THE IMPACTS OF BIRTH SPACING ON THE HEALTH OF MOTHER AND CHILD

Muntana Sillapaphan

A Dissertation Submitted in Partial
Fulfillment of the Requirements for the Degree of
Doctor of Philosophy (Population and Development)
School of Applied Statistics
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สัญญาอนุญาตให้เผยแพร่วิทยานิพนธ์

ทำที่.....
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วันที่.....เดือน.....พ.ศ. .....

สัญญาฉบับนี้ทำขึ้นระหว่าง.....
ที่อยู่เลขที่.....หมู่.....ถนน.....แขวง.....
เขต.....จังหวัด.....ซึ่งต่อไปในสัญญานี้เรียกว่า"ผู้อนุญาต"
ฝ่ายหนึ่ง กับ สถาบันบัณฑิตพัฒนบริหารศาสตร์ โดย.....
คณบดีคณะ..... สถาบันบัณฑิตพัฒนบริหารศาสตร์
ที่อยู่เลขที่.....หมู่.....ถนน.....แขวง.....
เขต.....จังหวัด.....ซึ่งต่อไปในสัญญานี้เรียกว่า"ผู้รับอนุญาต"
อีกฝ่ายหนึ่ง คู่สัญญาทั้งสองฝ่ายได้ตกลงทำสัญญามีข้อความดังต่อไปนี้

1. ผลงานลิขสิทธิ์

ผู้อนุญาตเป็นเจ้าของลิขสิทธิ์งานวิทยานิพนธ์ เรื่อง.....
.....
ซึ่งสร้างสรรค์ โดย.....ผู้อนุญาตรับรองว่า เป็นผู้สร้างสรรค์งานขึ้นเอง

2. เงื่อนไขการอนุญาต

ผู้อนุญาต ตกลงให้ผู้รับอนุญาตใช้สิทธิดังต่อไปนี้

2.1 ผู้รับอนุญาตมีสิทธิเผยแพร่ต่อสาธารณชน ซึ่งงานวิทยานิพนธ์ตามข้อ (1) เพื่อประโยชน์ในการวิจัย หรือศึกษา อันมิได้มีวัตถุประสงค์เพื่อหากำไร

2.2 ผู้อนุญาตอนุญาตให้ผู้รับอนุญาตใช้สิทธิตาม 2.1 เพื่อใช้ในห้องสมุดและเครือข่ายอินเทอร์เน็ตของห้องสมุด สถาบันบัณฑิตพัฒนบริหารศาสตร์ รวมทั้งเครือข่ายอินเทอร์เน็ตของโครงการพัฒนาเครือข่ายห้องสมุดในประเทศไทย (ThaiLIS)

3. การโอนสิทธิและ / หรือหน้าที่ตามสัญญานี้

ผู้อนุญาตและผู้รับอนุญาตไม่สามารถโอนสิทธิและหรือหน้าที่ ความรับผิดชอบของตนตามสัญญาฉบับนี้ให้แก่บุคคลภายนอกได้ เว้นแต่จะได้รับความยินยอมเป็นลายลักษณ์อักษรจากอีกฝ่ายก่อน

4. สิทธิของเจ้าของลิขสิทธิ์

ภายใต้บังคับแห่งสัญญาฉบับนี้ ผู้อนุญาตยังคงเป็นเจ้าของลิขสิทธิ์ในงานวิทยานิพนธ์ตามสัญญานี้ทุกประการ

สัญญานี้ทำขึ้นเป็นสองฉบับมีข้อความถูกต้องครบถ้วน คู่สัญญาได้อ่านและเข้าใจข้อความในสัญญาโดยตลอดดีแล้ว จึงลงลายมือชื่อพร้อมทั้งประทับตรา (ถ้ามี) ไว้เป็นสำคัญต่อหน้าพยานและเก็บไว้ฝ่ายละหนึ่งฉบับ

ลงชื่อ.....ผู้อนุญาต
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ลงชื่อ.....ผู้รับอนุญาต
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ABSTRACT

Title of Dissertation	The Impacts of Birth Spacing on the Health of Mother and Child
Author	Mrs. Muntana Sillapaphan
Degree	Doctor of Philosophy (Population and Development)
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This research, regarding the effects of birth spacing on maternal and child health, was aimed to: 1) study the pattern of birth spacing and compare birth intervals in each birth order and 2) study the impacts of birth spacing on the health of mother and child in each birth order. The research instrument employed was the questionnaire and the data was analyzed by using the cross-tabulation and the Logistic Regression Analysis. The samples consisted of 1,098 married women aged 15-45 with at least 1 child, excluding those living in Bangkok.

In the first birth interval, which refers to the duration after marriage to the first child birth, it was found that the women gave birth after marriage at an average interval of 21.99 months, half of them used a contraceptive method to postpone pregnancy after marriage, and the highest proportion of the respondents used an oral contraceptive method. In the second birth interval, which refers to the duration from the first child birth date to the second child birth date, it was found that the average interval was 57.08 months, the highest proportion of the respondents used the contraceptive method of female sterilization. This meant that, quite a number of women desired to have only 2 children. In the third birth, which refers to the duration from the second child birth date to the third child birth date, it was found that the average interval was 66.89 months. In respect to the actual versus preferred birth intervals, it was found for the first birth interval that the sample had an actual birth interval close to the preferred birth (21.99: 21.69 months). This finding should be due to the fact that the spouses had planned when to have their first child. In the second birth interval, the spouses had actual birth intervals much longer than the preferred one

(57.08 : 34.53 month). This finding may be mostly due to the birth interval campaigns done by the public health officers, and most of the samples held the opinion that the interval of 3-5 years was appropriate.

In regards to the impacts of birth spacing on the health of mother and child in each birth order, in the first birth, the factors that were found to be significant at 0.001 level, that affected maternal health in the postpartum period, were the complications and risks during pregnancy and the type of birth. But no statistic significant relationship was found as regards to the birth interval. In the second birth, the factors that were found to be significantly at 0.001 level, that affected maternal health in the postpartum period, were the complications and risks during pregnancy, the type of birth, and the birth interval. In the third birth, the factors that were found to be significantly at 0.05 and 0.01 level respectively, that affected maternal health in the postpartum period were the maternal age at pregnancy, the complications and risks during pregnancy, the type of birth, and the birth interval.

In respect to the impact of birth spacing on the health of infant in each birth order, it was found that, in the first parity the factors that were found to be significantly at 0.001 level, that affected infant health in the postnatal period, were the maternal complications and risks during pregnancy, but no statistic significant relationship was found as related to the birth interval. In the second parity, the factors that were found to be significant at 0.001 level, that affected newborn health in the postnatal period, were the maternal complications and risks during pregnancy and the birth interval. In the third parity, the factors that were found significant at 0.01 and 0.001 respectively, that affected infant health in the postnatal period, were the maternal complications and risks during pregnancy and the birth.

The suggestions from this research are that: motivate a married couple to look for the complications and risks that may be found during pregnancy; reward the mother for good practices at all stages of pregnancy; motivate a married couple to have a vaginal birth; motivate a married couple regarding the optimal birth interval and especially for the second and the third birth intervals, and clearly define the time from birth's date to the next pregnancy or one child's birth date to the next child's birth date; and motivate and educate a married couple about family planning methods in order to have the optimal birth interval by adopting the effective contraceptive method with a low failure rate.

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Muntana Sillapaphan

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CHAPTER 1

INTRODUCTION

1.1 Significance of the Problem

In the past, it was common for married women to bear many children. Most women married at a young age and began to have children from the start of their puberty through the end of their reproductive age (ages 15-49). This was a natural course that occurred when there was no use of contraceptives. From 1950 to 1955, the total fertility rate, or the number of children a woman has during the reproductive age, is 5.01 children per woman (World Health Organization : WHO, 2005).

Many years later, the world underwent numerous developments in various aspects including social, economical, and public health. These have led to the changes of the pattern of marriage, the use of contraceptives, and fertility rate. According to the 2003 World Fertility Report (WHO, 2003: 4), new patterns at marriage were being created between 1970 and 1990. The report shows how the average age of marriage rose from 25.4 to 27.2 for men and 21.5 to 23.2 for women. It is evident that both men and women had extended the length of time during which they remain single. As for the use of contraceptives, findings from the report state that the use of birth control among married women increases from 38 percent to 52 percent. The fertility rate was experiencing an opposite trend. It was decreasing like never before, from an average of 5.4 children per woman to 2.9 children per woman. The greatest decline is found in developing countries, with a drop from 5.9 children per woman to 3.9 children per woman. Fertility rate in developed countries falls as well, from 2.3 children per woman to 1.4 children per woman.

Changes in the fertility rate, the use of contraceptive, and the increase in the average marriage age have influenced birth intervals. Married couples who want to limit births usually approach the problem by two ways, through birth spacing and stopping (Knodel, 1987: 143-162). Couples that expect fewer children may choose to

space their next birth or have children subsequently until a desired number is reached before stopping. Toward the end of the reproductive age, birth spacing and stopping can be done through the use of contraceptives. Each year, there is an increasing number of people use birth control. Women whose first birth is at a later age are more likely to have their next child sooner in appropriate age for preventing any complications that may occure during pregnancy at the old age. Generally, women's fecundity peaks around the age of 20-30, which is the most appropriate age for pregnancy. Pregnant women over 35 hold the risk of miscarriage, having babies with congenital defects due to imperfections concerning chromosome arrangements, and pregnancy complications (Fertility Wikipedia, 2008). According to the Population and Health Survey by Donna Espeut who studies and compares the trends and differences in fertility rates in 28 developing countries, a decline in their total fertility rate was found in almost every country. This decline was found to be associated with low pregnancy proportion and the prolonged birth spacing. In some countries, besides the limits of births and lengthy birth spacing, it was also found that delaying the age of first pregnancy plays the important role in the changes of fertility rate. (Espeut, 2005: 1)

Many changes as discussed above influence birth intervals. In the past, the suggested number of years between births was at least 2 years. It is an appropriate length in which family planning specialists believe would help mothers and their new coming babies be healthy. During pregnancy, all women would hope that they and their babies are healthy both before and after the delivery. However, according to the report of the World Health Organization in 2005 (WHO, 2005), pregnancy and childbirth are still one of the leading causes of death, sickness, and physical disability of women during their reproductive age. Each year, about 529,000 women die from complications during pregnancy and childbirth, in which 99 percent is from developing countries and 1 percent from developed countries. Most of the causes of the mother's death can be prevented. Once the mother has died, the risk of her child dying increases as well. Research indicates that each year about 3.3 million babies face stillbirth and more than 4 million babies face neonatal death, or death within 28 days after birth. The highest rate of infant mortality was found in South East Asia where 1.4 million babies die each year, three fourths of which are neonatal deaths. Infant mortality can be prevented if pregnant women were physically healthy and receive proper care

during pregnancy, delivery, and after delivery. According to the report of UNFPA in 2002, the infant and child mortality rates are especially high if the mother is still young and if the interval between births is short. (UNFPA, 2002).

In Thailand, family planning programs were found to be very successful. Fertility has declined by 50 percent over the last 2 decades. Contraceptive use among currently married women 15-44 rose from 15 percent in 1969/70 to 68 percent in 1987. Based on 4 national surveys that were carried out in 1969/70, 1975, 1984, and 1987, respectively, it is estimated that the mean interval between births increased by almost 18 months, from 35.1 in 1969/70, to 52.9 months in 1987. It was also found that the birth interval of 24 months has declined between 1969/70 and 1987, from 30 percent to 19 percent. (Wongboonsin, and Knodel 1988: 10). Although these changes should have positive consequences to the health of mother and child, but the statistics of maternal and child health in 2005 show that: 8.8 percent of newborn babies weighed less than 2500 grams; infant mortality was 16.7 per 1000 births whereby the first three main causes were birth asphyxia, prematurity and pneumonia; mortality rate of children below 5 years was 31.4 per 1000 children, maternal death rate was 23.93 per 100,000 people whereby the first three main causes were haemorrhage, sepsis and toxemia; and the percentage of birth control use among married women was 81.1 (Division of Reproductive Health, 2005). Even though Thailand is experiencing longer birth interval than the past and this space was considered by many researches as the effective factor to the good health of mother and child, but still, the high number of deaths among mothers and infants is present. The Department of Health, Ministry of Public Health, has set the indicators and goals of maternal and child health programs in the Ninth National Economic and Social Development, there should only be 7 percent of infants weighing less that 2,500 grams, infant mortality below 15 percent per 1000 births, and mother's death below 18 plan (2002-2006) that the low birth weight rate (less than 2500 gms.) should not higher than 7 percent, infant mortality rate (per 100,000 live births) should not higher than 15 percent, and maternal mortality ratio (per 100,000 live births) should not higher than 18 (Department of Health, Ministry of Public Health. 2007). However, maternal mortality and infant mortality rates are still high and did not reach the target set.

Thus, the present birth interval may not be appropriate for the health of mother and child.

Thus, the researcher was interested in studying the impacts of birth intervals on the health of the mother and child and which birth interval has mostly affected on the mother and child as well as the health impact in each birth order. The results of the study can be useful for policy formation and developing a population and health plan for mother's and child's health.

1.2 Objectives

1. To study the pattern of birth spacing and compare birth intervals in each birth order.
2. To study the impacts of birth spacing on the health of mother and child in each birth order.

1.3 Research Boundaries

1. This research was carried out with the married women or women living with their spouses, aged 15-45 who have at least one child.
2. This research focused only on the closed birth interval which is the time interval from one child's birth date until the next child's birth date.
3. The study of the health impacts of the mothers was done on the problems that occurred 6 weeks after delivery, and for the children, the study was done on the problems that occurred 1 month after birth.

1.4 Expected Benefits

The results of the study will provide a clearer understanding regarding the pattern of birth intervals of each birth order, the impacts of birth spacing on the health of mother and child as well as the birth interval that was the most favorable to the

health of mother and child. The results can be used as a baseline information for planning a plan aiming to prevent problems and negative consequences that may occur to the mother and child in the future.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the researcher carried out the review of the concepts, theories and researches that related to birth spacing and its effects to mother's and child's health as follows:

2.1 Birth Spacing Concepts and Theories

2.1.1 Types of the Birth Spacing

Alluding to the birth spacing, there are different definitions and ways to measure the spacing as follows:

UTAH Department of Health (2008) defined the birth spacing as the time interval from one child's birth date until the next child's birth date.

Setty-Venugopal and Upadhuay, (2002) indicated that the birth interval can be measured in three ways, each of which differs accordingly with the needs of each researcher and the objective of each research project, as mentioned in the following details. 1) Birth-to-birth interval: (birth interval) the period between two consecutive live births, from birth date to birth date. This interval was mostly used in the Demographical Health Survey (DHS). It is easy to collect and calculate, but there miss spontaneous and induced abortion. Therefore, this type of interval seems to have average interval longer than they actually are. 2) Birth-to-conception interval: the period between a live birth or still birth and the conception of the next pregnancy, excluding any time during pregnancy. This definition was oftenly used by researchers because it is can be used even though the second baby is born prematurely. However, it is difficult to estimate the conception date. 3) Interpregnancy interval: the period from the conception of the first child to the conception of the next child. It is the best method to study its relationship with maternal health because it includes some pregnancies that end in induced or

spontaneous abortion. This is important because the fetus conceived but was not born whereby this condition mostly influences maternal and child health.

According to the above-mentioned definitions and methods to measure the spacing, it can be seen that they are different. In this study, the birth-to-birth interval was adopted, since most mothers can memorize their children's birth-dates precisely.

2.1.2 Birth Spacing Components

Spouses can limit their fertilities by performing two well-known ways for birth spacing and stopping (Knodel, 1987: 143 and Bongaarts and Potter 1983: 5) specified that the birth spacing can be divided as the following three components. 1) The postpartum infecundable interval (see Figure 2). Immediately after childbirth, women experience infecundable period, during which the normal pattern of ovulation and menstruation is absent. The duration of this birth interval naturally takes approximately 1.5-2 months. Nevertheless, if breastfeeding, the first menstruation after childbirth is postponed and prolonging this time period. 2) The waiting time to conception, also called the fecundable or ovulation interval , from the first postpartum ovulation. The length of this interval is inversely related to the natural fecundability and to the use of an effective contraception. Short conception delays when the natural fecundity is high and no contraception is practiced. The waiting time to conception lengthens with the decline of the natural fecundability and with the higher prevalence and effectiveness of contraception. 3) A full-term pregnancy. Generally, this interval takes approximately 38 weeks after conception or approximately 40 weeks after the last menstruation, in case of the pregnancy, until the childbirth is due.

If the pregnancy ends prematurely in a spontaneous or induced intrauterine death, it is regarded as a pregnancy wastage. In this case, the next child birth spacing will be prolonged, as presented at the end of Figure 2.1 In the event that the pregnancy is ended up by the premature cause due to the spontaneous or induced intrauterine death, the birth spacing consisted of the components as follows: 1) a shortened gestation 2) a brief infecundable period and 3) a conception wait.

In brief, the fertility can be explained by seven proximate determinants: marriage (and marital disruption); onset of permanent sterility; postpartum infecundability; natural fecundability or frequency of intercourse; use and effectiveness of contraception;

spontaneous intrauterine mortality and induced abortion. The first determinant, marriage (and marital disruption), and the second determinant, onset of permanent sterility, are used to define the fertility time period together with the other determinants as the determinatives of the rate of childbearing. As well, the birth spacing and economic, social, cultural and environmental factors that can have impacts on the fertility via one or more close determinants.

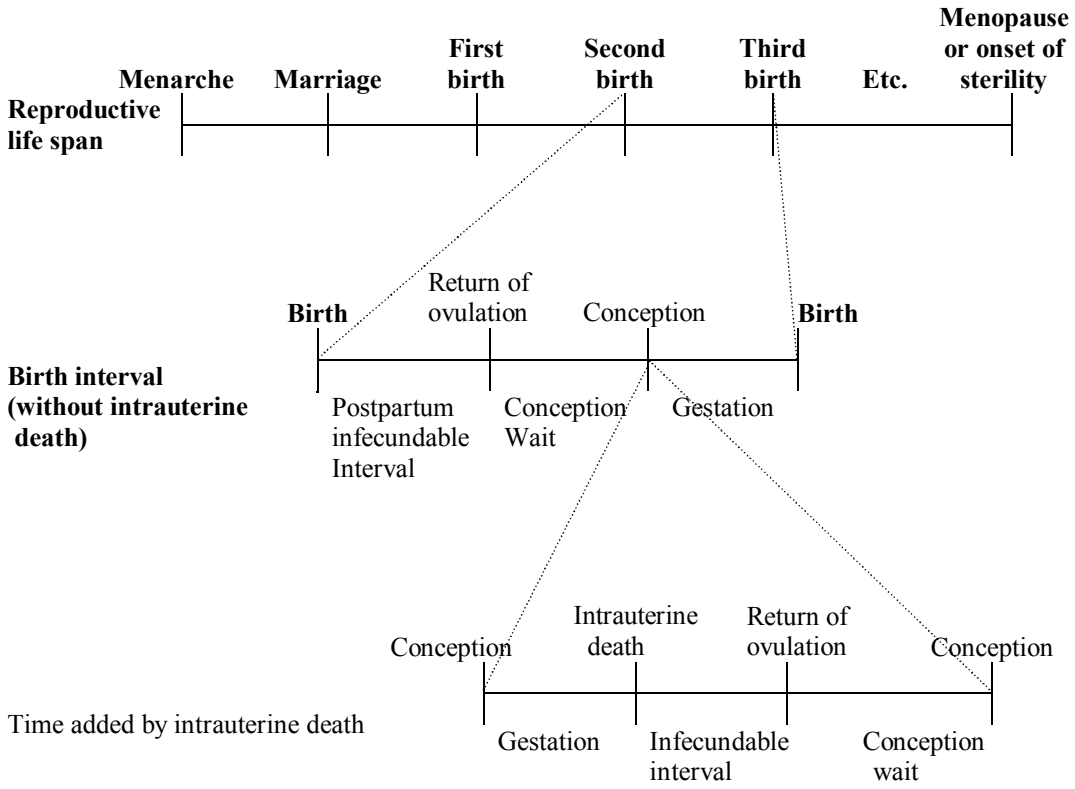

Figure 2.1 Events Determining the Reproductive Life Span and the Rate of Childbearing.
Source: Bongaarts, and Potter, 1983.

2.2 Maternal Health and Death

World Health Organization : (WHO, 2005 and WHO, UNICEF, UNFPA and the World Bank, 2005) defined mother's health as the health of women during pregnancy, childbirth and the postpartum period. For mother's death, it was defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, regardless

of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. In addition, according to the report of WHO, it was found that 1,500 women die of pregnancy or childbirth every day, which related to the complications. In 2005, it was predicted that there were 536,000 maternal deaths worldwide, most of which were in developing countries with preventable causes.

It was found that the incidents of the maternal deaths (2005) in rich and poor countries were different. In developing countries, the rate of the maternal death was 1:75; on the other hand, the rate of the maternal death in developed countries was 1:7300. Moreover, this difference also appeared in urban and rural sites. According to the maternal death prediction done by WHO, UNICEF, UNFPA, (2004), it was found that the maternal deaths in different world regions are different; the most number of it is in Asia (253,000 ones) and the least number is in Oceania (500 ones). In regard to the maternal death cause, it was found that 80 percent of the deaths affecting maternal ailments and deaths, those are: severe bleeding, mostly postpartum hemorrhage; infections; mostly sepsis; hypertensive disorders in pregnancy, usually eclampsia; and obstructed labour. According to the study of Ashford, (2002), who studied the project entitled "Hidden Suffering: Disabilities from Pregnancy and Childbirth in Less Developed Countries". It was found that for the women who die of the causes associated with pregnancy or childbirth, the leading fundamental complications affecting maternal health or disability are: hemorrhage, infection, obstructed labour, pregnancy-induced hypertension and unsafe abortion. The results from these complications are anemia, infertility, or in very rare cases, hormonal damage from severe bleeding. Women surviving from infection during labor face pelvic inflammatory disease, chronic pelvic pain, reproductive organ damage, and infertility. Obstructed or prolonged labor could lead to incontinence, fistula, genital prolapsed, uterine rupture, nerve damage. Pregnancy-induced hypertension can also be a precursor to chronic hypertension, kidney failure and nervous system problems. Finally, the disabilities related to unsafe abortion including pelvic inflammatory disease, chronic pelvic pain, reproductive organ damage, reproductive tract infection or infertility.

In Thailand, according to the study of Siripon Kanshana, (2008), who studied maternal mortality in Thailand in 1997, the incidence of maternal death in 1990 was

found to be highest in the Northern region (45:100,000 live births), followed by the Northeast, the South and the Central regions respectively. In 1990 and 1994, antepartum and postpartum haemorrhage were the major causes of death. Toxemia of pregnancy and sepsis were the second and the third ranking causes in 1990, while amniotic fluid embolism and heart diseases were the second and the third causes of death in 1994. With regard to public health statistical data in 2003 (Ministry of Public Health, 2003), it was found that the maternal mortality ratio was 20.6 per 100,000 live births, the first three causes of death were hemorrhage, sepsis and toxemia. We can see from above presentation that the causes of maternal mortality are the same ones that threaten maternal health and death.

As mentioned above, it was evident that the maternal death still results from pregnancy and childbirth. Thus, pregnancy needs an effective prenatal care. Prenatal care is very necessary for mother's and child's safe survival and child's appropriate growth and development, as in the following details.

2.2.1 Pregnancy and Childbirth

The time period that women are mostly potential for pregnancy or getting fertility peaks is during the age of 19-20; afterwards, the fertility decreases. At present, there are so many women who have to delay their pregnancies. This is due to many reasons, for example, the increase of educational level, women spend so much time for study, higher education leads to stable work, high income and occupational advancement, etc. These reasons lead to the higher age at first marriage. According to the World Fertility Report in 2003, it was found that the population worldwide resorted to higher age at first marriage; the average age at first marriage increased from 25.4 to 27.2 for men and from 21.5 to 23.2 for women (1970-1990). In addition, it was found that the age when they had their first child increased; in developed countries, the average age when they had their first child was 26.4, and in developing countries was 22.1 (WHO, 2003: 5-6). The high average age at first marriage depended on the living place and wife's education (Bongaarts and Potter, 1983: 60-61).

The fact that women have higher age at first marriage and the age when they have their first child also affects the delay of the second or later child. Women may have child with a short spacing in order to have child at their appropriate age with the

expected number and latterly stop having child, or they may have a long birth spacing as they wish and then have the next child afterwards. The women who have child at the higher age will encounter infertility. According to the statistical data regarding the endeavor of women to become pregnant without ovulation-stimulation chemical or having the test-tube baby, it was found that: 1) at the age of 30, 75 percent of woman is pregnant within 1 year and 91 percent within 4 years; 2) at the age of 35, 66 percent of woman is pregnant within 1 year and 84 percent within 4 years; and 3) at the age of 40, 44 percent of woman is pregnant within 1 year and 64 percent within 4 years.

The mentioned statistical data are used for the pregnancy ended by live birth and are combined with the increasing abortion rate of the elderly. According to March of Dimes, approximately 9 percent of woman with the pregnancy at the age of 20-24 ends up their pregnancies with abortion. This risk increases for approximately 9 percent at the age of 35-39 and over 50 percent at the age of 42. In addition to the fact that age affects woman fertility, it affects infant inborn disorders, especially as to the number and order of chromosomes. This increasing risk depending on mother's age. The March of Dimes (Pregnancy, 2008) indicated to the chance of women to have children with Down syndrome symptom in each of the women's age interval, such as: 1) Women at the age of 25 have the chance of 1:1, 250; 2) Women at the age of 30 have the chance of 1:1,000; 3) Women at the age of 35 have the chance of 1:400; and 4) Women at the age of 40 have the chance of 1:100.

Therefore, the appropriate pregnancy-age period of women is between 20-30. For the pregnant women at aged under 18, their babies will encounter higher risk of health complications, than the pregnant mothers aged 20-24. Pregnant adolescents are at risk of having high blood pressure, anemia, prolonged or obstructed labor. In addition, babies may die, be prematurely delivered, and have low birth weight (USAID and WHO, 2008).

In case of pregnancy at the age of over 35, apart from the fact that pregnancy rate decreases due to decreasing ovulation, there may be belly inflammation causing fascia. Also, despite difficult pregnancy, twin pregnancy found during the age of 35-39. In addition, there are high risks of high blood pressure or diabetes during pregnancy. It was also found that pregnant mothers at the age of over 35 have two times more diabetes and high blood pressure during pregnancy than general people, compared with mothers at the age of 20. If mothers are aging up to 40 years old, they are at risk of 25 percent

abortion, whereas mothers at the age of 25 are at risk of only 12-15 percent abortion. Furthermore, it was found that aged mothers have more problems with plancenta, low-lying placenta and premature placenta prevail. For the childbirth of aged mother, it was found that there are troublesome deliveries causing abdomen operation. It was also found that if the first pregnancy is at the age of 30, the rate of operation childbirth increases for 30 percent, but if the first pregnancy is at the age of over 35, the rate of operation childbirth increases for 80 percent with the more likelihood of Down syndrome for babies and less weight than young pregnancy. Also, due to probable maternal sickness, fetal distress may occur with babies (Siamhealth, 2008).

As soon as women become pregnant, they need to be cared for by doctors, nurses or midwives during their pregnancies, which is to take care of the health of mothers and fetus. This includes getting tetanus vaccination for newborn babies and suggestions for appropriate behavior during pregnancy, in order to decrease risks and complications during pregnancy. In addition, pregnant women have to be assessed with regard to pregnancy complications which are the severe problems. This is done by being diagnosed as the serious problems of pregnancy, which possibly affect infants in bellies, prenatal or postnatal death of infant or later disabilities, as well as maternal health and abnormal childbirth (Thira Tanthawanit, 1995: 31-47). The components of high-risk pregnancy diagnosis are showed in Table 2.1

Table 2.1 The Components of High-risk Pregnancy Diagnosis

Cause Component	Resultant Condition
1. Background	
1.1 Less than 16 years old	- High blood pressure or diabetes during pregnancy
1.2 More than 35 years old	- Down syndrome, small size of fetus, abortion , childbirth death, Cesarean section, increasing maternal mortality rate, obstetrical disorders such as diabetes, high blood pressure , low-lying placenta and so on.

Table 2.1 (Continued)

Cause Component	Resultant Condition
1.3 Infertility	- Usability to become pregnant again, especially for aged people
1.4 No prenatal care due to Poorness	- Disorders such as anemia, high blood pressure and so on, influencing both mothers and babies
2. Maternal-Prenatal Diseases That Frequently Occurred	
2.1 High blood pressure	- High blood pressure during pregnancy, slow growth and development of fetus increasing perinatal mortality
2.2 Diabetes	- Hydramnios, big infants, childbirth injury, inborn disability of infant and stillbirth
2.3 Heart trouble	- Maternal death rate of non-obstetric causes
2.4 Urinary system inflammation	- Preterm labour, intrauterine death and slow growing fetus
2.5 Anemia	- Abortion, unability to endure postnatal bleeding and easily getting infected
3. Obstetrical Background	
3.1 Pregnancy number	
3.1.1 First pregnancy	- High blood pressure during pregnancy
3.1.2 Fourth pregnancy or more	- High blood pressure during pregnancy, not well tightened womb and bleeding after childbirth
3.2 Continuous abortion ≥ 2 Times	- Regular abortion and first-quarter abortion
3.3 Complications during childbirth readiness and childbirth	- Repeated complications during childbirth readiness and childbirth
3.4 Preterm labour	- Infant prematurely delivered

Table 2.1 (Continued)

Cause Component	Resultant Condition
3.5 Operation childbirth	- Repeated operation childbirth and preterm labour due to incorrect pregnancy age calculation
3.6 Inborn disability of infant	- Repeated inborn disability of infant
3.7 Childbirth death of infant and newly born infant	- Childbirth death of infant and newly born infant according to obstetrical principles
3.8 High blood pressure	- High blood pressure during pregnancy
3.9 Intrauterine death	- Repeated intrauterine death
3.10 Bleeding after childbirth	- Repeated bleeding after childbirth
3.11 Postterm pregnancy	- Intrauterine death
4. Check-Up	
4.1 Abnormally fat with the weight of ≥ 80 kgs	- Tendency of diabetes, big infant and abnormal proportion of infant head and vagina
4.2 Abnormally short with the height of ≤ 140 cms	- Narrow pelvis leading to troublesome childbirth
4.3 Malnutrition	- Abortion, preterm labour, infection and high Morbidity
4.4 Infant in abnormal Position	- Troublesome childbirth and operation childbirth
4.5 Twin pregnancy	- Obstetrical complications such as preterm labour, inborn disability of infant and others
4.6 Hydramnios	- Inborn disability of infant possibly together with diabetes and Rh incompatibility
4.7 Abnormal pelvis	- Troublesome childbirth
4.8 Slowly growing infant	- Infant in high danger and perinatal mortality rate
4.9 Bleeding before childbirth owing to low-lying placenta and premature placenta previa	- Increase in death rate and danger for mother and Infant

Table 2.1 (Continued)

Cause Component	Resultant Condition
5. Laboratory Test	
5.1 White egg in urine (high blood pressure during pregnancy and urinary system inflammation)	- Preterm labour and small infant
5.2 Sugar in urine (diabetes)	- Twin pregnancy, big infant, inborn disability of infant, pregnancy injury and childbirth death of Infant
5.3 VDRL with plus result (syphilis)	- Water-swollen infant, childbirth death of infant and inborn syphilis
5.4 Blood saturation level (Hct<30% , Hemoglo-binopathy)	- Abortion, no endurance of bleeding after childbirth and getting infected easily
5.5 HBsAg with plus result	- 70 percent infant infection
5.6 HIV with plus result	- 30-40 percent infant infection
6. Childbirth Readiness and Childbirth	
6.1 High-risk pregnancy Background	- Increase in death rate and danger of mother and Infant
6.2 Postterm pregnancy	- Intrauterine death 2-3 times higher than usual
6.3 Premature pregnancy	1) High infant death rate 2) Respiratory distress syndrome (RDS)
6.4 Amniotic fluid sac before Childbirth readiness	1) Occurring together with preterm labour 2) Increase in getting Chorioaminonitis 3) Infection after childbirth 4) Infant getting infected after childbirth

Table 2.1 (Continued)

Cause Component	Resultant Condition
6.5 Bleeding	1) Low-lying placenta together with preterm labour causing danger due to bleeding 2) Premature placenta previa causing maternal danger
6.6 Fetus in abnormal Position	1) Troublesome childbirth 2) Operation childbirth
6.7 Fetal distress	- Infant in lack of oxygen with the need of assistance and spontaneous pregnancy end

Source: Thira Tanthawanit, 1995: 31-47.

Pregnancy consists of three trimester periods. The first trimester begins from the first day of the last menstruation to the 14th week (1-98 days in the uterus). The second one starts from the beginning of the 15th week until the end of the 28th week (99-196 days in the uterus). The third one starts from beginning of the 29th week until the childbirth due in the 42nd week (Pregnancy, 2008). Childbirth takes place after childbirth due of 37 weeks is completed; it is during 37-42 weeks or approximately 38 weeks after conception or approximately 40 weeks after the last menstruation. Pregnancy takes approximately 9 months. Childbirth comprises of several ways: normal childbirth, forceps delivery, vacuum extractor and Caesarean section (Childbirth. 2008).

In the event that pregnant women end up their pregnancies before childbirth with the pregnancy age of less than 28 weeks or infant weight of less than 1,000 grams, this is regarded as abortion, which is the end of the pregnancy before infants grow up and survive. The abortion that happens naturally is called spontaneous abortion; on the other hand, the abortion intendedly caused is called induced abortion.

The spontaneous abortion is found with approximately 30-33 percent of all pregnancies, most of which takes place within the first 3 months of the pregnancy (Wirat Witsawasukkhamongkol, 1995: 79-91). In the event that pregnant women have childbirths after the pregnancy age of 20 weeks but before that of 37 weeks, beginning from the first day of the last menstruation, this is called preterm labour (Pregnancy, 2008). Infants with the preterm labour are in more risk of infant mortality, most of which are neonatal mortality. They are the leading causes of the neonatal mortality with high risk of severe health problems, such as cerebral palsy, chronic lung disease, gastrointestional problems, mental retardation, vision, and hearing loss and others. Postterm pregnancy takes place at the time period of over 3 weeks after childbirth due; in this case, placenta previa takes place, which causes decreased oxygen and nutrient transfers to infants in the uterus. Without childbirth, this leads to the death fetus in uterus. Postterm pregnancy infants have obvious manners of being skinny, little weight, thin arms and legs, dry skin and long hair and nail (Postmature birth, 2008). According to the studies of Benchop Waiwanitchakul and Wongkullaphat Sanitwong Ayutthaya (1995: 127-130), it was found that the postterm pregnancy took place with 20 percent of women with exactly 41-week pregnancy age and with 10 percent of women with exactly 42-week pregnancy age, without the awareness of the direct causes of the postterm pregnancy. The impacts of the postterm pregnancy on the infants before delivery due are little amniotic fluid and fetal distress, but the impact on those after delivery due is the asphyxia of delivered infants.

2.2.2 The Puerperium

Women with childbirth go to the puerperium, beginning from approximately one hour to 6 weeks after childbirth. Postnatal cares should be specially given to mothers and infants in this important stage, including protections and urgent diagnoses of complications and diseases, as well as preparations for suggestions and services as to feeding, birth spacing, immunity provision and also maternal nutrition (WHO, 1998). In addition, postnatal women may encounter postpartum problems. According to the study of Fortney and Smith, (1996: 98-99), who studied maternal ailments in four developing countries Bangladesh, Egypt, India, and Indonesia, one of the findings was that frequent maternal postnatal problems were infections, urinary

bladder problems, backache, frequent headache, pelvis pain, hemorrhoids, constipation, sadness, anxiety, fatigue, perineum wound pain, breast problems such as tightened breasts, broken nipple wound and so on, and anemia.

The above mentioned problems frequently occur during puerperium. Regarding sexual relations in the postpartum period, it was found that 71 percent of all childbirth women have sexual relations again approximately with average of 8 times a week after childbirth. Feedings influence sexual relations within the first month after delivery; breast-feeding women decide to have less sexual relations than those who have supplementary feedings, and the feeding women are more painful during sexual inter. Another factor influencing postnatal sexual intercourse is the painfulness that related to perineum wound resulting from childbirth (Glazener, 1997: 330-335).

In addition to general postnatal problems, there are severe postnatal maternal problems whose severe complications regarded as the main causes of deaths after delivery, especially in developing countries, as follows: 1) Postpartum hemorrhage is the most important single cause of maternal death in the world. It is estimated to claim 150,000 mothers a year die of this, and 9 out of 10 of the death of this occur within 4 hours of delivery. 2) Puerperal genital infection, for instance, Toxemia, is still the main cause of maternal death in many developing countries. Having fever is the main symptom of the infection, and the treatment principle is to take antibiotics. The best way is to protect against it by making sure that the childbirth is clean and sanitary. 3) (Pre)eclampsia is the third most important cause of maternal death worldwide. Postnatal women have to suffer from high blood pressure with convulsions or severe high blood pressure in the first day after childbirth.

The above-mentioned problems are the severe postnatal complications leading to maternal deaths. Other possible complications are thromboembolic disease (TED), which is the main cause of the maternal death in developed countries, urinary system complications, reproductive organ complications, breast inflammation and postnatal mental health problems. Moreover, another one is postnatal maternal nutrition. Women's nutrition during their adolescences, pregnancies and feedings puts impacts directly on mothers' and infants' postnatal health; there should be the adequate increases in nutrients that postnatal women should gain for using their energies for feedings (WHO, 1998).

As mentioned above, it can be seen that the maternal death is owing to avoidable causes. Maternal health cares during pregnancy and childbirth and after childbirth can protect and lessen the complications caused by the pregnancy and childbirth. After childbirth, mothers have to adopt birth spacings so as to enable themselves to fully bring up their former children so that they are strong enough to grow up. In addition, mothers need recovery time periods before their next pregnancies. The birth spacing should include the appropriate time period, as mentioned in the following details.

2.2.3 Birth Spacing

Birth spacing is the time period during each childbirth. Many years ago, health service providers suggested mothers about birth spacing of at least 2 years. However, according to the studies in 2000 in Latin America (Population Report, 2002: 4-6), it was evident that 3-5 year birth spacing led to positive effects for maternal health. According to the study done by Latin American Center for Perinatology and Human Development (Centro Latinoamericano de Perinatología y Desarrollo Humano) (CLAP), which was a broad study aiming to assess the impacts of birth spacing on maternal health, data collection of which was from over 450,000 women. This finding depended upon the details indicating health diversity and many statistical reports of confounding factors. According to the researches in the past, the usefulness of long birth spacings was a lot less obvious for maternal health than for child health. In some studies, it was found that birth spacings of less than 2 years put risk on maternal health, according to the recorded data from hospitals during 1985-1997 in 19 countries in Latin America and the Caribbean.

Other studies done by CLAP supported the findings from the study of Demographic and Health Surveys (DHS) as to the birth spacing and newborn health, based on the data collected from over one million pregnant women during 1985 and 2000, they were found to be associated with how pregnancy intervals put impacts on the health of infants from the 28^{th} week in uterus to the first week of their lives. These studies adopted the data of interpregnancy interval, which means the time period from the previous childbirth to the next pregnancy; therefore, there was a data adjustment to be equivalent to the study results from DHS by adding 9 more months, and both maternal and newborn studies were to compare 27-32 months birth spacing with

shorter and longer birth spacings. According to the study results in maternal survival and health, it was found that the women with 27-32 months-birth spacing were more likely to reach a full pregnancy and childbirth than those with 9-14 month-birth spacing or with 69 or more month-birth spacing. In addition, these women were also healthy during and after their pregnancies.

According to the studies, it was as well found out that the women with 27-32 month-birth spacing were less likely to encounter third-trimester bleeding: bleeding after delivery, including placenta previa (when the placenta is in the lower uterus and bleeds), placental abruption (when the placenta bleeds, regardless of location), premature rupture of the membranes (tearing of the amniotic sac surrounding the fetus), anemia and puerperal endometritis (infection of the uterus after pregnancy), than those with 9-14 month-birth spacing. Moreover, the women with 27-32 month-birth spacing were less likely to encounter pre-eclampsia (pregnancy-induced hypertension and high levels of protein in urine), eclampsia (convulsions or seizures with pregnancy-induced hypertension and high level of protein in urine) and gestational diabetes mellitus (high levels of glucose in the blood during pregnancy), than those with 69 month-birth spacing.

Although differences were found with no statistical significance that the women with 27-32 month-birth spacing were little likely to encounter the eclampsia than those with 9-14 month-birth spacing. Besides, it was found that the women with 27-32 month-birth spacing were less likely to die during their pregnancies or childbirth or to encounter the third-trimester bleeding and gestational diabetes mellitus than those with 69 or more months of birth spacing. The women with 27-32 month-birth spacing seemed to be more likely to encounter the bleeding after delivery than those with 9-14 month-birth spacing or those with 69 or more month-birth spacing, as presented in Table 2.2

Table 2.2 Maternal Survival and Health: Findings from the Latin American Center for Perinatology and Human Development Study, 1985–1997.

Risk of Pregnancy-Related Death and Complications Relative to Risk for Mothers Who Give Birth 27 to 32 Months After Their Previous Child, by Birth Interval.

	Birth Intervals (in Months)					
Indicators for Maternal Health	**9–14**	**15–20**	**21–26**	**27–32**	**33–68**	**69+**
Maternal death	250%*	110%	NC		110%	110%
Third-trimester bleeding[1]	170%*	NC	NC		NC	110%
Premature rupture of Membranes	170%*	NC	NC		NC	NC
Anemia	130%*	NC	NC	Com-	NC	NC
Puerperal endometritis	130%*	NC	110%	par-	NC	NC
Pre-eclampsia	NC	NC	NC	ison	110%	180%*
Eclampsia	110%	NC	NC	Group (100%)	120%	180%*
Gestational diabetes mellitus	NC	NC	90%		NC	130%
Postpartum hemorrhage	90%	NC	NC		NC	90%

Note: Confounding factors taken into account include maternal age, parity, mother's education, marital status, cigarette smoking, prepregnancy body mass index, history of miscarriage, history of stillbirth, history of early neonatal death, history of low birth weight baby, gestational age at first prenatal care, number of prenatal visits, geographic area, hospital type, and year of deliver.

* Difference in risk of pregnancy-related death and complications is statistically significant ($p < .05$).

NC=no change in risk

Source: Conde-Agudelo, 2000: 38.

Furthermore, there were the study results of the researchers from the centers in Bogota and Cali, in Colombia (Rich, 2007: 196, 297-308), whereby a systematic review of observation studies investigating the relationship between birth spacing (inter-pregnancy or birth intervals) and adverse maternal outcomes such as pre-eclampsia, labor dystocia, and maternal death, were performed. They analyzed a total of 22 relevant studies, of which 14 were cohort or cross-sectional studies and 8 were case-control studies. The study results were found as follows:

2.2.3.1 Pre-eclampsia

According to the six studies including a total of about 1 million pregnancies, consistently reported there was a significant association between a long interpregnancy interval (defined as ranging from >48 months to >75 months) and pre-eclampsia, with an apparent dose-response relationship. It was found that inter-pregnancy intervals of 5 years or more appeared to be associated with a 60-80 percent increased risk of pre-eclampsia. The researchers suggested that "parous women with long intervals behave as nulliparous women with regard to the risk of pre-eclampsia, as if the protective effect for pre-eclampsia acquired by a women through a previous birth is lost after a long interval."

2.2.3.2 Uterine rupture in women attempting a vaginal birth after a previous cesarean delivery

Three of four studies found an association between a short interval (defined as birth intervals <19 months or <25 months, and an inter-pregnancy interval <6 months) and an increased risk of uterine rupture. Researchers explained this association as incomplete healing of the uterine scar from the previous Cesarean delivery.

2.2.3.3 Anemia

Five studies investigating the relationship of inter-pregnancy intervals and the risk of anemia have produced inconsistent results. Two studies found short intervals (defined as <6 months and <24 months) were associated with a significantly increased risk of anemia, while three have found no such link.

2.2.3.4 Labor Dystocia

A large study involving about 650,000 pregnancies found that labor dystocia was associated with the inter-pregnancy interval in a dose-response relationship – the higher the interval, the higher the risk of labor dystocia is. Researchers explained a

possible link that after delivery, a mother "may gradually lose her child-bearing capacities developed during the preceding pregnancy and physiologically become similar to a primigravid woman if another pregnancy is not timely conceived."

According to what is mentioned above, it can be concluded that the birth spacing relates to the health of mother and newborn infant, and the birth spacing should be of appropriate time period. This is so as to be able to lessen the complications that may occur with both mother and newborn infant. Also, the birth spacing puts impacts on the health of mother and newborn , which can be explained as follows:

Population Report (2002: 7-8) reported that it is difficult to identify what will cause the long birth spacing that affects maternal and infant's health. This is because many factors-such as the number of children a mother already has and her age at childbirth, which influence birth interval and affect child and maternal health. Also, a birth spacing affects more on one child, the preceding child as well as the proceeding child, and either birth interval could be responsible for a child's death as in the following presentation:

1) Maternal Depletion Syndrome

With short birth intervals, do not allow mothers enough time to restore her nutritional reserves after childbirth and breastfeeding. The recent studies confirm that short birth intervals affect mothers' energy, weight and body mass index. A mother's poor nutrition in turn affects fetal nutrition and growth and thus infant survival.

2) Premature Delivery

Some studies showed that shorter intervals are associated with an increased risk of premature birth, but others have showed no such association. Both premature delivery and fetal growth retardation can result in low-birth weight babies, who are at greater risk of dying in infancy.

3) Milk Diminution

If mothers have their next child while they are breastfeeding, they are often less able to produce breast milk for the previous child. When children are weaned too soon, their growth suffers, they are more likely to suffer from diarrhoeal disease and skin infections, and they are thus at greater risk of dying. Milk diminution is more likely to occur as women have more children and are undernourished.

4) Sibling Rivalry

When children are close in age, they compete for resources and for maternal care. Mothers may not be able to breastfeed the older sibling properly, either because her milk flow slows or because her time is taken up by the newborn. Mothers also may not be able to breastfeed the newborn properly, placing the newborn at higher risk for nutritional deficiency, infectious diseases contracted from older siblings, and other health problems as immunity declines. It is unclear whether siblings' competition for resources is important to explain the effects of short spacing, however. The risk of mortality for the older sibling remains the same when the newborn dies, but the risk of mortality for the newborn declines when the older sibling dies or when the older sibling aged five or older.

The reason why the interval longer than 5 years is less healthy is a little known. The researchers from the Demographic and Health Surveys (DHS) and Centro Latinoamericano de Perinatología y Desarrollo Humano (CLAP) suggested that after five or more years of not having children , mothers may lose the protective benefits of previous childbearing, such as the lessened risk of pre-eclampsia and eclampsia. Thus, mothers may be just as likely to experience the health problems associated pregnancy as first-time mothers and their children also could be just as likely to experience health problems or a higher risk of death as first-born children. Many women in developing countries suffer from reproductive health problems—such as pelvic inflammatory disease and uterine fibroids—and are thus less fertile. These women may become pregnant only at lengthy intervals , and their higher risk for pregnancy complications could be due to underlying reproductive health problems, not because of longer intervals.

According to what is mentioned above, it can be seen that maternal good health after pregnancy and childbirth is due to not only the cares in every pregnancy period but also appropriate birth spacing of 3-5 years as the research results suggested.

2.3 Child's Health and Mortality

After childbirth, infants had been evaluated of their health by delivery officers to see whether or not their health is good. If their health is good, they are allowed to go home with their mothers. Most newborn weight is between 2.5-4.5 kilograms with 48-51 centimeters length (Human Reproduction and Birth, 1998: 288 and WHO, 1998, 2008) stated that postnatal infant health and the sickness threatening them are of two major issues as follows:

2.3.1 Life Threatening Infant Morbidity

2.3.1.1 Preterm Birth

Birth at a gestational age of <37 weeks occurs in 5-9% of all pregnancies, with regional differences. In developed countries it is the main cause of perinatal mortality. The mentioned preterm birth affects premature death owing to failed respiratory system, especially immature lung.

2.3.1.2 Smallness for Gestational Age

Low birth weight (LBW, <2500 g, as defined by WHO) may be due to preterm delivery or smallness for gestational age (intra-uterine growth retardation), or to a combination of both. Infants with the preterm birth or low weight tend to have low body temperature, be more likely to get infected, be likely to be in need of life saving assistance and be difficult to be fed.

2.3.1.3 Congenital Anomalies

Congenital anomalies or malformations are an important cause of prenatal and neonatal deaths. The malformations may be caused by infections during pregnancy (rubella, cytomegalovirus infection, toxoplasmosis). Nutritious factor, iodine or folic acid deficiency, may be partly related.

2.3.1.4 Severe Bacterial Infection

Infections are significant causes of mortality and morbidity in newborn infants, both preterm and term. The two principal sources of neonatal infection are the mother and the environment, including the delivery place, the nursery or home. Infections manifesting in the first days of life are usually the result of exposure to microorganisms of maternal origin, infections presenting later have more often an

environmental source though they could manifest around birth. The infection is still the main problem threatening newborn infants in developing countries, for example, maternal pelvis infection. This problem will be obviously lessened if it is made sure that the delivery is done in the clean place.

2.3.1.5 Neonatal Tetanus

The main problem of dreadful infection in newborn infants is through the umbilical cord cut by infected scissors or blades. The best way to protect neonatal tetanus is the delivery, umbilical cord cutting with cleanness and keeping wounds clean, as well as getting pregnant ones vaccinated.

2.3.1.6 Newborns Suffering from Birth Trauma

This may be caused by difficult deliveries It includes fractures, subcutaneous haematomas, damage to the central nervous system like intracranial haemorrhage and spinal cord injuries, and damage to peripheral nerves like brachial plexus injury. The best prevention of birth injuries is an appropriate management of labour and delivery.

2.3.2 Other Serious Infant Morbidities

2.3.2.1 Disturbance of Thermoregulation

Newborn infants adjust themselves to surrounding environments outside maternal uterus by maintenance body temperature. Problematic keeping body temperature is of two issues: hypothermia, which is harmful to the newborn. The baby's body cools down rapidly, unless measures are taken such as keeping them dry and in a warm environment possibly firstly indicating infections, and hyperthermia is usually caused by a too warm environment. In medical sciences, having flu or getting infected cannot be regarded as the cause of the hyperthermia. Clinically hyperthermia cannot be distinguished from fever and an infection should always be considered and ruled out as a potential cause of increased body temperature.

2.3.2.2 Jaundice

This is still the problem frequently found in newborn infants that can disappear itself without any treatments. However, it can be hazardous especially for preterm infants or those with low birth weight.

2.3.2.3 Ophthalmia Neonatorum

This is a purulent discharge from the eyes occurring within the first

month of birth. Routine prophylaxis can be done by applying an antiseptic solution within 1 hour of birth.

2.3.2.4 Neonatal Herpes Infection

This is a serious but relatively rare infection of the newborn.

2.3.2.5 Hepatitis Binfection

If the mother is a carrier of the hepatitis B virus (HBV), there is a high risk of vertical transmission from the mother to the baby during and after birth.

2.3.2.6 Human Immunodeficiency Virus (HIV) Infection

According to the report of WHO (WHO, 2005), it was found that in each year 4 million infants die within one month after deliveries (the neonatal period). Also, according to the reports of USAID 2004 and WHO, 2008, it was found that almost 1 out of 3 of newborn deaths in the first 4 weeks of their lives were caused by infections such as tetanus, sepsis, respiratory infections and diarrhea. Also, birth asphyxia and injuries, complications of prematurity and congenital abnormalities were main causes of newborn deaths. In Thailand, according to the statistical data in 2003 (Factbook Thailand, 2006), it was found that infant mortality rate of 20.0:1,000 live births, the first three main causes of which in 1996 were birth asphyxia , prematurity and pneumonia. For the perinatal death rate in 2002, it was found that it was 9.4:1,000 live births, the causes of which in 1999-2001 were birth asphyxia, maccrated dead fetus and congenital anomaly. In addition, it was also found that low birth weight was still the health problem of children in some areas of Thailand, such as the north, the Northeastern and the central region, as well as the areas with hill tribe groups, low economics and low incomes. According the public health statistics, it was found that in 1990-2001 the proportion of the infants with low birth weight decreased from 10.2 to 8.9 percent. Regarding to birth asphyxia, according to the study in 1995, Thailand's perinatal asphyxia rate was 44.2:1,000 live births, with three factors leading to the perinatal asphyxia: 12.88 percent of the perinatal asphyxia was caused by maternal factors: toximia of pregnancy, ante-partum hemorrhage and hypertension; 61.74 percent by delivery factors: C/S, abnormal presentation, vacuum extraction and prolong labors; and 23.5 percent by fetal factors. In 2002, Thailand's perinatal asphyxia rate was 14.2:1,000 live births.

According to the limitations with regards to economy, society and medical sciences, in 1984 Morsley and Chen (Quoted in Death, Population Data Base, 2008) employed the concepts of proximate determinants to study child's and infant's health and death, proposing that economical, social determinants put indirect impacts on the death via the proximate determinants, which is regarded as a biological determinant. The proximate determinant consists of five groups as follows: 1) maternal influential factors, such as the age of mother, the number of children, the birth spacing and others; 2) declined environments, such as air (affecting respiratory system), water (affecting digestive system) and so on, causing infections to mothers and infants; 3) malnutrition, such as breast feeding, food consumption during pregnancy, child feeding and raising and others; 4) accidental injuries or self-harms; and 5) sickness protections with carefulness and treatment, such as vaccination, health care during pregnancy and so on.

This can be concluded as Figure 2.2

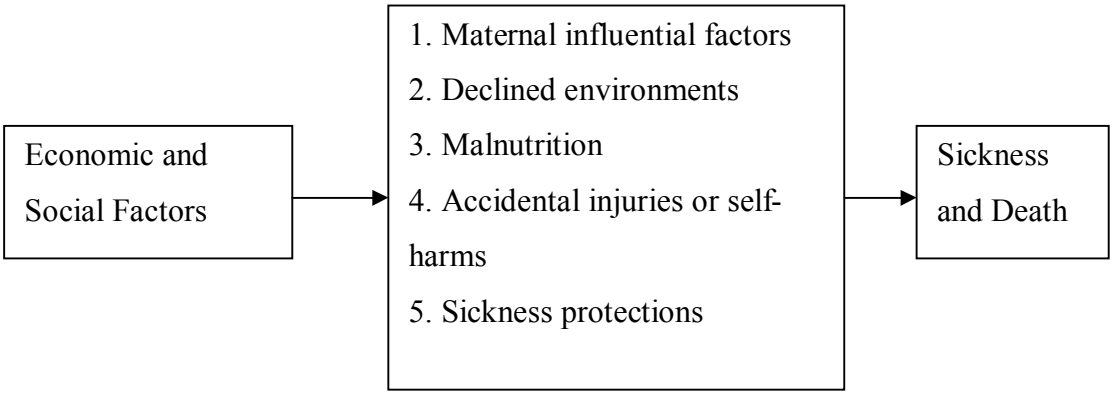

Figure 2.2 The Factors Affecting Maternal Sickness and Death

According to what is already mentioned, we can see that there are so many infants' ailments and deaths, which are related directly to mothers. Many research works indicated with statistical significance that stillbirth and neonatal death can be protected against if all women have appropriate fertility, including adequate good quality cares during pregnancy delivery and the postpartum period. Tinker (2002: 1-4) stated that the good health of newborns is dependent on maternal health. In

developing countries, maternal deaths in childbirth means almost certain death for newborns. When mothers are malnourished, sickly or receive inadequate prenatal and delivery care their babies face a higher risk of disease and preterm death. As a result, the rate of the neonatal death is thus high in the region where the risk of the maternal death is high. In addition, there are the explanations as to the relations between maternal sickness that affect children as follows:

1) Complications of Childbirth

The complications of childbirth can have a significant impact on newborns. Almost 30 percent of neonatal deaths are the result of injuries sustained during delivery.(T. Kusiako, Carine Ronsmans, and L. Van der Paal, 2000: 612). Asphyxia, for example, occurs when the newborn receives an inadequate supply of oxygen immediately before, during, or just after delivery. It is often caused by obstructed labor, a complication that also causes about 8 percent of maternal deaths. It was estimated that 4 million to 5 million newborns suffer from birth asphyxia and more than 1 million die from it. More than a million of those who alive suffer its consequences such as epilepsy, cerebral palsy, and developmental delay.

2) Impact of Maternal Infections

Many stillbirths and newborn deaths caused by infections can be prevented through appropriate maternal care. Mothers may pass sexually transmitted infections to their newborns during pregnancy, delivery or breastfeeding, and one-third of untreated HIV-positive mothers transmit the virus to their infants during perinatal period (between 22 weeks of pregnancy and the first week of life), resulting in nearly a half-million child deaths in 1999. Some sexually transmitted infections can lead to blindness and others are associated with stillbirth, low birth weight and a variety of other complication after birth. Infants are in higher risk due to getting infected when their umbilical cords are cut with dirty tools or treated with unclean instruments. Neonatal tetanus kills about 215,000 infants each year. Mothers are also susceptible to tetanus if their deliveries are unhygienic.

3) The Nutrition Link

The nutritional status of girls and women, even long before pregnancy, affects fetal development and newborn health. Almost one-quarter of newborns in the developing world start life with some degree of impaired growth and micronutrient

status. This condition is largely determined by the nutritional status of the mother. Impaired growth in the womb predisposes infants to have low birth weight, a condition affecting more than 20 million infants in the developing world every year. Low birth-weight infants who survive may suffer cognitive impairment, developmental problems such as poor attention span, and a much higher burden of disease and early mortality as adults than their counterparts who are born with normal weight. Malnutrition often follows an intergenerational cycle, and many women enter pregnancy malnourished. During pregnancy, they may not gain enough weight, which puts their babies at risk for low birth weight. Baby girls born underweight often grow up to be short, underweight adults. Very short women are more likely to have obstructed labor, which is dangerous for both their own health and that of their newborns. And thus, the cycle continues, as displayed in Figure 2.3.

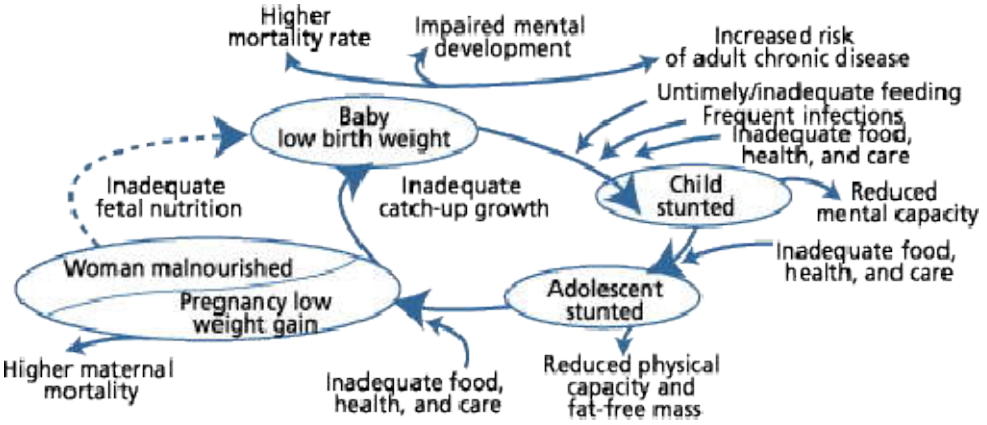

Figure 2.3 Poor Nutrition Throughout the Life Cycle.

Source: Adapted from the ACC/SCN-appointed Commission on the Nutrition Challenges of the 21st Century.

Furthermore, the birth spacing and newborn survival relation is also alluded to. The health of newborns is affected by the timing and frequency of the pregnancy; the women who give birth when they are too young or too old or have babies too closely spaced, place themselves and their newborns at increased risk of complications. According to the research results, there was an association between

newborn and infant mortality and birth interval. Infants born less than two to three years apart are significantly more likely to die. In addition, women who have delivered many children are at a higher risk of maternal mortality, and their newborns are at increased risk of death as well.

According to what has been already mentioned, it can be concluded that child's heath depends on those of mother; if mothers have good health, their children will also be the same. Maternal good health depends on the birth spacing, which is the recovery time period before the next childbirth. Thus, the birth spacing also affects child's good heath.

It was estimated that in every country, several thousand children can survive if all women have the birth spacing of at least 3 years or more. According to the study in 2002 (Quoted in Population Report, 2002: 1-4), done by the researchers for the study on Demographic and Health Surveys (DHS), it was found that children born 3-5 years after the previous birth are healthier at birth and more likely to survive at all stages of infancy and childhood through age five than children born before 3 years. The study has assessed outcomes of more than 430,000 pregnancies from 18 countries by comparing children born 3-4 years with children born less than 2 years, between children born 2-3 years , born 4-5 years and 5 years or more years after previous birth. The study result was that if mothers space their birth 3-5 years, compared with spacing their birth less than 3 years, their infants were more likely to survive in every stage of childhood, such as perinatal period (28 weeks gestation through the first week of life), the early neonatal period (the first week of life), the neonatal period (the first 28 days of life), from neonatal until 12 months and until 5 years.

When the comparison has been made with the newborns born less than 2 years after the previous birth, it was found that the children born 3-4 years after previous birth were 1.5 times more likely to survive in the first week of life, 2.2 times more likely to survive in the first 28 days of life, 2.3 times more likely to survive in the first year of life and 2.4 times more likely to survive until the age of five.

Moreover, not only were the children born 3-5 years after the previous birth more likely to survive, but they are also very less likely to encounter malnourishment during their infancy and childhood until the age of five. Also, it was found that the children born 3 or more years after previous birth are less likely to

suffer from short height for age and low weight for age than children born less than 3 years after the previous birth , as showed in Table 2.3

Table 2.3 Infant and Child Survival and Health: Findings from the Demographic and Health Surveys Study, 1992–1997.

Risk of Death and Health Problems Relative to Risk for Children Born 3 to 4 Years After the Previous Birth, by Birth Intervals*

	Birth Intervals (in Months)								
	< 42		**24-35**		**36-47**			**48+**	
Period of Child's Life									
Perinatal[1]	137%		105%		Comparison			140%	
Stillbirth[2]	131%		108%		Group			179%	
Early neontal[3]	152%		113%		(100%)			119%	
	< 17	18-23	24-29	30-35	36-41	42-47	48-53	54-59	60+
Neonatal[4]	317%	164%	126%	123%	Com-par-ison Group (100%)	117%	95%	93%	105%
Under age one[5]	316%	186%	143%	126%		108%	88%	103%	116%
Under age five[5]	281%	185%	151%	120%		105%	75%	80%	82%
Indicators of Child Health									
Stunting	140%	122%	128%	120%		93%	97%	82%	79%
Underweight	146%	120%	129%	111%		112%	95%	92%	78%

* Perinatal mortality, stillbirths, and early neonatal mortality were analyzed by year rather than month. The analysis did not separate 4- to 5-year intervals from intervals of 5 years and more. Intervals of 4 to 5 years do not appear healthier than intervals of less than 3 years because a higher mortality for children born after 5 years inflates the risk.

Note: Confounding factors taken into account include the length of the preceding birth interval, sex of child, birth order, mother's age at birth, survival of the preceding child at time of current child's birth, type of provider of prenatal care, timing of prenatal care, number of prenatal tetanus vaccinations, urban/rural residence, mother's education, index of household wealth, type of person attending the delivery, whether the child was wanted, and whether birth resulted from contraceptive failure.

[1] From 28 weeks gestation through the first week of life. Data pooled from 18 countries

[2] Data pooled from 18 countries

[3] The first week of life. Data pooled from 18 countries.

[4] The first 28 days of life. Difference in risk of death and health problems is statistically significant in 14 of 17 countries studied, $p < .001$ in all countries except Tanzania ($p < .01$) and the Philippines ($p < .05$). A p value measures chance. A p value < .001 shows that there is less than a 0.1%, or 1/1000 likelihood that the difference in risk is due to chance alone.

[5] Difference in risk of death and health problems is statistically significant in all 17 countries studied ($p < .001$).

Source: Rutstein, 2002: 159, 161.

In addition, according to the study carried out in 2000 in Latin American (Quoted in Population Report, 2002: 4-6) by Latin American Center for Perinatology and Human Development (Centro Latinoamericano de Perinatología y Desarrollo Humano) (CLAP), it was found that not only did the birth spacing put positive impacts on maternal health, but it also did the same impact to perinatal survival and health. Children born 27 to 32 months after the previous birth are more likely to survive in the perinatal period (28 weeks gestation through the first week of life) than those born at 9 to 14 month intervals.

Even though the difference is not statistically significant. Besides, it was also found that children born 27-32 months intervals were more likely to survive in the perinatal period than those born at 15 to 20 month or 21 to 26 month intervals. Infants born 27 to 32 months after the previous birth were also more likely to survive in the perinatal period than those born 69 months or more. It was estimated that if women spaced their births a minimum of 27 to 32 months apart, perinatal mortality in Latin America could decline by as much as 14%, from 39 deaths per 1,000 births to roughly 34 deaths per 1,000 births. The total number of perinatal deaths could fall by 60,500 per year.

Newborns are also healthier at birth if they born at 27- to 32-month intervals than those born either at 9- to 14-month or 15- to 20-month intervals. They are less likely to be low in weight (<2500 grams) or to be very low in weight (<1500 grams) at birth, to be born preterm (before 37 weeks gestation) or very preterm (before 32 weeks gestation), to be small for their gestational age, or to have a low Apgar score five minutes after birth. The Apgar score is a composite index of a newborn's status. It reflects respiration, heart rate, muscle tone, reflex response, and skin color at birth. Also, newborns born after the interval of 27 to 32 months are healthier than those born after a longer interval, particularly those born after 69 months or more. They are less likely to be low or very low in weight at birth, premature, or very premature. (See Table 2.4)

Table 2.4 Perinatal Survival and Health: Findings from the Latin American Centerfor Perinatology and Human Development Study, 1985– 2000.

Risk of Perinatal Death and Health Problems Relative to Risk for Infants Born 27 to 32 Months After the Previous Birth, by Birth Interval.

	Birth Intervals (in Months)							
Indicators for Perinatal Health	**9–14**	**15–20**	**21–26**	**27–32**	**33–44**	**45–56**	**57–68**	**69+**
Very preterm delivery[1]	327%*	133%*	103%		101%	NC	97%	116%
Preterm delivery[2]	231%*	115%*	NC		NC	101%	104%	109%
Fetal death[3]	240%*	124%*	107%		106%	109%	108%	121%
Very low birth weight[4]	225%*	123%*	NC	Com-	107%	102%	104%	115%
Low birth weight[5]	214%*	115%*	102%	par- ison	102%	NC	103%	119%
Early neonatal death[6]	202%*	127%*	108%	Group (100%)	102%	103%	105%	118%
Small for gestational age	125%*	117%*	101%		NC	101%	NC	101%
Low Apgar score at 5 minutes	118%	92%	109%		108%	107%	94%	105%

Note: Confounding factors taken into account include maternal age, parity, mother's education, marital status, cigarette smoking, prepregnancy body mass index, history of miscarriage, history of stillbirth, history of early neonatal death, history of low birth weight baby, gestational age at first prenatal care, number of prenatal visits, geographic area, hospital type, and year of delivery.

* Difference in risk of death and health problems is statistically significant ($p < .05$).

NC = no change in risk

[1] Before 32 weeks gestation

[2] Before 37 weeks gestation

[3] During the last 28 weeks of gestation

[4] <1500 grams

[5] <2500 grams

[6] During the first week of life

Source: Conde-Agudelo, 2002: 36.

In addition to the fact that children's health at birth depends on the birth spacing including vaccination and breast feeding. Regarding infant vaccination, WHO suggested that immunization should begin at the postnatal period. The vaccination is important for the prevention of infants' (diseases and disabilities) for example, tuberculosis, diphtheria, tetanus, pertussis, and poliomyelitis. Breast feeding (WHO, 2008) is useful for both mothers and their infants. The infants can get full, balanced and adequate nutrients which can prevent malnutrition or obesity. Other chemicals apart from the nutrients received include: hormones, enzymes, the chemicals controlling organ growth and contributing to body growth and the activity of some body organs, immunity and disease-protective chemicals. Breastfeeding will also help reduce the incidence inchildren of the allergy, diabetes and tooth decay as well as getting love, warmth and care from their mothers. For the positive impacts on mothers, breast feeding causes their wombs to be well shrunk, to be fast recovered and to get rid of lochia due to hormones, their body will be in shape due to the fact that the fat accumulated during their pregnancies is used to produce breast milk, increasing motherhood feeling due to the commitment to their children, lengthening the period betweens pregnancies. For the mothers who only breastfeed their children and never skip breast feeding longer than 5 hours, and menstruation has not started, 98 percent of them will have a chance not to get pregnant within the first six month after delivery. So breast feeding is useful as a contraceptive. Other benefits of breast feeding includes time saving since breast milk as always available all the time with appropriate temperature, family expense saving and less chances to get breast and ovary cancer.

According to what has been mentioned, it can be concluded that infant's good health depends on maternal health. The birth spacing, including tetanus toxoid immunization for mothers, clean delivery care, umbilical cord care, eye care, early and exclusive breast feeding and giving antibiotics can lessen the deaths related to infections. Keeping babies warm, resuscitation techniques and skilled birthing professionals can prevent birth asphyxia and deaths causing by other factors related to delivery injuries. In addition, the syphilis control and getting enough iron can lessen inborn disabilities (USAID and WHO, 2008).

2.4 Conceptual Framework

According to the review of literatures and the related researches, the independent variables that were used to study the birth spacing affecting mother's and infant's health in each birth are as follows.

2.4.1 The Factors Affecting Mother Health in The Postpartum Period

2.4.1.1 Age at Pregnancy

2.4.1.2 Prenatal Care

2.4.1.3 Complications and Risk Pregnancy

2.4.1.4 Type of Birth

2.4.1.5 Birth Interval

2.4.2 The Factors Affecting Infant Health in The Postnatal Period

2.4.2.1 Mother's Age at Pregnancy

2.4.2.2 Complications and Risk Pregnancy

2.4.2.3 Type of Birth

2.4.2.4 Immunization

2.4.2.5 Breast Feeding

2.4.2.6 Birth Interval

CHAPTER 3

RESEARCH METHODOLOGY

This research is conducted by using qualitative methodology and the data were gathering from the survey. The aim of this chapter is to present the details regarding the sources and the research procedures. The following topics were covered: Population and Sample, Operational Definitions of the Research Variables, Construction of the Research Instruments Measurement of the Variables, Data Collection, Measuring Variables, and Description of General Characteristics the of Samples.

3.1 Population and Samples

3.1.1 Population

Population consisted of all married women ages 15-49 with at least 1 child, excluding those living in Bangkok. In 2005, according to the Department of National Statistics, the total number of women in this category was 10,970,400 (Nation Development of Statistics, 2008)

3.1.2 Sample Size

The sample size of the married women for conducting this research was calculated by using the Yamane formula (Yamane, 1973: 125) as follows:

$$n = \frac{N}{1+Ne^2}$$

where n = size of sample group

$e = 0.03$

$$n = \frac{10,970,400}{1+10,970,400(0.03)^2}$$

$$= 1,111$$

3.1.3 Sampling Method

In order to select the samples, stratified-multistage random sampling method was employed and in each stage, simple random sampling was used (see figure 3.1). The detailed procedures were as follows:

Stage 1 Divide all provinces, excluding Bangkok, into 4 regions: Northern, Central, North Eastern, and Southern regions.

Stage 2 The total number of selected provinces was 24. Provinces were randomly selected proportionally from each region. The provinces selected from the Southern region were Phatthalung, Trang, Nakhon Si Thammarat, Surat Thani, and Chumphon. The provinces selected from the Central region were Chachoengsao, Nakhon Nayok, Nakhon Pathom, Sa Kaeo, Kanchanburi, Suphan Buri, Ayutthaya, and Sing Buri. The provinces selected from the Northern region were Nakhon Sawan, Phichit, Phetchabun, Phitsanulok, Phayao, and Chiang Mai. And the provinces selected from the North-Eastern region were Nakhon Ratchasima, Buriram, Khon Kaen, and Ubon Ratchathani.

Stage 3 Two districts (amphur) were randomly selected from each selected province.

Stage 4 Two townships (tambon) per were selected from each selected district.

Stage 5 Four villages (mooban) were selected from each selected township.

After villages were chosen, surveys were administered with the married women aged 15-49 who had at least 1 child.

Table 3.1 Distribution of the Total Population and Sample Size by Region

Regions	**Population (thousands) (married women ages 15-45)**	**Sample Size (number of women)**
Central (excluding Bangkok)	3,013.6	350
North	2,207.2	255
North East	4,175.0	335
South	1,574.6	260
Total	**10,970.4**	**1,200**

Table 3.2 Distribution of Number of the Samples by Province

Region	Sample Size
Central	350
Chachoengsao	50
Nakhon Pathom	50
Nakhon Nayok	40
Sa Kaeo	30
Kanchanburi	50
Suphan Buri	40
Ayutthaya	50
Sing Buri	40
North	255
Nakhon Sawan	40
Phichit	40
Phetchabun	45
Phitsanulok	40
Chiang Mai	60
Phayao	30
North East	335
Nakhon Ratchasima	100
Buriram	80
Khon Kaen	55
Ubon Ratchathani	100
South	260
Phatthalung	50
Trang	50
Nakhon Si Thammarat	55
Surat Thani	50
Chumphon	55
Total	**1,200**

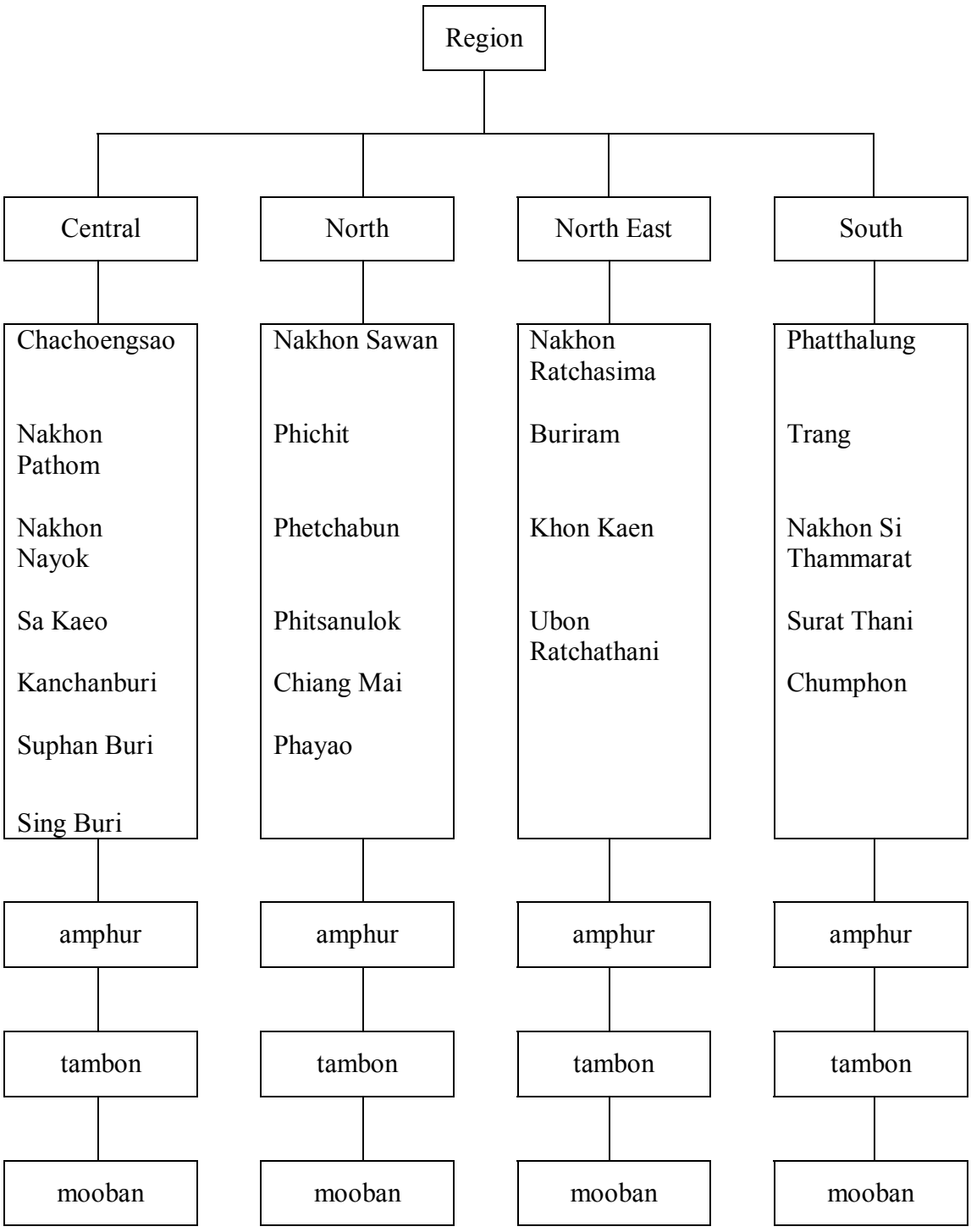

Figure 3.1 Sampling Method

3.2 Operational Definitions of the Research Variables

Before introducing the methods used to construct the research tools, the operational definitions of the research variables were presented as follows:

3.2.1 Birth interval refers to the space between the births of the next child

3.2.2 First birth interval refers to the duration after marriage to the first child birth

3.2.3 Newborn refers to infants 4 weeks old

3.2.4 Neonatal mortality refers to death of baby within 28 days of life

3.2.5 Post neonatal mortality refers to death of baby within 28 days to 1 year of life

3.2.6 Perinatal mortality refers to death of fetus during late pregnancy, childbirth or within 7 days after birth

3.2.7 Risk factors during pregnancy refers to complications that may occur during pregnancy as the results of the following factors:

3.2.7.1 Substance Use (cigarettes, alcohol, drugs)

3.2.7.2 Age < 17 or > 35 years

3.2.7.3 Previous Child Delivered before Gestational Age Reach 37 weeks

3.2.7.4 Previous Child Weighs < 2,500 or > 4,000 grams

3.2.7.5 Underwent Hysterectomy

3.2.7.6 History of Heart Disease

3.2.7.7 History of 3 Miscarriages

3.2.7.8 Anemia During Pregnancy

3.2.7.9 Positive Test for VDRL

3.2.7.10 Suffering from Diffuse Goiter

3.2.7.11 Hypertension Greater than or Equal to140/90mmHg

3.2.7.12 Proteinuria

3.2.7.13 Patient of Heart Disease or was Diagnosed with Heart Disease

3.2.7.14 Size of Uterus not in Relation to Gestational Age

3.2.7.15 Pregnant with Twins

3.2.7.16 Abnormal Position of Fetus (not the head position) after the 34^{th} week of Gestational Age

3.2.7.17 Bleeding During Pregnancy

3.2.7.18 Pregnant over 40 weeks

3.2.7.19 Weight Increases <1 kg./M after 24 weeks of pregnancy

3.2.7.20 Fetus moves less than 10 times per day after 32 weeks of pregnancy

3.2.7.21 Genitourinary Disorder/ Urinary tract diseases

3.2.7.22 Height Below 140 centimeters

3.2.7.23 Weighs 80 kgs. or more

3.2.7.24 Abnormal from iliac crest

3.2.7.25 Miscarriage as a result of loosely attached placenta or early expulsion of placenta

3.2.8 Health of mother after child birth refers to complications that may occur to the mother 6 weeks after child birth. These complications may include:

3.2.8.1 Excessive loss of blood during child birth

3.2.8.2 Excessive loss of blood after child birth

3.2.8.3 Anemia

3.2.8.4 Infected Pelvis

3.2.8.5 Hypertension During Child Birth

3.2.8.6 Genitourinary Disorder

3.2.8.7 Mental Illness

3.2.8.8 Nutrition Deficiency

Mothers with a good health after child birth are those having no complications mentioned above.

3.2.9 Health of newborn refers to complications that may occur to newborn 7 days after birth. These complications may include:

3.2.9.1 Congenital Disability

3.2.9.2 Infection after Birth

3.2.9.3 Infection of Respiratory System

3.2.9.4 Tetanus after Birth

3.2.9.5 Infected Umbilical Cord

3.2.9.6 Injured or Wounded from Delivery

3.2.9.7 Lack of Oxygen

3.2.9.8 Pre-mature Delivery

3.2.9.9 Low Birth Weight

3.2.9.10 Low body temperature

3.2.9.11 Risk of death from infection

3.2.9.12 Difficult to be breast fed

3.2.9.13 Underwent numerous life resuscitation

3.2.9.14 Physiological jaundice of newborn

3.2.9.15 Serious conjunctivitis infection

3.2.9.16 Diarrhea

Newborns with a good health after birth are those having no complications mentioned above.

3.3 Research Instruments

The questionnaire was used to collect the data regarding the consequences of birth intervals on the health of the sampled mother and newborns. It was developed by applying the concepts and principles derived from literature review. Parts of the questions were adapted from the questionnaire used in the project on Thailand Demographic and Health Surveys (DHS) that was developed in 1987 to study demographic, health, and nutrition of the sampled households. The details of the questionnaire were as follows.

Part 1 Personal Characteristics and Background Information. The part consisted of the questions regarding age, religion, education level, profession, and income of the respondents.

Part 2 Fertility Status. This part composed of the questions regarding age of first menstruation, marriage age, and number of sexual intercourse a work.

Part 3 Birth Intervals of Different Birth Orders. The questions in this part concerned with pregnancy, miscarriage, methods of birth control used, and menstruation before and after child birth.

Part 4 Health of Mother and Newborn. This part consisted of the questions in regards with age of pregnancy and child birth, care and caution taken during pregnancy and complications occurring during pregnancy, care and caution

taken during child birth and complications occurring during child birth, survival and health of mother after child birth, breast feeding, sexual abstinence, survival and health of newborn, and health of child during different stages of the child's age.

Parts of the questionnaire were checked for face validity by the theses advisor before having it pretested. The pretest has been don with the sampled group of mothers aged 15-45 who have at least 1 child and resided in Muang District, Chaiyaphum Province. Revision of the questionnaire has been done before using with the sampled respondents.

3.4 Data Collection

The data collection was carried out by the local surveyors who had been trained about the data collection skills in regards with interview techniques. Each person was given a handbook to ensure a common understanding about the interview. Data collection was done May to August 2007. A total of 1,200 questionnaires were distributed to the sampled provinces in each region, however 1,098 completed questionnaires were returned. All returned questionnaires have been taken for inspection and the answers were verified by checking with mothers' pre-natal care handbook, which provided the details on the health of mothers and newborns. Totally 800 handbooks (78 percent) were used to validate the data collected.

Characteristics and methods used to measure dependent variables were explained in greater detail in the next chapter but meanwhile, the simple and easy explanation was presented in Table 3.3.

Table 3.3 Measurements and Details of Variables Used

Variables	Measurement	Details
Independent Variable		
Maternal health after childbirth	Nominal	1. Unhealthy
		2. Healthy
Child health after birth	Nominal	1. Has complications
		2. No complications
Independent Variable		
Birth Interval	Interval	$\leq$ 35 months
		36-60 months
		$\geq$ 61 months
Age at Pregnancy	Interval	$\leq$ 19 years
		20-30 years
		30-34 years
		$\geq$ 35 years
Prenatal care	Nominal	1. No
		2. Yes
Complications and risk pregnancy	Nominal	1. No
		2. Yes
Mother's vaccination for tetanus	Nominal	1. No
		2. Yes
Type of birth	Nominal	1. Normal labour
		2. Cesarean birth
Imminization	Nominal	1. Incomplete
		2. Complete
Breast feeding	Interval	1. No
		2. Yes

3.5 Data Analysis

Descriptive statistics were used to analyze the characteristics of the sampled group in relation to the characteristics of independent and dependent variables by presenting them in terms of frequency, percentage, arithmetic mean, standard deviation, and the highest and lowest values.

3.5.1 Pattern of birth intervals and the comparison between birth order. The statistics used were: frequency, percentage, arithmetic mean average, standard deviation, maximun and minimum values, and cross tabulation for each birth order.

3.5.2 The consequences of birth interval on the maternal and child health. The analysis was divided into 2 parts:

3.5.2.1 The consequences of birth interval on maternal health. Independent variables included age at pregnancy, prenatal care, complications and risk pregnancy, mode of delivery, and birth interval. Dependent variable included maternal health.

3.5.2.2 The consequences of birth interval on child health. Independent variables included age at pregnancy, complications and risk pregnancy, type of birth, immunization, breast feeding, and birth interval. Dependent variable included child's complications.

Regarding the study on the consequences of birth interval on maternal and child health 2 values for the independent variables were set as having, complications and without complications. Therefore, logistic regression was used to analyze the effects of the dependent variables as mentioned above as regards to the health of mother after child birth the and health of child after birth.

3.6 General Characteristics of the Samples

Table 3.4 showed the general characteristics of the samples. It was found that: the average age of the samples was 31.20 years, with the lowest and the highest of 15 and 46 respectively. The largest group of the age interval was 30-39 years (57.7 percent), 97.5 percent of the respondents were Buddhists, 29.3 percent finished secondary school, 31.1 percent were employees, and the similar finding percentages

were found between those who had income below 5,000 baht and 5,001-10,000 baht per month (33.3 percent and 33.2 percent respectively).

Table 3.4 General Characteristics of the Samples (N=1,098)

General Characteristics	Percentage
Age (years)	
≤ 19	1.5
20-29	34.2
30-39	57.7
≥ 40	6.5
Ave. age (SD)	31.20 (5.49)
Youngest (yrs.)	15
Oldest (yrs.)	46
Religion	
Buddhism	97.5
Christ / Islam	2.5
Education	
none	3.0
Primary	25.0
Junior Secondary	29.3
Senior Secondary	18.2
Diploma and higher	24.7
Main Occupation	
Government Service/State Enterprise	17.7
Private Company/Labor	31.1
Trade / Personal Business Owner	14.8
Agriculture	25.0
None	11.4
Income (Baht)	
≤ 5,000	33.3
5,001-10,000	33.2
10,001-15,000	11.7
15,001-20,000	5.7
>20,000	4.6
None	11.4

CHAPTER 4

THE PATTERN OF BIRTH INTERVALS

With regards to the pattern of birth intervals, pregnancy and abortion, fertility, the birth interval in that order of the live birth, beginning from the age at first marriage to the first delivery, the first birth interval until the second delivery, the second birth interval until the third delivery, the actual versus preferred birth intervals and the awareness of birth intervals, were presented in this chapter, as follows:

4.1 Pregnancy and Abortion

Table 4.1 showed the history of the pregnancy and the number of children, it was found that out of all 1,098 samples, there were 69 one-parity women , 806 two-parity women and 223 three-parity women. At the time of the data collection was carried out, it was found that (1) the one-parity women had 69 live births (100%); (2) the two-parity women had 927 live births (94.5%), 51 abortions (5.0%) and 6 dead births (0.6%) and (3) the three-parity women had 196 live births (87.9%), 25 abortions 11.2%) and 2 dead births (0.9%). The study of the pattern of the birth interval in each birth order of the live birth which studied with only the live births, not including the abortion. Therefore, the number of the children involved in the study of the birth interval pattern in each order of the live birth was 1,055 for the first birth order, 978 for the second birth order and 198 for the third birth order. See Table 4.2.

Table 4.1 Pregnancy History and Parity

Data	1st Parity n = 69	2nd Parity n= 806	3rd Parity n = 223
Life Birth	100.0	94.5	87.9
Abortion	0	5.0	11.2
Death	0	0.6	0.9

Table 4.2 Children in Each Birth Interval

Information	Parity
1st Birth Interval	1055
2nd Birth Interval	978
3rd Birth Interval	198

4.2 Fertility

Table 4.3, showed the details about fertility of the sampled group. Actually fertility begins when women have the menarche (first menstruation in their lives). The data in Table 4.3 showed that the average age of the samples when they had the menarche was 13.64 with the lowest age of 11 and the highest of 17. This finding was congruent with the average age of Thai girls nationwide when they had the menarche which was about 12.3+1.2 years (Khanjanathiti, 1972). But this age was higher than the average age of menarche in the United States, is which was 12.5 years. (Anderson, and Must, 2008)

In regards to the age at first marriage, the average age at first marriage of the samples was found to be 21.65, with the lowest and the highest age of 13 and 44 years. Regarding the marriage age, most of them (60.5%) were married during the ages of 20-29. The mentioned average age at first marriage was lower than that of Thai women in 1990 which was 23.5 (Annual Report, 1995) and lower than the age at first marriage of women of the world in 2006 which was 25.5 (Bureau of the Census, 2008). This finding showed that the samples got married earlier than those in the past.

The data in Table 4.4, showed the average number of sexual intercourse a week. It was found that the highest percentage of the 3 birth intervals (50.2, 49.1 and 50.4 percent respectively) indicated that they could not remember/uncertain about the average number of sexual intercourse performed week. However, according to the data of 2005 Global Sex Survey report, it was found that globally people having sex with an average of 103 times a year or approximate nearly by 2 times per weeks (1.98) and having sex an average of 97 times per weeks or approximate 1.86 times

per week. (Durex, 2005) In Thai society the sex-related conversation was inappropriate to reveal or publicize. Therefore, in answering any questions regarding sexual intercourse, most of the sampled women were unable to remember the exact number or were uncertain about the number of sexual intercourses performed.

In general, the number of the regular sexual intercourse of 96 times a year or 2 times week is likely for 80 percent of getting pregnant if they did not used birth control method. (Cited in Phanthasak Sukralerk, 2008). Even though the data of this study showed that most sampled women were uncertain about the number of sexual intercourses performed, but if those sexual intercourses performed during ovulation, which is approximately during the middle of the menstruation cycle at the 14th day after the first day of the previous menstruation, without any birth control methods or with the failed ones, they may get pregnant (Fertility, 2008).

Table 4.3 Fertility of the Samples

Information (n=1098)	**Percent**
Age of menarche (years)	
≤ 12	23.4
13-14	48.7
≥ 15	27.9
Average age (SD)	13.64 (1.36)
Minimun (years.)	12
Maximun (years.)	17
Age at first marriage (years)	
≤ 19	34.2
20-29	60.9
30-39	4.7
≥ 40	0.2
Average age (SD)	21.65 (4.29)
Minimun (years.)	12
Maximun (years.)	44

Table 4.4 Number of Sexual Intercourse Per Week and Reasons for Having Children

Information	1st Birth interval	2nd Birth interval	3rd Birth interval
Sexual intercourse per a week (time)			
0-1 times	14.5	19.9	27.2
2-3 times	30.1	28.3	21.1
≥ 4 times	5.2	2.7	1.3
Can't remember/uncertain	50.2	49.1	50.4

4.3 Birth Interval

In order to study the pattern of the birth intervals, the details of every birth interval were collected and the birth intervals were divided into groups based on the full-term pregnancy whereby averagely the gestation period was 9 months (Pregnancy, 2008). Thus, the shortest birth interval starts with 9 months. In order to figure out its more details, the birth intervals were divided into the interval of 6 months. The details of the birth interval in each birth order of the live birth were presented as follows:

4.3.1 The First Birth Interval

Table 4.5 showed the first birth interval (after marriage), it was found that the samples delivered their first children after marriages with the average birth interval of 21.99 months (1.10 year), with the shortest interval of 9 months and the longest one of 132 months (11 years). With the consideration of the birth interval of 6 months, it was found that most of the samples (almost 60 percent) had the birth interval of 9-14 months, 57.7 percent had the birth interval of 9 months-1.2 years, and the lowest number of them (0.7 percent) had the interval of 27-32 months (2.3-3 years). This finding indicated that most of the samples had their first children within two years. This finding was relevant to the average of the first birth interval of China, which was found that women had their first children within 2 years after marriages (Zheng, 2000).

In regards with birth control methods used to postpone the first birth after marriage, it was found that almost 60 percent of the samples used the contraceptive method (58.9 percent). The most used contraceptive method mostly used was oral contraceptive pill (76.0%) and the lowest one was condom together with coitus interruptus (0.6%). Regarding contraceptive failure, it was found that most of them, (78.6%) had no contraceptive failure. This finding was congruent with the review of the literature that in developing countries the total potential demand for contraception to space births is large-at about one-third of all women of reproductive age. Based on the Population Reports analysis of 54 countries with data from the DHS. Married women with few children account for most of the potential demand for birth spacing. Also, some married women with no children want to delay first births.(Quoted in Population Reports, 2002: 12)

For the reasons for having first children, 80.2 percent, samples or spouses themselves wanted to have children, while 4.5 percent indicated that they decided to have children because their parents/paternal grandparents/maternal ones or spouses wanted to. This finding showed that there are no cultural norms and customs that influence woman's birth. Couples who face pressure for childbearing from their families or society want to have their first child soon after marriage and continue to have children rapidly. In some societies having many children and having them quickly is a sign of male virility and female fertility. (Quoted in Population Reports, 2002: 17) Also, this finding was congruent with the change of Thai families whereby in the past Thai family is a relative system with the living together of at least 3 generations (paternal grandparents/maternal ones/parents and children). As the result, the decisions on family's different issues, including the having of children, was the major role of family seniors. In extended families, the people who were responsible for raising children were mainly paternal grandparents and maternal ones. Afterwards, economic and social changes led to approximately 50 percent of families being nuclear families (National Statistical Office of Thailand, 2008), and the relationship between family members has been changed to a separated living. In general, when spouses want to have children they usually rearing children considered the ones who will rearing their children. For the extended family, rearing children is mainly the duty of the child care center; therefore, the decision to have children is only the spouses.

Concerning the first birth interval, it can be explained that most of the spouses do not decide to have children immediately after marriage. Generally, after marriage, most of them usually spend a time period to adapt and learn each other's needs, which is the foundation of the couples' life; also, some couples spend a time period in the preparation of their bodies, their minds, as well as family's economical status, before having children. As the result, birth control is mostly to postponement of having children. The adopted contraceptive method is mainly to take oral contraceptive, which is relevant to the statistical data of the Department of Health that most of the women (36.7%) adopted the contraceptive method of the oral contraceptive pill (The Department of Health, 2005). This contraceptive method is very popular because it can be used or stopped at once if they want to have children. The inferior one is the oral contraceptive, which is effective and highly safe and can be used for the people of every age and for women both with and without any children. Also, it is noticeable that the contraceptive method most employed for delaying first births is for female than male. The least adopted one is the condom together with the coitus interruptus. The condom is used not only for preventing the pregnancy but also for preventing the sexually transmitted infections (STI), including HIV/AIDS. The coitus interruptus, also known as the withdrawal method, is the practice of ending sexual intercourse ("pulling out") before ejaculation. The main risk of coitus interruptus is that the man may not perform the maneuver correctly, or may not perform the maneuver in a timely manner. Although concern has been raised about the risk of pregnancy from sperm from pre-ejaculate. However, there are also still some pregnancy chances; therefore, this is not a recommended for the effective birth control method (Birth Control, 2008). Thus, this method was not popular to postpone pregnancy. The mentioned data are congruent with the study results of Nittaya Kiatying-ungsulee and colleagues (Nitaya Kiatying-ungsulee et al, 2003), who studied the drug system and Thai women health with the case study of the oral contraceptive pill. It was found that women mainly take responsibility for birth control. Thai women adopt the oral contraceptive pill with the highest proportion and tend to adopt more contraceptive injections. This means that in the long term they are in higher risk of the ailments due to the undesirable symptoms of using the birth control method. Whereas men play very few roles in the birth control due to the lack of intensive supportive government policies for male

roles, as regards to vasectomy and condom as well as the decreased trend of condom promotion for birth control. Even though everyone confirms that the condom adoption is the only method for the birth control and lessening the risk of getting sexually transmitted infections and HIV/AIDS simultaneously.

Table 4.5 The First Birth Interval (After Married)

Information (n = 1055)	**Percent**
The First Birth Interval (months)	
9-14	57.4
15-20	0.9
21-26	21.8
27-32	0.4
33-38	9.1
45-50	4.6
57-62	3.0
≥63	2.7
Average age (SD)	21.99 (16.31)
Minimun (years)	9
Maximun (years)	132
Contraception Use for Birth Spacing	
Used	58.9
Did not use	41.1
Contraception Method used After Marriage (n = 621)	
Oral contraceptive pill	76.0
Contraceptive injection	7.9
Condom	4.5
Coitus interruptus	3.3
Condom + Calendar-based methods	3.7
Condom + Coitus interruptus	0.6
Calendar - based methods +Coitus interruptus	1.8
Condom + Calendar-based methods+Coitus interruptus	2.2
Contraceptive Failure (n = 621)	
Yes	21.4
No	78.6
Reason for Having Children (n = 1055)	
The samples or spouses themselves want to have	80.2
Parents/paternal grandparents/maternal ones or spouses want to have	4.5
Unplanned pregnancy	15.3

4.3.2 The Second Birth Interval

Table 4.6 showed the detail information about second birth interval, which is the time interval from the first child's birth date until the second child's birth date, it was found that the samples have the shortest birth interval of 11 months, with the longest one of 266 months (22.2 years) and the average of 57.08 months (4.9 years). This average increased by an average of 5 months from the surveys in 1987 which was found a birth interval of 52.9 months. (Wongboonsin and Knodel, 1987: 10). Besides, longer interval was found in the of the developing countries with the average of 32 months for 25.09 months (2.1years). This was congruent with the review of the literature, which was found that many women need to space births longer in order to get the health benefits. (Population report, 2002: 8-10). When the consideration by birth interval was made it was found that most of the samples (11.3%) had the birth interval of during 33-38 months (2.9-3.2 years). According to the review of the literature the appropriate birth interval of 36-60 months (3-5 years) was beneficial for mother's and infant health. (Quoted in Population report, 2002: 4-6)

According to the data, it was notable that the birth interval which was close to number of the birth interval that was to the mostly found was during 21-26 months (1.9-2.2 years), with the percentage of 10.7. This can be explained that generally, after the childbirth, mothers have been suggested to take the 2-3 years birth interval. If they comprehend that birth interval is the interval between the childbirths of the previous child and the next pregnancy, if they leave a space of 2 years until the next pregnancy, and if including the pregnancy time period until the childbirth due of 9 months, the birth interval is during 33 or more months. On the other hand, if they understand that it is the interval of the childbirths of the previous child until the next childbirths, which means that they leave a space of one year and a few months until the next pregnancies with the birth interval of 21-26 months. Thus, it is possible that they may be confused of how to define the birth interval. As a result, it was found that the rates of the birth intervals of 33-38 months and 21-26 months were quite similar.

In respect to the reasons to having a second children, it was found that most of the samples spouses themselves (79.2%) desire to have children. This finding showed that to having children there are no cultural norms and customs influencing woman's birth. In regards to birth control, most of the samples with the percentage of 85.3 used

the contraceptive method after their second childbirth. Regarding the contraceptive failure, it was found that almost all of them with the percentage of 92.7 had no failure. As to the most adopted method, it was found that most of them with the percentage of 31.29 used female sterilization method, which is a highly effective method with the low failure rate of less than 1 percent. This method should be done in case of the couples have enough children or the women were not ready to have children due to medical or genetic reasons. In Thailand, the rate of female childless sterilization adoption was 22 percent out of all the ones who adopted birth control (United Nation, 2005). The results of the data analysis showed that most of the samples who used female sterilization method after the second children indicated that they wanted to stop childbearing before the end of childbearing age with the desire to have only 2 children.

It was also notable that the birth control adopted by the samples with the rate that was not very different from the female sterilization method used after the second childbirth was the contraceptive injective with the percentage of 30.93. The advantages of this method are that it is effective and highly safe and it can be used with the women of every age and with or with no children. Besides the users can become pregnant within not a long time after quitting. In addition, it can be used safely for the women during breast feeding by beginning at the sixth week after the childbirth. The contraceptive injective that contains only progesterone supposed to be used every 3 months. It was found that 17.7 percent of all the ones who used birth control in Thailand used the injection (United Nation, 2005). The women who used this kind of the birth control may not want more children but do not want to use female sterilization method because they worry about the operation. They may want to postpone the next pregnancy so they can become pregnant again after quitting.

Table 4.6 The Second Birth Interval

Information (n = 978)	**Percent**
Second Birth Interval (months)	
9-14	4.6
15-20	7.7
21-26	10.7
27-32	6.6
33-38	11.3
39-44	4.9
45-50	8.4
51-56	3.8
57-62	6.7
63-68	4.6
69-74	5.4
75-80	3.4
81-86	3.5
87-92	1.6
93-98	1.8
99-104	1.7
105-110	2.4
111-116	1.1
117-122	2.6
123 +	7.1
Average age (SD)	57.08 (37.08)
Minimun (months)	11
Maximun (months)	266
Contraceptive used for birth spacing (n = 834)	
Used	85.3
Did not use	14.7
Contraception method after first childbirth (n = 834)	
Oral contraceptive pill	23.74
IUD insertion	9.23
Contraceptive injection	30.93
Condom	1.2
Female sterilization	31.29
Others	3.7
Contraceptive failure (n = 834)	
Yes	7.3
No	92.7
Reason for have children (n = 978)	
The samples or spouses themselves want to have	79.2
Parents/paternal grandparents/maternal ones or spouses want to have	4.7
Unplanned pregnancy	16.1

4.3.3 The Third Birth Interval

Table 4.7 showed the detailed information about third birth interval, which is the time interval from the second child's birth date until the third child's birth date. It was found that the samples had the shortest birth interval of 11 months with the longest one of 236 months (19.8 years) and the average of 66.89 months (5.7 years) which was on average 7 months longer than the optimal birth spacing. When the consideration was made in term of the birth interval, it was found that most of the samples with 11.9 percent had the birth interval of 123 or more months (10.3 or more years). Regarding the reason for have children, it was found that most of the samples /spouses themselves (62.6%) desired to have children. Although most of them want to have children, it was noticeable that the percentage of unplanned pregnancy was 31.4. This maybe due to the fact that they wish to have more children or to replace the dead ones, because the long birth interval from the former children. It was found that the more children mothers have, the older they are, and those mothers with their old ages may affect their and health as well as their children's health.

In regards to the birth control after the third childbirth, it was found that most of them, with the percentage of 98.3, adopted the birth control. For the most adopted method, it was found that almost 60 percent employed the female sterilization method (59.6 percent). Regarding the failure of the adopted birth control with the pregnancy, it was found that almost all of them, with the percentage of 98.3, reported no failure of the birth control used. It was found that most of the birth control method used after the third delivery was female sterilization (59.6%), thus this finding showed that most mothers wanted to stop childbearing before the end of childbearing age.

Table 4.7 The Third Birth Interval

Information (n = 198)	**Percent**
Third Birth Interval (months)	
9-14	5.5
15-20	5.0
21-26	7.0
27-32	5.5
33-38	7.5
39-44	4.0
45-50	8.0
51-56	7.0
57-62	9.5
63-68	2.0
69-74	5.5
75-80	4.0
81-86	5.5
87-92	2.0
93-98	3.5
99-104	0.5
105-110	1.5
111-116	2.5
117-122	2.5
123 +	11.9
Average age (SD)	66.89 (43.92)
Minimun (months)	11
Maximun (months)	236
Contraception Use for Birth Spacing (n = 181)	
Used	90.0
Not used	10.0
Contraception Method used After First Childbirth (n = 181)	
Oral contraceptive pill	8.8
IUD insertion	10.4
Contraceptive injection	17.1
Condom	0.5
Female sterilization	59.6
Others	4.4
Contraceptive Failure (n = 181)	
Yes	1.7
No	98.3
Reason for have Children (n = 978)	
The samples or spouses themselves want to have	62.6
Parents/paternal grandparents/maternal ones or spouses want to have	6.0
Unplanned pregnancy	31.4

4.4 Actual Versus Preferred Birth Intervals

In order to study the birth interval it is necessary to study women's preferred birth interval, as well, so the comparison can be made between the actual birth interval and the preferred one. According to the review of the literature, it was found that averagely the women in developing countries have shorter birth intervals than they prefer. (Cited in Population report, 2002: 8). The following details concerned with the comparison of the first birth interval and the second one.

4.4.1 Comparison of the Actual and Preferred First Birth Intervals

Table 4.8 showed the actual first birth interval (after marriage) compared with the preferred first one. It was found that the samples gave births to their first children at the average marriage age of 21.99 months (1.10 year); for the preferred interval, it was found that they wished to have the first child at the averagely 21.69 months (1.9 year) after getting married. Comparison of the actual interval with the preferred one, showed that the averages were found to be similar, which was contrary to the data from the review of the literature that the actual interval is shorter than the preferred one. This finding may be due to the fact the spouses have planned to have children after their marriages with the intervals as they wish, and that decision on the childbirth is theirs with no other pressure factors, such as the needs to have children ofparents/paternal grandparents/maternal grandparents and others. The birth interval after the marriage was mostly found to be related to the birth control use to postpone child birth.

Table 4.8 Comparison of the Actual and Preferred First Birth Intervals

Interval (months)	**Actual Interval Percent**	**Preferred Interval Percent**
9-14	57.7	48.0
15-20	1.5	0.1
21-26	21.0	33.9
27-32	0.7	12.1
33-44	9.0	1.1
45-56	4.5	0
57-68	3.0	4.7
≥69	2.6	0.1
Average age (SD)	21.77 (12.00)	21.70 (12.29)
Minimun (months)	9	11
Maximun (months)	132	72

4.4.2 Comparison of the Actual and Preferred Second Birth Intervals

Table 4.9 showed the detailed information about the second birth interval (after marriage) compared with the preferred second one. It was found that the samples had the average actual birth interval of 57.08 months (4.9 years); for the preferred interval, it was found that the average interval was of 34.53 months (2.11 years). This means that the actual interval was 22.53 months (2.7 years) longer than the preferred one. This finding contrasts to the data from the review of the literature that averagely the women in developing countries have shorter birth intervals than they prefer. This finding may be due to that the decision of having children is of the spouses themselves, there are no cultural norms and customs influencing women's birth. As contraceptives become widely available and social norms changed, more people are choosing longer intervals. (Cited in Population report, 2002: 10)

The finding that the preferred interval was shorter than the actual one may probably results from the fact that mothers prefer to have children with close intervals. This may be due to several reasons, for example, they have the high ages at first marriage, so they hurry to have children before they are too old for pregnancy;

they are in the trouble of the lack of the persons who will assist to raise their child while they are raising their first one, so they hurry to have one more child to be raised together with the first one; as well as some mothers may lose the their jobs so they hurry to have the desired number of children before returning to work again, and others.

As to the fact that the actual birth interval was longer than the preferred one may result from several reasons, for example, mothers have young ages at the first marriage or childbirth, so they need not have the next child before they are too old for pregnancy; they have been persuaded by the officers who provided pregnancy care or delivery assistance for the at least 2-3 years of the birth interval; and some women encountered ailments relating to their pregnancies and the deliveries, so they fear of the mentioned conditions and then delay the childbirth. These issues may result in the longer interval than they desire.

Table 4.9 Comparison of the Actual and Preferred Second Birth Interval

Interval (months)	**Actual Interval Percent**	**Preferred Interval Percent**
≤24	21.0	33.5
36	18.7	38.7
48	13.7	9.4
60	9.9	18.4
≤61	36.7	0
Average age (SD)	57.08 (37.03)	34.53 (12.89)
Minimun (months)	24	24
Maximun (months)	266	60

4.5 Awareness of the Birth Interval

In order to study the birth interval it is necessary to study the awareness of the target group about the mentioned interval. In studying the awareness about the birth intervals, the intervals were divided into years in order to make the questions easier for the samples to answer them. The study results are as follows:

Table 4.10 showed the awareness of the birth intervals and the appropriate one. It was found that nearly a half of the samples (47.2 percent) were informed about the usefulness of the birth interval by prenatal care or delivery officers. For the knowledge about birth interval, it was found that the samples knew that they should have the average interval of 2.86 years; most of them, with 45.4 percent knew that they should have the interval of 24 months (2 years). This finding was relevant to the information of the World Health Organization (WHO) in regards to campaign of the postnatal maternal health promotion whereby postnatal mothers were suggested by the public health personnel about the breast feeding, immunization, nutrition and the birth interval of at least 2-3 years (WHO, 2008). It is notable that most mothers knew that they should have the interval of at least 2 years, nonetheless, the second number of mothers with 33.6 percent was aware of a birth interval of 36 months (3 years). The public health personnel's suggestion obtained by mothers was the birth interval of at least 2-3 years, as a result, some of them were aware of the birth interval of 2 years and others of that of 3 years.

According to the review of the literature, it was found that the birth interval of 36-60 months (3-5 years) was advantageous for mother's and infant's health (Population report, 2002: 1). Regarding the opinion toward the mentioned interval, it was found that most of the samples, (64.0%) thought that it was appropriate. This finding may be due to that the samples expressed their opinion that the birth interval of 3-5 years was not too longer than that of 2-3 years, as well as that with the birth interval of 3-5 years, the former child has grown up enough so that they can adequately take some cares of themselves. Therefore, mothers preferred the birth interval of 3-5 years.

Table 4.10 The Awareness of the Samples toward Birth Intervals

Information (n=1055)	**Percent**
Source(s) of Birth Spacing Information	
Books	18.1
Parents/grandparents	12.1
Prenatal care or delivery officer	47.2
Don't know benefits of birth spacing	22.6
Year of Birth Spacings that have been Informed	
1 years	1.5
2 years	46.3
3 years	33.7
4 years	6.4
≥5 years	12.1
Average age (SD)	2.83 (1.09)
Minimun (year)	1
Maximun (years)	10
Opinion Toward the 3-5 year Birth Spacing	
Appropriate	64.0
Too long	32.2
Too short	3.8

In brief, the pattern of the birth interval was studied only the birth interval in each order of the live birth. From all of the 1,098 samples, at the time of the data collection, it was found that there were 1,055 were in the first birth interval, 978 second birth interval and 198 third birth interval. All the details of every childbirth interval were collected. The study results were that: the samples had the first menstruation at the average age of 13.64; the average age at first marriage was 21.65; and most of them were uncertain about the number of sexual intercourses performed per week or could not remember.

As to the birth interval, it was found that: (1) the birth interval of the first childbirth was averaged 21.99 months (1.10 year) with the high percentage of women who adopted contraceptive pill to delay childbirth; (2) the interval from the first childbirth to the second childbirth was averaged 57.08 months (4.9 years) with the high percentage of women who adopted female sterilization after the second childbirth to stop the childbirth before the end of fertility. This finding indicated the desires of most of the samples to have only two children, even though most of them wanted more children, and therefore (3) the birth interval of the third childbirth was averaged 66.89 months (5.7 years) with the high percentage who adopted female sterilization after the third childbirth. In regards to the reasons of having children, it was found that all the three childbirth orders were the needs of the samples or their spouses with no other factors related to or putting pressure on the childbirth.

The comparison of the preferred birth interval with the actual one showed that the average of the actual first birth interval of the samples was close to that of the preferred one. This showed that the spouses' postnuptial childbirth planning and the decision on the childbirth were not pressured by other factors. For the actual second birth interval compared with the preferred one, it was found that the average time period of the actual birth interval was longer than that preferred one. This finding may be mostly due to the birth interval campaigns done by the public health officers, and most of the samples hold the opinion that the interval of 3-5 years was appropriate.

CHAPTER 5

MOTHER AND NEWBORN HEALTH

There are several factors effecting mother and newborn health in the postpartum period, such as, age at pregnancy, prenatal care, complication and risk pregnancy, type of birth and birth interval. In presenting the study results, the researcher presented the factors determining the good health of mothers and newborns during the postpartum period, by dividing the presentation into two parts, the factors determining the good health of mothers and the factors determining the good health of newborns during the postpartum period by birth order. Including the relationship between the several factors relating to the health of mothers and newborns, as in the following details.

5.1 Mother's Health

In presenting the factors determining the good health mothers in the postpartum period, the presentation was made in order beginning with the birth interval, age at pregnancy, prenatal care, complications and risks pregnancy, types of birth and complications the postpartum period. Among all of the 1,089 respondents, there are 69 ones with one pregnancy, 806 ones with two pregnancies and 223 ones with three pregnancies. At the time of the data collection, it was found that the samples with one pregnancy had 69 live births, the ones with two pregnancies had 927 live births with 51 abortions and 6 dead births, and ones with three pregnancies had 196 live births with 25 abortions and 2 dead births. The data collection was done with all details of the birth intervals thus, the numbers of children in each birth order that had been analyzed were 105.5, 978 and 196 for the first, the second and the thirst birth intervals respectively.

5.1.1 Maternal Health in the Postpartum Period

Maternal health in the postpartum period begins from approximately one hour to the sixth week after childbirth, in the postpartum period women may experience some postpartum problems, which are the causes of the maternal morbidity and mortality. Table 5.1 showed the maternal complications and health in the postpartum period by the first three complications in each birth as follows: 1) After the first childbirth, mothers had complications in the postpartum period which included anemia, malnutrition and postpartum haemorrhage with the percentage of 19.1, 2.7 and 2.1 respectively. 2) After the second childbirth, mothers had complications in the postpartum period which included anemia, (pre)eclampsia, and postpartum haemorrhage with the percentage of 34.5, 6.2 and 5.8 respectively. 3) After the third childbirth, mothers had complications in the postpartum period which included anemia, (pre)eclampsia and postpartum haemorrhage with the percentage of 34.8, 8.1 and 7.6 respectively.

The postpartum maternal risks and complications found were congruent with the mortality causes of the mothers worldwide in 2005, which included severe bleeding/hemorrhage (25%), infections (13%), unsafe abortions (13%), eclampsia (12%), obstructed labour (8%), other direct causes (8%), and indirect causes (20%). The indirect causes such as malaria, anaemia, HIV/AIDS and cardiovascular disease, which complicate the pregnancy or are aggravated by it (WHO, 2005). Considering the complications occurred, it was found that these complications relate to each other. It can be explained that the mothers with the anemia in the postpartum period may be those who had the anemia during pregnancy, or they may have some genetic diseases, e.g. thalassemia, or may have improper consumption behavior leading to themicronutrient malnutritions that were mostly found during postpartum, for example, iodine deficiency disorders (IDD), vitamin A deficiency, iron deficiency anemia. When the mothers had anemia caused by those mentioned causes, anemia was the complication that was mostly found during postpartum period. Anemia found in pregnant women increased blood loss and infections at childbirth leading to the high number of maternal mortality in the postpartum period (WHO, 2008).Therefore, as anemia was found mostly in the postpartum period, it was found that mothers had malnutritions and postpartum hemorrhage. This finding was relevant to the data of the World Health

Organization that anemia was the predisposing factor to the postpartum hemorrhage which was extensively found in developing countries. However, the hemorrhage was mainly caused by uterine atony and retained placenta (WHO, 2008).

In regards to the (pre)eclampsia, which was mostly found in the second and third birth orders, was the third most important cause of maternal mortality worldwield. Hypertensive disorders of pregnancy may start after 20 weeks gestation, but they are more common toward the end of pregnancy. The causes of the hypertension in pregnant women is not obvious. Nonetheless, according to the statistical data, it was found that the hypertension is always found in the pregnant women with chronic hypertension that is caused by such diseases as diabetes, vascular disease, kidney disease and others. Pre-eclampsia is characterized by prenatal hypertension, the presence of protein in the urine and edema, with no well-known cause but frequently found in the first pregnancy, with twin pregnancy, elderly primigravidarum , diabetes and others, history of hypertension with pre-eclampsia, with temporary perinatal hypertension with recovery after delivery, and others (Kamthorn Phruesananon, 1995: 154). As the results, after the 2nd and 3rd childbirths , with the older age of mothers and the poor nutrition and the high body fat, the mothers were found to have high blood pressure.

As has already been mentioned, it can be seen that maternal complications in the postpartum period which are the causes of the maternal morbidity and mortality, were interrelated. The conclusion of the over all picture of the maternal health in the postpartum period in all the three orders, can be made that the high percentage of the sampled respondents of are healthy (77.0%, 59.9% and 57.6% respectively). Even though most of them were healthy but it was notable that their good health decreased as the birth order increased. This can be explained that as the birth interval increases, mothers get older with less healthiness and more prenatal complications, this condition then causes more postnatal complications. In relation to the treatment of the complications, mothers with all the three orders of the birth intervals got the treatment provided by government hospitals, with the percentage of 97.1, 98.2 and 57.6 respectively.

Table 5.1 Maternal Health in the Postpartum Period

Maternal Health	1st birth (n=1055) Percentage	2nd birth (n=978) Percentage	3rd birth (n=198) Percentage
Postpartum Hemorrhage			
Yes	2.1	5.8	7.6
No	97.9	94.2	92.4
Anemia			
Yes	19.1	34.5	34.8
No	80.9	65.5	65.2
Puerperal Genital Infection			
Yes	0.2	0.2	0.5
No	99.8	99.8	99.5
(Pre)eclampsia			
Yes	1.9	6.2	8.1
No	98.1	93.8	91.9
Complications of the Urinary Tract			
Yes	0.4	1.7	0.5
No	99.6	98.3	99.5
Psychological Problems in the Postpartum Period			
Yes	1.0	1.5	0.5
No	99.0	98.5	99.5
Malnutrition			
Yes	2.7	4.6	6.6
No	97.3	95.4	93.4
Maternal Health After Delivery			
Poor	23.0	40.1	42.4
Good	77.0	59.9	57.6
Complication Treatment	(n=243)	(n=392)	(n=99)
Get the Treatment at the Birth Place	97.1	98.2	57.6
Buy medicine + No treatment	2.9	1.8	42.4

5.1.2 The Birth Interval

According to the review of the literature, it was found that the birth interval of 3-5 years is appropriate for the good health of mothers. (Population report, 2002: 4-6). Therefore, in this study, the birth interval was divided into three periods: ≤ 35 months, 36-60 months and ≥ 61 months, and the mentioned birth interval was classified in accordance with the birth order, as the following details:

Table 5.2, showed the information of birth intervals by birth order. It was found that in the 1ST birth, the time from after married to 1ST child birth's date, the highest proportion of 60 percent of the respondents had ≤35 months birth interval. In the 2nd

birth, the time from the 1ST child birth's date until the 2nd child's birth date, and 3rd birth, the time from the 2nd child's birth date until the 3rd child's birth date, the highest proportion of the respondents had ≥ 61 months, birth interval 63.3 and 41.3 percent respectively.

Table 5.2 The Birth Intervals by Birth Order

Birth order	Birth Interval		
	≤ 35 months	**36-60 months**	**61 months**
The 1st birth (n=1055)	80.6	16.7	2.7
The 2nd birth l (n=978)	33.0	30.3	63.3
The 3rd birth (n=196)	24.4	34.3	41.3

5.1.3 Age at Pregnancy

The important factor affecting maternal health in the postpartum period is the age at pregnancy. According to Table 5.3, it was found that, for the first birth with the highest proportion was 39.1 percent, the pregnant mothers were during the age of 20-24 with the average age at pregnancy of 24.07 years; for the second and third births with the highest proportions were 32.6 and 28.3 percent respectively, they were pregnant during the age of 25-29 with the average age at pregnancy of 27.79 and 31.20 years respectively. The ages at pregnancy of all the three orders were the optimal ages at pregnancy. This finding was with congruent with the data resulting from the review of the literature that the optimal age at pregnancy is 20-30 years. (Pregnancy, 2008). Also, it is notable that in the third birth, mothers had age at pregnancy of 30-34 years with 27.8 percent with the number that was not different from that considered the highest peak period for pregnancy (25-29 years old). Even though the pregnancy during that age period is larger than the optimal period for pregnancy (20-30 years old), it can be considered as the age at pregnancy with low risk of the complications during pregnancy which should not over 35 years old. If women get pregnant at the age of over 35 years, they will be risky for experience to birth defects, especially

those involving abnormal chromosome number and arrangement. (Thira Tanthawanit, 1996: 3-47).

Table 5.3 Maternal Age at Pregnancy by Birth Interval

Maternal Age at Pregnancy (years)	**Birth Interval**		
	1st birth (n=1055)	**2nd birth** (n=978)	**3rd birth** (n=198)
	Percentage	**Percentage**	**Percentage**
≤ 19	17.6	4.8	12.1
20-24	39.1	27.1	21.7
25-29	28.7	32.6	28.3
30-34	11.9	25.5	27.8
≥35	2.7	10.0	10.1
Average(SD)	23.00 (4.52)	27.79 (4.81)	31.02 (4.64)
Minimum(years)	15	16	21
Maximum(years)	45	46	42

5.1.4 Prenatal Care

Prenatal care is the care that looks after the health of mothers and fetuses, checks the disorders or complications that may occur during pregnancy, as well as giving suggestion to mothers about how the proper behavior needed during pregnancy. In order to assess whether or not pregnant women should get prenatal care services, it is necessary to assess the awareness of the prenatal care services of the samples to see whether or not they have been informed about the prenatal care services.

Table 5.4 showed the detailed information about the prenatal care by the birth order. It was found that in terms of the awareness of the prenatal care, the samples with all the three orders of the birth were informed about the prenatal care information from the prenatal care campaigns organized by health officers with the highest percentages of 58.9, 65.5 and 74.7 respectively. In regards to the prenatal care services, it was found that nearly all of the first and second birth orders had attended the prenatal care services, with the percentage of 99.1 and 99.9 respectively; for the third birth

order, all the mothers had received the prenatal care services, with the percentage of 100. As to the place of the prenatal care services, most of all the three birth orders popularly got the services at government hospitals with the highest percentages of 60.3, 60.4 and 59.1 respectively.

In regards to of the gestational age when getting to the prenatal care services, it was found that all the three birth orders got the services mostly during the gestational age of 3-4 months with the highest percentages of 49.7, 47.1 and 56.1 respectively and with the gestational age of 2.74, 2.68 and 2.73 months respectively, which was the optimal age at pregnancy for getting prenatal care (not over 3 months). This finding was congruent with the data resulting from the review of the literature that mother should receive prenatal care early when their pregnancy age of not over 3 months from the last menstruation. The statistics showed that if the women received the prenatal care early and regularly, the incident rate of stillbirth and prenatal mortality decreased 75 percent specially if the prenatal care started with in 3 months of pregnancy (WHO, 2001)

Regarding the number of time for attending prenatal care clinics, it was found that all the three birth orders attended the highest number of services of five times and higher with the highest percentages of 86.1, 92.5 and 89.9 respectively, with the average times of 7.63, 8.07 and 7.61 respectively. With regards to the average time of receiving the prenatal care services for each pregnancy, it was found that the highest percentages, of mothers (84.7, 90.0 and 82.6 percent respectively), attended more than five times of the prenatal care services, which was higher than the standard criteria for the appropriate prenatal care services recommended by the World Health Organization that pregnant women should get at least four times of the prenatal care services (WHO, 2001)

In terms of the tetanus vaccination, it was found that among all the three orders of the birth orders, nearly all of the first and second birth got the tetanus vaccination (with the highest percentage of 99.1 and 99.9 respectively) while the third one, all of the mothers got the tetanus vaccination (100 percent). The tetanus vaccination is able to protect tetanus in both mothers and newborns, caused by contacted unclean instruments during delivery or unsanitary delivery assistance. The pregnant women who get the prenatal care services will be vaccinated three times; after the first

vaccination, they will get the second one a month later and the third one six months later. When they are fully vaccinated three times, they can be protected against tetanus for five years (Bureau of General Communicable Disease Department of Disease Control MOPH, 2008).

Table 5.4 The Prenatal Care by Birth Order

Information	**Birth Order**		
	1st birth (n=1055)	**2nd birth** (n=978)	**3rd birth** (n=198)
	Percentage	**Percentage**	**Percentage**
Source of Prenatal Care Information received			
Books	18.9	17.7	15.7
Campaigns by officers	58.9	65.5	74.7
Parents/grandparents/ friends	22.3	16.8	9.6
Prenatal Care Services Received			
Yes	99.1	99.9	100.0
No	0.9	0.1	0.0
Prenatal Care Place	(n=1046)	(n=977)	(n=198)
Health centers	18.5	18.4	18.7
Clinics + Private Hospitals	21.2	21.2	22.2
Government Hospitals	60.3	60.4	59.1
Gestational age at the First Prenatal Care			
1-2 months	44.6	47.0	39.4
3-4 months	49.7	47.1	56.1
5 months or more	5.6	5.9	4.5
Average (SD)	2.74 (1.09)	2.68 (1.05)	2.73 (1.08)
Minimum (months)	1	1	1
Maximum (months)	7	7	7
The Number of the Prenatal Care			
$\leq$ 4 times (times)	13.9	7.5	10.1
$\geq$ 5 times (times)	86.1	92.5	89.9
Average (SD)	7.63 (2.68)	8.07 (2.54)	7.61 (2.53)
Minimum (times)	1	1	1
Maximum (times)	15	14	15
Tetanus Vaccination			
Yes	99.1	99.9	100.0
No	0.9	0.1	0.0

5.1.5 Risk Factors and Complications During Pregnancy

During pregnancy, one of the factors that affects the health of mothers and fetuses is the risks and complications during pregnancy. The fact that a mother encounters with one of the risks during pregnancy within the high risks during pregnancy is considered that woman is at risk or complications during pregnancy.

Table 5.5 showed maternal complications and risk factors during pregnancy. The risks and complications found during pregnancy effect may lead to adverse effects of mother and child health at birth. In case of the women who had health problems before pregnancy , when they get pregnant those health problems may get worst. Thus, properly when the pregnant women got the prenatal care services, pregnant women need to be bewared or cared properly in order to care, protect, and treat as well as recover their health, which will later positively affect the mother's and newborn's health. Therefore, it is needed to survey the maternal risks and complications during pregnancy. It was found that the first three most found risks and complications in each of the birth orders were as follows:

For the first birth order, the risks and complications found were anemia during pregnancy, substance use, and bleeding during pregnancy with the highest percentages of 7.7, 4.6, and 2.6 respectively.

For the second birth order, the risks and complications found were: underwent hysterotomy, anemia during pregnancy, and substance use with the highest percentages of 18.2 , 14.1 , and 14.1 respectively.

For the third birth order, the risks and complications found were anemia during pregnancy, preterm labour and underwent hypertension with the percentages of 19.1, 15.1 and 70.3 respectively.

Considering the risks and complications during pregnancy found in each of the birth interval orders, it was found out that these risks and complications relate to each other. For example, anemia during pregnancy, the complication that was mostly found in every birth order and the important public health problem for different countries worldwide. Its prevalence and severity are mostly found in developing countries, especially in South Asia which was found among 65 percent of the pregnant women (Maeyer and Adicls – Tegman, 1985: 302-316). In Thailand, it was found that 12 percent of pregnant Thai women have anemia during pregnancy, 96,000 cases a

year. The causes of this complication are consumption of the food with inadequate iron, chronic blood lose caused by hookworms, peptic ulcer or hemorrhoids, including such genetic diseases as thalassemia, which was found that the population who are the carriers of this disease are up to 30-40 percent. This leads mothers and newborns get high risk of thalassemia and other more complications, for example, premature childbirth, abortion, dead fetus in utero, low birth weight, postpartum haemorrhage, infection in postpartum period and (Pre)eclampsia (Niphanphorn Woramongkol, 2008). According to the research entitled "Risk Factors Associated with Anemia in Thai Pregnant Women", it was found that one of the important factors that significantly related statistical significance to anemia was the birth interval of less than 24 months (Anuchit Nitithammayong et al, 2008). As has already mentioned, it can be seen that pregnant women may already have anemia or hiding genetic diseases during pregnancy, which, thus, leads to more severe risks and complications. As a result, it was found that the anemia is the complication that was mostly found in every of the birth orders.

The substance use is the use of addictive substances such as tobacco, alcohol and drug use. According to the study of American College of Obstetricians and Gynecologists (2008), it was found that substance use during pregnancy causes the problems with both mothers and newborns for example, smoking; in pregnant women causes their fetuses to get harmful chemicals such as tar, nicotine and carbon monoxide. The nicotine is the cause of constricted vessel, so less oxygen and nutrients reach the fetus. Carbon monoxide lowers the amount of oxygen the baby received. Also, women who smoke during pregnancy are more likely to have certain problems: an ectopic pregnancy ,vaginal bleeding, problems with the way the placenta attaches to the uterus, a stillbirth, and a low-birth-weight baby (weighing less than 51¼2 pounds) In addition, smoking hurts the baby after birth, too. The baby may breathe in harmful amounts of smoke from cigarettes smoked nearby (secondhand smoke). Breathing secondhand smoke increases the risk of asthma and sudden infant death syndrome (SIDS).

As to alcohol, when a pregnant woman drinks alcohol, it quickly reaches her fetus. The same amount of alcohol that is in her blood is in her baby's blood. In an adult, the liver breaks down the alcohol. But a baby's liver is not yet able to do this. Thus, alcohol is much more harmful to a fetus than it is to an adult. Drinking at any time during pregnancy can cause problems. Alcohol increases the chance of having a

miscarriage or a preterm baby. Alcohol abuse during pregnancy is a leading cause of mental retardation.

As to drugs, some women need to take medicine during pregnancy for their health or for the health of the baby As many as 1 in 10 babies may be born to women who use illegal drugs during their pregnancies. These substances can be harmful to you and to the health and growth of your baby during pregnancy. Using illegal drugs in the early stage of pregnancy can cause birth defects and miscarriage. During the last 12 weeks of pregnancy, illegal drug use can stunt the growth of the fetus and cause preterm birth and fetal death. Illegal drugs include: marijuana cocaine heroin methamphetamine. As to medications, the medicine can also cross the placenta and enter the baby's bloodstream. In some cases, a medication could cause birth defects, addiction, or other problems in the baby. Those drugs include phynytoine, tetracycline, warfarin , ect.

Bleeding during pregnancy, may be caused by the substance use ; smoking during pregnancy can cause vaginal bleeding, which is divided into early pregnancy and late pregnancy. The bleeding of the early pregnancy (before 20 weeks) may result from the time when the fertilized egg implanted in the uterus during the first 1-2 months of the pregnancy. From miscarriage, it mainly takes place within the first 12 weeks, mostly caused by the abnormality of embryo or fetus. Regarding ectopic pregnancy, it occurs when the fertilized egg does not implant in the uterus. Ectopic pregnancys is at a higher risk if it has an infection in the fallopian tubes (such as pelvic inflammatory disease) , a previous ectopic pregnancy , tubal surgery and molar pregnancy. The bleeding in late pregnancy (over 20 weeks) is usually caused by the abnormality of the pregnancy. It heavy bleeding occurs, it usually involves a problem with the placenta, such as placenta previa, placental abruption and preterm birth (American College of Obstetricians and Gynecologists, 2008)

Underwent hysterotomy is the situation that mothers have previous uterus surgery due to cesarean births; when mothers got their first pregnancies and had cesarean births, in later orders, they need to get cesarean births to prevent the uterine rupture (Wirot Tangchareonsatian, 1997). The indication of the caesarean birth is the obstructed labour caused by some problems regarding delivery such as cephalopelvic disproportion, fetal jeopardy, which is the condition that infants are under sudden stress, or caused by endless lack of oxygen, prolapsed cord, (Pre)eclampcia, bleeding

during pregnancy, smallness for gestational age, heavy bleeding during pregnancy caused by the placenta previa and placenta abruption, prevoius cesarean section, underwent hysterotomy, various diseases such as diabetes, chronic hypertension and others, history of childbirth of troublesome childbirth, birth anomalies resulting from the childbirth or deaths, infertility, and old mothers with the age of over 35, and others. In addition to the indication of the caesarean birth, there are also the Cesarean Delivery on Maternal Request; (CDMR). The World Health Organization estimates that in developed countries the rate of the cesarean birth is of 10 and 15 percent of all the childbirths. In 2004, the rate of the caesarean birth in the United Kingdom was 20 percent, whereas in Canada of 22.5 percent in 2001-2002. In the United States, the rate of the cesarean birth reduced from the percentage of 46 in 1996 to that of 30.2 in 2005. In developing countries, Brazil was one of the countries with the high rate of the cesarean births in the world whereby in government hospitals the rate was up to 35 percent, and 80 percent in private hospitals. In Thailand, according to the research about the childbirth pattern in 344 government and private hospitals nationwide (236 government hospitals and 108 private hospitals) of Thai women during 1990-1996 (Wirot Tangchareonsathian, 1997), it was found that the rate of cesarean section rose from 15.2 percent in 1990 to 22.4 percent in 1996. Besides, according to the study of Suthat Kolkitkovin (Kolkitkoson, 1995: 325-343), it was found that the cesarean birth was more generally accepted than vaginal birth. The cesarean birth has increased dramatically in the past 20 years due to the explainable reasons of the higher number of the first pregnancy. The cesarean birth was mostly found in the first pregnancy and other reasons for Cesarean section are increasing maternal age, currently increased check-ups with high-frequency tolls and child check-ups with electrical devices, the cesarean birth for the children in bottom position, decreased childbirth in mid-pelvis, earlier decision on the cesarean birth, increasingly repeated cesarean birth and better social and economic factors.

Premature labor and delivery is the condition that women have labour pain and giving birth after the gestational age of 20 weeks but before that of 37 weeks from the first day of the last menstruation, which is considered as the preterm labor (Wikipedia, 2008). There are several factors related to maternal diseases or the possibility of the preterm labor, for example, chromosome disorder, (Pre)eclamsia; hypertension during pregnancy, maternal age of over 35, maternal age of less than 18, mothers with

short cervix, mothers with diabetes, maternal anxiety, periodontal disease and so on. According to the study of the March of Dimes Multicenter Prematurity and Prevention, it was found that 54 percent of pregnancy with twins was more likely for the preterm labor of up to 9.6 percent than the single one. Besides, the women who spend more than a year trying to become pregnant before pregnancy are in very high risk of the preterm labor. According to the study done by Dr. Olga Basso of the University of Aarhus in Denmark and Dr. Donna Baird of the U.S. National Institute of Environmental Health Sciences, the study results suggested that the women with troublesome pregnancy was 40-percent higher risk of the preterm labor than those with easy pregnancy; also, smoking and drinking alcohol during pregnancy lead to more chances of the preterm labor.

As has already been mentioned, it can be summarized that the complications occurred in all the three birth orders relate to one another. The more severe anemia found in all the three birth orders was perhaps due to the fact that mothers had hiding diseases before pregnancy. The substance use, especially smoking, may be the cause of the bleeding during pregnancy and the preterm labor. Also, the caesarean birth may be needed by mothers or in accordance with the indication of the caesarean birth, which will also affect later caesarean births. When a mother has one of the complications during pregnancy, it is considered that that she is at risks and complications during pregnancy. Out of all the three birth orders, the highest proportion of the mothers did not have any complications with the percentage of 77.0, 59.9 and 57.6 respectively. Moreover, it is notable that although most of the mothers did not have any complications, but the number of the complications lessened with the later birth intervals. This can explain that the later the orders of the birth are, the older mothers will be, and the older mothers are, the higher the risks during pregnancy will be. Furthermore, in case of the inappropriate birth interval for maternal good health of 3-5 years, it was found that mothers had more complications. For the complication treatment, it was found that with the highest proportion with 60.8, 58.0 and 55.0 percent of the birth interval respectively, mothers got the treatments in the prenatal care places; in case of common sickness, it was found that with the high percentages of 56.4, 58.0 and 55.1 respectively, the mothers got the treatments in government hospitals.

Table 5.5 Risk factors and complications during of Pregnancy by birth intervals

Risk Factors and Complications of Pregnancy	**1st birth** (n=1055) **Percentage**	**2nd birth** (n=978) **Percentage**	**3rd birth** (n=198) **Percentage**
Substance use (cigarettes, alcohol, drugs)			
Yes	7.3	7.3	7.6
No	92.7	92.7	92.4
Age < 17 or > 35 years			
Yes	2.3	3.2	6.1
No	97.7	96.8	93.9
Previous child delivered before gestational age reach 37 weeks			
Yes	0.1	6.3	14.1
No	99.9	93.7	85.9
Previous child weighs < 2,500 or > 4,000 grams			
Yes	0.5	4.6	8.6
No	99.5	95.4	91.4
Underwent hysterotomy			
Yes	0.2	19.1	14.1
No	99.8	80.9	85.9
History of heart disease			
Yes	0.8	0.7	2.5
No	99.2	99.3	97.5
History of 3 miscarriages			
Yes	0.0	0.0	0.0
No	100.0	100.0	100.0
Anemia during pregnancy			
Yes	7.7	15.1	18.2
No	92.3	84.9	81.8
Positive test for VDRL			
Yes	0.1	0.0	0.0
No	99.9	100.0	100.0
Suffering from diffuse goiter			
Yes	0.9	1.0	1.0
No	99.1	99.0	99.0
Hypertension greater than or equal to140/90mmHg			
Yes	1.5	3.3	4.5
No	98.5	96.7	95.5
Proteinuria			
Yes	1.3	0.6	0.5
No	98.7	99.4	99.5
Patient of heart disease or is diagnosed with heart disease			
Yes	0.5	0.6	0.0
No	99.5	99.4	100.0

Table 5.5 (continued)

Risk Factors and Complications of Pregnancy	1st birth(n=1055) Percentage	2nd birth(n=978) Percentage	3rd birth(n=198) Percentage
Size of uterus not in relation to gestational age			
Yes	1.3	0.6	1.0
No	98.7	99.4	99.0
Pregnant with twins			
Yes	0.0	0.1	0.0
No	100.0	99.9	100.0
Abnormal position of fetus after the 34th week of gestational age			
Yes	2.5	1.0	1.5
No	97.5	99.0	98.5
Bleeding during pregnancy			
Yes	2.6	3.6	3.0
No	97.4	96.4	97.0
Pregnant over 40 weeks			
Yes	0.5	1.0	2.0
No	99.5	99.0	98.0
Weight increases <1 kg./M after 24 weeks of pregnancy			
Yes	1.1	0.8	0.0
No	98.9	99.2	100.0
Fetus moves less than 10 times per day after 32 weeks of pregnancy			
Yes	0.9	0.8	1.0
No	99.1	99.2	99.0
Genitourinary disorder/ Urinary tract diseases			
Yes	1.2	1.3	0.0
No	98.8	98.7	100.0
Height below 140 centimeters			
Yes	1.1	1.0	1.0
No	98.9	99.0	99.0
Weighs 80 kg. or more			
Yes	1.8	2.7	2.0
No	98.2	97.3	98.0
Cephalopelvic disproportion (CPD)			
Yes	1.5	1.8	2.0
No	98.5	98.2	98.0
Abruption placenta			
Yes	0.9	1.5	1.0
No	99.1	98.5	99.0
High risk pregnancy			
Yes	28.0	43.4	49.0
No	72.0	56.6	51.0

Table 5.5 (continued)

Risk Factors and Complications of Pregnancy	1st birth(n=1055) Percentage	2nd birth(n=978) Percentage	3rd birth(n=198) Percentage
Place of treatment	(n=295)	(n=424)	(n=97)
Prenatal care place	60.8	58.0	55.0
Buy medicine	5.0	1.0	3.0
No treatment	35.0	41.0	41.0
Place of treatment when getting sick			
Health center	28.2	27.6	31.8
Clinic + private hospital	14.9	15.1	12.1
Government hospital	56.4	58.0	55.1
Buy medicine	0.5	0.1	0.5

5.1.6 Types of the Childbirth and the Complications During Pregnancy

In regards to maternal and child health, which results from the risk of the childbirth, it was found that the factors related to complications such as maternal age at childbirth, gestational age at childbirth, types of the childbirth and the risks and complications at childbirth.

According to Table 5.6, it was found that with the highest percentage of 46.1 percent of the age at childbirth in the first birth, mothers delivered during the age of 20-24 years; with the highest percentage of 36.6 percent of the age at childbirth in the second birth, mothers delivered during the age of 25-29 years; and with the highest percentage of 43.4 percent of the age at childbirth in the third birth, mothers delivered during the age of 30-34 years. As to the average maternal age at childbirth, it was found that the average ages were of 23.34, 28.09 and 31.45 respectively, which is congruent to the data from the review of the literature that that average age was appropriate for self-childbirth; if mothers deliver at the average age of 35 years or higher, they are at high risk of vaginal birth, which is necessary for the caesarean birth (2008).

With regards to the gestational age at childbirth, it was found that in all the three orders of the birth interval, mothers delivered at the due gestational age with the highest proportion of 93.7, 91.8 and 89.4 percent respectively with the average gestational age at childbirth of 38.97, 38.60 and 38.49 weeks respectively.

It is noticeable that in all the three birth orders, mothers delivered at the due term gestational age, but the number of the gestational age was found to be decreased with the higher birth orders. The study result suggests that mothers with the percentage of 6.3, 8.3 and 10.6 for each of the birth interval orders delivered during the gestational age of 29-36 weeks. According to the review of the literature, it was found that the childbirth usually takes place after 37-week pregnancy, during 37-42 weeks, or approximately 38 weeks after the conception or approximately 40 weeks after the last menstruation, which takes totally 9 months. In case of the childbirth with less than 28-week gestational age, which was considered as abortion; the childbirth with the gestational age of 29-36 weeks was the preterm labour; and the childbirth with the gestational age of over 42 weeks was the postterm pregnancy (2008). As to the pre-rupture of membrane, occurring with the preterm childbirth and perhaps increasing the infections in both mothers and infants, it was found that with the highest proportion of 93.7, 91.8 and 89.4 percent of all the three orders of pregnancy, mothers did not have the pre-rupture of membrane. However, it is notable that it decreased with the increasing birth orders. This finding was relevant to the data from the study regarding the gestational age at childbirth that the number of the mothers with the preterm childbirths increased as the birth interval orders grow higher.

In regards to the types of the childbirth, it was found that the highest proportion of all the three birth orders with the percentage of 74.8, 72.2 and 77.8 respectively were of vaginal birth. Nevertheless, considering cesarean birth, it was found that its number for the first birth increased from 25.2 to 27.8 for the second one. This is possible that in the first pregnancy mothers got the cesarean birth with appropriate medical indications such as disorder infant position, cephalopelvic disproportion leading to troublesome childbirth, mothers fear of the pain from vaginal birth. With the cesarean birth for the first pregnancy, later childbirths have to be done with the cesarean birth again to avoid rupture uterine. Otherwise, the first childbirth was done with the vaginal birth but the cesarean birth was for the later childbirths, since later childbirths were at high risk of the disorder child position or that cesarean birth without any medical indications but with the desire of mothers themselves for the cesarean birth, resulting from the experience of the pain caused by the childbirth in the first birth order and from no desire to encounter the same pain. This finding was relevant to the data of Thai

people's childbirths that 80-90 percent of the childbirths were the vaginal births, with only 10-20 percent of the cesarean birth.

However, the rate of Thai cesarean births increased for approximately 50 percent, which is higher than the standard determined by the World Health Organization that it should not be over 15 percent. Apart from the medical indications for mother's and infant's safety, the cesarean birth relates to society, values and economy. According to the survey of the cesarean birth situations in Thailand from 1991 to 2001, it was found that their trends were constantly higher and higher; in 1991the percentage was 15 and in 2001 it increased as 21 percent, with the most number of 54 percent in private hospitals; the inferior number of 30 percent in center/general hospitals; and other government hospitals with 25 percent (Wanlop Thainuea, 2004). Regarding the third birth order which was found that cesarean births occurred with the percentage of 22.2, this finding possibly because most women ended up the pregnancies with the second ones, and the caesarean birth was mostly done with the mothers of not too many children. This situation may affect the maternal health and the troublesome cesarean birth.

In terms of the hemorrhage during childbirth, it was found that in all the three birth orders the highest proportion with the percentage of 88.9, 86.6 and 91.4,mothers was did not experience more blood loss during childbirth. According to the review of the literature, it was found that the bleeding during childbirth is generally not over 500 cubic centimeters (cc.); if mothers bleed 700-1,000 cubic centimeters (cc.), they may be led to hypovolemic shock. As to the childbirth assistant of all the three birth orders, it was found that the highest proportion with the percentage of 51.4, 50.1 and 52.5 of the childbirths were done by nurses or midwives. With regards to the places of delivery, in all the three birth interval orders with the highest percentage of 91.8, 92.1 and 88.4 of mothers who delivered at government hospitals. The childbirths of the samples could be considered as the safe ones and were, done by skillful medical personnel and at the standardized places.

Table 5.6 Type of Birth and Complication at Birth by Birth Interval

Information	Birth Interval		
	1st birth(n=1055)	**2nd birth** (n=978)	**3rd birth** (n=198)
	Percentage	**Percentage**	**Percentage**
Age at Delivery (years)			
≤ 19	18.4	1.9	0.0
20-24	46.1	22.7	6.6
25-29	25.0	36.6	24.7
30-34	8.9	28.8	43.4
≥ 35	1.6	9.9	25.3
Average (SD)	23.34 (4.51)	28.09 (4.81)	31.45 (4.66)
Minimum	15	16	21
Maximum	45	46	43
Week gestation (weeks)			
≤ 28	0.0	0.0	0.0
29-36	6.3	8.3	10.6
37-42	93.7	91.8	89.4
≥ 43	0.0	0.0	0.0
Average (SD)	38.97 (1.29)	38.60 (1.33)	38.49 (1.32)
Minimum	32	32	32
Maximum	42	42	42
Pre-rupture of membrane			
Yes	6.3	8.2	10.6
No	93.7	91.8	89.4
Type of Birth			
Vaginal birth	74.8	72.2	77.8
Caesarean birth	25.2	27.8	22.2
Hemorrhage			
Yes	11.1	13.4	8.6
No	88.9	86.6	91.4
Professions associated with childbirth			
Doctor	46.8	48.7	43.9
Nurse or midwife	51.4	50.1	52.5
Traditional midwife	1.8	1.2	3.5
Place of delivery			
Health center	0.9	0.8	0.5
Private hospital	5.8	6.0	7.1
Government hospital	91.8	92.1	88.4
At home	1.5	1.0	4.0

5.2 The Impacts of Birth Spacing on Mother's Health

In the study of "Birth Spacing affecting Maternal Health", the independent variables were: the maternal age at pregnancy, the prenatal care, the risk and complication during pregnancy, and the types of birth and the birth interval, and the dependent variable was the mother's health. In this regard, the researcher did the Multivariate Analysis with the Logistic Regression statistics in order to study the factors that determine the mother's health. The analysis was done separately in accordance with the birth interval orders as the following results:

5.2.1 The Impacts of the First Birth Interval on the Mother's Health

Table 5.7, showed the results of the analysis of the factors influencing the health of mothers after giving the first birth by employing the Logistic Regression analysis, It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 882.056 and the decreasing of the Model χ^2 from the model with only the constant value was statistical significant at .001 level. This means that the model was appropriate to study the factors affecting maternal health in the postpartum period; having the independent variables of other models constant, the prenatal risks and complications($p<.001$), and the type of birth($p<.001$), influence the maternal health in the postpartum period with the statistical significance. Regarding the age at pregnancy, the prenatal care and the birth interval were not found to be related to the good health of mothers. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 79.5 percent.

The healthiness odds of the maternal health after giving first birth without risk and complication during pregnancy was 5.335 times of the odds of maternal health with risk and complication during pregnancy. This means that mother without any risk and complication during pregnancy, will be about five times healthier in the postpartum period than those with the risks and complications during pregnancy. This finding may be due to the fact that the pregnancy and the childbirth perhaps cause such diseases as the (Pre)eclamcia, the diabetes, the anemia, veneral diseases and so on, to be more severe. Furthermore, the pregnancy with high risks will be the

pregnancy that may affect the maternal health as well as the disordered childbirth (Thira Tanthawanit, 1995). Thus, healthiness and without risk and complication during pregnancy resulted in good health of mothers in the post partum period.

The healthiness odds of the maternal health after giving the first birth by vaginal birth was 6.874 times of odds of maternal health who gave the first birth by Cesarean birth. This finding showed that mothers who gave the first birth by vaginal birth, will be healthier in the postpartum period six times than those who gave their first births by cesarean birth, during the postpartum period. This finding can be explained that the vaginal birth is natural that infant, placenta, placenta membrane and amnioic fluid come out of the womb cavity through the vagina, the advantages of which are that mothers have a few prenatal hemorrhages, prenatal injuries and postnatal complications, and they spend less time recovering their bodies than the cesarean birth. The Cesarean birth is the childbirth that the newborn is taken out of the womb via the laparotomy and the hysterotomy. The complications from the cesarean birth are: more hemorrhages than through the vaginal birth; risks of the injuries of the organs in abdomen from the operation; risks of the infections via the operated wounds; and more time of the recovery than the vaginal birth (2008). According to the statistical data, the caesarean birth relates to the maternal death at the rate of 20:100,000 births in the United States. Therefore, we can see that mothers with the vaginal births have better postnatal health than those with the caesarean births. (Richard Depp, 1987: 539).

The factors that were not found to be related to maternal health in the postpartum period are the maternal age at pregnancy; prenatal care; and the birth interval. This can be explained that, in terms of the maternal age at pregnancy, although the befitting age at pregnancy is during 20-30, mothers are at higher risks of different prenatal diseases while when mothers get older (2008), such as the (Pre)eclamsia or prenatal diabetes, including more problems with placenta, e.g. placenta previa, placental abruption and so on (Siamhealth, 2008). However, with the appropriate age at pregnancy, they are less likely to get the so-called diseases; mostly, in the first birth interval, they are in the appropriate age for pregnancy, so they are more likely to have the postnatal good health. Nevertheless, even though they are in

the appropriate age for pregnancy, they are likely to have the postnatal bad health if they are not healthy; thus, the maternal age does not affect their postnatal health.

In relation to the prenatal care, it can be explained that in getting the prenatal care services, pregnant mothers were cared for by doctors, nurses or midwives, so as to take care of the health of mothers and their fetuses, to check up for the possible disorders or complications and to be suggested about how to behave properly that needed for the pregnancy in different aspects (WHO, 2001). Nonetheless, if the prenatal care cannot reveal the maternal risks or complications, these cannot be lessened, which is not useful for the maternal health. The effectiveness of the prenatal care depends upon the quality of the care offered by the service provider (Timothy and Jennifer, 1992: 142). Thus, the prenatal care did not relate to the maternal postnatal good health.

In regards to the birth interval, the first birth interval, the period from the marriage to the first childbirth, does not need the recovery period for the prevoius childbirth at all. After prenatal marriage, mothers and their spouses generally have check-ups to see whether or not they are healthy enough for the pregnancy and to find out the genetic diseases such as the anemia, the thalassemia or such the diseases that are hazardous to both mothers and infants as the German measles, AIDS and others. As a result, the birth interval did not affect the maternal good health in the first birth interval.

Table 5.7 The Impacts of the First Birth Interval on the Mother's Health

Factor		b	SE	Exp(b)
Age at pregnancy (years)				
≥ 35		-.788	.951	.455
30-34		-.426	.915	.604
20-39		-.426	.929	.653
≤ 19				
Prenatal care				
Yes		.739	.701	2.093
No				
Complication and risk pregnancy				
No		1.674***	.176	5.335
Yes				
Type of birth				
Normal labour		1.928***	.180	6.874
Cesarean birth				
Birth interval (months)				
≥ 61		-.885	.528	.413
36-60		-.779	.496	.459
≤ 35				
Constant	-1.213			
-2 Log Likelihood	882.650			
Model χ^2 (df)	256.068*** (8)			
% classify correctly	79.5			

Note: *p<.05 **p<.01 ***p<.001

5.2.2 The Impacts of the Second Birth Interval on the Mother's Health

According to Table 5.8, showing the results of the analysis of the factors influencing the good health of mother after giving the second birth with the Logistic Regression analysis. It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 1071.171 and the decreasing Model χ^2 from the model with only the constant value was statistical significance of .001. This finding means that the model was appropriate to use for studying the factors affecting maternal health in the postpartum period. Making the independent variables of other models constant, the prenatal risks and complications(p<.001) , the type of birth(p<.001) and birth interval(p<.001) were found to influent the maternal health in the postpartum period with the statistical significance. But age at pregnancy was not found to be related to

the maternal health. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 71.5 percent..

The healthiness odds of the maternal health after giving the second birth without risk and complication during pregnancy was 3.515 times of the maternal health odds with risk and complication during pregnancy. This means that, without any of the prenatal risks and complications, mothers will be healthier about three times than those with the risks and complications in the postpartum period

The healthiness odds of the maternal health after giving the second birth by vaginal birth was 3.388 times of the maternal health odds whose gave the second birth by cesarean birth. This finding showed that mothers who gave the second birth by vaginal birth, will be healthier in the postpartum period three times than those who gave their second births by cesarean birth, during the postpartum period. This means that, in the cesarean birth of the second birth, the mothers with the cesarean birth for the first pregnancy need it again for the next childbirth in order to avoid the uterine rupture even though they can have the vaginal birth after cesarean birth for the first pregnancy (VBAC; Vaginal birth after caesarean). This can be done in the case of not too big fetus and good maternal bearing-down force. However, this is so risky that most mothers have the cesarean birth again. Some of them have difficult in the second cesarean birth than that in the first one because they may have some adhesion in their abdomen resulting from the first cesarean birth. This causes mother to spend more time for the cesarean section and anasthesia, so they have more operational risks. Some of them are more painful with their operated wounds than in the first caesarean birth including the longer recovery periods (Richard, 1987: 542). Thus, the vaginal birth leads to the healthier mother than the cesarean birth.

In terms of the birth interval, the healthiness odds of the maternal health after giving the second birth with the birth interval of $\geq$ 61 months was .633 times lower than odds of healthy mother with the birth interval of $\leq$35 months. But the healthiness odds of the healthy mother after birth with the birth interval of 36-60 months was 2.448 times of the odds of maternal health with the birth interval of <35 months. This means that, mother after giving the second birth with the birth interval of >61months had lower level of health about 0.6 times than mother with birth interval of <35

months, but , mother after the second birth with the birth interval of 36-60 months had better level of health about 2 times than those whose birth interval was ≥35 months. This finding shows that the birth interval of 36-60 months was the optimal interval to have children, which is congruent with the data from the studies of the Latin American Center for Perinatology and Human Development (Centro Latinoamericano de Perinatología y Desarrollo Humano) (CLAP) in 2000 and the Demographic and Health Surveys (DHS) regarding the birth spacing and the newborn health during 1985-2000 (Cited in Population report, 2002: 4-6). The birth spacing or the birth interval is the period for mothers to recover themselves to become healthy from the previous childbirths and to heal the complications resulting from the previous pregnancy and childbirth to preparation for the next pregnancy. According to the research results, the appropriate period of birth spacing was found to be 36-60 months. Also,the healthy maternal in the prenatal and prenatal period could leads to the healthy maternal in the postpartum period. In the case of the short birth interval, mothers may not be healthy enough and become pregnant again, they are more easily to have prenatal risks and complications than the healthier mothers. According to the review of the literature, it was found that the mothers with the birth interval of less than 36 months are likely to encounter the anemia , the uterine rupture in women attempting a vaginal birth after a previous cesarean delivery , the premature delivery, and the maternal depletion syndrome (Rich, 2007). On the other hand, mother with the birth interval of over 61 months cause the odds of the postnatal good health to increase for 1.281 times of mother with less than 35 months birth interval–the longer birth interval causes better maternal health, despite the data in the review of the literature that the mothers with the birth interval of 61 months or more are likely to encounter the health problems relating to the pregnancy like the ones with the first Compared with the short birth interval, the mothers with the second birth interval, the not so long one, are more likely to have more recoveries. Thus, the so-called birth interval led to the healthy mother in the postpartum period.

The factor that was not found to affect the health of mothers in the postpartum period was the maternal age at pregnancy. The maternal age at pregnancy in the second birth was higher than that in the first one. The review of the literature suggests that higher age at pregnancy causes more risks of the postnatal bad health; however,

the mothers in the second birth interval are during the appropriate age for pregnancy (20-30 years old), so, the age at pregnancy in the second birth interval did not affect maternal health in the postpartum period. For the prenatal care in the second birth, it was found that nearly all of the mothers (99.9 percent) received the prenatal care, thus, the prenatal care was not found to affected maternal health in the post partum period.

Table 5.8 The Impacts of the second Birth Interval on the Mother's Health

Factor		b	SE	Exp(b)
Age at pregnancy (years)				
≥ 35		-.127	.348	.881
30-34		-.277	.344	.758
20-39		-.016	.550	.984
≤ 19				
Complication and risk pregnancy				
No		1.257***	.155	3.515
Yes				
Type of birth				
Normal labour		1.220***	.177	3.388
Cesarean birth				
Birth interval (months)				
≥ 61		-.458*	.195	.633
36-60		.895***	.186	2.448
≤ 35				
Constant	-1.324			
-2 Log Likelihood	1071.171			
Model χ^2 (df)	245.886*** (8)			
% classify correctly	71.5			

Note: *p<.05 **p<.01 ***p<.001

5.2.3 The Impacts of the Third Birth Interval on the Mother's Health

Table 5.9 showed the results of the analysis of the factors affecting mothers' health after giving the third birth with the Logistic Regression analysis. It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 236.256 and the decreasing of the Model χ^2 from the model with only the constant value was statistical significance of .001. This finding means that the model was appropriate to

use for studying the factors affecting maternal health in the postpartum period. Making the independent variables of other models constant, the age at pregnancy($p<.05$), the prenatal risks and complications ($p<.01$), the type of birth ($p<.01$) and birth interval ($p<.05$) influenced the maternal health in the postpartum period with the statistical significance. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 71.5 percent.

Regarding the maternal age at pregnancy in the third birth, it was found that mother got pregnancy at the age of 20 years and over. As the result from this study, the healthiness odds of the maternal health after giving the third birth with the age of 35 years up was .421 times lower than odds of healthy mother with the age of 20-29 years. This means that the mother who gave the third birth with the age of 35 years and higher had lower level of health about 0.4 times than the mother with the age of 20-29 years. This finding was relevant to the review of the literature that optimal maternal age at pregnancy is 20-30 years. (Pregnancy, 2008). In case of the maternal age at pregnancy of 35 years or higher, mother will not only experience the decreased fertility rate caused by decreased ovulation, but they also have inflammations in abdomen leading to adhesion and twins pregnancies, that usually occur at the age of 35-39. The pregnant mothers with older age at pregnancy are at high risks of the (Pre)eclamsia or diabetes with two times more chances than others, compared to 20-year-old mothers. Also, if mothers are up to 40 years old, they are at risk of the abortions at the percentage of approximately 25, whereas the 25-year-old ones have the risk rate of the abortions at the percentage of only approximately 12-15. In addition, old mothers may more chance to experience placenta previa and placental abruption. As to the type of birth, maternal old age at birth needs the Cesarean birth to avoid the troublesome delivery. It was found that if they have the first pregnancy at the age of 30, the Cesarean birth rate increases for 80 percent. Their newborns may weigh less than those of young pregnant women, have more chances of the Down syndrome and have fetal distress due to the fact that their mothers are not healthy (Siamhealth, 2008). Therefore, the mother of the maternal age at pregnancy 35 years or higher will have less healthy than the mother with the age of 20-29 years.

The healthiness odds of the maternal health after giving the third birth without risk and complication during pregnancy was 2.283 times of the maternal health odds with risk and complication during pregnancy. This means that, mothers after giving the third birth without any of the prenatal risks and complications, mothers will be more healthier in the postpartum period about 2 time than those with prenatal risks and complications. Mothers may decrease serious prenatal risks and complications affecting maternal health after giving birth in the postpartum period. The healthiness odds of the maternal health after giving the third birth by vaginal birth was 2.793 times of odds of maternal health who gave the third birth by Cesarean birth. This finding shows that mothers who gave the third birth by vaginal birth, will be healthy in the postpartum period two times than those who gave their third births by cesarean birth, during the postpartum period. This means that, the mothers who gave the third birth via vaginal birth were at lower risk and complications, took shorter time to recover after birth and were healthier than those who gave birth by Cesarean birth.

In terms of the birth interval, the healthiness odds of the maternal health after giving the third birth with the birth interval of 36-60 months was 2.459 times of odds of maternal health with ≤35 months. This means that, the mothers after giving the third birth with the birth interval of 36-60 months were healthier about two times than those with the birth interval of ≤35 months. Thus, the birth interval of 36-60 months is the optimal birth interval. As to the birth interval of >61months, it did not affect the health of the mothers in the postpartum period because in the third pregnancy mothers may get pregnancy with old age and be more likely to have risks and complications during pregnancy. In addition to the long birth spacing, mothers are more likely to have risks and complications during pregnancy than normal, so the birth interval with ≥61 months did not affect maternal healthy in the postpartum period.

Table 5.9 The Impacts of the Third Birth Interval on the Mother's Health

Factor		b	SE	Exp(b)
Age at pregnancy (years)				
≥ 35		-1.024	.442	.359
30-34		-.865*	.489	.421
20-29				
Complication and risk pregnancy				
No		.825**	.329	2.283
Yes				
Type of birth				
Normal labour		1.027**	.397	2.793
Cesarean birth				
Birth interval (months)				
≥ 61		-.421	.397	.656
36-60		.900*	.419	2.459
≤ 35				
Constant	-.247			
-2 Log Likelihood	236.256			
Model χ^2 (df)	38.751*** (6)			
% classify correctly	71.5			

Note: *p<.05 **p<.01 ***p<.001

5.3 Child's Health

In presenting the factors as the determinants of the healthy child, the researcher presents the newborn weight, newborn's health, breastfeeding and immunization in each birth order, as in the following details:

5.3.1 Birth Weight and Child Health in the Postnatal Period

Table 5.10 showed the detailed information about the birth weight and health of newborns. It was found that in all the three birth orders, the highest percentage of 94.8, 93.4 and 93.5 respectively, had the newborns' birth weight of 2,500-4,000 grams with the average birth weight of 3,020, 3,035 and 3,062 grams respectively, which was agreed with the standard criteria set. According to the review of the literature, it was found that the normal weights of most of the newborns are 2.5-4.0 kilograms

(WHO, 2008). In terms of the newborn health, the newborns in all the three birth orders with the percentage of 82.9, 73.1 and 68.7 respectively were healthy; also, it is noticeable that the number of healthy newborns decreased as the birth interval order increased. The complications found in newborns that were the causes of the newborns sickness and death in each birth orders, by the first three orders, were as follows: 1) The 1^{ST} child, newborns had complications in the postnatal period such as preterm birth, jaundice, and hypothermia, with the percentage of 6.3, 5.9, 5.1 respectively. 2) The 2^{nd} child, newborns had complications in the postnatal period such as jaundice, hypothermia, and preterm birth, with the percentage of 12.9, 8.7, 8.2 respectively. 3) The 3^{rd} child, newborns have complications in the postnatal period such as jaundice, hypothermia, and preterm birth, with the percentage of 16.2, 13.1, 10.6 respectively.

The complications found in each of the birth orders were not different which were the preterm labour, the hypothermia and jaundice. The preterm labour was relevant to the cause of the infant deaths in 2006 that the preterm birth was the first cause of the neonatal death with the percentage of 33 of all the deaths in this group (WHO, 2008).The preterm labour takes place in the event of the delivery occurred after the gestational age of 20 weeks but before 37 weeks. There are many factors leading to the preterm labour and relating to the maternal diseases, such as the chromosome disorder, the hypertension, (Pre)eclamcia, the maternal age of over 35, the maternal age of less than 18, the maternal diabetes. Smoking and alcohol drinking during pregnancy are the causes of preterm birth. Smoking was the unhealthy behavior found mostly among pregnant women and significant relationship between mothers' smoking and low birth weight was found. However, the newborns can be healthy if mothers quit smoking before the gestational age of 32 weeks, and so on (Yuean Tantinirandorn, 2007: 115-126). The preterm-labour newborns are at high more risks of the infant mortality, which mostly happens in the first month of infants' lives (neonatal mortality). They are at high risks of the severe health problems, such as cerebral palsy, chronic lung disease, gastrointestional problems, mental retardation, vision or hearing loss and so on. In addition, they have other symptoms, such as the pale body, the low body temperature, the respiratory distress syndrome and others. As has already been mentioned, it can be seen that the complications found in newborns relate to one another, and the preterm labour is still the complication mostly found

among newborns. As to the treatment of the newborns complications, in all the three orders of the birth intervals, the highest proportion of the infants get the treatments in the delivery places with the percentage of 92.7, 95.8 and 93.5 respectively.

Table 5.10 Birth Weight and Newborn Health in Postnatal Period

Newborns health	1st birth(n=1055) Percent	2nd birth (n=978) Percent	3rd birth (n=198) Percent
Birth weight (grams)			
≤ 2499	4.5	5.9	6.5
2500-4000	94.8	93.4	93.5
≥ 4001	0.7	0.7	0.0
Average (SD)	3020 (368.01)	3035 (374.29)	3061 (400.10)
Minimum	1800	1600	1900
Maximum	4350	4200	4000
Neonatal health			
Poor	17.1	26.9	31.3
Healthy	82.9	73.1	68.7
Congenital anomalies			
Yes	100.0	100.0	100.0
No	0.0	0.0	0.0
Neonatal infections			
Yes	0.3	0.3	0.5
No	99.7	99.7	99.5
Respiratory infections			
Yes	0.0	0.2	1.0
No	100.0	99.8	99.0
Neonatal tetanus			
Yes	0.2	0.0	0.0
No	99.8	100.0	100.0
Umbilical cord infection			
Yes	0.5	0.3	0.0
No	99.5	99.7	100.0
Birth injuries			
Yes	0.7	0.4	0.0
No	99.3	99.6	100.0
Birth asphyxia			
Yes	1.6	1.8	1.0
No	98.4	98.2	99.0
Preterm birth			
Yes	6.3	8.2	10.6
No	96.7	91.8	89.4

Table 5.10 (continued)

Newborns health	1st birth(n=1055) Percentage	2nd birth (n=978) Percentage	3rd birth (n=198) Percentage
Low birth weight			
Yes	4.5	6.0	6.6
No	95.5	94.0	93.4
Hypothermia			
Yes	5.1	8.7	13.1
No	94.9	91.3	86.9
Neonatal Jaundice			
Yes	5.9	12.9	16.2
No	94.1	97.1	83.8
Ophthalmia neonatorum			
Yes	0.8	0.0	0.5
No	99.2	100.0	99.5
Diarrhea			
Yes	0.5	1.4	2.0
No	99.5	98.6	98.0
Place of treatment	(n = 180)	(n = 263)	(n = 62)
Place of birth	92.7	95.8	93.5
No treatment	7.3	4.2	6.5

5.3.2 Breastfeeding and Immunization

Table 5.11 showed detailed information about postnatal breastfeeding. Almost all the newborns in all the three birth orders were breast fed (with the percentage of 99.4, 99.5 and 98.5 respectively). The highest proportion of all birth orders were breastfed immediately after the delivery (with the percentage of 72.6, 74.7 and 84.6 respectively); and most of the samples had adequate milk to feed their children in every birth order (with the percentage of 94.2, 88.9 and 89.7 respectively). In respect to the breast feeding period, the average periods in each of the birth orders were 91.0, 92.2 and 91.5 days respectively, which were relevant to the number of the days that were campaigned for the breastfeeding. According to the review of the literature, mothers were persuaded to breastfeed immediately after the delivery until 3-4 months with no other nutrients. Maternal milk is useful for both mothers and newborns– newborns can obtain full, balanced and adequate nutrients; for mothers, the breast feeding causes: the womb to well contract, to be fast recovered and to well drive out the toxic liquid as a result of hormones; the maternal shape to well recover due to the

fact that the prenatal accumulated fat is used to produce the milk, to enhance motherhood and so on (WHO, 2008).

According to the child vaccination, the newborns of almost all the three birth orders with the percentage of 98.6, 98.9 and 99.0 respectively were vaccinated; all the newborns in the third birth interval were vaccinated. The vaccination for every child is the policy of the Ministry of Public Health that promotes all the children to be vaccinated, because disease protection is of low expenses and healthy children. Also, the review of the literature suggests that the child vaccination is to protect the diseases causing some ailments and disabilities, such as tuberculosis, diphtheria, whooping cough, measles, German measles, mumps and others (WHO, 2008).

Table 5. 11 Breast Feeding and Immunization

Information	**1st birth**(n=1055) **Percent**	**2nd birth**(n=978) **Percent**	**3rd birth**(n=198) **Percent**
Breast Feeding			
Yes	99.4	99.5	98.5
No	0.6	0.5	1.5
Initiation of breast feeding	(n=1049)	(n=973)	(n=195)
Early suckling	72.6	74.7	84.6
Late suckling	27.4	25.3	15.4
Enough milk to feed			
Yes	94.2	88.9	89.7
No	5.8	11.1	10.3
Time for breast feeding (days)			
≤90	68.9	66.4	71.8
91-180	30.1	33.0	28.2
≥181-240	0.6	0.6	0.0
Average (SD)	91.0 (35.15)	92.2 (39.66)	91.5 (36.76)
Minimum	5	3	14
Maximum	240	240	180
Immunization			
Yes	98.6	98.9	99.0
No	1.4	1.1	1.0

5.4 The Child's Health in Each of the Birth Interval

In the study of the impacts of the birth interval on the child health, the independent variables were the maternal age at pregnancy, the prenatal risks and complications, the type of birth, the breastfeeding, the child vaccination and the birth interval and the dependent variable was the child's health. In this respect, the researcher employed the Multivariate Analysis with the Logistic Regression in order to study the factors determining the child's health. The study results are as follows:

5.4.1 The Impacts of the First Birth Interval on the Child's Health

According to Table 5.12, the data showed the results of the analysis of the factors influencing infant to be healthy in the postnatal period with the Logistic Regression analysis. It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 866.395 and the decreasing of the Model χ^2 from the model with only the constant value was statistical significance of .001. This means that the model was appropriate to study the factors affecting the first infant's health in the postnatal period. When making the independent variables of other models constant, the prenatal risks and complications($P<.001$) influenced the newborn health in the postnatal period with the statistical significance. The maternal age at pregnancy, the type of birth, the child vaccination, and the birth interval were found not to relate to the child's good health. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 83.7 percent.

The healthiness odds of the newborn health in the first birth of the mothers without any of the prenatal risks was 3.542 times of odds of newborn health in the first birth of the mothers with the prenatal risks. This means that, if the mothers are healthy without any of the prenatal risks and complications, their newborns will be healthier about 3 times than those whose mothers with the prenatal risks and complications. This finding was relevant to the review of the literature that the pregnancy with serious prenatal problems is diagnosed as the risky pregnancy that may lead to the still birth, the neonatal birth or the neonatal disability, including the

maternal health as well as the disordered delivery (The Merck Manuals Online Medical, 2008). This was also congruent with the first three causes of the infant mortality that were mostly found in Thailand in 1996, those included: birth asphyxia, prematurity and pneumonia. There were three factors that lead to the prenatal asphyxia whereby 12.88 percent of these cases were caused by the maternal factors: toximia of pregnancy, ante-partum hemorrhage and hypertension, while 2.5.38 percent were caused by the delivery factors: the cesarean section, abnormal presentation, vacuum extraction and prolonged labors, and 25.38 percent were caused by the fetal factors (Factbook Thailand, 2008). It can be seen that more than a half of the infant mortality were caused by the maternal factors. As a result, the prenatal risks and complications affect the health of the newborns.The risk of poor outcome is considerably increased among mothers below 16 and over 40 years of age.(Korones and Lancaster, 1981).

The factors that were not fond to affect the postnatal-maternal health were: maternal age at pregnancy, type of birth, child vaccination, and birth interval. This can be explained that in the first birth interval, the mothers are during the appropriate age at pregnancy (20-30 years old). The review of the literature suggests that the neonatal mortality is in the lowest rate if the mothers are during the age of 20-30, and that the risk of poor outcome is considerably increased below 16 and over 40 years of age (Korones and Lancaster, 1981).Therefore, in this birth interval, the maternal age did not affect the infant's health. As to the type of birth, the review of the literature suggests that the complications of the childbirth can affect the newborns with the statistical significance, with the highest number of 30 percent of the neonatal deaths results from the delivery injuries (Kusiako, Ronsmans, and Van der Paul, 2000: 612). In the mothers with the vaginal birth, the troublesome childbirths or the delivery injuries result from: big infants with the weight of over 4,000 grams (8 pounds, 13 ounces); the preterm labour, cephalopelvic disproportion – the size and shape of the mother's pelvis is not adequate for the baby to be born vaginally, dystosia; difficult labor or childbirth, the prolonged labor and the abnormal birthing presentation, e.g. breech (buttocks first) delivery. These causes lead the infants to prenatal injuries. In the Cesarean birth, the infants are likely to be hurt by operation knives or to be prematurely delivered, because most of the recent Cesarean births are done without

labour pain but with calculating the last menstruation of the size of the fetus, which is likely to be done by mistake, leading to the preterm labour. As has already been mentioned, if the infants are delivered by obstetricians or skilled nurses in such high-safety place as hospitals, the so-called incidents are very scarcely found. As a result, the modes of delivery did not affect the child's good health.

In terms of the vaccination, the review of the literature suggests that the newborns are likely to get the impact of maternal infections. Many of the still births and the newborn deaths caused by the infections can be protected by sufficient maternal prenatal cares. Moreover, the protection of the likely infections in newborns begins with the newborn vaccination; however, although they are not vaccinated, they cannot get infected in the event that they do not contact the infections. Therefore, the vaccination found to affect the newborn's health. In relation to the birth interval, the interval did not relate to the child's health because in the first birth interval, beginning from the marriage to the first childbirth, the mothers have never had any childbirth before, and they may be healthy. Therefore, the birth interval did not affect the newborn's health.

Table 5.12 The Impacts of the First Birth Interval on the Child's Health

Factor		b	SE	Exp(b)
Maternal age at pregnancy (years)				
≥ 35		1.181	1.120	3.259
30-34		.958	1.094	2.607
20-39		.457	1.110	1.581
≤ 19				
Maternal complication and risk pregnancy				
No		1.265***	.181	3.542
Yes				
Type of birth				
Normal labour		.139	.195	1.149
Cesarean birth				
Immunization				
Complete		1.655	.951	5.234
No complete				
Birth interval (months)				
> 61		-.679	.488	.520
36-60		-.654	.454	.518
< 35				
Constant	-1.267			
-2 Log Likelihood	866.395			
Model χ^2 (df)	61.745*** (8)			
% classify correctly	83.7			

Note: * p<.05 **p<.01 ***p<.001

5.4.2 The Impacts of the Second Birth Interval on the Child's Health

Table 5.13 showed the results of the analysis of the factors influencing infant to Be healthy in the postnatal period with the Logistic Regression analysis. It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 1011.624 and the decreasing of the Model χ^2 from the model with only the constant value was statistical significance of .001. This means that the model was appropriate to study the factors affecting the second newborn health in the postnatal period; making the independent variables of other models constant, the prenatal risks and complications(p<.001) and the birth interval(p<.001) influenced the newborns health in the postnatal period with the statistical significance. The maternal age at pregnancy, the type of birth, and the child vaccination were not found to be related to

the child's good health. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 73.1 percent.

The healthiness odds of the newborns healthy in the second birth of the mothers without any of the prenatal risks was 2.465 times of odds of newborn health of the second birth of the mothers with the prenatal risks. This means that, if the mothers are healthy during pregnancies and childbirths, their newborns will also be healthy about two times than those whose mothers had prenatal risks . This finding was similar to the review of the literature that many neonatal ailments and deaths relate directly to the mothers. Also, there are a number of the research works, done by Tinker and Ransom (2002: 1-4), that indicate with the statistical significance that the stillbirths and the neonatal deaths can be protected if all women are adequately healthy, with the quality prenatal, childbirth and postnatal cares.

In terms of the birth interval, the healthiness odds of the second newborns health in the postnatal period with the birth interval of $\geq$ 61 months was .408 times that lower than odds of healthy newborns with the birth interval of $\leq$35 months. But the healthiness odds of the healthy newborns in the postnatal period with the birth interval 36-60 months was 1.937 times of the odds of newborns health with birth interval of <35 months. This means that the second newborns in the postnatal period with the birth interval of >61 months had lower level of health about 0.4 time than the infants with the birth interval of <35 months, but, newborns in the postnatal period with the birth interval of 36-60 months were nearly two times healthier than the newborns with the birth interval of <35 months. This finding showed that, the birth interval of 36-60 months was the optimal interval for the good health of infants in the postnatal period, which was relevant to the review of the literature that the newborns with the birth interval of 3-5 years were healthier and more likely to survive in their infancy and childhood until the age of 5 than those with that of less than 3 years. Moreover, not only were the newborns with the birth interval of 3-5 years likely to survive, but they were also very less likely to encounter the malnourishment in their infancy and childhood until the age of 5. Also, those with the birth interval of 3 years or higher are less likely to encounter the short height for age and the low weight for age than those with that of less than 3 years. Furthermore, this finding was also

relevant to the studies carried out in 2000 in Latin America done by the Latin American Center for Perinatology and Human Development (Centro Latinoamericano de Perinatología y Desarrollo Humano) (CLAP) that the infants with the birth interval of 27-32 months had better health than those with that of 9-14 or 15-20 months; also, they were very little likely to have low birth weight (<2,500 grams) or very low birth weight (<1,500 grams) at childbirth; the preterm labour (before 37 weeks of the gestation) or the very preterm birth (before 32 weeks gestation); and small pregnancy compared with the gestational age and low Apgar score within the first five minutes after delivery. In addition, the newborns with the birth interval of 27-32 months had better health than those with the long birth interval, especially those with that of 69 months or more; the newborns with the birth interval of 27-32 months were very little likely to have low weight or very low weight at childbirth, the preterm labour or the very preterm birth (Cited in Population report, 2002: 1-6) The factors that were not found to affect the maternal postnatal good health were the maternal age at pregnancy, the type of birth, and the child vaccination, with the reasons already mentioned regarding the first birth order.

Table 5.13 The Impacts of the Second Birth Interval on the Child's Health

Factor		b	SE	Exp(b)
Maternal age at pregnancy (years)				
≥ 35		-.175	.349	.840
30-34		-.350	.346	.705
20-39		.336	.541	1.399
≤ 19				
Maternal complication and risk pregnancy				
No		.902***	.169	2.465
Yes				
Type of birth				
Normal labour		.105	.184	1.110
Cesarean birth				
Immunization				
Complete		.579	.927	1.785
No complete				
Birth interval (months)				
> 61		-.897***	.223	.408
36-60		.661***	.183	1.937
< 35				
Constant	-1.284			
-2 Log Likelihood	1011.624			
Model χ^2 (df)	111.254*** (8)			
% classify correctly	73.1			

Note: * p<.05 **p<.01 ***p<.001

5.4.3 The Impacts of the Third Birth Interval on the Child Health

Table 5.14 showed the results of the analysis of the factors influencing infant to be healthy in the postnatal period with the Logistic Regression analysis. It was found that -2 Log likelihood or -2LL with indicated the goodness of fit was 192.651 and the decreasing of the Model χ^2 from the model with only the constant value was statistical significance of .001. This finding means that the model was appropriate to study the factors effecting to third infant health in the postnatal period; making the independent variables of other models constant, the prenatal risks and complications(p<.01) and the birth interval(p<.001) influenced the newborns health in the postnatal period with the statistical significance. The maternal age at pregnancy, and the type of birth did not relate to the child's good health. In case of the child

vaccination, it was found that nearly all of newborns in the third birth orders of 99.0 percentage had received vaccine, so the analysis of the relationship of the factors did not include this variable. According to percent correctly classify, this model is considered efficient because it yields the prediction of maternal health status in the postpartum period with the accuracy of 77.3 percent.

The healthiness odds of the newborns health in third birth of the mothers without any of the prenatal risks was 2.978 times of the odds of newborns health of the third birth of the mothers with the prenatal risks. This means that, if the mothers are healthy during pregnancies and childbirths, their newborns will also be healthy nearly 3 times than those whose mothers were unhealthy during pregnancies and childbirths.

In terms of the birth interval, the healthiness odds of the third newborns health in the postnatal period with the birth interval of 36-60 months was 5.530 times of the odds of newborns health with the birth interval of <35 months. This means that, the third newborns in the postnatal period with the birth interval of 36-60 months was healthier about 5 times than the newborns with the birth interval of <35 months. This finding showed that, the birth interval of 36-60 months was the optimal interval for healthy newborns in the postnatal period. This can be explained that, in the third birth orders mothers have already experienced 2 childbirths so it is necessary for them to have optimal birth interval in order to recover and to be healthy before getting the next pregnancy. In regards to the third birth, mothers get older compared to the two previous births, thus , mothers are more likely to have complications than the previous births and if mothers with complications and risks during pregnancy these problems will affect newborns health as well. So the optimal birth interval of 36-60 months is good for newborns health. The factors that were not found to affect the maternal-postnatal good health are the maternal age at pregnancy, and the type of birth, as the reasons that have been afore mentioned in the first birth order.

Table 5.14 The Impacts of the Third Birth Interval on the Child's Health

Factor		b	SE	Exp(b)
Age at pregnancy (years)				
≥ 35		-.702	.563	.496
30-34		-.119	.480	.887
20-39				
Complication and risk pregnancy				
No		1.091**	.386	2.978
Yes				
Type of birth				
Normal labour		.610	.430	1.840
Cesarean birth				
Birth interval (months)				
> 61		-.877	.495	.416
36-60		1.710***	.450	5.530
< 35				
Constant	-1.530			
-2 Log Likelihood	192.651			
Model χ^2 (df)	53.496 (6)			
% classify correctly	77.3			

Note: * p<.05 **p<.01 ***p<.001

According to the study results, it can be concluded that in regards to the maternal health in the postpartum period in each of the birth orders, the factors that affected the maternal health in the first birth order, beginning from the marriage until the first childbirth, are the absence of prenatal risks and complications and vaginal birth. The factors that affected the maternal health in the second birth orders, which begins from the first childbirth until the second childbirth, are the absence of the prenatal risks and complications, the vaginal birth and the birth interval of 36-60 months. The factors that affected the maternal health in the third birth orders, which begins from the second childbirth until the third childbirth, are the absence of the prenatal risks and complications, the vaginal birth and the birth interval of 36-60 months. Concerning the health of the child in each of the birth orders, the factor that affected the healthy child in the first birth is the prenatal maternal risks and complications; the factors that affected the healthy child in the second birth are the

absence of the prenatal maternal risks and complications and the birth interval of 36-60 months.

Generally, it can be summarized that the birth interval, the period in which the mothers recover themselves to become healthy before the next pregnancies, needs the appropriate period of 36-60 months. But, in order to help mothers be healthy, besides the appropriate birth interval, there are several other factors in relation to the mother's good health such as the absence of the prenatal maternal risks and complications and the vaginal birth. The healthy mothers with no prenatal maternal risks and complications will lead to the healthy children as well.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

The study on "The Impacts of Birth Spacing on the Health of Mother and Child" was aimed to study the pattern of birth spacing and compare birth intervals in each birth order, and to study the impacts of birth spacing on the health of mother and child in each birth order. Thus, the researcher collected the data from the sampled 1,098 married women aged 15-49 with at least 1 child, from 24 provinces excluding those living in Bangkok. The selected 24 provinces were from 4 regions of Thailand, the North, Central, North-Eastern, and Southern regions**.** In random sampling for this research, stratified multistage random sampling method was employed and in each stage, a simple random sampling was used. Descriptive statistics in regards to frequency, percentage, arithmetics mean, standard deviation, the highest and lowest values and cross-tabulation were used to describe the pattern of birth spacing and to compare the birth intervals in each birth order. The impacts of birth interval on the maternal and child health were studied by dividing into 2 parts: the impacts of birth interval on maternal health and child health and the relationship of the independent and dependent variables in each birth order which was analyzed by using logistic regression.

6.1 Conclusions

6.1.1 The Pattern of Birth Spacing and the Comparison of the Birth Intervals in Each Birth Order

6.1.1.1 General Characteristics Fertility of the Samples

It was found that the total of the samples was 1,098 with an average age of 31.20 years, nearly all of the respondents were Buddhist with the highest percentage of them graduated from high school, highest percentage of them worked

as construction labours, and the similar finding existed between the income of below 5,000 baht and 5,001-10,000 baht per month. In terms of the fertility, the average age at first menstruation was 13.64 years and the average age at marriage was 21.65 years.

6.1.1.2 The Pattern of Birth Spacing and the Comparison of the Birth Intervals in Each Birth Order

Briefly, it was found that out of all the 1,098 samples there were 69 one-parity women , 806 two-parity women and 223 three-parity women. At the time of the data collection, it was found that (1) the one-parity women had 69 live births; (2) the two-parity women had 927 live births, 51 abortions and 6 dead births and (3) the three-parity women had 196 live births, 25 abortions and 2 dead births. The study of the pattern of the birth interval in each order of the live birth was focused only on the live birth excluding abortions. Therefore, the number of children involved in the study of the pattern of the birth interval in each order of the live birth was 1,055 for the first birth interval, 978 for the second birth interval and 198 for the third birth interval.

In the first birth interval which refers to the day after marriage to the first child birth, it was found that the respondents gave birth after marriage with the average interval of 21.99 months (1.10 years.), half of them used contraceptive method to postpone pregnancy after marriage, and the highest proportion of them used an oral contraceptive method. In the second birth interval, which refers to first child birth date to the second child birth date, it was found that the average interval was 57.08 months(4.9 years.), the highest proportion used the female sterilization. This meant that, the samples desired to have 2 children. In the third birth which refers to second child birth date to the third child birth date, it was found that the average interval was 66.89 months (5.7 years.) and nearly all of them usedfemale sterilization.

In respect of the actual versus preferred birth intervals in the first birth interval it was found that the samples had an actual birth interval close to the preferred birth interval (21.99: 21.69 months). This meant that the spouses had planned when to have children. In the second birth interval, the spouses had actual birth intervals longer than the preferred ones (57.08 : 34.53 months). This finding may be due to several factors, such as the young ages at first marriage, the childbirth

of the mothers, so they need not have their next children before they are too old for pregnancy; they were advised by officers as to pregnancy care or delivery assistance for at least 2-3 years birth interval; and some encountered ailments owing to the pregnancy and the delivery, so that they feared of those conditions and then delayed the childbirth. These issues may result in the longer interval than they wished or they knew that birth spacing was beneficial so they used contraceptive method.

6.1.1.3 The Impacts of Birth Spacing on the Health of Mother and Child in Each Birth Order.

In respect of the impacts of birth spacing on the health of mother and child in each birth order, it was found that, in the first birth mother had average age at pregnancy of 23 years, the average gestational age to seek prenatal care was 2.74 months, nearly all received tetanus toxiod, and the highest proportion had full term pregnancy with vaginal birth in the government hospital. In terms of the complications and risks during pregnancy, the three complications and risks reported with the highest proportion were anemia during pregnancy, substance use, and bleeding during pregnancy. In the postnatal period, the complications and risks reported were anemia, malnutrition, and postpartum hemorrhage. The factors that were found significantly affected maternal health in the postpartum period were the complications and risks during pregnancy ($p<0.001$) and the type of birth ($p<0.001$) while no significant relationship was the found as regards to birth interval. In the second birth, it was found that mother had the average age at pregnancy of 27.79 years, the average gestational age to seek prenatal care was 2.68 months, nearly all received tetanus toxiod, and the highest proportion had full term pregnancy with vaginal birth in the government hospital. In terms of the complications and risks during pregnancy, the three complications and risks reported with the highest proportion were underwent hysterectomy, anemia during pregnancy, substance use. And in the postnatal period the complications and risks reported were anemia, (Pre)eclampsia, and postpartum hemorrhage. The factors that were found to affect maternal health in the postpartum period significantly were: the complications and risks during pregnancy ($p<0.001$), the type of birth ($p<0.001$), and the birth interval of 36-60 months ($p<0.001$). In the third birth, it was found that the mother had an average age at pregnancy of 31.20 years, average gestational age to seek prenatal care was 2.73 months, all of the samples

received tetanus toxiod, the highest proportion had full term pregnancy with vaginal birth in the government hospital. In terms of the complications and risks during pregnancy, three complications and risks reported were anemia during pregnancy, preterm birth and underwent hysterectomy. In the postnatal period the three complications and risks found were anemia, (Pre)eclampsia, and postpartum hemorrhage. The factors that were found significantly affected maternal health in the postpartum period were the maternal age at pregnancy ($p<.05$), the complications and risks during pregnancy ($p<0.01$), the type of birth ($p<0.01$), and the birth interval 36-60 months ($p<0.05$).

In respect to the impacts of birth spacing on the health of infant in each birth order, it was found that in the first birth, the infant had the average birth weight of 3,020 grams, average day for breast feeding was for 91.0 days, nearly all children received vaccination. In terms of the postnatal complications, the complications found were preterm birth, jaundice, and hypothermia. The factors that were found significantly affected the infant health in the postnatal period were the maternal complications and risks during pregnancy ($p<0.001$) while no significant relationship was found as regards to birth interval. The second birth, the infant had the average birth weight of 3,035 grams, average day for breast feeding was 92.2 days, nearly all of children received vaccination. In terms of postnatal complications, the complications found were preterm birth, jaundice, and hypothermia. The factors that were found significantly affected the infant health in the postnatal period were the maternal complications and risks during pregnancy ($p<0.001$) and the birth interval of 36-60 months ($p<0.001$). In the third birth, the infant's average birth weight was 3,061 grams, average day for breast feeding was 91.5 days, nearly all children received vaccination. In regards to the postnatal complications, the complications reported were jaundice, hypothermia, and preterm birth. The factors that were found significantly affected the infant health in the postnatal period were the maternal complications and risks during pregnancy ($p<0.01$) and the birth interval of 36-60 months ($p<0.001$).

Generally, it can be summarized that the impacts of birth spacing on the health of mother and child in each birth order depend on several factors such as the maternal complications and risks during pregnancy, the type of birth, and the optimal birth interval that affect maternal health as well as infant health.

6.2 Recommendations

From the study, as it was found that maternal and child health depends on several factors such as the maternal complications and risks during pregnancy, the type of birth, and the optimal birth interval, thus, the researcher suggests the guidelines for development as follows:

1) Spouses should be motivated to look for the complications and risks that may occur during pregnancy.

2) Rewarding the mothers who performed good practices at all stages of pregnancy.

3) Spouses should be motivated to have a vaginal birth.

4) Spouses should be motivated and informed about the optimal birth interval and specified timing, and how to define clearly about the time from birth's date to the next pregnancy or the child's birth date to the next child's birth date.

5) Spouses should be motivated about family planning in order to have the optimal birth interval by adopting an efficient contraceptive method with low failure rate.

6.3 Implications for Future Researches

The study on "The Impacts of Birth Spacing on the Health of Mother and Child" was a retrospective study with the sampled mothers who had at least one child. That may be considered as the healthy maternal and child group, thus, for future researches, the recommendation is the indepth study of the same type of this research should be carried out in a specific group with poor health of both mothers and infants.

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APPENDICES

The Questionnaire for the Study Entitled the Impacts of Birth Spacing on Mother's and Infant's Health

Date of Interview……..Time……Interviewer……Province……

Note: ……..

Remarks: 1st, 2nd and 3rd pregnancies include the ones with abortions and infant deaths.

1. General Information

Interviewee's Name……Age……Years

1.1 Nationality……

1.2 Religion ○ Buddhism ○ Christianity ○ Islamism ○ others (specify)……

1.3 Current marital status ○ married ○ widowed ○ divorced ○ separated

2. Education

2.1 Personal Educational background ○ Junior high school ○ Senior high school/vocational certificate ○ Diploma/advanced vocational certificate ○ Bachelor's degree or higher ○ Uneducated ○ Others (specify)……

2.1 Husband's educational background ○ Junior high school ○ Senior high school/vocational certificate ○ Diploma/advanced vocational certificate ○ Bachelor's degree or higher ○ Uneducated ○ Others (pls. specify)……

3. Occupation

3.1 Your occupation ○ Government officer/state enterprise officer ○ Company officer/employee ○ Trader/ business owner ○ Agriculturist ○ Unemployed

3.2 Your husband's occupation ○ Government officer/state enterprise officer ○ Company officer/employee ○ Trader/ business owner ○ Agriculturist ○ Unemployed

4. Economic Status

4.1 Your income ○ lower than 5,000 Baht ○ 5,001 - 10,000 Baht ○ 10,001 -15,000 Baht ○ 15,001 – 20,000 Baht ○ ≥ 20,001 ○ No income

4.2 Husband's income ○ lower than 5,000 Baht ○ 5,001 - 10,000 Baht ○ 10,001 -15,000 Baht ○ 15,001 – 20,000 Baht ○ ≥ 20,001 ○ No income

4.3 Average family debt per month ○ lower than 5,000 Baht ○ 5,001 - 10,000 Baht ○ 10,001 or more ○ No debt

5. Child Desire

5.1 In your lifetime, the number of children that you wish or intend to have is ..... . ……son(s) …….daughter(s)

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
5.2 Your feeling toward your children	○ Happy ○ Unhappy ○ Destiny ○ Others (specify)……	○ Happy ○ Unhappy ○ Destiny ○ Others (specify)…...	○ Happy ○ Unhappy ○ Destiny ○ Others (specify)…...
5.3 What do you think the cause of the unwanted or undesired number of your children?	○ Health problem ○ Marital status change ○ Unwanted by you/your spouse ○ Economic problem ○ Lack of babysitter ○ Obstacle to work ○ Others (specify)….....	○ Health problem ○ Marital status change ○ Unwanted by you/your spouse ○ Economic problem ○ Lack of babysitter ○ Obstacle to work ○ Others (specify)….....	○ Health problem ○ Marital status change ○ Unwanted by you/your spouse ○ Economic problem ○ Lack of babysitter ○ Obstacle to work ○ Others (specify)….....
6. Age at First Marriage + Fertility			
6.1 How old were you when you were pregnant?	……..years…….month(s)	……..years…….month(s)	……..years…….month(s)
6.2 You had the first menstruation when you were……..years old……month(s). 6.3 You were married when you were……..years old……month(s). 6.4 You have been living with your current spouse for……year(s)……month(s). 6.5 Since you were married, you have been pregnant……time(s) with……..abortion(s) and……infant death(s).			
6.6 What is the average time of your sexual intercourse per week?	○ 0-1 time ○ 2-3 time ○ Cannot remember ○ Others (specify)….....	○ 0-1 time ○ 2-3 time ○ Cannot remember ○ Others (specify)….....	○ 0-1 time ○ 2-3 time ○ Cannot remember ○ Others (specify)….....
7.6 Have you ever encountered infertility problem?	○ Ever ○ Never	○ Ever ○ Never	○ Ever ○ Never
8. Pressure on Fertility			
8.1 Living condition of the Family ○ Single family ○ Extended family 8.2 There are…….members in your family. 8.3 Have you ever been suggested about fertility by other family members? ○ Ever ○ Never 8.4 If you have been suggested, who did that? ○ Paternal grandfather / paternal grandmother ○ Maternal grandfather / maternal grandmother ○ Husband ○ Others (specify)….....			

8.5 Have you ever been suggested about fertility by person other than your family members? ○ Ever ○ Never
8.6 If you have been suggested, who did that? ○ Neighbor ○ Village headman ○ Others (specify)…....
8.7 Who is in charge of the fertility decision in your family? ○ Paternal grandfather / paternal grandmother ○ Maternal grandfather / maternal grandmother ○ Husband ○ Yourself ○ Others (specify)…....

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
8.9 What is your reason for having children ?	○You or your spouse want to have. ○ Grandparents want to have. ○You are accidentally pregnant. ○ Others (specify)….....	○You or your spouse want to have. ○ Grandparents want to have. ○You are accidentally pregnant. ○ Others (specify)….....	○You or your spouse want to have. ○ Grandparents want to have. ○You are accidentally pregnant. ○ Others (specify)….....
9. Child Sex and Birth Order			
9.1 Do your family members anticipate specific child sex?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
9.2 Who in your family is influential to anticipate child gender? ○ Paternal grandfather / paternal grandmother ○ Maternal grandfather / maternal grandmother ○ Husband ○ Yourself ○ Others (specify)….....			
9.3 What is the gender of your child?	○ Male ○ Female	○ Male ○ Female	○ Male ○ Female
9.4 Are you content with the gender of your child according to birth order?	○ Content ○ Discontent	○ Content ○ Discontent	○ Content ○ Discontent
9.5 If you are <u>discontented</u> with the gender of your child according to birth order, do you think you will have more children with the gender that you desire?	○ More ○ No more	○ More ○ No more	○ More ○ No more
10. Pregnancy Care			
10.1 Did you receive prenatal care when you are pregnant?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10.2 What was your pregnancy age when you attended prenatal care clinic?	……month(s)	……month(s)	……month(s)

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
10.3 In case of did not receive prenatal care, what are the reasons for that?	○ Pregnancy unawareness ○ Economic problem ○ Remote distance ○ Discontentment with the service ○ Considering unnecessary ○ Others (specify)….....	○ Unawareness of pregnancy ○ Economic problem ○ Remote distance ○ Discontentment with the service ○ Considering unnecessary ○ Others (specify)….....	○ Unawareness of pregnancy ○ Economic problem ○ Remote distance ○ Discontentment with the service ○ Considering unnecessary ○ Others (specify)….....
10.4 What is the source of prenatal care that you received?	○ Books ○ Officer's campaign ○ Parents/grandparents ○ Others (specify)….....	○ Books ○ Officer's campaign ○ Parents/grandparents ○ Others (specify)….....	○ Books ○ Officer's campaign ○ Parents/grandparents ○ Others (specify)….....
10.5 Where did you get prenatal care?	○ Health center ○ Clinic/ Private hospital ○ Government hospital ○ Others (specify)….....	○ Health center ○ Clinic/ Private hospital ○ Government hospital ○ Others (specify)….....	○ Health center ○ Clinic/ Private hospital ○ Government hospital ○ Others (specify)….....
10.7 How many times did you have the prenatal care?	……time(s)	……time(s)	……time(s)
10.8 Did you have the injection against tetanus?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10.9 Did you consume drug, alcohol or cigarette during your pregnancy?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10.10 Did you take any medicine other than regular tonic during your pregnancy?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10.11 Did you have these risks or disorders during your pregnancy?			
1) When you got pregnancy <17or >35 years.	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
2) Have you ever delivered before your pregnancy age of 37 weeks	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
3) Giving birth to an infant weighing < 2,500 or > 4,000 grams	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
4) Have you ever had womb operation	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
Have you ever had:			
5) History of a heart trouble	O Yes O No	O Yes O No	O Yes O No
6) Three abortions or more	O Yes O No	O Yes O No	O Yes O No
7) Anaemia	O Yes O No	O Yes O No	O Yes O No
8) VDRL check-up with plus result	O Yes O No	O Yes O No	O Yes O No
9) Thyroid problem	O Yes O No	O Yes O No	O Yes O No
10) Blood pressure of 140/90 mm.hg or more	O Yes O No	O Yes O No	O Yes O No
11) White egg in your urine	O Yes O No	O Yes O No	O Yes O No
12) A heart trouble	O Yes O No	O Yes O No	O Yes O No
13) Womb size not congruent to pregnancy age	O Yes O No	O Yes O No	O Yes O No
14) Twin pregnancy	O Yes O No	O Yes O No	O Yes O No
15) Infant in disorder position (not head position) from the 34th week on	O Yes O No	O Yes O No	O Yes O No
16) Bleeding during pregnancy	O Yes O No	O Yes O No	O Yes O No
17) Over 40 weeks pregnancy	O Yes O No	O Yes O No	O Yes O No
18) Weight less than 1 kg./month from the 24th week on	O Yes O No	O Yes O No	O Yes O No
19) The baby tossing about not over 10 times/day from the 32nd week on	O Yes O No	O Yes O No	O Yes O No
20) Urinary tract infection	O Yes O No	O Yes O No	O Yes O No
21) Less than 140 cms. height	O Yes O No	O Yes O No	O Yes O No

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
Have you ever had:			
22) Disorder with your weight of 80 kgs.or more	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
23) Disorder with your pelvis	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
24) Prenatal bleeding owing to low plancenta prematurely	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10.12 Where did you get treatment in the event that you are in risk of pregnancy (in11.11)?	○ Prenatal care place ○ Self treatment ○ No treatment ○ Others (specify)….....	○ Prenatal care place ○ Self treatment ○ No treatment ○ Others (specify)….....	○ Prenatal care place ○ Self treatment ○ No treatment ○ Others (specify)….....
10.13 General where did you get treatment when you get sick?	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Buy medicine for yourself ○ Others (specify)….....	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Buy medicine for yourself ○ Others (specify)….....	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Buy medicine for yourself ○ Others (specify)….....
11. Types of delivery and delivery assistant			
11.1 How old were you when you have delivery?	……years old	……years old	……years old
11.2 How many weeks were you pregnant before delivery?	……weeks	……weeks	……weeks
11.3 Did you have broken amniotic fluid sac before delivery due?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
11.4 Types of your deliver?	○ Normal labour ○ Cesarean birth ○ Others (specify)….....	○ Normal labour ○ Cesarean birth ○ Others (specify)….....	○ Normal labour ○ Cesarean birth ○ Others (specify)….....
11.5 Where did you deliver?	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Others (specify)….....	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Others (specify)….....	○ Health center ○ Clinic + private hospital ○ Government hospital ○ Others (specify)….....

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
11.6 Who helped you deliver?	○ Doctor ○ Nurse or midwife ○ Traditional midwife ○ Others (specify)….....	○ Doctor ○ Nurse or midwife ○ Traditional midwife ○ Others (specify)….....	○ Doctor ○ Nurse or midwife ○ Traditional midwife ○ Others (specify)….....
11.7 Did you bleed so much during your delivery?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
12. Did you have the following problems after delivery?			
1) Bleeding after delivery	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
2) Anaemia	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
3) Pelvis Infection	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
4) High blood pressure while delivery	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
5) Urinary system problem	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
6) Mental health problem	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
7) Nutrition	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
13. Where did you get treatment in case of the above-mentioned problems in ?	○ Prenatal care place ○ No treatment ○ Others (specify)….....	○ Prenatal care place ○ No treatment ○ Others (specify)….....	○ Prenatal care place ○ No treatment ○ Others (specify)….....
14. How was your health after your delivery until the sixth week?	○ Well ○ Problems + continuous treatments ○ Problems + self treatments ○ Others (specify)….....	○ Well ○ Problems + continuous treatments ○ Problems + self treatments ○ Others (specify)….....	○ Well ○ Problems + continuous treatments ○ Problems + self treatments ○ Others (specify)….....

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
15. Breast Feeding			
15.1 What are the sources of breast feeding usefulness information that you were informed?	○ Unaware of the usefulness ○ Books ○ Parents/grandparents ○ Officer's campaign ○ Others (specify)….....	○ Unaware of the usefulness ○ Books ○ Parents/grandparents ○ Officer's campaign ○ Others (specify)….....	○ Unaware of the usefulness ○ Books ○ Parents/grandparents ○ Officer's campaign ○ Others (specify)….....
15.2 When did your children get your breast feeding after your delivery?	○ Early sucking ○ Late sucking	○ Early sucking ○ Late sucking	○ Early sucking ○ Late sucking
15.3 Did you have enough breast milk to feed your children?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
15.4 How long did you feed your children with only your breast milk without any water or nutrients?	……days	……days	……days
15.5 How many times did you feed your child with your breast milk during lunch?	○ As soon as the baby cry or get hungry ○ Every……hour ○Not exactly	○ As soon as the baby cry or get hungry ○ Every……hour ○Not exactly	○ As soon as the baby cry or get hungry ○ Every……hour ○Not exactly
15.6 How many times did you feed your children with your breast milk during night?	○ As soon as the baby cry or get hungry ○ Every……hour ○ Not exactly	○ As soon as the baby cry or get hungry ○ Every……hour ○ Not exactly	○ As soon as the baby cry or get hungry ○ Every……hour ○ Not exactly
15.7 Did you stop feeding your previous child when you gave birth to the 2nd or 3rd child?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
15.8 Did you have menstruation again while you breast feed your children?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
16. Quitting Sexual Intercourse after Delivery			
16.1 How long did you quit sexual intercourse after delivery?	○ Did not quit ○ Quitting for……..days	○ Did not quit ○ Quitting for……..days	○ Did not quit ○ Quitting for……..days

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
16.2 What source of the information about quitting sexual intercourse after delivery that you were informed?	○ Unawareness of quitting sexual intercourse ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....	○ Unawareness of quitting sexual intercourse ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....	○ Unawareness of quitting sexual intercourse ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....
16.3 Did you have sexual intercourse after delivery again before or after menstruation?	○ Before ○ After	○ Before ○ After	○ Before ○ After
17. Child's Health and Survival			
17.1 Your Children's birth weight ?	……grams	……grams	……grams
17.2 Did your children have the following postnatal disorders**?**			
1) Inborn disability	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
2) Postnatal infection	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
3) Respiratory system infection	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
4) Postnatal tetanus	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
5) Umbilical cord infection	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
6) Delivery injury	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
7) Oxygen shortage	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
8) Premature delivery	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
9) Low weight when newly born	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
10) Low body temperature	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
11) Infectious death likelihood	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
12) Feeding difficulty	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
13) Frequent recovery assistance	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
14) Pale body	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
15) Serious conjunctivitis	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
16) Diarrhea	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
17.3 Where did your children get treatments in case that they have the disorders in 17.2?	○ Delivery place ○ Buy medicine ○ Others (specify)….....	○ Delivery place ○ Buy medicine ○ Others (specify)….....	○ Delivery place ○ Buy medicine ○ Others (specify)….....
17.4 How was your children's overall health when newly born until seven days?	○ Healthy ○ Complications needing continuous cure ○ Recoverable Complications ○ Others (specify)….....	○ Healthy ○ Complications needing continuous cure ○ Recoverable Complications ○ Others (specify)….....	○ Healthy ○ Complications needing continuous cure ○ Recoverable Complications ○ Others (specify)….....
17.5 How was your children's overall health from eight days to one month?	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....
17.6 How was your children's overall health from one month to one year?	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
17.7 How was your children's overall health from one year to five years?	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....
17.8 Were your children fully vaccinated?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
17.9 How old are your children now?	……..year(s)…….month(s)	……..year(s)…….month(s)	……..year(s)…….month(s)
17.10 How is your children's health now?	○ Healthy ○ Dead ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Dead ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....	○ Healthy ○ Dead ○ Often sick ○ Slowly grown up ○ Slowly developed ○ Others (specify)….....
18. Birth Spacing			
18.1 From the time after your first menstruation until your first delivery, it took…….month(s) ……..year(s).			
18.2 From your first delivery with your spouse the first one to now, it takes…….month(s) ……..year(s).			
18.3 Date of each of your deliveries	Date……	Date……	Date……
18.4 How long did it take you to become pregnant again after abortion in case that you had it?	……..year(s)…….month(s)	……..year(s)…….month(s)	……..year(s)…….month(s)
18.5 How long did it take you to become pregnant again after your children died in case that your children died, no matter how old they were?	……..year(s)…….month(s)	……..year(s)…….month(s)	……..year(s)…….month(s)
18.6 How long do your appropriate birth spacings take as you have been informed?	……..year(s)	……..year(s)	……..year(s)

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
18.7 How do you think about the mentioned intervals in 18.6?	○ Fairly appropriate ○ Too long ○ Too short ○ Others (specify)….....	○ Fairly appropriate ○ Too long ○ Too short ○ Others (specify)….....	○ Fairly appropriate ○ Too long ○ Too short ○ Others (specify)….....
18.8 What source(s) of birth spacing that you were informed ?	○ Unawareness of the usefulness ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....	○ Unawareness of the usefulness ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....	○ Unawareness of the usefulness ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Others (specify)….....
18.9 In your opinion, how long dose each of appropriate birth spacings take?	……..year(s)…….month(s) (from the 1st one to the 2nd one)	……..year(s)…….month(s) (from the 2nd one to the 3rd one)	……..year(s)…….month(s) (from the 3rd one to the 4th one)
18.10 What is your opinion about the 3-5 year birth spacing?	○ Appropriate ○ Too long ○ Too short	○ Appropriate ○ Too long ○ Too short	○ Appropriate ○ Too long ○ Too short
19. Birth Control			
19.1 What way(s) of the birth control did you employ after your marriage or living with your spouse and before your pregnancy?	○ Contraceptive pill ○ Birth Control injection ○ Condom ○ Abstinence ○ External ejaculation ○ Contraceptive pill implantation ○ Safety period ○ Others (specify)….....	○ Contraceptive pill ○ Birth Control injection ○ Condom ○ Abstinence ○ External ejaculation ○ Contraceptive pill implantation ○ Safety period ○ Others (specify)….....	○ Contraceptive pill ○ Birth Control injection ○ Condom ○ Abstinence ○ External ejaculation ○ Contraceptive pill implantation ○ Safety period ○ Others (specify)…..
19.2 What source(s) of the birth control that you were informed? ○ Books ○ Parents/grandparents ○ Prenatal care or delivery officer ○ Drugstore ○ Others (specify)…..			
19.3 Did you use birth control after your marriage or living with your spouse and before your pregnancy? ○ Yes ○ No			

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
19.4 When were you pregnant, before or after you stopped using the method(s) of birth control ?	O Before O After	O Before O After	O Before O After
19.5 What method of the birth control did you use for your birth spacings after your deliveries?	O Contraceptive pill O Birth control injection O Condom O Female sterilization O Vasectomy O Abstinence O External ejaculation O Contraceptive pill implantation O Safety period O Others (specify)…….	O Contraceptive pill O Birth control injection O Condom O Female sterilization O Vasectomy O Abstinence O External ejaculation O Contraceptive pill implantation O Safety period O Others (specify)……….	O Contraceptive pill O Birth control injection O Condom O Female sterilization O Vasectomy O Abstinence O External ejaculation O Contraceptive pill implantation O Safety period O Others (specify)…….
19.6 Did you get pregnant while you were using the method(s) of the birth control?	O Yes O No	O Yes O No	O Yes O No
19.7 What method (s) of the birth control that will you use to stop pregnancy after you have enough children?	O Contraceptive pill O Birth control injection O Condom O Female sterilization O Vasectomy O External ejaculation O Others (specify)…….		
19.8 What problems did you have from the birth control method(s) used?	O Not effective O Spouse's disapproval O Health problem O High cost O Inconvenience O Others (specify)…….	O Not effective O Spouse's disapproval O Health problem O High cost O Inconvenience O Others (specify)…….	O Not effective O Spouse's disapproval O Health problem O High cost O Inconvenience O Others (specify)…….

Question	1st Pregnancy	2nd Pregnancy	3rd Pregnancy
19.9 Where do you mainly get birth control services?	○ Drugstore ○ Clinic/private hospital ○ Government hospital ○ Health center ○ Others (specify)….....	○ Drugstore ○ Clinic/private hospital ○ Government hospital ○ Health center ○ Others (specify)….....	○ Drugstore ○ Clinic/private hospital ○ Government hospital ○ Health center ○ Others (specify)….....
20. Employment			
20.1 Did you work before your deliveries?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
21.2 Were pregnancy and delivery the obstacles of your work?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
22.3 Will you continue your work after your delivery?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
23.4 Did your pregnancies and deliveries affect your employments?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
24.5 Are your children the obstacles of work?	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No

……Thank you for your 0.

BIOGRAPHY

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