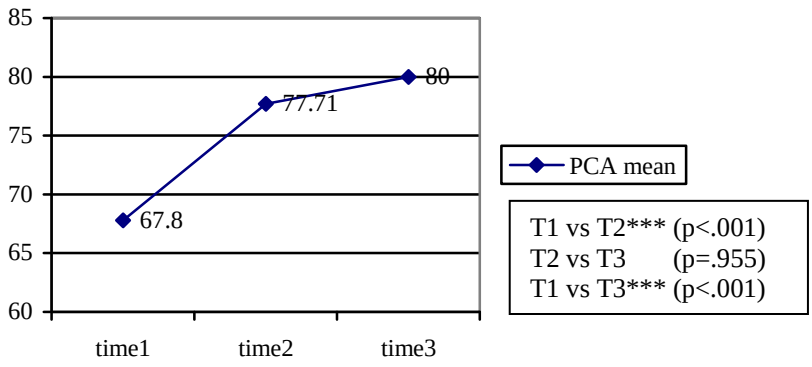


Figure 4-12 Comparison of the FCA mean scores

3. Summary of the father involvement model

According to all parts of the model development, the father involvement model was constructed based on the Neuman Systems Model as the conceptual framework through the research and development process. The significant components in this model were extracted and summarized via the four phases of the study including situation analysis, planning of model development, model implementation, and model evaluation. As a guide for promoting the father involvement, this model was emerged from three significant components including the inputs, process, and outputs. First, the inputs of the model which were used to put into the nursing intervention consisted of four components including human resources, materials, time, and management. The human resources are the set of individuals who participated in the model. This covered the fathers-to-be/fathers**,** pregnant women/mothers, and nurses. The fathers-to-be/ fathers and pregnant women/mothers needed to participate into all sections of nursing intervention while the nurses are as the facilitator for promoting the fathers' involvement. The materials of this model were composed of the nursing intervention plan and fathers' booklet. The nursing intervention plan and fathers' booklet were used as the instrument for promoting the fathers' involvement through the primary and secondary prevention. Time is the periods used to participate in the nursing intervention. Four periods including the 32-36 weeks of gestational age, 36-40 weeks of gestational age, 2-3 days after delivery, and 1 week after delivery were used to provide the nursing intervention. The management of this model is that the strategies for increasing the successfulness of the father involvement model. This covered risk assessment of fathers-to-be/fathers and their partners, planning for solving the problems and barriers, coordination of teamwork to organize in the father involvement model, and monitoring and evaluation the problems and barriers.

Second, the process of this model is significant that required transforming the inputs into the outputs. The primary prevention including promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period and monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period was conducted to prepare the fatherhood readiness for fathers-to-be. The intervention helped fathers-to-be to increase knowledge and understand the father role and function

for strengthening belief system, life style, and socioculture of family system as a flexible line of defense. An increasing ability to function as a good father indicated an intact normal line of defense for family system. After that, the secondary prevention including promoting the father involvement in the care for postnatal mother and newborn and monitoring of problems and barriers regarding the care for postnatal mother and newborn were conducted. The intervention helped to increase the fathers' skills in care for their partners and babies after delivery as strengthening the lines of resistance in order to maintain the family wellbeing. To increase the successfulness of the model, the nursing intervention was revised via three main steps including action for implementation, re-assessment, and re-planning.

Final, the effectiveness of the father involvement model was evaluated from the outputs and outcomes of the model. The outputs included prenatal and postnatal care knowledge, attitude toward fatherhood, father competence and father involvement while the outcomes included marital relationship and father-child attachment. The elements of the father involvement model are present in below figure.

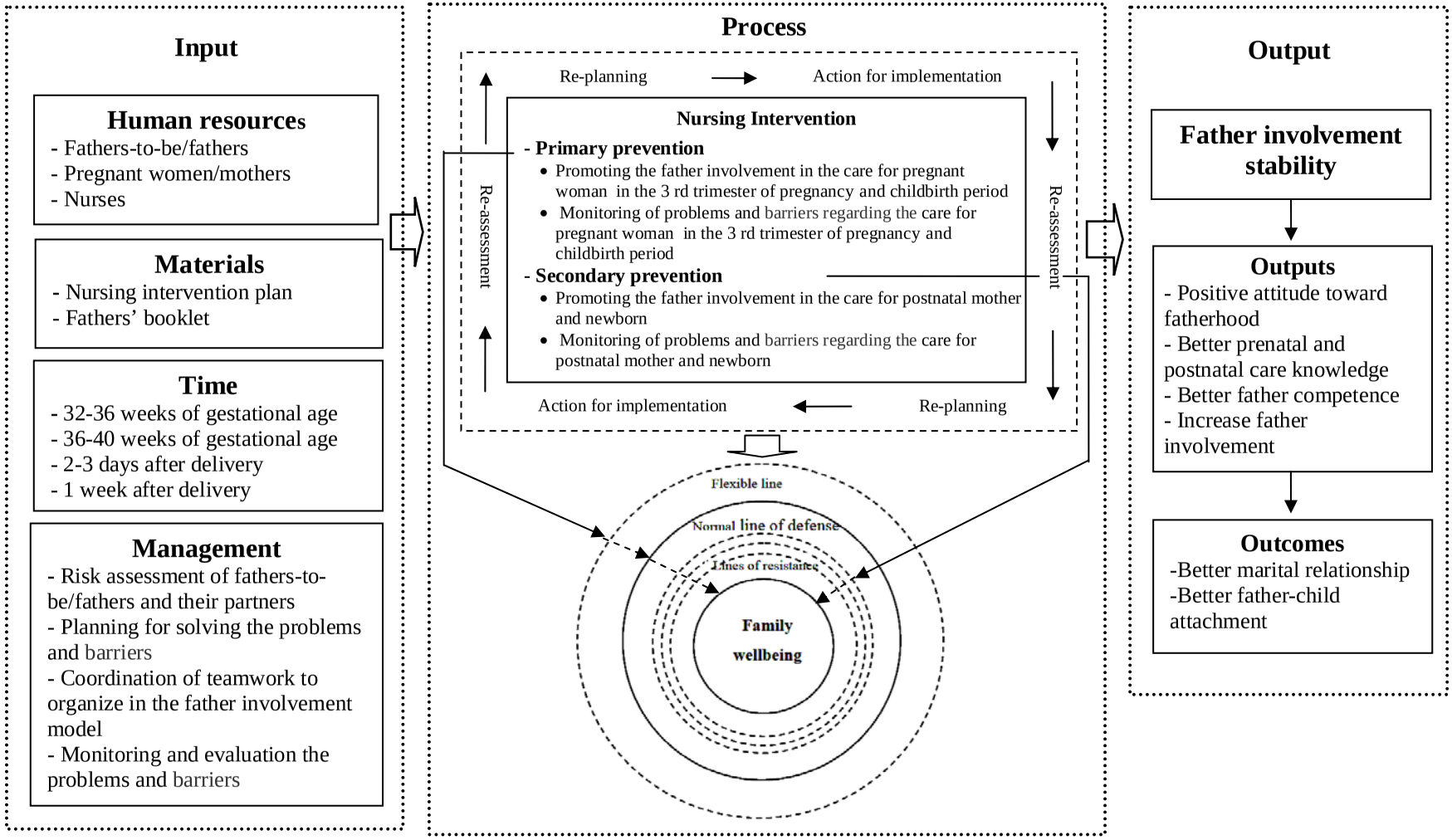


Figure 4-13 The model of father involvement during pregnancy and neonatal period

CHAPTER V
DISCUSSION

The current study was the research and development study and mainly aimed at developing the father involvement model during pregnancy and neonatal period base on the Neuman Systems Model as a framework. The collecting data in this study used both quantitative and qualitative research methods. All questionnaires were distributed to the fathers-to-be/fathers to complete by themselves in phase 1: situation analysis and phase 4: model evaluation and analyzed by the descriptive statistics, correlation coefficients, backward multiple regressions, and repeated measures ANOVA. The qualitative data were assessed using individual in-depth interviews and discussion and analyzed by the means of content analysis. The participants were the fathers-to-be/fathers, pregnant women/mothers, nurses, and village health volunteers in Ban Bueng District, Chon Buri Province. The present study was conducted from May 2012 to January 2013. The discussion of the research findings is described in four parts according to the aims of the study as below.

1. Characteristics of fathers' involvement
2. Factors influencing the involvement of fathers
3. The properties of nursing intervention in the father involvement model
4. The outputs and outcomes of the father involvement model
5. Problems and obstacles
6. Strengths of the study
7. Weaknesses of the study

5.1 Characteristics of Fathers' Involvement

The purpose of this part was to gain a better understanding of the fathers' involvement in Thai samples which was assessed by using both questionnaires and in-depth interviews in the situation analysis phase. The results of quantitative method demonstrated the mean score of involvement of fathers-to-be with four subscales (including the personal care activities, household activities, occupational activities, and social and community activities) and of fathers with five subscales which was added the infant care activities were a moderate level (mean 71.77 the total score of 112; *SD*=7.10 and 88.14 of the total score of 136; *SD*=12.16, respectively (see Table 4-4). Inspection of each subscale of fathers' involvement was found a moderate level of all subscales of fathers-to-be and fathers.

Although the mothers in the current study increased participation in the labor force (63.6% of employment) and the structure of Thai families was changed from extended families (48.5%) to nuclear families (51.5%), the mean scores of both fathers-to-be and fathers with four subscales were similar at moderate level. Since most fathers-to-be/fathers in this study were low socioeconomic status (above 80% educated with senior high school or less and an average income of 12,375.68 baht per month), they needed to work hard to increase family income. Therefore, they had less free time to involve in the other tasks such as child care and house work. Moreover, over 50% of them did not receive the information support from health care providers. This may affect the knowledge, attitude, and skill of fathers to involve in child care.

Similar to previous studies conducted in Thailand, the results indicated approximately 50% of men involved in care for their partners during pregnancy (Porntragoonthub, 2008). For childrearing, the Ministry of Public Health (2007) reported that the rate of fathers' participation in the activities to encourage child development in the whole Kingdom of Thailand was 57.5% and the lowest of rate was in Northeastern area (43.6%) where most samples in this study came from. Moreover, congruent with a prior study conducted in Turkey indicated there were no significant differences in all subscales between fathers-to-be and fathers (Sevil & Özkan, 2009). The mean scores of Turkish fathers-to-be and fathers were a moderate level in personal care, baby care, and social and community activities, except occupational activities with a high level.

On the other hand, unlike previous studies of western culture, McVeigh and college (2002; 2005) presented the increasing involvement of fathers with a high level of mean scores was in aspects of child care, occupational, and household responsibilities while the personal care and social and community activities were reduced. Consistent with the study in Finland and Sweden, the fathers share the baby care experience as equal parents (Kaila-Behm & Vehviläinen-Julkunen, 2000) and support their partners during pregnancy and childbirth (Ny, Plantin, Dejin-Karisson, & Dykes, 2008). Furthermore, becoming a father needs to reorganize their daily life and reduce some social activities to involve as the big responsibilities with their partners for childrearing and increase the household activities (Fägerskiöld, 2008; Ny et al., 2008). Therefore, in the transitional period, fathers-to-be/ fathers are expected that they must reorganize and balance between the father role and function and other activities in the past to increase the involvement as a good parent.

According to the cultural transformations, the qualitative results in this study pointed that the perceptions of Thai people have changed from a father as primary earners to an involved father. This method provided clearly understanding about the father involvement in Thai current situation that fathers should participate in term of budget preparation, sharing the household chores, managing in their social life, and caring for pregnant women/mothers. However, the fathers-to-be/fathers had different views of the baby care and daily life activities with other stakeholders. The fathers-to-be/fathers viewed that it was difficult to care for baby and they should have the free time for normal activities in daily life while other stakeholders thought the fathers should participate in baby care and reorganize their daily life. These findings have relation to the concept of involved fathers who should participate in the daily tasks of child rearing and nurturing and share equally in their family responsibilities such as household chores (Gerson, 1997). Congruent with the needs of Thai mothers in a previous study, the mothers requested the fathers support in the postnatal period such as sharing some household chores but they were also worry that the fathers were not competent and did not know about baby care (Theerakulchai, 2004). However, requesting that the fathers should share the household chores and participate in baby care may not be successful because some people, especially fathers perceived that the housework was not the responsibility of men.

5.2 Factors Influencing the Involvement of Fathers

This part discussed the factors influencing the fathers' involvement based on the stressor concept of the Neuman Systems Model by using both the quantitative and qualitative methods. It is divided into two parts as described below.

5.2.1 Factors associated with the involvement of fathers

The quantitative findings indicated that most factors from intrapersonal stressors (such as prenatal and postnatal care knowledge**,** attitude toward fatherhood, and father competence) and interpersonal stressors (such as marital relationship and father-child attachment) had positive association with father involvement. The factors associated with the father involvement are described as follows.

5.2.1.1 Intrapersonal stressors

In this study, the factors from the intrapersonal stressors which had positive association with the father involvement consisted of fathers' age, prenatal and postnatal care knowledge**,** attitude toward fatherhood, and father competence**.** These factors are the internal environmental forces occurring within the boundary of the client system and have a high effect on the ability of the client system. The qualitative results also pointed the other factors affecting the fathers' involvement such as parenting responsibilities and an equal of gender roles of fathers. The factors from intrapersonal stressors associated with the father involvement are described as follows.

5.2.1.1.1 Prenatal and postnatal care knowledge

The quantitative findings in this study revealed the prenatal and postnatal care knowledge mean scores of fathers-to-be and fathers were a moderate level. It is possible that about 50% of this sample was first time fathers in nuclear families (51.5% vs. 48.5% of extended families) and over 50% of them did not receive the information support from health care providers. Therefore, they had not got the health care information and no experiences in the care for their partner and babies in both prenatal and postnatal period. Congruent with the qualitative findings in this study, most fathers had less health care information than mothers because of the less support such as health education and role model. This is similar to the findings by Theerakulchai (2004) supported that because the father did not know about baby care, the mothers needed them to do some household chores instead of caring for the babies.

Moreover, it also indicated the positive relationship between the prenatal and postnatal care knowledge and father involvement. It means that the fathers who had better understanding of care for their partners and babies also had better involvement during pregnancy and after childbirth as a good father. Similar to the previous studies in Thailand and western countries, they have consistently supported that the knowledge in care for their partners and babies associated with the father's role performance (Nirach, 1999), the needs of participation in care for their partners with natural childbirth (Suwansujarid & Suppasri, 2013) and the fathers' involvement (Cabrera et al., 2008; Hoza, et al., 2000). However, these findings differ from the findings by Ouichareon (2005), who reported no significant relationship between the fathers' knowledge and participation in child care. To sum up, the significant information about prenatal and postnatal care should also be provided for the fathers to support for their partners and babies.

5.2.1.1.2 Attitude toward fatherhood

According to quantitative results, attitude toward fatherhood mean scores were a high level for both fathers-to-be and fathers. It is possible that the participants in the present study were the first time fathers; thus, they also felt love, pride, and joy toward their babies. These scores were closed to the mean score of fathers with this scale in the western culture (Mc Bride & Rime, 1997; Schoppe-Sullivan, Brown, Cannon, Mangelsdorf, & Sokolowski, 2008). The findings indicated that there were changes of the perception regarding the father role from traditional value to new value with involved father. In this study, it may result from increasing of the labor force participation of mothers (63.6% vs. 36.4% of unemployment) and nuclear families (51.5% vs. 48.5% of extended families).

In this study, the positive relationship between the attitude toward fatherhood and father involvement also indicated that the high level of attitude toward fatherhood led to better fathers' involvement during pregnancy and neonatal period. Congruent with the qualitative findings, it described that a positive feeling toward fatherhood was the most significant factor affecting the fathers' involvement such as care for baby and changing some inappropriate such as drinking and going to the pub or bar or party. As demonstrated in previous studies, the attitude about father role meaningfully related to the level of father involvement in Thailand

(Srisuwat, 1998; Suwansujarid & Suppasri, 2013) and western countries (Buston, 2010; McVeigh et al., 2002).

Besides, the qualitative findings indicated that the traditional gender attitude in parenthood that the fathers are the head of family unit while the mothers are responsible in child care and household tasks affected the opinion and expression of Thai fathers, especially non-working mothers. This assumption is associated with the findings in Thailand by Theerakulchai (2004) describing that most mothers accepted that women must take on the roles of mother and wife and perceived that the baby care and housework were the full responsibilities of women rather than men, even though they returned to work because they were more appropriate in care for baby than men. Similar to several investigations, the results supported that the traditional gender attitude in some culture influenced on the fathers' attitude or feelings toward fatherhood (Sanderson & Thompson, 2002) and fathers' involvement (Raojutitham, 2006; Singh & Ram, 2009).

5.2.1.1.3 Father competence

The quantitative finding from the current study presented that the father competence mean scores of both fathers-to-be and fathers were a moderate level. According to the assumption of competence, the parenting competence is the abilities to manage the demands of parenting (Ngai et al., 2007) meaning that the fathers still have not enough to care for their children. Congruent with the qualitative result, the fathers described because of the constant and careful activities of baby care, the caregivers need to dedicate their time and energy into their babies. Thus, they felt frustrated and stressful to care for baby. Since most participants in this study were low socioeconomic status, they needed to work hard and had less free time to learn in the parenting program. There is similar to a prior study describing that since the fathers were not competent in baby care, the mothers also requested them to share some house work (Theerakulchai, 2004). Not surprisingly, the mean scores of fathers in this study had lower than that of study conducted in the western culture such as the study by Gibaud-Wallston (1977) (mean=72.03) and the study by Ferketich and Mercer (1995) (mean=78.43 and 74.00 for fathers with experienced and inexperienced, respectively) because they had no experience in childrearing and about 50% of them did not received the health care information from health care providers.

Furthermore, there was the positive relationship between the father competence and father involvement. It means that the fathers who perceive themselves high competent in father role are likely to be more involve as a good father during pregnancy and postnatal period. Congruent with previous studies, the fathers' competence is directly and indirectly related to the positive involvement of fathers (Fagan & Barnett, 2003; Schoppe-Sullivan et al., 2008). Additionally, the father competence was reported to have a positive association with a healthy marital relationship (Ohan et al., 2000) and self-esteem (Gibaud-Wallston, 1977), and a negative correlation with fathers' depression (Rogers & Matthews, 2004) and child misbehavior (Johnston & Mash, 1989). Fathers who have a low sense of father competence were presumed to have a low self-esteem and experience more anxiety and depression; therefore, leading to a low level of father involvement. Therefore, strengthening the perception of father competence can improve their performance as parents and it can be used as a parenting indicator for measuring the effectiveness of the programs.

5.2.1.1.4 Father' age

A significant and positive relationship between the fathers-to-be/fathers' age and the father involvement was not unexpected in the current study. The older fathers had a high level of the fathers' involvement during pregnancy and postnatal period. This relationship may have occurred because most fathers with older have more emotional maturity and responsibility to fatherhood. In addition, they have higher income and are more able to obtain leave from the jobs for supporting the mothers than the younger fathers. Congruent with a previous study, McVeigh and colleagues (2002) reported younger fathers showed less likely to maintain involvement while older fathers showed particularly the high level of father involvement. On the other hand, the study by Castillo and Fenzl-Crossman (2010) is inversely consistent with this study finding that fathers' age was negative related to the father involvement. In addition, some studies reported no significant correlation between the fathers' age and father participation in childrearing (Cabrera et al., 2009; Carter & Speizer, 2005; Cook, Jones, Dick, & Singh, 2005; Garfield & Chung, 2006; Raojutitham, 2006; Supavititpatana, 1993) and a study reported no significant difference between the fathers' age and all subscales of father involvement (Sevil & Özkan, 2009).

However, the present study found that the educational level of fathers had no association with the father involvement**.** This is consistent with several investigations that provided additional evidence (Cabrera et al., 2009; Garfield & Chung, 2006; Gavin et al., 2002; Johnson, 2001; Supavititpatana, 1993). Hence, it suggests that the fathers-to-be/fathers can do the function as a good parent although there is difference of educational level of fathers.

5.2.1.2 Interpersonal stressors

In the current study, the factors from the interpersonal stressors which had positive association with the father involvement consisted of marital relationship and father-child attachment. These factors are the external environmental forces occurring outside the boundary of the client system at proximal range. They less affected the fathers' level of involvement in their families than the factors of intrapersonal stressors. In addition, the qualitative results also pointed the other factors affecting the fathers' involvement such as social support for the fathers. The factors from the interpersonal stressors associated with the father involvement are described as follows

5.2.1.2.1 Marital relationship

As described in quantitative analysis, the marital relationship mean scores were a high level. Since the marital relationship is an indicator of the couple's adaptation, this indicated that the fathers-to-be/fathers in this study could adapt with their partners and led to view the couple in a romantic relationship. Compared with the study conducted in western culture, the mean scores (mean = 46.23 and 48.41 for fathers-to-be and fathers, respectively) were close to those of the study by Busby and colleagues (1995) (mean = 48.00). It is possible that most participants in this study were the first few years of marriage and also received all support from their partners, especially love and understanding; thus, the marriage was also happy and functional. However, these scores had lower mean scores than the study by Walker-O'Neal and Futris (2011) (mean = 52.71). These findings suggest that the marital relationship should still be improved to increase the higher score and maintain satisfaction and extend the duration of healthy relationship.

The marital relationship was found to be positively associated with the fathers' involvement. It means that if the fathers and mothers have

the romantic relationship, the fathers will be involved with child care. On the other hand, if the fathers have a conflict family quality and do not reside in the same home, they will have a low level of involvement with their partners. Fortunately, the qualitative findings in this study confirm and clarify the quantitative results that the healthy couple relationship is an important factor occurring among father and mother, which influence on the positive accessibility of fathers to their partners and babies such as do not be interested in care for their partners and babies, non-intention to their over time of work, and socializing with their friends. These findings support previous literature in Thailand and other culture founding that the high level of the marital relationship let to better the fathers' involvement in childrearing (Castillo & Fenzl-Crossman, 2010; Sanderson & Thompson, 2002). Moreover, the marital relationship was a predictor of the fathers' involvement (Carter, 2002; Coley & Hernandez, 2006; Gavin et al., 2002; Johnson, 2001; Raojutitham, 2006; Srissuwat, 1998). In the current study, unlike some studies found the couple relationship was not related to the fathers' involvement in childrearing (Cabrera et al., 2008; Feldman, 2000). In addition, with the arrival of a first child, it leads to a decrease in new parents' well-being due to increasing responsibilities of both fathers and mothers (Keizer, Dykstra, & Poortman, 2010).

5.2.1.2.2 Father-child attachment

Interestingly, the mean scores of father-child attachment were a high level. This indicates that the fathers have high quality of relationship with their babies since most participants were the first time fathers and also had good attitude toward fatherhood and healthy marital relationship. However, the scores (mean=70.61 and 74.06 for fathers-to-be and fathers, respectively) were lower than those of Australian fathers (mean=79.02) (Condon et al., 2008). Thus, the findings suggest that an intervention should still design to improve and retain stability of the father-child attachment.

Furthermore, the study found that the father-child relationship was positively associated with the father involvement. It means that if the fathers have a healthy relationship with the baby, they will function as good parent. On the other hand, if the fathers have a conflict with the baby, they will have a low level of involvement, especially baby care activities. In the current, it is important to note

that the relationship of the fathers (*r*=.315) is relatively higher than that of the fathers-to-be (*r*=.279) since based upon the assumption of attachment, this is the product of the fathers' response to infant signals for proximity and contact. Additionally, the qualitative findings in this study also pointed that the fathers' positive feeling toward their babies was an important factor. It has influence on the positive interaction of fathers with their babies and can reduce some social activities such as no drinking and no party with his friends because the fatherhood needs to have a greater responsibility to care for their babies with great pride and happiness. Furthermore, the correlation coefficient between father-child relationship and fathers' involvement in this study supports previous findings conducted in Thailand (Ouichareon, 2005) and western culture (Brown, Mangelsdorf, & Neff, 2012; Cow, Owen, Henderson, & Margand, 1992). It has been noted that the father-child attachment is an essential adaptation to develop good fathering behaviour.

However, this study found that the family characteristics had no association with the father involvement**.** Consistent with previous investigations, the fathers' involvement had no association with the family of original (Johnson, 2001; Srissuwat, 1998). Hence, it suggests that the fathers-to-be/fathers can do the function as a good parent although there is difference of family characteristics.

5.2.1.3 Extrapersonal stressors

In this study, most factors from the extrapersonal stressors such as fathers' income and occupational status and mothers' occupational status had no association with the father involvement**.** These factors are the external environmental forces occurring outside the boundary of the client system at distal range, relatively lowly affect the fathers' involvement. However, the qualitative results also pointed the other factors affecting the fathers' involvement such as accessibility to prenatal health education, no father involvement policy in labor and delivery care unit, and no paternity leave. Several investigations have provided additional evidence that the fathers' involvement had no association with fathers' income (Srissuwat, 1998; Supavititpatana, 1993) and employment (Garfield & Chung, 2006; Gavin et al., 2002; Srissuwat, 1998). Therefore, it suggests that the fathers-to-be/fathers can do the function as a good parent although there is difference of economic and occupational status.

5.2.2 Predictors of the fathers' involvement

For fathers-to-be, the regression model identified two factors including prenatal and postnatal care knowledge and attitude toward fatherhood were found to predict 31.5% of the variance in the father involvement. After childbirth, three factors including prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment were found to predict 33.2% of the variance in the father involvement. It may include that the main predictors of father involvement are the prenatal and postnatal care knowledge and attitude toward fatherhood. Therefore, it means that if the fathers-to-be/fathers have a better understanding about prenatal and postnatal care and positive attitude toward fatherhood, they will highly participate in some activities during pregnancy and neonatal period such as doing the household chores and taking care for baby, and reduce some activities such as socializing with friends and paying attention to personal activities.

According to the stressor concept of the Neuman Systems Model, the prenatal and postnatal care knowledge and attitude toward fatherhood are the intrapersonal stressors. The intrapersonal stressors are the internal environmental forces occurring within the boundary of the client system and have a high effect on the ability of the client system to function adequately to learn information. Therefore, if the fathers have a high level of knowledge and positive attitude, they will also have a high level of fathers' involvement. Consistent with the learning domains (Bloom, 1975), the adequate prenatal and postnatal care knowledge is useful for the fathers-to-be/fathers to understand and use information to care for their partners and babies such as select healthy food, complication and care, signs preceding labor, and care of discomfort. Additionally, the positive attitude toward fatherhood is the impetus for action or practice of fathers-to-be/fathers as a good parent.

These results from the current study are confirmed by a previous finding in Thailand which found that revealed that the fathers-to-be' knowledge of and attitude toward natural childbirth were predictors of the fathers-to-be' needs for participation in care of their partners during childbirth (Suwansujarid & Suppasri, 2013). Interestingly, the father-child attachment in this study was added in the regression model of fathers with non-significance, congruent with the study by Ouichareon (2005). It is possible that the fathers and their babies start to directly interact with feeling of love. Moreover,

some studies found that the fathers' attitude toward sex roles and marital relationship were significant predictors influencing on the fathers' involvement in child care (Raojutitham, 2006).

In conclusion, these findings demonstrated that promoting attitude toward fatherhood and improving prenatal and postnatal care knowledge could increase the father involvement during pregnancy and neonatal period. However, when considering the mean scores of three predictors, the prenatal and postnatal care knowledge is only a moderate level while attitude toward fatherhood and father-child attachment had a high level. In this sample, it demonstrates that there is the value change from the traditional gender role to involve role of fathers. As the results, the fathers gradually increase their involvement in household chores and child care although the mothers are generally still responsible for childrearing. To take advantage of this opportunity, it can conclude that prenatal and postnatal care knowledge is a crucial factor for this sample in order to encourage the fathers' involvement during pregnancy and neonatal period.

In the situation analysis of this research setting, the intrapersonal stressors surrounding the family system such as prenatal and postnatal care knowledge and attitude toward fatherhood play a major role influencing the fathers' involvement. Two factors were used to create the main strategies in the nursing intervention of the father involvement model during pregnancy and neonatal period. The interpersonal stressors such as marital relationship and extrapersonal stressors such as educational status and income are the external environmental interaction forces occurring outside the boundary of the client system at proximal and distal range, relatively. The findings indicated that the factors of interpersonal stressors had less an effect on the fathers' involvement than those of intrapersonal stressors while had more effect on the fathers' involvement than those of extrapersonal stressors. Therefore, the results of these relationships would be useful as the strategies of the nursing intervention plan in the father involvement model including the factors from intrapersonal and interpersonal stressors.

5.3 The Properties of Nursing Intervention in the Father Involvement Model

In the current study, the nursing intervention in the father involvement model was created through the framework of the study with the Neuman Systems Model and results of situation analysis. This nursing intervention supports the parental school project of Ministry of Public Health, Thailand and the health political initiatives on the paternity leave to facilitate the fathers' involvement from the period of pregnancy until after childbirth with active care for their partners and children. Based on the Neuman Systems Model, the nursing intervention in this study was accomplished through the primary and secondary prevention. The focus of this nursing intervention was to promote the fathers' involvement during pregnancy and neonatal period that led to the family system stability.

The primary prevention has two sections including promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period, and monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period. This is used as wellness retention of family system during pregnancy that the activities of this intervention will protect the fathers' normal line of defense by strengthening the flexible line of defense (Neuman & Fawcett, 2002; 2011). Thus, the fathers-to-be who received the information support and skill practice from nurses would have an increasing ability to function as a good father such as appropriate activities in their daily life and social life, budget preparation, and care for the pregnant women indicated an intact normal line of defense for family system.

After childbirth, the secondary prevention is instituted for the fathers with their partners. The secondary prevention included promoting the father involvement in the care for postnatal mother and newborn, and monitoring of problems and barriers regarding the care for postnatal mother and newborn via home visit program. This is used as wellness attainment of family system that the activities of this intervention will protect the basic structure by strengthening the internal line of resistance defense (Neuman & Fawcett, 2002; 2011). Thus, the fathers who participated in the education program and skill training from the nurses would have the ability to care for their partners and babies to maintain the family wellbeing.

Moreover, to get the achievement of nursing intervention program, the researcher should concern the possibility to access the program of fathers and continuation of fathers' involvement. Therefore, the method of training approach, strategies, and content in the program are important and essential depended on the assessment data collected from stakeholders in situation analysis and the needs of fathers-to-be/fathers and their partners in each section of implementation phase. In details, the significant properties of nursing intervention in this study are described as below.

5.3.1 The training approach in the nursing intervention for promoting the fathers' involvement

The qualitative findings from situation analysis described the approach method is important to participate in the health education program for fathers-to-be/fathers. To increase the number of fathers-to-be/fathers' participation, some stakeholders suggested that some sections of the intervention should be provided in the community on the holiday. Congruent with the study by Turan and colleagues (2001), the results found that there was the low attendance of fathers-to-be/fathers in the section of hospital based program because of institutional and social barriers which were not specific to fathers' involvement such as the female atmosphere of the antenatal care unit and difficulties in getting time off work. However, a section in the prenatal period in the present study should still be provided at the hospital to share their information and experience with group discussion and learn the real place for childbirth. Hence, the method of training approach for promoting the fathers' involvement during pregnancy and neonatal period was addressed both hospital and community based approaches. The hospital based approaches were used for section 1: promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period and section 3: promoting the father involvement in the care for postnatal mother and newborn. The community based approaches were used for section 2: monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period via telephone consultant and education and section 4: monitoring of problems and barriers regarding the care for postnatal mother and newborn via home visit program.

Compared with the program components in other countries, the nursing interventions were provided for father with hospital based approach (Crummette et al., 1985; Diemer, 1997; McKellar et al., 2008) or community based approach (Huebner, Tyll, Luallen, Johnston, & Thompson, 2001) or both hospital and community based approaches (Doherty et al., 2006; Turan et al., 2001). When comparing with the father preparation program in Thailand, most previous studies were conducted only hospital based approach (Mamark, 2007; Naunboonruang, 2002; Promneramit, 2005; Promtong, 2007; Seaharatanapatum, 2007). Therefore, using both hospital and community based approaches is an innovation way which is suitable for real situation of fathers to increase achievement of the nursing intervention, especially community based approaches via home visiting.

5.3.2 Strategies in the nursing intervention for promoting the fathers' involvement

From the situation analysis, the quantitative findings revealed that the prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment were positively associated with the father involvement and main predictors of father involvement are prenatal and postnatal care knowledge and attitude toward fatherhood. These concepts were used as strategies for nursing intervention in the father involvement model. Thus, the main strategies for promoting the fathers' involvement during pregnancy and neonatal period consisted of educating prenatal and postnatal care knowledge, raising awareness of fathers in parental function, developing the father competence and skills, and enhancing a good marital relationship and father-child attachment.

Firstly, educating the prenatal and postnatal care knowledge and raising awareness in the father role for fathers-to-be/fathers are significant strategies which influenced the behavior changes. The adequate knowledge helps them to understand and use information to care for their partners and babies and positive attitude motivate them for changing from inappropriate behaviors to involvement as a good parent. In the current study, the discussion process and pedagogical approaches in the nursing intervention were used to increase the prenatal and postnatal care knowledge and solve the negative attitude about fathers' function. For instance, baby care is difficult and

fathers do not have a responsibility to do the household chore. These strategies would encourage the fathers to involve in the father role, especially baby care and reduce some activities such as drinking and going to party with their friends.

Secondly, developing the father competence and skills is the process to increase the abilities of fathers-to-be/fathers in care for their partners and babies. In the current study, the discussion process and training with demonstrations and return demonstrations were used to increase competence and skills of fathers. The discussion process helps fathers to solve the problems of their partners and babies in prenatal and postnatal period. The training will increase the fathers' skill for caring of their partners and babies, especially infant care activities. Thus, the high competence and skills will encourage fathers to be more effective in the care for their partners and babies and do not avoid interactions with their babies.

Finally, enhancing a good marital relationship and father-child attachment are the way for increasing the intention of fathers-to-be/fathers' involvement. In this study, the positive patterns of interaction between fathers and their partners and babies was used to enhance marital relationship and father-child attachment closeness such as massage for their partners and holding their babies which expressed love emotions. Therefore, if the process of nursing intervention can increase the healthy marital relationship and father-child attachment, the fathers-to-be/fathers will feel that they have a greater responsibility to care for their babies with great pride and happiness.

5.3.3 The contents in the nursing intervention for promoting the fathers' involvement

In the current study, the contents of nursing intervention consisted of five main components including the significant of involvement of fathers, care for pregnant women during the 3 rd trimester of pregnancy, care for mothers in the labor and childbirth period, care for mothers in the postnatal period, and care for babies in the neonatal period which were provided via four sections of health education and distributed via fathers' booklet for self study. Moreover, the fathers' booklet also added up the topics of question and answer ("question top hit") and father record in the fathers' booklet. The question top hit was created for fathers to solve the problems and care for women in the 3 rd trimester of pregnancy, labor and childbirth, and postnatal

period and babies in neonatal period while the father record was created to motivate them to participate in the care for their partners and babies in prenatal and postnatal period.

As the review of literature indicated, the contents of nursing intervention in this study were similar to those of previous studies (Turan et al., 2001; Svensson et al., 2009), except the significant of fathers' involvement. Most studies focused on only one period. For instance, some studies focused the care of their partners in the prenatal and childbirth period (Gungor & Beji, 2007; Li et al., 2009; Mamark, 2007; Nungkla, 2003; Promtong, 2007) and newborn care (Kongnguen, 2002; McKellar et al., 2008; Naunboonruang, 2002; Promneramit, 2005; Seaharatanapatum, 2007; Sukparin, 2002). However, there are difference of the contents in this study from other studies which were established, provided, and added up by the specific problems or needs of fathers and their partners in each section. The new topics were added up in the father involvement intervention such as Thai herbal healing in the postnatal period (Yuu Fai) and how to store the breast milk for their babies when mothers have to go to work. Therefore, the fathers receiving the nursing intervention may, in time, get information enough to solve their problems.

5.4 The Outputs and Outcomes of the Father Involvement Model

From the primary and secondary prevention of the Neuman Systems Model, the outputs and outcomes of the father involvement model were evaluated by the action to retain and attain family system stability. The outputs were assessed via prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement while the outcomes were assessed via marital relationship and father-child attachment. The discussion of this part is described as below.

5.4.1 The outputs of the father involvement model

5.4.1.1 Prenatal and postnatal care knowledge

The mean scores of prenatal and postnatal care knowledge increased at one week after delivery ($\overline{X}$ = 39.65) from before the intervention ($\overline{X}$ = 34.42) and then slightly decreased at one month after delivery for follow-up ($\overline{X}$ =

37.84) from one week after delivery. It is noteworthy that the mean scores of prenatal and postnatal care knowledge were significantly different between before the intervention and one week after delivery, but they were not significantly different between before the intervention and one month after delivery. When comparing with the prenatal and postnatal care knowledge mean scores in the situation analysis, the mean score of fathers-to-be before the intervention was close to those of fathers-to-be ($\overline{X}$ =34.20) while the mean scores of fathers after completing intervention at one week and one month after delivery were higher than those of fathers ($\overline{X}$ =35.08). Based on these findings, it may be inferred that this intervention improved the fathers' knowledge, especially at one week after delivery, but did not improved at one month after delivery.

Although, at one month after delivery for follow-up, the mean scores of prenatal and postnatal care knowledge decreased from at one week after delivery, there was no significantly difference and was higher than before intervention. The results can be explained that reducing of mean scores at one month after delivery may results from unused information or no remember of fathers after childbirth such as care for pregnant women. Additionally, in the postnatal period, all samples did not have paternity leave and also needed to work hard because they had low economic status (over 50% of income with less than 10,000 baht per month). These affected the self study and recalling back to the information from the program. However, this mean score was also higher than that of fathers in the situation analysis.

According to the fathers' better knowledge after completing the intervention, it can be explained that the sharing information and experience in the group discussion and self study from the fathers' booklet can increase their critical thinking and needs to seek the additional information, and the researcher and team provided update need information. Consistence with the previous studies, it indicates that the education program affect the better knowledge of fathers after completing the program when comparing with the mean score before intervention and of the control group (Doherty et al., 2006; Kongnguen, 2002; Naunboonruang, 2002). In conclusion, the increasing knowledge gained from this intervention cannot be maintained to one month after delivery and it is inferred that the model needs a booster program to maintain and improve their knowledge.

5.4.1.2 Attitude toward fatherhood

The attitude toward fatherhood mean scores slightly increased at one week after delivery ($\overline{X}$ =61.34) from before the intervention ($\overline{X}$ =59.57) and increase at one month after delivery for follow-up ($\overline{X}$ =62.42). Comparing with the attitude toward fatherhood mean scores in the situation analysis, the mean score of fathers-to-be before the intervention was close to that of fathers-to-be ($\overline{X}$ =59.99) while the mean scores at one week and one month after delivery for follow-up were higher than that of fathers ($\overline{X}$ =59.62). However, these mean scores were significantly different between before the intervention and one month after delivery, but were not significantly different between before the intervention and one week after delivery. It is possible that the early postnatal period is the crucial transitional period that the fathers must adapt to the parenting role and the changing attitude also needs a long time. As the result, the fathers' attitude may not improve in the short time period. However, before the intervention, the attitude toward fatherhood mean scores of fathers-to-be is high level. Therefore, the findings may be inferred that this intervention could improve the fathers' attitude at one month after delivery but did not improve at one week after delivery.

At one month after delivery for follow-up, the mean score of attitude toward fatherhood was higher than before the intervention with significant difference and at one week after delivery with no difference. Moreover, these mean scores after delivery were higher than that of fathers in situation analysis. It can be explained that the nursing intervention such as discussion among the fathers-to-be and their partners, self assessment and care practices could raise awareness in the father role and function. This is an important factor to positive access with their partners and babies such as care for baby and change some inappropriate behaviors, including drinking and going to the party with their friends. Similar to the previous studies, the health education programs were significantly effective to improve positive attitude of fathers after completing the program when comparing with the mean score at before intervention and of the control group (Klunketrgit, 2006; Mendez-Baldwin & Busch-Rossnagel, 2003; Wagner & Clayton, 1999). To sum up, the nursing intervention in this model could raise the positive attitude of fathers during pregnancy and neonatal period.

5.4.1.3 Father competence

The father competence mean scores increased at one week after delivery ($\overline{X}$ =64.69) and one month after delivery for follow-up ($\overline{X}$ =67.30) from before the intervention ($\overline{X}$ =60.61). However, the mean scores were significantly different between before the intervention and both one week after delivery and one month after delivery. When comparing with the father competence mean scores in the situation analysis, the mean score of fathers-to-be before the intervention was lower than the mean scores of fathers-to-be ($\overline{X}$ =62.72) and the mean scores of fathers after completing intervention at one week and one month after delivery were lower than that of fathers ($\overline{X}$ =69.16). Although the mean scores of fathers at both one week and one month after delivery were lower than that of fathers in the situation analysis, these mean scores after completing intervention were significantly higher than that before intervention. It is possible that the mean score of them before intervention was less than that of father-to-be in the situation analysis. Moreover, the demographic characteristics of participants in the situation analysis (57.8% of senior high school or higher and an average income of 12,375.68 + 6,553.69) had higher than those of participants in the implementation phase (30.7% of senior high school or equivalent level, 0% of degree level, and an average income of 10,722.69 + 5,361.33). It may be caused of limitation to improve the fathers' competence.

However, the mean scores of father competence increased both at one week after delivery and one month after delivery from before the intervention. It can be explained that the discussion process with pedagogical approaches and skill practices in this model may increase the level of fathers' sense of competence. Moreover, most of them also received the support from the partners, parents, relatives, and friend both before and after childbirth. Of particular interest, the strong community network with family, relatives, and friends, especially health care providers may contribute to the fathers increasing the sense of competence score. The finding in this study is consistent with the previous studies (Gibaud-Wallston, 1977; Mendez-Baldwin & Busch-Rossnagel, 2003; Pisterman et al., 1992). In conclusion, it can be indicated that this intervention had a positive impact on the sense of father competence.

5.4.1.4 Father involvement

The father involvement mean score with 4 subscales (personal care activities, household activities, infant care activities, occupational activities, and social and community activities) and baby care subscale increased at one week after delivery ($\overline{X}$ =88.85 and 13.58) and one month after delivery for follow-up ($\overline{X}$ =86.89 and 19.15) from before the intervention ($\overline{X}$ =72.54 and 11.31). However, these mean scores were significantly different between before the intervention and both one week after delivery and one month after delivery. When comparing with the mean scores in the situation analysis, the father involvement mean score with 4 subscales before the intervention was close to that of fathers-to-be ($\overline{X}$ =71.77) and the mean scores with 4 subscales and baby care subscale after completing intervention at one week and one month after delivery were higher than those of father ($\overline{X}$ = 75.07 and 13.07, respectively). Based on these findings, it may be inferred that this intervention can increase the involvement of fathers.

At one week and one month after delivery for follow-up, the father involvement mean score was significantly higher than before the intervention. It is possible that since prenatal and postnatal care knowledge and attitude toward fatherhood were the significant predictors of father involvement, when the score of two predictors increased, the father involvement score will be increased as well. Additionally, the fathers-to-be had a high level of attitude toward fatherhood and marital relationship; it may motivate them or raise their intention to participate in the activities with their partners and care for their babies. Moreover, the fathers-to-be/fathers were also guided by practices with their partners and babies and monitoring their problems and barriers to enhance the involvement of fathers. Consistence with the previous studies that the intervention program such as a lecture, group discussion, skill demonstration, and home visitation could encourage and enhance the childrearing behaviors of fathers (Chaekuntod, 1996; Doherty et al., 2006; Sukparin, 2002). The differences may also reflect that this intervention in the father involvement model during the transition to parenthood could improve the fathering by increasing the father involvement.

5.4.2 The outcomes of the father involvement model

5.4.2.1 Marital relationship

The marital relationship mean scores increased at one month after delivery for follow-up ($\overline{X}$ = 51.88) from before the intervention ($\overline{X}$ = 48.00) and slightly increase at one week after delivery ($\overline{X}$ = 50.57) from before the intervention. However, the mean scores of marital relationship were significantly different between before the intervention and one month after delivery, but were not significantly different between before the intervention and one week after delivery. When comparing with the marital relationship mean scores in the situation analysis, the mean score of fathers-to-be before the intervention was higher than that of father-to-be ($\overline{X}$ =46.23) and the mean scores of fathers after completing intervention at one week and one month after delivery were higher than that of fathers ($\overline{X}$ =48.41). Hence, it may be inferred that this intervention improved the marital relationship, especially at one month after delivery for follow-up, but did not improved at one week after delivery when comparing with before the intervention.

At one month after delivery for follow-up, the mean score of marital relationship was higher than before the intervention with significant difference and at one week after delivery with no difference. It is possible that in the early period after childbirth, both fathers and mothers need to adaptively pass through these challenging transitions. This period lead to stress and strain in their families and decreased marital relationship. Several studies have reported a decline in marital relationship following the birth of the first child (Lawrence, Rothman, Cobb, & Rothman, 2008; Meijer & Van den Wittenboer, 2007). Consistent with a study by Mamark (2007), it was found that the education program could not improve the marital relationship after completing at immediately after the intervention. Although the fathers-to-be who received the intervention had a high level of marital relationship before intervention and was higher than that of fathers-to-be in the situation analysis, these mean scores both at one week and one month after delivery were higher than that of fathers in the situation analysis. Therefore, it can be concluded that the section of interaction between fathers and their partners in the father involvement model helped to improve the healthy marital relationship which is an important factor let them to care for their partners.

5.4.2.2 Father-child attachment

The father-child attachment mean scores increased at one week after delivery ($\overline{X}$ = 77.71) from before the intervention ($\overline{X}$ = 67.80) and slightly increase at one month after delivery for follow-up ($\overline{X}$ = 80.00) from one week after delivery. Although the mean scores of father-child attachment were significantly different between before the intervention and both at one week after delivery and one month after delivery, they were not significantly different between one week and one month after delivery. When comparing with the father-child attachment mean scores in the situation analysis, the mean score before the intervention was lower than that of father-to-be ($\overline{X}$ =70.61) but the mean scores of fathers after completing intervention at one week and one month after delivery were higher than that of fathers ($\overline{X}$ =74.06). These findings may be inferred that this intervention helped to improve the father child attachment.

Although the father-child attachment mean score of fathers-to-be before intervention was lower than that of fathers-to-be in situation analysis, the mean scores of fathers after completing intervention at both one week and one month after delivery were higher than that of fathers in the situation analysis. It is possible that fathers in this program had opportunities to receive information about baby care, discussion with their partners and father group, interaction and care practices with their babies. These findings are consistent with the previous studies in Thailand and western culture which indicated the health education program could improve the father-child attachment (Chaekuntod, 1996; Mamark, 2007; Promtong, 2007; Promneramit, 2005) and father-child interaction (Doherty et al., 2006). It is interesting to note that the section of interaction and practices between fathers and their babies in the father involvement model could increase the positive sense of father-child attachment which is an important factor let them to care for their babies.

In conclusion, the nursing intervention in the father involvement model had a positive effect on the outputs and outcomes to retain and attain family system stability. For a better quality health care, this intervention including teaching and learning methods and topics could be an appropriate learning for fathers to improve prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, and father involvement for encouraging strong, positive marital relationships and

healthy father-child attachment. The differences from other programs are that the activities in this intervention focus on the collaboration of fathers for problem-solving and care practices for their partners and baby, especially staying at home. Furthermore, these results also represent that the Neuman Systems Model can be used as a guide in the development of father involvement model via the research and development process.

5.5 Problems and Obstacles

The problems and obstacles in the study are described as follows.

1. According to a short time and rapid change of transition period using in the study (between the third trimester of pregnancy and one month after childbirth), the participants might be excluded from the current study since this study needed to create the intervention from the results in the situation analysis. As the results, some participants in the situation analysis cannot include in the implementation phase because their partners were more than 36 weeks of gestational age or after childbirth when stating the first section of intervention.

2. According to the urban migration to this setting, some pregnant women who are the partners of participants in the situation analysis and implementation phase moved to the other provinces for childbirth or recovery in the postnatal period with their relatives. Thus, some participants in the situation analysis could not include in the implementation phase and might be drop out since their partners changed the plan for childbirth and after childbirth.

3. In the implementation phase, this phase needed to study in period of the third trimester of pregnancy until one month after childbirth. If there are severe complications of baby that lead to dead of their babies, the participants must be drop out from this phase.

4. The fathers could not participate in the meeting date, especially in the working day. Some fathers who work as company workers need to work on Monday to Saturday and have a day off on Sunday. Therefore, they rejected to participate in this program, especially the prenatal care education. Furthermore, some fathers dropped out because their partners planed to give birth and rest with partners' relatives after childbirth in the other provinces.

5. According to the qualitative findings, for Thai culture, the traditional gender roles in parenthood have still retained a level of relevance that states the mothers as primary caregivers for the baby and contributors to household chores while the fathers as head of family for earning money. Although the researcher persuaded the fathers about the importance of father involvement, some fathers were not aware of this issue and did not participate in the father preparation. This is also a reason why some fathers were not interested to participate in the study.

6. Because a shortage of nurses in the hospital and primary health care centers and the limitation of date and time that the nursing intervention provided in holiday (Sunday) or the same date and time with visiting at antenatal care unit, the researcher did not success completely to collaborate with nurses. Thus, it was difficult to push all process of this study which depended on the needs of the fathers to be a part of the parenting class of hospital.

5.6 Strengths of the Study

The strengths of this study are described as follows

1. The intervention in this study emphasised both hospital and community based approaches. The hospital based approach helped the participants to share the information and experience with group discussion and learn the real place for childbirth. For increasing the achievement of the program, the intervention with community based approach including home visiting was tailored to the needs and situation, particularly in fathers' skills with their babies.

2. Of some interest is the nursing intervention's differential pattern to help fathers adapt to the parental role and responsibilities. This intervention was strongest in fathers' collaboration for solving the problems and skill practices. The fathers' ability to solve the problems of their partners and babies was increased by identifying the problems, looking for possible solutions, making a decision, implementation, and monitoring the outcomes. Moreover, the fathers' skill practices were improved by using the return demonstration and monitoring the skills via home visiting.

3. The process of research and development was effective in helping to create the appropriate nursing intervention with the real situation via four processes

including situation analysis, planning of model development, model implementation and model evaluation. It helped the study to manage the activities that served their needs and problems within their context.

4. The quantitative and qualitative methods in situation analysis helped the researcher to get a better understanding the information in both breadth and depth of this study. Especially the qualitative method, it helped to identify the problems, needs, barriers, and ways to create the appropriate intervention with the real situation from several views of the stakeholders including fathers-to-be/fathers, pregnant women/ mothers, nurses, and village health volunteers. Thus, these methods could help the study to have more complete information.

5. According to the action research step in the model implementation, it helped to develop the nursing intervention in the model that the components of the nursing intervention cover the current problems of the fathers-to-be/fathers and their partners. Consequently, it helped the study to increase the effectiveness of the nursing intervention in the model.

5.7 Weaknesses of the Study

The weaknesses of this study are described as follows.

1. The present study depended on the current problems in the setting; therefore, the knowledge gained from the current study might not be able to be generalization to other studies because of the different context of the area. However, it can be applied to the other families with similar situations.

2. From policy and program perspectives, the qualitative findings in this study suggested that the fathers should participate in the care for mothers at the labor and delivery care unit. However, in this setting, there are no policy to allow the fathers to care for their partners in the labor and delivery care unit and a shortage of nurses in this unit.

3. Because of the time limitation, the duration of evaluation phase in this study was limited to one month after delivery. It might affect the stability of fathers' involvement to keep the fathers involved with their partners for childrearing on the later. Therefore, further studies should extend the time in the evaluation and focus on both fathers and mothers perspectives.

CHAPTER VI
CONCLUSION

This chapter is organized into three sections: conclusion of the research study, lessons learned, limitations, implications, and recommendations for further research are presented as follows.

6.1 Conclusion of the Research Study

This research and development study explored the process of development of the father involvement model during pregnancy and neonatal period. The set activities were the arrangement of the innovative nursing intervention for promoting the fathers' participation in Ban Bueng District, Chon Buri Province following the Neuman Systems Model. The research was carried out four phases for developing the father involvement model from May 2012 to January 2013. The details of each phase are presented as follows.

6.1.1 Situation analysis

The situation analysis phase was designed to collect the preliminary data in real situation for creating the nursing intervention in promoting the fathers' involvement. In the quantitative method, the main objective was to examine the factors association with the father involvement. There were 90 fathers-to-be and 116 fathers who answered the self-administered questionnaires. Almost all of them aged between 21-30 years old (80.0% for fathers-to-be with an average of 25.62 years old (*SD*=3.78) and 47.4% for fathers with an average of 27.71 years old (*SD*=5.45)). More than three fourth in both groups were employee and less than 5% of them were government officer. The results of this method are summarized as follows.

1) Social support of participants

The social support of participants came from partners (94.4%), parents (62.2%) and relatives (55.6%) for the fathers-to-be and from partners (99.1%),

partner's parents (68.1%) and partner's relatives (55.2%) for fathers. Most of them received all types of support from partners while the informational and appraisal support came from nurses and parents, respectively.

2) Characteristics of father involvement

The average scores of total and subscale of father involvement were at a moderate level for both fathers-to-be and fathers.

3) The factors influencing the father involvement

The father involvement had a positive association with the fathers-to-be/ fathers' age, prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, marital relationship, and father-child attachment but had no relation to the fathers' occupation, educational status, and economic status. The predictors of father involvement consisted of the prenatal and postnatal care knowledge and attitude toward fatherhood with 31.5% of explained variance for the fathers-to-be and the prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment with 33.2% of explained variance for the fathers.

Then, the qualitative approach was used to clarify the existing details in real situation with 12 stakeholders including father-to-be/fathers, pregnant woman/ mothers, nurses, and village health volunteers through the in-depth interviews. The results of this method are summarized as follows:

1) Characteristics of father involvement

The findings were composed of six themes of father involvement in the third trimester of pregnancy and neonatal period including reorganizing their daily life activities, sharing the household responsibility with their partners, participation in baby care responsibility, budget preparation, manage activities in their social life, and caring for pregnant women/mothers.

2) The factors influencing the father involvement

In this study, there were four factors of intrapersonal stressors, three factors of interpersonal stressors, and four factors of extrapersonal stressors. First, the intrapersonal stressors included receiving health information, positive feeling toward fatherhood, parenting responsibilities of the fathers, and acceptance for an equal of gender roles in the parenthood. Second, the intrapersonal stressors included couple relationship, positive feeling toward baby, and social support. Third, the extrapersonal

stressors comprised financial status, accessibility to father training program, no health care policy for the fathers' participation in the care for mothers during labor and delivery period, and no health policy for paternity leave.

3) Consequences of the fathers' involvement

The impacts of the fathers' involvement were composed of the fathers' lifestyle, family relationship, emotional health of mothers, psychological development of the children, and community capacity.

4) Barriers for the fathers' participation in the program

The barriers of fathers for participating in the program were pointed out by stakeholders. They are composed of the internal barriers of fathers (such as fathers' perception of baby care task and needs), occupational barriers (such as family income, over workload, and no paternity leave), prenatal and postnatal health care system barriers (such as lack of the information, and the limitation of date and time for the education class).

6.1.2 Planning of model development

The second phase was planning of model development to emerge the drafts of nursing intervention based on the quantitative and qualitative findings. This phase was composed of three steps. First, the findings were identified the father involvement characteristics, factors influencing the fathers' involvement, problems and needs of fathers and their partners to develop the nursing intervention. Second, based on the results from situation analysis, the drafts of nursing intervention were created by participating with nurses. Third, they were examined and revised according to the recommendations of experts, nurses, and fathers-to-be/fathers.

The aim of nursing intervention was to promote the father involvement in the third trimester of pregnancy and neonatal period. The drafts of nursing intervention plan consisted of the primary and secondary prevention with four sections. The primary prevention included promoting the father involvement in the care for pregnant woman in the third trimester of pregnancy and childbirth period and monitoring of problems and barriers regarding the care for pregnant woman in the third trimester of pregnancy and childbirth period. The secondary prevention included promoting the father involvement in the care for postnatal mother and newborn and monitoring of problems and barriers regarding the care for postnatal mother and newborn.

6.1.3 Model implementation

The third phase was the model implementation among 26 fathers who completed four sessions of nursing intervention. This phase consisted of three main steps including action for implementation, re-assessment, and re-planning. The first and second spiral processes were occurred in the third trimester of pregnancy and childbirth period, respectively. Since the problems in these periods were that most fathers-to-be had low self confidence about the care for their partners in the real situation, the recall back to health education and training was included via telephone consultant and education. The third spiral process which was occurred in the neonatal period. Since the problems in this period were that some baby care activities were difficult for the first time fathers, they were included for training via home visit. Furthermore, two topics such as traditional Thai herbal healing (Yuu Fai) and how to store the breast milk for their babies were added into the intervention to response to needs of fathers and their partners.

6.1.4 Model evaluation

The fourth phase was the model evaluation among 26 fathers. The evaluation examined the outputs and outcomes of the father involvement model in two times including one week and one month after delivery. All most of them aged between 21-30 years old (65.4%) with an average of 24.23 years old (*SD*=4.23). Approximately eighty percent (80.8%) were employee. They had an average income of 10,722.69 baht per month (*SD*=5,361.33). To the compare mean differences of six indicators of three times of evaluation including before intervention, one week after delivery, and one month after delivery, repeated measured ANOVA analysis was used to analyze the data. The results revealed that the father involvement intervention had effects on the prenatal and postnatal care knowledge, attitude toward fatherhood, father competence, father involvement, marital relationship, and father-child attachment. Although in one month after delivery, the mean scores of prenatal and postnatal care knowledge would be decreased from one week after delivery, it was not significantly different. In addition, the mean scores of attitude toward fatherhood and marital relationship at one week after delivery would be increased from before intervention with no significance, but the mean scores of them at one month after delivery would be increased significantly from before intervention.

6.2 Lessons Learned

Lessons learned from this study have taught the research to be aware of several issues as described below.

6.2.1 Lesson learned from situation analysis

To understand the factors of the father involvement, the quantitative and qualitative methods are useful for confirming the data that are much reliable. It is important to balance the breadth of obtaining quantitative data in assessment efforts with the depth of qualitative data. First, the quantitative method proves the study statistically. For example, the findings indicated that there were three predictors of father involvement including prenatal and postnatal care knowledge, attitude toward fatherhood, and father-child attachment. Second, the in depth interview can describe the details of father involvement characteristics, the factors of father involvement, problems and needs from stakeholder views. It can describe the feeling and reasons regarding the fathers' involvement in care for their partners and babies. For instance, the fathers perceived that the baby care activities were difficult. Therefore, the findings from both methods were used to conduct the father involvement model, which was appropriate for the context of fathers and their families.

6.2.2 Lesson learned from conducting action research

The research that used the action research as its methodology may require more time than others because it need to revise the nursing intervention to solve the problems and needs of fathers and their partners. For example, to raise self confidence of new fathers for practice in the real situation, the baby practice such as baby bathing needed to be included for training at home. Second, some information was included into the father involvement model such as traditional Thai herbal healing (Yuu Fai) and how to store the breast milk for their babies. The success of this study was based on the fathers-to-be/fathers' devotion to responsibilities and cooperation in each activities. The action process is particularly useful for the maternal and child care services; it indicates that the fathers-to-be/fathers and their partners need to add up other health information and change some activities to fit for their capabilities and contexts. Therefore, the findings from action research will guide the decisions as to

how best to improve the nursing intervention that is flexible to promote the fathers' involvement.

6.2.3 Lesson learned from the Neuman Systems Model

The Neuman Systems Model is useful to create a theoretical framework. First, the conceptual structure of stressors including intrapersonal, interpersonal, and extrapersonal stressors in the Neuman Systems Model was utilized to identify the factors influencing the father involvement in the third trimester of pregnancy and neonatal period. The factors from this study can be used as the theoretical strategy in the nursing intervention to encourage the father to involve in care for their partners and babies. Second, the concepts of client system and nursing as the primary and secondary prevention are used to describe the nursing intervention in the father involvement model. The primary prevention is conducted to promote the father involvement in the third trimester of pregnancy and childbirth period. The secondary prevention was conducted to encourage the father involvement and increase the fathers' ability to care for their partners in the postnatal period and babies in the neonatal period.

6.3 Limitations

6.3.1 The current study based on the research and development process was conducted at the community hospital. There are likely to affect the generalizability of the findings. However, it can be applied to other groups of fathers such as young fathers, fathers of older children, and from clinical sittings with similar contexts.

6.3.2 Because of no control group in the implementation phase, the outputs and outcomes of the father involvement model may not occur from the nursing intervention. However, these results were compared with the findings in the situation analysis to evaluate the effectiveness of this model.

6.4 Implications

The findings of this study provided several implications as follows.

6.4.1 Policy planning

6.4.1.1 The Ministry of Public Health (MoPH) has established a policy of strengthening family bonds under Sai Yai Rak Project (Family Love Bonding Project). Because of the increasing divorce rate in Thailand, it is important for policy makers to add the father involvement concept in the parenting program of Family Love Bonding Project in order to encourage the fathers-to-be/fathers' participation in child care since in uteri, newborn until adolescent in a proper way.

6.4.1.2 According to the positive effects of this study and to success the fathers' participation in the training program and involvement for taking care of their partners and babies, the policy makers should strongly recommend the paternity leave policy for all fathers.

6.4.1.3 In order to achieve the goal of strengthening family bonds and increase the long-term sustainability of fathers' involvement in childrearing, the hospitals and health care centers should increase the father involvement in all activities of Family Love Bonding Project.

6.4.2 Nursing practice

6.4.2.1 To improve the parenting program of Family Love Bonding Project, the father involvement intervention plan can be used as a guideline for nurses or incorporated into their health education class for training the fathers-to-be/fathers in the third trimester of pregnancy and neonatal period. However, this intervention needed to participate among nurses at antenatal, labor and delivery, and postnatal care units and visiting nurses as well as village health volunteers.

6.4.2.2 The fathers' booklet can be used as a guideline for fathers-to-be and fathers to take care of their partners and babies in the third trimester of pregnancy and neonatal period. However, this booklet should be improved to respond to the needs of fathers and their families in each context.

6.4.2.3 According to the benefits from this study, the father involvement model can be applied to provide the health education program in all

maternal and child care units such as antenatal care clinic, labor and delivery care unit, postnatal care unit, family planning clinic, and well baby clinic, as well as during home visit. Moreover, this concept should not be applied only for fathers-to-be/fathers whose partners and babies have normal condition but also for those whose have high-risk maternal and child conditions. To achieve this, the hospital should change some services such as antenatal care, well baby care, and home visit, especially labor and delivery care so that the fathers-to-be/fathers can participate in these services with their partners and children.

6.4.2.4 The model, process, and methods of the current study can be applied to see the needs and problems of fathers, families, and health care providers and success of implementation that fit for the contexts of the family and health care system.

6.4.3 Nursing education

6.4.3.1 The father involvement concept should be integrated in maternal and child nursing to raise the awareness of nursing students for promoting the fathers' participation in the care for their partners and children during pregnancy, childbirth and the postpartum period.

6.4.3.2 The model, process, and methods of this study can be applied in the research study by graduate students to develop the nursing intervention based on the results of situation analysis in each context.

6.5 Recommendations for Further Research

Based on the findings from this study, the recommendations are offered for further research as following.

6.5.1 The qualitative method should be used for studying in depth to have better understanding of the problems and needs of fathers to involve in the different contexts of family and community. The different contexts lead to different model for promoting the fathers' involvement.

6.5.2 Further quantitative study should be required to establish the extent to which the direct and indirect effects of the factors related to the fathers'

involvement.

6.5.3 The developed model produced in this study should be re-implemented and re-evaluated the effectiveness of this model in the same characteristic participants with control group to improve this model.

6.5.4 For sustainability of the father involvement model, the longitudinal research should increase a booster program and expand the duration of evaluation such as six months and one year.

6.5.5 In this study, the father involvement model focused on the care in the third trimester of pregnancy and neonatal period. Thus, the future study should be conducted the nursing intervention for the fathers to take care of children in other periods such as toddler, preschooler, school age child, and adolescence.

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APPENDICES

APPENDIX A
LIST OF EXPERTS

There were three experts who had translated and back translated the questionnaires.

1. Assoc. Prof. Dr. Nujjaree Chaimongkol
   Faculty of Nursing, Burapha University
2. Dr. Wantana Suppaseemanont
   Faculty of Nursing, Burapha University
3. Assoc. Prof. Dr. Naowarut Charoenca
   Faculty of Public Health, Mahidol University

There were five experts who had validated the contents of research instruments.

1. Assoc. Prof. Dr. Rachanee Sunsern
   Faculty of Nursing, Mae Fah Luang University
2. Assoc. Prof. Dr. Nujjaree Chaimongkol
   Faculty of Nursing, Burapha University
3. Assoc. Prof. Dr. Sutham Nanthamongkolchai
   Faculty of Public Health, Mahidol University
4. Asst. Prof. Dr. Pranom Rodcumdee
   Faculty of Nursing, Chulalongkorn University
5. Asst. Prof. Dr. Siriwan Sang-in
   Faculty of Nursing, Burapha University

APPENDIX B
SELF-ADMINISTERED QUESTIONNAIRES

แบบสอบถามโครงการวิจัยเรื่อง
การพัฒนารูปแบบการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิด

คำชี้แจง

แบบสอบถามชุดนี้ มีวัตถุประสงค์เพื่อใช้ในการศึกษาสถานการณ์และปัจจัยที่มีอิทธิพลต่อการทำหน้าที่ของบิดาในระยะตั้งครรภ์และทารกแรกเกิด และใช้ในการประเมินผลการศึกษาวิจัยการพัฒนารูปแบบการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิด ทุกคำตอบที่ได้จะเป็นประโยชน์ในการนำมาประยุกต์ใช้กับการเรียนการสอน เป็นแนวทางในการพัฒนาคุณภาพการให้บริการสุขภาพและการศึกษาวิจัยเกี่ยวกับการพยาบาลมารดาและทารก

แบบสอบถามชุดนี้ประกอบด้วย 7 ส่วน คือ

ส่วนที่ 1 แบบบันทึกข้อมูลพื้นฐาน

ส่วนที่ 2 แบบวัดการทำหน้าที่การเป็นบิดา

ส่วนที่ 3 แบบวัดความรู้เกี่ยวกับการดูแลก่อนและหลังคลอด

ส่วนที่ 4 แบบสอบถามเกี่ยวกับทัศนคติต่อบทบาทของบิดา

ส่วนที่ 5 แบบวัดสมรรถนะการเป็นบิดา

ส่วนที่ 6 แบบวัดสัมพันธภาพระหว่างคู่สมรส

ส่วนที่ 7 แบบวัดสัมพันธภาพระหว่างบิดาและบุตร

ข้อมูลที่ได้จากการตอบแบบสอบถามนี้ ผู้วิจัยขอรับรองว่าจะถูกเก็บไว้ใช้เฉพาะในการศึกษาวิจัยเท่านั้น ไม่มีการนำเสนอผลในรายบุคคล และไม่มีผลต่อสัมพันธภาพและการรับบริการสุขภาพของท่านแต่อย่างใด หากท่านมีข้อสงสัยประการใดเกี่ยวกับงานวิจัยครั้งนี้ ผู้วิจัยยินดีตอบและให้ซักถามข้อสงสัยได้ตลอดการศึกษาวิจัย และขอขอบคุณทุกท่านที่มีส่วนร่วมในการตอบแบบสอบถามนี้

นางตติรัตน์ สุวรรณสุจริต
นักศึกษาปริญญาเอก ภาควิชาการพยาบาลสาธารณสุข
คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล

แบบบันทึกข้อมูลพื้นฐาน

คำชี้แจง: กรุณากรอกข้อความ หรือทำเครื่องหมาย ✓ ลงใน □ หน้าคำตอบของท่าน

ข้อมูลส่วนบุคคลของบิดา

1. ปัจจุบันท่านอายุ…….ปี ..... เดือน
2. ท่านนับถือศาสนา

□ พุทธ □ คริสต์

□ อิสลาม □ อื่น ๆ ระบุ.....

ข้อมูลส่วนบุคคลของมารดา

1. ปัจจุบันภรรยาอายุ…….ปี ..... เดือน
2. ภรรยานับถือศาสนา

□ พุทธ □ คริสต์

□ อิสลาม □ อื่น ๆ ระบุ.....

ข้อมูลการได้รับการสนับสนุนทางสังคมของบิดา

คำชี้แจง: โปรดอ่านข้อความ และกรุณาทำเครื่องหมาย ✓ลงในช่องว่างเกี่ยวกับความช่วยเหลือที่ท่านได้รับในขณะที่ภรรยาอยู่ในระยะตั้งครรภ์/หลังคลอด

คำถาม: บุคคลต่อไปนี้ให้ความช่วยเหลือท่านในขณะที่ภรรยาอยู่ในระยะตั้งครรภ์/หลังคลอดหรือไม่ ถ้าช่วยเหลือ บุคคลดังกล่าวให้ความช่วยเหลือเรื่องอะไรบ้าง (ตอบได้มากกว่า 1 เรื่อง)

บุคคลที่ให้ความช่วยเหลือ	ไม่ได้ช่วยเหลือ	ช่วยเหลือ	ถ้าช่วยเหลือ บุคคลดังกล่าวให้ความช่วยเหลือในเรื่อง						
			ความรัก/ความเข้าใจ	เป็นแบบอย่าง	ข้อมูล/ความรู้	สิ่งของ	เงิน	ช่วยทำงาน	อื่น ๆ ระบุ
1. ภรรยา									
2. พ่อแม่									
12. เจ้าหน้าที่สาธารณสุข									

แบบวัดการทำหน้าที่การเป็นบิดา

ส่วนที่ 1 กรุณาทำเครื่องหมาย ✓ หน้าข้อความแต่ละข้อเกี่ยวกับ**กิจกรรมในครัวเรือนที่ท่านทำก่อนภรรยาตั้งครรภ์**และทำเครื่องหมาย ✓ลงในช่องว่างด้านขวาที่แสดงถึง**การทำกิจกรรมนี้ในปัจจุบัน**

ก่อนภรรยาตั้งครรภ์ ท่านทำกิจกรรมดังนี้			ปัจจุบันท่านทำกิจกรรมนี้			
			ไม่ทำเลย	ทำน้อยกว่าเดิม	ทำเท่าเดิม	ทำมากกว่าเดิม
1	……	ทำความสะอาดบ้าน				
2	……	ดูแลความเป็นระเบียบเรียบร้อยในบ้าน เช่น เก็บที่นอน จัดของให้เป็นระเบียบ				
3	……	ซักผ้า				
11	……	ปรับปรุงหรือซ่อมแซมบ้าน เช่น ทำความสะอาดบ้านตามเทศกาล ทาสีบ้าน				

แบบวัดความรู้เกี่ยวกับการดูแลก่อนและหลังคลอด

คำชี้แจง: โปรดอ่านข้อความเกี่ยวกับการดูแลก่อนและหลังคลอดในแต่ละข้อ และระบุว่าข้อความด้านล่างถูกต้องหรือไม่ โดยทำเครื่องหมาย ✓ลงในช่องว่างที่ตรงกับความเข้าใจของท่านมากที่สุด

ข้อความ	ไม่ถูกต้อง	ไม่น่าจะถูกต้อง	ไม่ทราบ	น่าจะถูกต้อง	ถูกต้อง
1. อาหารหลักที่หญิงตั้งครรภ์ควรรับประทาน คือ นม/ผลิตภัณฑ์จากนม					
2. ถ้าหญิงตั้งครรภ์มีอาการแสบร้อนบริเวณลิ้นปี่ หญิงตั้งครรภ์ควรไปพบบุคลากรด้านสาธารณสุขทันที					
15. การที่หญิงตั้งครรภ์มีความดันโลหิตสูงขึ้นทันที อาจเป็นอาการนำของภาวะความดันโลหิตสูงจากการตั้งครรภ์					

แบบสอบถามเกี่ยวกับทัศนคติต่อบทบาทของบิดา

คำชี้แจง: โปรดอ่านข้อความในแต่ละข้อ และกรุณาทำเครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความรู้สึกของท่านมากที่สุด

ข้อความ	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วยปานกลาง	เฉย ๆ	เห็นด้วยปานกลาง	เห็นด้วยอย่างยิ่ง
1. การที่พ่อใช้เวลาอยู่และเล่นกับลูก เป็นสิ่งจำเป็นต่อความผาสุกของลูก					
2. การแสดงความอ่อนโยนและความรักต่อทารก เป็นสิ่งที่ยากสำหรับผู้ชาย					
15. การเป็นพ่อถือว่าเป็นรางวัลชีวิตที่มีค่า					

แบบวัดสมรรถนะของการเป็นบิดา

คำชี้แจง: โปรดอ่านข้อความในแต่ละข้อ และกรุณาทำเครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความคิดเห็นของท่านมากที่สุด

ข้อความ	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วยปานกลาง	ไม่เห็นด้วยเล็กน้อย	เห็นด้วยเล็กน้อย	เห็นด้วยปานกลาง	เห็นด้วยอย่างยิ่ง
1. เมื่อรู้และเข้าใจว่า พฤติกรรมของพ่อมีผลต่อลูก ทำให้ท่านสามารถแก้ไขปัญหาในการดูแลลูกได้ง่ายขึ้น						
2. ถึงแม้ว่าการเป็นพ่อเป็นรางวัลชีวิต แต่ก็รู้สึกคับข้องใจที่จะต้องดูแลลูกที่ยังเป็นทารก						
3. ในแต่ละวัน ท่านเข้านอนและตื่นนอนด้วยความรู้สึกว่ายังทำหน้าที่พ่อได้ไม่สมบูรณ์						
16. การเป็นพ่อทำให้ท่านรู้สึกเครียดและกังวล						

แบบวัดสัมพันธภาพระหว่างคู่สมรส ฉบับปรับปรุง

คำชี้แจง: โปรดอ่านข้อความเกี่ยวกับสัมพันธภาพระหว่างท่านกับคู่สมรสในแต่ละข้อ และกรุณาทำเครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับคำตอบของท่านมากที่สุด

ความเห็นพ้องต้องกันของท่านกับคู่สมรสในเรื่องต่อไปนี้	ไม่เห็นด้วยเสมอ	ไม่เห็นด้วยเป็นส่วนใหญ่	ไม่เห็นด้วยบ่อย	เห็นด้วยเป็นบางครั้ง	เห็นด้วยเป็นส่วนใหญ่	เห็นด้วยเสมอ
1. เรื่องเกี่ยวกับศาสนา						
2. การแสดงความรัก						

เหตุการณ์ต่อไปนี้เกิดขึ้นระหว่างท่านกับคู่สมรส บ่อยเท่าไร	ไม่เคย	น้อยกว่า 1 ครั้ง/เดือน	1-2 ครั้ง/เดือน	1-2 ครั้ง/สัปดาห์	1 ครั้ง/วัน	มากกว่า 1 ครั้ง/วัน
14. พูดคุย/ถกปัญหากันอย่างใจเย็น						

แบบวัดสัมพันธภาพระหว่างบิดาและบุตร

คำชี้แจง: โปรดอ่านข้อความในแต่ละข้อ และกรุณาทำเครื่องหมาย ✓ ลงใน □ ที่ตรงกับคำตอบของท่านมากที่สุด

1. เมื่อต้องดูแลลูก ท่านรู้สึกรำคาญและหงุดหงิด

□ บ่อยมาก □ บ่อย □ บางครั้ง □ น้อยมาก □ ไม่เคย

2. เมื่อต้องดูแลลูก ท่านรู้สึกว่าลูกดูแลยากหรือทำให้เกิดอารมณ์เสีย

□ บ่อยมาก □ บ่อย □ บางครั้ง □ น้อยมาก □ ไม่เคย

3. ในสองสัปดาห์ที่ผ่านมา ความรู้สึกของท่านต่อลูก คือ

□ ไม่ชอบ □ เฉย ๆ/ไม่รู้สึก □ รักเล็กน้อย □ รักปานกลาง □ รักมาก

18. ในช่วงเวลาหนึ่งเดือนที่ผ่านมา ท่านรู้สึกว่าไม่มีเวลาพอให้กับตนเอง หรือทำในสิ่งที่ท่านสนใจ

□ เกือบตลอดเวลา □ บ่อยมาก □ บางครั้ง □ ไม่เคย

APPENDIX C
TEST OF CONSTRUCT VALIDITY

Summary of test for the assumption of factor analysis

Scale	MSA range	KMO test	Bartlett's Test of Sphercity		
			χ^2	*df*	*p*-value
IFS-F scale	.52-.86	.78	2457.38	561	< .001
PCK scale	.57-.79	.69	311.69	105	< .001
PSOC scale	.61-.86	.78	911.55	136	< .001
RDAS scale	.68-.88	.80	700.58	91	< .001
PIAQ scale	.48-.86	.75	547.35	171	< .001
ROFQ scale	.50-.90	.82	671.21	105	< .001

The criteria of MSA: greater than .5
The criteria of KMO test: greater than .6
The criteria of Bartlett's test of Sphericity: smaller than alpha at .05 level of significance

Summary of goodness of fit measures of the scale for CFA

Model	χ^2	*df*	*p*	χ^2/*df*	RMSEA	GFI	TLI	CFI	AGFI	Possible range [a]
IFS-F scale										
Original model	646.65	515	<.001	1.25	.04	.83	.93	.94	.80	.20-.91
PCK scale										
Original model	161.37	89	<.001	1.81	.06	.89	.61	.67	.86	.12-.57
Revised model	134.61	76	<.001	1.77	.06	.91	.71	.71	.87	.21-.55
PSOC scale										
Original model	262.96	118	<.001	2.23	.08	.88	.79	.82	.84	.17-.77
Revised model	168.23	103	<.001	1.63	.06	.91	.90	.91	.88	.21-.77
RDAS scale										
Original model	133.27	74	<.001	1.80	.06	.91	.88	.91	.87	.42-.92
PIAQ scale										
Original model	232.53	149	<.001	1.56	.05	.89	.76	.79	.86	.11-.57
Revised model	204.17	132	<.001	1.55	.05	.90	.78	.81	.87	.23-.57

a = Possible range of factor loading

Summary of factor structure of the ROFQ scale for EFA

Item	F1	F2	F3	F4	h_i^2
Item 1			.559		.459
Item 2				.674	.512
Item 3			.671		.523
Item 4			.769		.619
Item 5				.717	.574
Item 6		.686			.522
Item 7		.777			.612
Item 8	.524				.495
Item 9	.735				.579
Item 10	.532				.557
Item 11	.763				.666
Item 12	.630				.576
Item 13		.578			.442
Item 14		.659			.510
Item 15	.586				.504
λ	4.287	1.451	1.307	1.104	
% Variance (Total)	18.052	14.857	12.892	8.524	54.325

APPENDIX D
INTERVIEW GUIDELINE

แบบสัมภาษณ์สำหรับบิดา

โครงการวิจัยเรื่อง การพัฒนารูปแบบการมีส่วนร่วมของบิดาในระยะตั้งครรภ์และทารกแรกเกิด

วัน เดือน ปี ที่สัมภาษณ์……..…..

ชื่อผู้สัมภาษณ์.....

1. ท่านมีมุมมองเกี่ยวกับบทบาทหน้าที่ของพ่อในขณะภรรยาอยู่ในระยะตั้งครรภ์และหลังคลอดอย่างไร
2. อะไรเป็นสิ่งสนับสนุนให้ผู้ชายสามารถทำหน้าที่พ่อได้อย่างเหมาะสมในระยะตั้งครรภ์และหลังคลอด
3. อะไรเป็นอุปสรรคต่อการทำหน้าที่ของพ่ออย่างเหมาะสมในระยะตั้งครรภ์และหลังคลอด

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9. ถ้าจะจัดกิจกรรมในระยะตั้งครรภ์และหลังคลอด ท่านคิดว่าควรจัดกิจกรรมในรูปแบบใด สถานที่ใด และช่วงเวลาใดที่ท่านและภรรยาสะดวกเข้าร่วมกิจกรรม
10. ความเป็นไปได้ที่ท่านจะเข้าร่วมกิจกรรมกับภรรยาในระยะตั้งครรภ์และหลังคลอด

หมายเหตุ กรณีที่ยังได้ข้อมูลไม่ครบ ผู้วิจัยจะถามรายละเอียดต่อในแต่ละคำถาม

APPENDIX E

THE NURSING INTERVENTION PLAN

คู่มือ
การจัดกิจกรรมการพยาบาลสำหรับบิดามารดา

จัดทำโดย
ตติรัตน์ สุวรรณสุจริต
หลักสูตรสาธารณสุขศาสตรดุษฎีบัณฑิต
สาขาวิชาเอกการพยาบาลสาธารณสุข
คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล

คำนำ

คู่มือการจัดกิจกรรมการพยาบาลสำหรับบิดาและมารดาฉบับนี้จัดทำขึ้นโดยมีวัตถุประสงค์เพื่อใช้เป็นคู่มือจัดกิจกรรมการพยาบาลเพื่อส่งเสริมการมีส่วนร่วมของบิดาในการดูแลสุขภาพร่างกายและจิตใจของคุณแม่และลูก ซึ่งจะนำไปสู่การทำหน้าที่การเป็นบิดาอย่างเหมาะสม เสริมสร้างความรักความผูกพันภายในครอบครัว และคุณภาพชีวิตที่ดีของครอบครัว โดยคู่มือการจัดกิจกรรมการพยาบาลสำหรับบิดาและมารดานี้ประกอบด้วยการจัดกิจกรรม จำนวน 4 ครั้ง คือ (1) การส่งเสริมการมีส่วนร่วมในการดูแลมารดาในระยะตั้งครรภ์และระยะคลอดของบิดา (2) การติดตามและแก้ไขปัญหาและอุปสรรคเกี่ยวกับการดูแลมารดาในระยะตั้งครรภ์และระยะคลอด (3) การส่งเสริมการมีส่วนร่วมในการดูแลมารดาหลังคลอดและทารกแรกเกิดของบิดา และ (4) การติดตามและแก้ไขปัญหาและอุปสรรคเกี่ยวกับการดูแลมารดาหลังคลอดและทารกแรกเกิด

คู่มือฉบับนี้เป็นส่วนหนึ่งของดุษฎีนิพนธ์ ซึ่งผู้จัดทำขอขอบพระคุณผศ.ดร. ปัญญรัตน์ ลาภวงศ์วัฒนา ผศ.ดร. ภรณี วัฒนสมบูรณ์ รศ.ดร. รัชนี สรรเสริญ รศ.ดร. นุจรี ไชยมงคล รศ.ดร. สุธรรม นันทมงคลชัย ผศ.ดร. ประนอม รอดคำดี และผศ.ดร.ศิริวรรณ ยืนยง ที่ช่วยตรวจสอบความถูกต้องและให้ข้อเสนอแนะในการจัดทำคู่มือฉบับนี้

ตติรัตน์ สุวรรณสุจริต

สารบัญ

APPENDIX F

THE FATHERS' BOOKLET

คู่มือคุณพ่อ
การมีส่วนร่วมในระยะตั้งครรภ์และทารกแรกเกิด

ตติรัตน์ สุวรรณสุจริต

คำนำ

คู่มือฉบับนี้เรียบเรียงขึ้น โดยมีวัตถุประสงค์เพื่อเป็นคู่มือของคุณพ่อในการดูแลสุขภาพร่างกายและจิตใจของคุณแม่และลูกได้อย่างถูกต้องและเหมาะสม ซึ่งจะนำไปสู่การเสริมสร้างความรักความผูกพันภายในครอบครัว และคุณภาพชีวิตที่ดีของครอบครัว โดยเนื้อหาในคู่มือนี้ประกอบด้วยความสำคัญในการมีส่วนร่วมของคุณพ่อ การดูแลคุณแม่ในระยะ 3 เดือนสุดท้ายของการตั้งครรภ์ ระยะคลอด และระยะหลังคลอด รวมทั้งการดูแลลูกในระยะแรกเกิด และคำถามเกี่ยวกับการดูแลคุณแม่และลูกตั้งแต่ในระยะตั้งครรภ์จนถึงหลังคลอด

คู่มือฉบับนี้เป็นส่วนหนึ่งของดุษฎีนิพนธ์ ซึ่งผู้จัดทำขอขอบพระคุณผศ.ดร. ปัญญรัตน์ ลาภวงศ์วัฒนา ผศ.ดร. ภรณี วัฒนสมบูรณ์ รศ.ดร. รัชนี สรรเสริญ รศ.ดร. บุจรี ไชยมงคล รศ.ดร. สุธรรม นันทมงคลชัย ผศ.ดร. ประนอม รอดคำดี และผศ.ดร. ศิริวรรณ ยืนยง ที่ช่วยตรวจสอบความถูกต้องของเนื้อหา

ด้วยความปรารถนาดีจาก

ตติรัตน์ สุวรรณสุจริต
สาขาวิชาเอกการพยาบาลสาธารณสุข
คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล
(081-817-1557)

ความสำคัญ
ในการมีส่วนร่วมของคุณพ่อ

"การเป็นพ่อถือว่าเป็นรางวัลที่มีค่าสำหรับผม ผมจึงอยากเรียนรู้บทบาทหน้าที่การเป็นพ่อที่ดี รับรองว่าผมจะนำไปทำตามแน่นอน"

บันทึกของคุณพ่อ

คุณพ่อสามารถช่วยคุณแม่ดูแลลูกในระยะแรกเกิดในเรื่องต่อไปนี้ได้หรือไม่

★ การอุ้มลูกในท่าต่างๆ		
- อุ้มลูกให้เรอ	☐ ทำได้	☐ ทำไม่ได้
- อุ้มลูกเดินเล่น	☐ ทำได้	☐ ทำไม่ได้
- อุ้มลูกเมื่อร้องกวน	☐ ทำได้	☐ ทำไม่ได้
★ การทำความสะอาดหลังขับถ่าย	☐ ทำได้	☐ ทำไม่ได้
★ การเช็ดตัว	☐ ทำได้	☐ ทำไม่ได้
★ การอาบน้ำให้ลูก	☐ ทำได้	☐ ทำไม่ได้
★ การเปลี่ยนเสื้อผ้า	☐ ทำได้	☐ ทำไม่ได้
★ การเปลี่ยนผ้าอ้อม	☐ ทำได้	☐ ทำไม่ได้
★ การห่อตัวทารก	☐ ทำได้	☐ ทำไม่ได้
★ การทำความสะอาดตา	☐ ทำได้	☐ ทำไม่ได้
★ การทำความสะอาดสะดือ	☐ ทำได้	☐ ทำไม่ได้

อื่น ๆ ระบุ .....

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APPENDIX G
PHOTOGRAPHS OF ACTIVITIES

APPENDIX H
ETHIC DOCUMENT

Certificate of Approval
Ethical Review Committee for Human Research
Faculty of Public Health, Mahidol University

COA. No. MUPH 2012-129

Protocol Title :	DEVELOPMENT OF THE FATHER INVOLVEMENT MODEL DURING PREGNANCY AND NEONATAL PERIOD
Protocol No. :	119/2555
Principal Investigator :	Mrs. Tatirat Suwansujarid
Affiliation :	Doctor of Public Health (International Program) Faculty of Public Health, Mahidol University
Approval Includes :	1. Project proposal 2. Information sheet 3. Informed consent form 4. Data collection form/Program or Activity plan
Date of Approval :	25 April 2012
Date of Expiration :	24 April 2013

The aforementioned project have been reviewed and approved according to the Declaration of Helsinki by Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University.

(Assoc. Prof. Sutham Nanthamongkolchai)
Chairman of Ethical Review Committee for Human Research

(Assoc. Prof. Phitaya Charupoonphol)
Dean of Faculty of Public Health

420/1 Rajvithi Road, Bangkok, Thailand 10400.
Tel. (662) 3548543-9 ext. 1127, 7404 Fax. (662) 6409854

APPENDIX I

TEST OF ASSUMPTION

Summary of test for normality of the variables

Variables	Group	KS test		Shapiro-Wilk		Skewness	Kurtosis	Result	Graph
		Statistic	*p*-value	Statistic	*p*-value				
Age	1	.131	.001	.964	.013	-.093	-.683	Flatness	Nearly normal
	2	.129	.000	.929	.000	-.081	-1.324	Flatness	Nearly normal
Transformed age	1	.104	.017	.964	.015	-.272	-.112	Flatness	Nearly normal
	2	.103	.004	.939	.000	-.263	-1.007	Flatness	Nearly normal
Year of education	1	.232	.000	.889	.000	.230	-.689	Flatness	Flatness
	2	.208	.000	.903	.000	-.038	-.714	Flatness	Flatness
Transformed year of education	1	.207	.000	.885	.000	-.309	-.614	Flatness	Flatness
	2	.228	.000	.895	.000	-.309	-.614	Flatness	Flatness
Income	1	.247	.000	.827	.000	1.661	3.437	Peaked with positive skew	Peaked with positive skew
	2	.206	.000	.788	.000	2.344	8.451	Peaked positive skew	Peaked positive skew
Transformed income	1	.189	.000	.947	.000	.568	-.278	Nearly normal	Nearly normal
	2	.165	.000	.959	.001	.388	.700	Nearly normal	Nearly normal
Father involvement	1	.073	.200	.978	.142	-.200	-.282	Normal	Normal
	2	.065	.200	.983	.148	-.026	-.574	Normal	Normal
Prenatal and postnatal care knowledge	1	.101	.023	.981	.217	.214	-.327	Normal	Normal
	2	.059	.200	.994	.884	.076	-.150	Normal	Normal
Attitude toward fatherhood	1	.084	.153	.981	.204	-.178	.232	Normal	Normal
	2	.080	.066	.986	.268	-.257	-.330	Normal	Normal
Father competence	1	.075	.200	.980	.191	.265	-.493	Normal	Normal
	2	.066	.200	.983	.162	-.043	-.696	Normal	Normal
Marital relationship	1	.065	.200	.987	.508	-.071	-.185	Normal	Normal
	2	.071	.200	.985	.230	-.218	-.094	Normal	Normal
Father-child attachment	1	.055	.200	.981	.221	-.378	-.292	Normal	Normal
	2	.045	.200	.985	.227	-.383	-.138	Normal	Normal

Group of participants: 1= Father-to-be, 2 = Father

Summary of test for the assumption of multiple regression analysis

Prior to multiple regression analysis, the data were cleaned and examined all assumptions for linear multiple regression as described below.

1. Normality, linearity, homoscedasticity of residuals

1.1 Testing of normality of residuals by statistic and histogram, it indicated that the errors of prediction were normally distributed around each and every predicted dependent variable score as below.

Summary of test for normality of residuals

Group	KS test		Histogram	Result
	Statistic	*p*-value		
Fathers-to-be (n = 90)	.670	.761	Normal	Normal
Fathers (n = 116)	.444	.989	Normal	Normal

1.2 Testing linearity and homoscedasticity of residuals by scatterplot, the residuals have a straight-line relationship with predicted dependent variable scores indicating these assumptions were met in both groups.

2. Absence of outliers

The statistical criterion for indentifying an outlier was of p = .001 with a standardized residuals in excess of around $\pm$ 3.3. The scatterplot for fathers-to-be and fathers presented the value of standardized residuals were less than $\pm$ 3.3.

The multivariate outlier was tested by using Mahalanobis distance that the value of χ^2 at df = 6, α = .001 is less than 22.458. The values in the fathers-to-be and fathers were from 1.000 to 8.398 and from .183 to 11.754, respectively.

3. No autocorrelation

The autocorrelation was tested by Durbin Watson test, if significant with the criteria of 1.5-2.5, indicating the error terms were independent. The Durbin Watson statistic was 1.863 and 1.453 for fathers-to0be and fathers, respectively.

4. Absence of multicollinearity

The test of multicollinearity was identified by using the Tolerance and Variance Inflation Factor (VIF) statistics. The predictors were independent in each other (indicating no multicollinearity with the criteria of tolerance 0.5-1 and VIF< 10).

In addition, correlation coefficient (*r*) between independent variables and dependent variable were lower than 0.75 (see table 4-6). The result indicated that there was no multicollinearity in both fathers-to-be and fathers.

Summary of test for multicollinearity

Variables	Fathers-to-be (*n* = 90)		Fathers (*n* = 116)	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Age	.893	1.117	.947	1.055
Prenatal and postnatal care knowledge	.709	1.410	.696	1.438
Attitude toward fatherhood	.783	1.277	.681	1.469
Father competence	.866	1.154	.697	1.434
Marital relationship	.852	1.173	.873	1.146
Father-child attachment	.826	1.211	.860	1.163

APPENDIX J
DATA ANALYSIS

1. Participants' source of support in the situation analysis phase

The number of participants' source of support

Source of support	Father-to-be (*n*=90)		Father (*n*=116)		Total (*n*=206)	
	Number	Percent	Number	Percent	Number	Percent
- Partner	7	7.8	0	0.0	7	3.4
- Relatives	3	3.3	0	0.0	3	1.5
- Partner and relatives	24	26.7	16	13.8	40	19.4
- Partner and friends/ supervisors	3	3.3	4	3.4	7	3.4
- Partner and health care providers	3	3.3	4	3.4	7	3.4
- Relatives and friends/supervisors	2	2.2	0	0.0	2	1.0
- Friends/supervisors, and health care providers	0	0.0	1	.9	1	.5
- Partner, relatives, and friends/supervisor	22	24.5	4	3.4	26	12.6
- Partner, relatives, and health care providers	10	11.1	26	22.4	36	17.4
- Partner, friends/ supervisors, and health care providers	0	0.0	7	6.1	7	3.4
- Partner, relatives, friends/supervisors, and health care providers	16	17.8	54	46.6	70	34.0

2. Factors associated with father involvement

Relationships between seven factors and father involvement for fathers-to-be (*n*=90)

Variables	FI	Age	Income	PCK	ATF	FC	MR
Age	.213*						
Income	.156	.341**					
PCK	.474***	.155	.196				
ATF	.475***	.163	.204	.428***			
FC	.282**	.104	.204	.309**	.217*		
MR	.284**	.012	.047	.344**	.225*	.170	
FCA	.279**	.286**	.138	.221*	.242*	.242*	.197

*p < .05, **p < .01, ***p < .001

Relationships between seven factors and father involvement for fathers (*n*=116)

Variables	FI	Age	Income	PCK	ATF	FC	MR
Age	.191*						
Income	.173	.483***					
PCK	.486***	.196*	.076				
ATF	.459***	.075	.159	.435***			
FC	.403***	.110	.124	.394***	.496***		
MR	.274**	.143	.279*	.300**	.242**	.244**	
FCA	.315**	.175	.103	.325***	.213*	.257**	.183*

*p < .05, **p < .01, ***p < .001

3. Predictors of father involvement

The model for backward multiple regression analysis of predicting factors and father involvement for the fathers-to-be (*n*=90)

Variables	B	SE.	Beta	*t*	*p*-value
Model 1					.
Age	.191	.175	.102	1.094	277
Prenatal and postnatal care knowledge	.356	.147	.255	2.423	.017*
Attitude toward fatherhood	.374	.129	.289	2.903	.005**
Father competence	.080	.082	.092	.977	.332
Marital relationship	.099	.095	.099	1.037	.301
Father-child attachment	.071	.085	.081	.844	.407
Constant = 17.670, R^2 = .357, R^2_{adjust} = .310, F = 7.670, p-value < .001					
Model 2					
Age	.229	.168	.122	1.360	.178
Prenatal and postnatal care knowledge	.362	.146	.258	2.472	.015*
Attitude toward fatherhood	.387	.128	.299	3.029	.003**
Father competence	.090	.080	.105	1.121	.265
Marital relationship	.109	.094	.110	1.160	.249
Constant =19.637 , R^2 = .351, R^2_{adjust} = .313, F = 9.097, *p-value* < .001					
Model 3					
Age	.242	.168	.129	1.439	.154
Prenatal and postnatal care knowledge	.397	.143	.283	2.769	.007**
Attitude toward fatherhood	.399	.127	.308	3.130	.002**
Marital relationship	.116	.094	.117	1.236	.220
Constant = 22.708, R^2 = .342, R^2_{adjust} = .311, F = 11.024, *p-value* < .001					
Model 4					
Age	.230	.169	.122	1.364	.176
Prenatal and postnatal care knowledge	.447	.138	.319	3.248	.002**
Attitude toward fatherhood	.414	.127	.320	3.256	.002**
Constant =25.750, R^2 = .330, R^2_{adjust} = .306, F = 14.103, *p-value* < .001					
Model 5					
Prenatal and postnatal care knowledge	.464	.138	.331	3.371	.001**
Attitude toward fatherhood	.432	.127	.333	3.397	.001**
Constant = 29.988, R^2 = .315, R^2_{adjust} = .299, F = 20.025, *p-value* < .001					

*p < .05, **p < .01, ***p < .001

The model for backward multiple regression analysis of predicting factors and father involvement for the fathers (*n*=116)

Variables	B	SE.	Beta	*t*	*p*-value
Model 1					
Age	.210	.176	.094	1.195	.235
Prenatal and postnatal care knowledge	.492	.177	.255	2.779	.006**
Attitude toward fatherhood	.460	.183	.233	2.508	.014*
Father competence	.141	.100	.130	1.415	.160
Marital relationship	.112	.128	.073	.894	.373
Father-child attachment	.186	.125	.120	1.455	.149
Constant = 8.700, R^2 = .360, R^2_{adjust} = .325, F = 10.208, p-value < .001					
Model 2					
Age	-1.217	1.106	-.086	-1.100	.274
Prenatal and postnatal care knowledge	.528	.174	.274	3.034	.003**
Attitude toward fatherhood	.470	.183	.238	2.569	.012*
Father competence	.148	.099	.136	1.488	.140
Father-child attachment	.194	.128	.125	1.515	.133
Constant = 10.932, R^2 = .355, R^2_{adjust} = .326, F = 12.112, *p-value* < .001					
Model 3					
Prenatal and postnatal care knowledge	.546	.173	.284	3.147	.002**
Attitude toward fatherhood	.469	.183	.238	2.562	.012*
Father competence	.150	.099	.138	1.508	.134
Father-child attachment	.212	.127	.137	1.663	.099
Constant = 15.003, R^2 = .345, R^2_{adjust} = .322, F = 14.642, *p-value* < .001					
Model 4					
Prenatal and postnatal care knowledge	.596	.171	.309	3.478	.001**
Attitude toward fatherhood	.575	.170	.292	3.386	.001**
Father-child attachment	.236	.127	.152	1.858	.066
Constant = 15.473, R^2 = .332, R^2_{adjust} = .314, F = 18.554, *p-value* < .001					

BIOGRAPHY

NAME	Mrs Tatirat Suwansujarid
DATE OF BIRTH	July 30, 1969
PLACE OF BIRTH	Ang Thong, Thailand
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