EARLY TRANSITION TO MOTHERHOOD: EVIDENCE FROM KANCHANABURI DEMOGRAPHIC SURVEILLANCE SYSTEM, THAILAND

NOWROZY KAMAR JAHAN

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.....
Ms. Nowrozy Kamar Jahan
Candidate

.....
Asst. Prof. Aree Prohmmo, Ph.D.
Major Advisor

.....
Assoc. Prof. Philip Guest, Ph.D.
Co-Advisor

.....
Asst. Prof. Aree Jampaklay, Ph.D.
Co-Advisor

.....
Prof. M.R. Jisnuson Svasti, Ph.D.
Dean
Faculty of Graduate Studies

.....
Assoc. Prof. Chai Podhisita, Ph.D.
Chair
Doctor of Philosophy Program in Demography
Institute for Population and Social Research

Thesis
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on
September 28, 2007

.....
Ms. Nowrozy Kamar Jahan
Candidate

.....
Assoc. Prof. Kusol Soonthorndhada, Ph.D.
Chair

.....
Asst. Prof. Aree Jampaklay, Ph.D.
Member

.....
Asst. Prof. Aree Prohmmo, Ph.D.
Member

.....
Assoc. Prof. Wassana Im-em, Ph.D.
Member

.....
Assoc. Prof. Philip Guest, Ph.D.
Member

.....
Prof. M.R. Jisnuson Svasti, Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

.....
Assoc. Prof. Churnrurtai Kanchanachitra, Ph.D.
Director
Institute for Population and Social Research
Mahidol University

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Nowrozy Kamar Jahan

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NOWROZY KAMAR JAHAN 4737936 PRDE/ D

Ph.D. (DEMOGRAPHY)

THESIS ADVISORS: AREE PROHMMO, Ph.D. PHILIP GUEST, Ph.D. AREE JAMPAKLAY, Ph.D.

ABSTRACT

Levels of teenage marriage and fertility are relatively high in Thailand where the overall level of fertility is below replacement level and the great majority of Thai females are delaying their marriage into their twenties. In 2006, 14 percent of Thai women aged 15-19 had married. The fertility rate for women aged 15-19 has not declined as much as other age groups. This study explores the determinants of the timing of first marriage and first pregnancy among Thai female adolescents. Longitudinal data (2000-2004) of the Kanchanaburi Demographic Surveillance System (KDSS) was used for the analysis. The study population was all female aged 15-19 and unmarried at the time of enrolment into the KDSS. Life table method and event history analysis were used in the analysis. The study found that probability of teenage marriage was highest among those who were not in school and the probability of teenage pregnancy was highest among those who did not use contraceptives. The study identifies other variables related to earlier age at marriage and pregnancy included individual, household and community characteristics. Teenage marriage and pregnancy limit the educational and occupational choices of young women and therefore the factors that contribute to early marriage and childbearing need to be brought to the attention of policymakers. Strong political commitment is needed to effectively implement Thai education policy and improve access to adolescent reproductive health services in order to reduce levels of teenage marriage and pregnancy.

KEY WORDS: TEENAGE MARRIAGE/TEENAGE PREGNANCY/ /EDUCATION /CONTRACEPTIVE USE /THAILAND

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LIST OF ABBREVIATION

AIDS	Acquired Immune Deficiency Syndrome
ASFR	Age Specific Fertility Rate
CPR	Contraceptive Prevalence Rate
EHA	Event History Analysis
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agricultural Organization
HIV	Human Immunodeficiency Virus
ICPD	International Conferences of Population and Development
ICPD (PoA)	International Conferences of Population and Development Programme of Action
IPSR	Institute for Population and Social Research
KDSS	Kanchanaburi Demographic Surveillance System
MDG	Millennium Development Goals
MMR	Maternal Mortality Ratio
NESDB	National Educational and Social Development Board
NSO	National Statistical Office
SMAM	Singulate Mean Age At Marriage
TFR	Total Fertility Rate
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
WHO	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Problem Statement

Research on the "early transition to motherhood" focuses on those individuals who are adolescents. Adolescence is a transitional phase, when an individual prepares him/herself before taking the roles and responsibilities of adulthood. During this brief period of adaptation, they attain external and internal physical maturity along with mental development. The whole transitional phase is divided into two halves and the second half (15-19 years of age) is identified as the late period of adolescence (United Nations Population Fund, 2003a: 3).

In the 21st century, female adolescents of developing countries are delaying their marriage more than their mothers' generation did in the 20th century. This happens partly due to social and structural changes and economic development and partly due to efforts of international agencies. Female school enrollment is increasing and the gender gap in secondary schooling is reducing throughout the developing world (UNESCO Institute for Statistics, cited in Population Reference Bureau, 2006). An increased number of female adolescents thus continue their education through late adolescence as well as delaying their marriage and childbearing.

In spite of this trend, marriage in late adolescence followed by childbearing is widespread in developing countries. It is evident that in developing countries excluding China, 23 percent of female adolescents aged 15 to 19 years marry compared to 3 percent of the same age group in developed countries. Nine percent of adolescents aged 15-19 years in developing countries give birth in contrast to only two percent of adolescents at this age in developed countries. In developing countries, 22 percent of women become mothers by the age of 18 years (Population Reference Bureau, 2006).

In Thailand, Thai marital fertility has declined due to delayed marriage, increased celibacy and the availability of an effective family planning program. The great majority of Thai females delay their marriage well into their twenties. At the 1970 census, the female singulate mean age at marriage was 22 years (National Statistical Office, 1970), and increased to 24 years in the recent 2000 census (National Statistical Office, 2000). The percent of women never married is increasing in Thailand; where in the past marriage was almost universal (Xenos & Gultiano, 1992). Thai fertility decline is also attributed to the high rate of contraceptive use, with the contraceptive prevalence rate among married women reaching 81 percent in 2006 (National Statistical Office, 2006). Thailand's fertility transition has progressed rapidly. Nevertheless, adolescent marriage followed by childbearing persists.

In 1990, 15 percent of Thai women aged 15-19 years were ever married (United Nations, 2000a), at a time when the singulate mean age at marriage (SMAM) was 23.5 years (National Statistical Office, 1990). During the same period, the proportion of ever married women aged 15-19 years of the neighboring countries was lower than that of Thailand (See Table A2 in Appendix A) (United Nations, 2000a). Even in 2006, 14 percent of Thai adolescents were ever-married (National Statistical Office, 2006).

A relatively high level of Thai adolescent fertility is a proxy measure of relatively high levels of adolescent marriage. In Thai society, marriage has traditionally been considered as the onset of sexual experience. Although this has been changing, childbearing out of wedlock is not yet acceptable. Thus, timing of first birth usually follows age at first marriage. Adolescent fertility is relatively high in Thailand where the total fertility rate (TFR) is below the replacement level. TFR was 1.5 children per woman in 2006 (National Statistical Office, 2007). Age Specific Fertility Rates (ASFR) among Thai women aged 15–19 have reduced from 58 per 1000 in 2004 to 42 per 1000 in 2007. Yet, this rate remains higher than the Southeast Asian regional level in 2007 (34 per 1000) (United Nations Economic and Social Commission for Asia and the Pacific, 2007). It was also higher than that of the many neighboring countries (See Table A5 in Appendix A). Hence, in most Southeast Asian countries, TFR was higher than that of Thailand, but the fertility rate was lower among young women under age 20 when compared with Thai adolescents.

Thai adolescent fertility had not changed at the same pace as fertility change in other age groups. In spite of a steady descending trend in TFR and ASFR of other age groups, adolescent fertility in Thailand has maintained a fluctuating trend over the last decade (See Table A6 and A7 in Appendix A). The percentage of live births that occur to Thai women below 20 years has also remained stagnant at around 13 percent (See Table A13 in Appendix A) for the last 16 years (Ministry of Public Health, cited in Kanchanachitra, et al., 2005). Adolescent fertility levels vary across the country, with the proportion of adolescent mothers ranging from 39 in Yala Province to six in Nan province (Reproductive Health Statistics, cited in United Nations Economic and Social Commission for Asia and the Pacific, 2001). The high prevalence of induced abortion among Thai adolescents also indicates a high incidence of unwanted and untimely pregnancy (Warakamin, et al., 2004).

Marriage and childbearing during adolescence has major consequences on the lives of young women. It affects not only their reproductive health but also their level of educational attainment and labor force participation. In Thailand, the proportion (96 percent) of girls who remain in educational institutions at the age of 12-14 years declines to 70 percent and 17 percent when they reach the ages of 15-19 and 20-24 years respectively (National Statistical Office, 2003, cited in World Health Organization, 2007a). Marriage and pregnancy during adolescence may be partly responsible for these sharp declines.

A similar situation is also found at the provincial level. The female singulate mean age at marriage in Kanchanaburi province was 23.4 years in 2000 (National Statistical Office, 2000). Yet, 18 percent of mothers in Kanchanaburi province were younger than 20 years (Reproductive Health Statistics, cited in United Nations Economic and Social Commission for Asia and the Pacific, 2001). In the Kanchanaburi project area of the Institute for Population and Social Research (IPSR), Mahidol University, which is the focus area of the current study, the female singulate mean age at marriage was 20.7 years in 2003 (Guest & Jampaklay, 2005: 81) and ASFR (15-19), which was 78 per 1000 women in the year 2000 (Institute for Population and Social Research, 2001), only marginally declined to 77 per 1000 women in the year 2004 (Guest, et al., 2007: 143). There was wide variation in this

situation in the different strata, classified according to the main occupation of the population and land use patterns, of the study area. ASFR (15-19) was highest in the Uplands stratum at 117 per 1000 women and lowest in the Urban/Semi-Urban Stratum at 44 per 1000 women (Guest, et al., 2007:143).

Adolescent marriage and childbearing is a major social and health concern. It interrupts the transitional phase of adolescence. An early transition to motherhood is harmful at the individual as well as at the national level. Every female child has a right to successfully complete her adolescence period before becoming a mother. During this transitional period, an adolescent should be cared for by her mother; instead of taking care of her own baby. All the above-mentioned factors are major motivators for undertaking this research.

1.2 Rationale

Adolescence is a critical stage of the female life cycle when adolescents are considered neither girls nor women. During this period, they may be exposed to the risk of experiencing many critical inter-related life events e.g. first marriage and first pregnancy. If they marry and have unprotected sex, they may experience parenthood. Parenthood is indeed a happy event if it is not untimely. Early entry into marriage as well as reproduction tends to constrain the educational attainment and economic opportunities of young women. This is detrimental to their prospects for careers and denies the opportunity to pursue their academic goals. Thus, it often lowers their status in society.

Adolescents are often deprived of better education and good reproductive health if they get married and become pregnant at early ages. In Thailand, a significant proportion of Thai adolescents are not in school and are deprived of completing their primary education. Universal primary education is one of the Millennium Development Goals (United Nations, 2000b). A substantial number of adolescents could not take advantage of educational opportunities and fail to complete their basic education, which in Thailand is 12 years according to the National Education Act of 1999 (Office of the National Education Commission, 1999).

According to the Thai Population and Housing Census, 2000, at the national level, 34.3 percent of the population aged 6-24 years did not attend school and the average years of educational attainment of the population aged 15 years and over were only 7.8 years. At the same time, in Kanchanaburi Province, the mean years of educational attainment of the population aged 15 years and over were only 6.2 years, and 40.8 percent of the population aged 6-24 years did not attend school (National Statistical Office, 2000).

The female gross secondary enrolment rates in Thailand have increased substantially. The overall female gross secondary enrolment level has increased from 30 percent in 1991 to 63 percent and 72 percent in 2002 and 2005 respectively (UNESCO Institute for Statistics, 2007). At the lower secondary level, the enrollment rate increased from 57 percent in 1992 (Office of the National Economic and Social Development Board, 1998, cited in United Nations, 2000c) to 86 percent in 2004 (United Nations Educational, Scientific and Cultural Organization, 2007) whereas at the upper secondary level, it increased from 22.2 percent in 1992 (Office of the National Economic and Social Development Board, 1998, cited in United Nations, 2000c) to 63 percent in 2004 (United Nations Educational, Scientific and Cultural Organization, 2007). Hence, there was 23 percent attrition rate from lower secondary to upper secondary education, so clearly large proportions of girls are not completing their basic schooling.

Worldwide, approximately 10 percent of all births are attributed to women aged 15 to 19 years (World Health Organization, 2006a: 4), which was 11 percent in 1998 (World Health Organization, 1998: 15). So, this burden to young girls has not lessened over the past decade. Pregnancy and childbirth related complications are the main causes of death among young women. Maternal mortality for adolescent women is twice than that of women who are aged above twenty (United Nations Children Fund, 2000). Thirteen percents of all maternal deaths occur among adolescent mothers (World Health Organization, 2000, cited in World Health Organization, 2007b: 1). These pregnancies force adolescent mothers to carry the burden of motherhood before they become physically and mentally mature enough for that responsibility and economically ready to take care of their children.

The reproductive systems of adoelscents are not fully mature as their reproductive organs have not yet completed their physical growth, which usually occurs by the age of 20 years (Lowdermilk & Perry, 2004: 98). Physiologically pregnancy, which is a normal process, becomes stressful for young mothers and places them in a traumatic situation. Compared to women aged above 20 years, adolescents are more likely to suffer from severe complications during delivery, which results in higher morbidity. Childbearing among adolescents may cause irreparable injury to their reproductive organs and may adversely affect their future fertility. This will have lifelong consequences, regardless of whether the child is wanted or not. Obstetric fistula is a long term devasting injury in the birth canal. It is more common among young women aged less than 20 years than other women (United Nations Population Fund & EngenderHealth, 2003). This serious complication results from prolonged or obstructed labor. Adolescents are more vulnerable to this suffering due to their small pelvic cavity and immature birth canals (Bacci, et al., 1993, cited in Family Health International, 2005b). Thai pregnant adolescents are also more likely to suffer from frequent obstetric complications like pre-term delivery and pre–eclampsia (Suebnukarn & Phupong, 2005).

In addition, adolescents are not often psychologically mature enough to bear the burden of childbearing and rearing. Hence, the concern regarding the consequences of adolescent pregnancy was acknowledged as a priority issue in the International Conference of Population and Development (ICPD). In the ICPD Programme of Action, special emphasis was given to adolescent sexual and reproductive health issues (Chapter VII E). One of the important obejctives was “to substantially reduce all adolescent pregnancies” (United Nations Population Fund, 1994: 37).

Early initiation of sexual experience exposes the adolescent not only to the risk of early childbearing, but also to the risk of contracting sexually transmitted infections, including HIV. Thai adolescents are not an exception (Ministry of Public Health, Thailand & World Health Organization, 2005). In Thailand, during the period of 1984 to 2005, 1,174 reported AIDS cases were found among female adolescents

aged 15-19 (Ministry of Public Health, 2005, cited in World Health Organization, 2006b).

Adolescents may suffer from spontaneous as well as induced abortions as a negative outcome of early pregnancy. Worldwide, 20 million adolescents undergo unsafe abortions each year and suffer from the complications of unsafe abortions (World Health Organization & United Nations Population Fund, 2006). They usually suffer from complications due to four major causes: a delay in seeking abortion, induced abortion undertaken by unskilled lay abortionists, use of unsterilized equipments and delays in seeking care for complications (Olukoya, et al., 2001; World Health Organization, 2004).

A study found that 20 percent of hospital admitted cases were adolescents because of complications due to induced abortion. They were admitted to hospitals for the management of abortion complications. Around 30 percent of these abortions was done outside of hospital by unqualified service providers (Warakamin, et al., 2004). A high rate of abortion was also found among vocational school students in Thailand; approximately 27 percent of the female students had aborted their pregnancies (Manopaiboon, et al., 2003). This high rate of induced abortion indicates either ineffective use of contraception or a lack of use of contraceptive methods among the adolescents.

Contraceptive use is also relatively high among adolescent women. Around 72 percent of married Thai adolescents aged 15-19 used contraception (National Statistical Office, 2006). Another nationally representative study also found that 76 percent of currently married women aged 15-19 were using contraceptive (Chayovan, et al., 2003). Yet, abortion is not uncommon among these women.

Attitude towards premarital sex, which may leads to unwanted pregnancy and prompts early marriage, has also changed due to influence of western culture and socio-economic development. The proportion of sexually active female students in secondary school has increased significantly. The proportion of female students, who had sex with their boy friends or lovers, has increased from 2.5 percent in 1996 to 4 percent in 2004 (Ministry of Public Health, 2004a, cited in World Health Organization, 2007a). Another nationally representative survey also found that 47

percent of ever-married Thai women aged 15-19 years had sex before marriage and 2.7 percent of single women aged 15-19 also engaged in premarital sex (Chayovan, et al., 2003).

Overall, the falling level of world fertility is a positive development. The fertility transition, which commenced in developed countries, has now reached to developing countries, where different countries experienced this transition at different times and different speeds. On average, fertility (TFR) has declined in both developed and developing countries and has reached the “below replacement level” not only in many developed countries of Western Europe, North America and Japan but also in many rapidly modernizing developing countries such as Singapore, South Korea, Taiwan and Thailand.

This situation is a direct consequence of a decreased demand for live births and increased demand for contraceptive use. The demand for children decreased due to improved child survival, increase costs of rearing children and structural societal change that reduce the benefits of having many children. Also, women achieved independence from household obligations due to reduced pressure for traditional behavior, lower economic contribution of children, higher education and empowerment. These all constitute the main driving force of fertility decline.

Given these pressures for low fertility, it is important to find out the causes behind the relatively high levels of Thai adolescent marriage and pregnancy. This issue has hitherto been little researched. In 1979, the Population Council conducted a survey of adolescents in Bangkok and in a province of the Northeast which mainly focused on knowledge of reproductive behavior (Podhisita & Pattaravanich, 1995). Studies were conducted in hospitals (Taneepanichskul, et al., 1995.) and in schools (Manopaiboon, et al., 2003), but there has almost no research done at the community level. Also, there is lack of longitudinal studies to examine the timing of first marriage and first pregnancy among Thai adolescents.

Hence, this community-based longitudinal study examines this issue in the Kanchanaburi project area, which is situated in Kanchanaburi province of Thailand, where adolescent marriage and fertility are an issue of concern. Besides, the socio-economic characteristics and topography of Kanchanaburi province are similar to the average of the whole country (See Table A1 in Appendix A). Hence, it is an ideal

study site. This study uses data from this province of Thailand in order to contribute to the sparse literature related to adolescent marriage and pregnancy in Thailand.

The high prevalence of adolescent marriage and pregnancy is a concern at the policy level. Thus, one of the important targets of the Thai maternal health care program is to reduce teenage pregnancy (United Nations Population Fund, 2005: 15). To contribute to these efforts, it is essential to carry out this study and to document and disseminate the findings. The findings of this study assist Thai policymakers to understand factors associated with adolescent marriage and childbearing. Also, the study findings are useful in the planning and designing of educational and health service programs to meet the current and future education, employment and reproductive health care needs of female adolescents.

1.3 Research Objectives

This study has four objectives as follows:

1. To describe the timing of first marriage among Thai female adolescents
2. To identify the determinants of timing of first marriage among Thai female adolescents
3. To describe the timing of first pregnancy among Thai female adolescents
4. To analyze the determinants of timing of first pregnancy among Thai female adolescents

1.4 Outline of the Thesis

The thesis is organized as follows: chapter two reviews the related literatures and develops a conceptual framework and hypotheses for the analysis. Chapter three describes the data and methodology used in the analysis. Chapter four and chapter five present the findings of the timing of first marriage and first pregnancy among Thai female adolescents respectively. Chapter six presents the discussion, draws conclusions, and provides recommendations for policy makers and for future research.

CHAPTER II

LITERATURE REVIEW

Adolescent marriage followed by pregnancy has been one of the most critical, but not properly addressed, reproductive health problems of the last few decades. Momentum for change was established at the International Conference on Population and Development (ICPD) in 1994. For this reason, at the beginning of the literature review, sections of the ICPD Programme of Action that are related to the study, the ICPD at 5, the Millennium Declaration, and the ICPD at 10 conferences are briefly discussed. In addition, this section also addresses Thailand's achievements and challenges in the field of reproductive health especially in adolescent reproductive health. A section on the education system of Thailand is included. The literature review also focuses on the relevant theories and factors related to the timing of first marriage and first pregnancy among female adolescents.

2.1 ICPD

ICPD focused on promoting a comprehensive, right-based reproductive health program for all age groups and for both sexes, irrespective of marital status. The Programme of Action (ICPD-PoA) posits that a better quality of life for the present and for the future generation depends on the successful implementation of this "Programme of Action", which consists of 14 action-oriented chapters. Out of which, four chapters are closely linked to this study.

Chapter VII E focused on adolescents, who need appropriate information to make responsible decisions. Due to lack of appropriate information and services and presence of risky sexual behavior during adolescence period, female adolescents suffer from unwanted pregnancy, sexually transmitted diseases and subsequent risk of infertility (Cater & Coleman, 2006). In addition, marriage and childbearing reduce their educational and employment opportunities. Thus it adversely affects their social status and quality of life. For this reason, this ICPD-PoA gave special attention to adolescents in order to address their sexual and reproductive health requirements

including unwanted pregnancy and unsafe abortion. Hence, the second objective of this proposed action was “to substantially reduce all adolescent pregnancies” (United Nations, 1995:37).

In addition, chapter IV A concentrates on female empowerment and status which is also related to education. So, the third objective of this proposed action was “to ensure that all women, as well as men, are provided with the education necessary for them to meet their basic needs and can exercise their human rights” (United Nations, 1995: 17). It was hoped that improved female status will facilitate women including female adolescents to participate in the reproductive decision making processes particularly in the areas of sexuality and reproduction.

Reproductive health and reproductive rights are the main focus of attention in the ICPD. For this reason, chapter VII A focused on this vital issue. Reproductive health covers a wide range of services including adolescent reproductive health and reproductive rights, which provide basic rights to all individuals to freely and responsibly decide the timing of their childbearing. ICPD acknowledged the importance to have appropriate information and access to relevant reproductive health services, so that adolescents can manage their sexuality in a responsible way (United Nations, 1995:30).

As the highest portion of maternal morbidity and mortality can be prevented through prevention of unwanted pregnancies and any subsequent poorly managed abortion; thus chapter VIII C of ICPD PoA gives emphasis to women’s health and safe motherhood to prevent, detect and manage high-risk pregnancies and births, particularly among adolescents (United Nations, 1995:43). It also focused on the needs of adolescents, both males and females, for information, education and counseling to delay their early family formation, premature sexual activity and first pregnancy (United Nations, 1995:44).

2.2 ICPD at 5 and Millennium Declaration

In 1999, the progress and challenges of the ICPD PoA was reviewed, which created the “Millennium Declaration and an ambitious sets of goals”. Out of eight Millennium Development Goals, one is linked to education and another is linked to improve maternal health. Both are also related to this study. It was identified that males and females do not have equal access to education either at the primary or

secondary level. Thus one of the targets was “to eliminate the gender gap both in primary and secondary education, preferably by 2005”. Maternal mortality was still high due to lack of adequate reproductive health services and thus emphasis was given for its reduction (United Nations, 2006).

The ICPD at 5 also draws attention to the special needs of adolescents and calls upon countries to set up suitable and flexible interventions to meet those needs. In response to these calls, many Asian countries including Thailand, have taken action. Thailand had an effective health service delivery system through its primary health care center (Ministry of Public Health, 2002), but it did not focus on reproductive health services, which came into action after ICPD. Like many other countries, in the initial five years Thailand could not achieve their goals related to adolescent reproductive health programs. Deeply rooted socio-cultural factors act as constraints and negatively influence on the attempt to initiate adolescent reproductive health programs (United Nations, 1999).

2.3 ICPD at 10

Ten years after ICPD, there was a combination of success and failure on the achievements of the ICPD commitments. The most important achievement of the ESCAP region’s countries was the adaptation and modification of their population policies and programs in accordance with the ICPD’s principles and recommendations. Almost all the signatory countries have made attempt to achieve “universal access to primary and secondary education” and “to eliminate the gender gap in primary and secondary education.” But, most of the countries have slowly progressed to close the gender gap in education (United Nations Population Fund, 2003b).

Despite many constraining factors, all the signatory countries moved towards success at different speeds. Still, there are some key issues, challenges and constraints which need to be addressed in the reproductive health domain. Still today, in Asian region, 12 percent of all maternal deaths occur due to the complications of unsafe abortion. The occurrence of unsafe abortion is high in those countries where abortion is illegal and in those places where adolescents face strict restraints on access to reproductive health services (United Nations, 2004).

Although most of the countries of the ESCAP region have placed adolescent reproductive health needs on their national agendas, the majority of them still have not been able to ensure adolescents access to appropriate information and services. In many countries, such as in India and the Philippines, socio-cultural and religious norms act as constraints on creating a supportive environment for the implementation of separate adolescent reproductive health programs (United Nations Population Fund, 2003b, cited in United Nations, 2004). Although, it was found that there is "significant improvement in access to education and health care, still now, large segments of the population who are poor, live in remote areas do not have equal access to these services" (United Nations, 2004). So, adolescents irrespective of their marital status and the entire underprivileged poor segment, who live in rural areas and are deprived of proper reproductive health services and information, also demand special attention.

2.4 ICPD and Thailand

The Thai government has undertaken several initiatives to transform their ICPD commitment into actions. They have formulated a reproductive health policy and implemented different reproductive health programs beyond family planning program.

2.4.1 Reproductive Health Policy and other Policies

The Thai Government was one of the governments represented at the ICPD in Cairo in 1994 and has committed to improve the reproductive health of Thai citizens. In response to their ICPD commitment, in July, 1997, the Minister of Public Health declared the national reproductive health policy of Thailand that "*All Thai citizens at all ages must have good reproductive health throughout their entire lives.*" This covers the whole life cycle from birth until death as it is said "*to be born with quality and to die with dignity"* (Department of Health, 1998). The Family Planning and Population Committee of Thailand also has given an operational meaning of the definition of reproductive health, which was developed in ICPD, as "*a state of complete physical, and mental well-being as an outcome of complete reproductive processes and functions in both men and women at every stage of life, that bring about social well-being*" (Ministry of Public Health & World Health Organization, 2003).

Besides the reproductive health policy, different other policies were taken up by the Thai government to tackle the issue of adolescent sexuality. Among those, the National Youth Policy, National Health Development Plan and Public Health Development Plan, are noteworthy. Thai adolescents are also considered in the National Youth Policy as this policy is for those individuals who are below 25 years. In the fourth youth policy, young people were considered as precious human capital of the country. Thus, they deserve full support and cooperation of the government during their development process, so that they can be developed as a responsible Thai Citizen (National Youth Bureau, 1994, cited in United Nations, 2000c). The Ninth National Health Development Plan (2002-2006) also gives emphasis to good reproductive health through providing health information and promoting sex education (Bureau of Health Policy and Planning, 2001, cited in Ministry of Public Health, 2004b). Thus, it can meet the diverse needs of young people.

2.4.2 Reproductive Health Division

In October, 2002, a separate division, called the "Reproductive Health Division" under the Department of Health was established. This division was formerly known as "The Family Planning and Population Division", to take the responsibility of the reproductive health programs. In Thailand, not only the government, but also Non-Government Organizations (NGO) and other partners have been involved in the implementation of reproductive health programs. As part of its responsibility, the reproductive health division has published "Reproductive Health Profile" which has highlighted the progress of the ICPD Programmes of Actions in Thailand (Ministry of Public Health & World Health Organization, 2003).

2.4.3 Reproductive Health Programs in Thailand

Since ICPD, the Thai government has integrated reproductive health services for all individuals irrespective of their age and gives the highest priority to quality of life, as Thailand has already reduced its population growth and reached to below replacement level of fertility. The Thai government designed the Eighth National Economic and Social Development Plan (1997-2001) in synchronization with the ICPD Programme of Action, where special emphasis was given to disseminate reproductive health information and services to adolescents (National Education and

Social Development Board, 1997, cited in Ministry of Public Health & World Health Organization, 2003). The Ninth National Economic and Social Development Plan (2002-2006) also gave emphasis to good reproductive health (Bureau of Health Policy and Planning, 2001 cited in Ministry of Public Health, 2004b).

2.4.3.1 Family Planning Program

Thailand's family planning program has become a model for other developing countries due to its striking success. One of its objectives was to prevent unwanted pregnancies and to reduce the incidence of high-risk pregnancies by providing quality family planning services (Department of Health, 1998). The Total Fertility Rate (TFR) declined from 6.3 births per women in 1970 to 1.5 births per women in 2006 and population growth rate reduced from 3.3 percent per annum in 1970 to 0.4 percent in 2006 (National Statistical Office, 2007).

Another success of the Thai family planning program is reflected by the high Contraceptive Prevalence Rate (CPR) among married women of reproductive age (15-44 years). At the beginning of this program, in 1970, it was only 14.4 percent and increased to 81 percent in 2006. The most frequently used contraceptive method is the pill. Female sterilization, a permanent contraceptive method, and injection, a temporary but long lasting contraceptive method, are also employed with high frequency (National Statistical Office, 2006). These three methods are female methods, which indicate that females take the major responsibility for fertility control.

Despite this immense achievement, there remains a problem in providing high quality and safety methods to specific groups such as adolescents (United Nations Population Fund, 2005). Traditionally in Thailand, family planning service was for married couples. Thai adolescents, especially those who were unmarried and sexually active, depend on the pill or condom. They can easily buy these methods from drug and departmental stores. But, they do not get correct information and proper counseling while buying (Ministry of Public Health & World Health Organization, 2003). Thus, they are vulnerable to unwanted pregnancies resulting from contraceptive failure.

2.4.3.2 Maternal Health Program

The aim of every National Economic and Social Development Plan of Thailand has been to reduce maternal deaths. In Thailand, the Maternal Mortality Ratio (MMR) has been considerably reduced from 44.3 per 100,000 live births in 1995 to 23.9 per 100,000 live births in 2002 due to improved maternal and child health care services throughout the country (Ministry of Public Health, 2002). However, it is still considered as one of the leading causes of death among pregnant women.

In comparison to the developed world, this level is still high and continues to prompt action to improve the quality of reproductive health of Thai women. The Ninth National Economic and Social Development Plan (2002-2006) had a target to reduce this MMR below 18 per 100,000 live births (Bureau of Health Policy and Planning, 2001 cited in Ministry of Public Health, 2004b). This is also considered as the MDG Plus target for Goal 5, as the MDG target is not applicable for Thailand (National Economic and Social Development Board & Office of the United Nations Residents Coordinator, 2004). Prevention of pregnancy among women less than 20 years gets special attention in the National Economic and Social Development Plans. One of the important targets of the Ninth National Economic and Social Development Plans was to maintain teenage pregnancy rate below 10 percent (Ministry of Public Health & World Health Organization, 2003).

There are several causes of maternal deaths in Thailand. “Obstructed labor” is one of them, along with hemorrhage, hypertension, toxemia of pregnancy, sepsis, amniotic embolism, etc (Bureau of Health Promotion, 2001). One of the serious complications related to childbirth is obstetric fistula. It has a negative effect on overall health and well-being of women. A hospital-based study identifies preterm labor and anemia as the most common obstetric complications and low birth weight as the main neonatal complication of Thai teenage pregnancy (Watcharaseranee, et al., 2006).

2.4.3.3 Abortion Services

Unsafe abortion is considered as one of the negative outcomes of unwanted pregnancies. It has become a major public health concern due to its hazardous impact on women’s health, especially among female adolescents. Hence, it has been

prioritized in the ICPD Programme of Action (United Nations, 1995:44) and it is recommended in the ICPD at 5 that governments should "take appropriate steps to avoid abortion" as it is related to maternal mortality (United Nations, 1999).

Abortion is not legally permitted in Thailand. According to the Thai Criminal Code, Article 305, enacted in 1997, "*Induced abortion is legally permitted when it is performed by a physician on a woman under only two conditions, when the pregnancy is a risk to the women's health or when the pregnancy is due to rape"*. Abortion is considered as a criminal act if it is carried out for any other reasons other than the two reasons identified above (Ministry of Public Health & World Health Organization, 2003). As a result, Thai women who have unplanned and unwanted pregnancies do not have legal access to safe abortion services. Consequently, they may suffer from serious post abortion complications which may endanger their lives.

Induced abortion is a negative outcome of risky sexual behaviour. But it is difficult to obtain accurate abortion data. Hospital records do not reflect the real situation. Only those women who badly need treatment for post abortion complications and admitted to hospital are included in abortion complication data. Still, an alarming feature was found in the latest hospital-based survey. In 1999, 20.3 percent of women, who were admitted for the treatment of induced abortion's complications, were adolescents aged 15-19 [See Table A19 in Appendix A] (Warakamin & Nongluk, 2000).

This has become a main concern to Thai policymakers. Thai governments are implementing programs to disseminate information, counseling and services on reproductive health to reduce the high numbers of unplanned pregnancies. They have introduced "shelter services" as an alternative to induced abortion for women with unplanned pregnancies (Ministry of Public Health & World Health Organization, 2003). Unplanned pregnancies and unsafe abortion are linked; abortion will also decline if unplanned pregnancies are reduced.

2.4.3.4 Adolescent Reproductive Health Program

Although Thai government did not face any major difficulties starting an adolescent reproductive health program, it has been only to reach a "small proportion of the adolescent population" (United Nations Population Fund, 2005). The growing number of sexually active Thai young people is considered as a "neglected" group.

But they should not be overlooked as the current generation is more advanced in their sexual experience in comparison to older generations. Their first sexual experiences are occurring at an earlier age (Chayovan, et al., 2003). In addition, their attitude towards premarital sex has changed. Many young male and female are also involved in "indirect or causal" sex work (Ministry of Health & World Health Organization, 2005, cited in World Health Organization, 2007). High levels of premarital sexual activity are related to a high incidence of unplanned adolescent pregnancies (United Nations Population Fund, 2005).

Although the Thai government has tried to meet the reproductive health needs of adolescents, female adolescents especially those who are unmarried do not feel comfortable in accessing family planning services in public hospitals. There is evidence that they are treated differently from married clients by health personnel. Premarital sex is more acceptable for Thai young males and hence they have more easy access to reproductive health services than young females (Tangmunkongvoraku & Pratima, 2004, cited in United Nations Population Fund, 2005). Young unmarried females also do not want to disclose their sexual activity to their parents and to the society through service providers as society has different outlook for unmarried young males and females about their involvement in sexual activity.

Three principal strategies have been maintained in implementing programs with adolescents in Thailand: increase knowledge of reproductive health and build skills in problem solving, decision-making and life planning; offer youth-friendly services and promote a safe and supportive environment (Ministry of Health & World Health Organization, 2003).

The following programs have been implemented in adolescent reproductive health in Thailand.

i) Compulsory sex education in schools

ii) Counseling services

iii) Innovative source of information

iv) Friend's corner: Youth Friendly Health services

i) Compulsory sex education in schools

School based sex education is used as Thai socio-cultural norms still consider sex as a social taboo for public discussion. Sex education was included in the educational curricula at primary level in 1978 and at secondary level in 1981, under the coverage of “Family Life education” in all Thai public schools (Ministry of Education, 1987, cited in Sariyant, 1997). After 1990, the devastating HIV/AIDS epidemic provided motivation to take sex education more seriously (Smith, et al., 2001). However, the school-based sex education program, which is biologically focused and inconsistently delivered, has not been able to reduce the gap between knowledge and life skills among Thai young people (Vuttanont, et.al., 2006). Hence, the Thai government emphasizes on the development of positive attitudes towards healthy sexual behavior and skills, especially negotiation skills for safe sex, through interactive teaching methods.

Many argue that parents are the best educators of young people regarding their sexuality (Basow, 1992; Greenglass, 1982, cited in Sariyant, 1997). The Thai government has also involved parents in this process by developing sex education materials for them; so that they can help their children to understand sexuality without being judgmental. Still, many parents feel embarrassed when dealing with adolescent sexuality issues (United Nations Population Fund, 2005). Sex education has also been provided through peer educators and has been found to be effective in disseminating knowledge and developing skills regarding sexuality (Vuttanont, et.al., 2006).

ii) Counseling services

Adolescent reproductive health counseling is one of the important components of Thai reproductive health care (Warakamin & Takrudtong, 1998). This service is available both in school and out of school. In almost every school of Thailand, teachers and students received counseling training on adolescent reproductive health. This service is also available in all public hospitals. Health personnel received training to handle sexuality issues, especially for adolescents when referred from schools. However, many young people do not feel comfortable accessing public sexual health services due to a lack of confidentiality and provider judgmental attitudes (United Nations Population Fund, 2005). For these reasons, special attention has been given to

maintaining privacy and confidentiality of young people who access public services. To reinforce the stress on confidentiality, telephone hotline service has been started in every public hospital (Ministry of Public Health & World Health Organization, 2003), and this allows adolescents to obtain necessary and correct health information from health counselors without disclosing their identity

iii) Innovative source of information

Both the public and private sectors have introduced innovative activities to serve the needs and demands of young people while at the same time maintaining their confidentiality. Telephone hot-lines, health columns in newspapers, magazines and internet are among these activities. Several websites have opened for young people, such as www.teenhut.com, www.teenpath.net, www.friendcorner.net, etc (Ministry of Public Health & World Health Organization, 2003).

Many Thai adolescents consider the internet as an electronic source of information. Both in printed and electronic media, there are special health columns for Thai young people. Health counselors are available in these websites to provide reproductive health-related information to Thai young people. Thai university students have expressed their frustration on uninformative school-based sex education courses and have mentioned the internet as the most preferred way to receive sex education (LaMar, 2003). Thai adolescents in urban areas depend heavily on this technology for information as they can obtain information in an interactive and interesting way while maintaining their anonymity.

iv) Friend corner

Despite having public reproductive health services many Thai adolescents do not feel comfortable to access these services because of perceived lack of privacy, fear of limited confidentiality, and perceptions of an unfriendly environment with judgmental staff. Costs related to transportation and services are also cited as an important barrier to receiving services. Hence, the Thai government has implemented a project called “Friend Corner” (Poonkhum, et.al., 2002). This outreach approach is staffed by peer educators, who are also teenagers and who have received special training on reproductive health issues. The Friends Corner is a gender-sensitive

meeting place for young people, where they can informally share their problems and can get appropriate counseling and suggestions either from trained health counselors or peer counselors. They also receive services at an affordable cost (World Health Organization, 2002). These meeting places are located in convenient places such as shopping malls, youth centers, educational institutes etc. Initially, there were 24 adolescent friend corners in 24 provinces, which increased to 51 centers by 2002. The Thai government now is focused on improving the quality of services at these sites (Poonkhum, 2003).

2.5 National Education System in Thailand

The timing of marriage and pregnancy is highly influenced by educational continuation patterns of adolescents. Hence, it is important to describe the education system in Thailand. The following issues are important in this regard:

1. Structure of national education system
2. National education scheme and plan
3. National budget for education sector
4. Educational reform and new national educational policy
5. Educational achievement for both sexes at the primary and secondary level
6. Millennium Development Goals and education in Thailand

2.5.1 Structure of National Education System

Structurally, the Thai education system consists of both formal and non formal education.

a) Formal education

The Thai formal educational system has two major divisions: basic education and higher education. Basic education means the first 12 years of education, which has three levels: elementary or primary schooling (Grades 1 to 6); lower secondary (Grades 7 to 9) and upper secondary (Grades 9 to 12). In the upper secondary education, there are two streams: the academic stream, where students study academic subjects, and the vocational stream, where students obtain training to develop their skills for the labor market. After completing the lower secondary level, students who

continue their education have to choose one of these two streams. Detailed information on the Thai education system is described in Table A14 in the Appendix A (Ministry of Education, 2007).

b) Non-formal education

In order to improve the quality of life of out-of-school youth, the Thai government introduced a national non-formal education system in 1979 (Department of Non-formal education, 2006). This system creates opportunities for their further educational and skill development training. They can pursue both simultaneously. The advantage of this system is that there are no age restrictions for students. Besides class room teaching programs, there are distance learning and independent study programs (United Nations Economic and Social Commission for Asia and the Pacific, 2000). Out-of-school youth who have at least a formal primary school level education can switch from the academic stream to the vocational stream to increase their educational and occupational skills (United Nations, 2000c).

2.5.2 National Education Scheme and Plans

Since 1961, Thailand has had a National Educational Scheme, which consists of three five-year National Educational Development Plans. The first educational scheme concentrated on increasing the quantity of students, the second scheme paid attention to improving the quality of education; and finally, the current scheme stresses the maintenance of symmetry and balance between males and females and rural and urban areas (Ministry of Education, 2007). In the Eighth National Education Development Plan (1997-2001), the Thai government focused attention on teaching methods which have been shifted from a top-down, or teacher-centered approach to a participatory or a student-centered approach in order to develop the full potential human resources for the country. One of the important goals of this plan was to ensure “basic education for all people”; and “to extend basic education to the secondary educational level” (Office of National Economic Commission, 1999).

2.5.3 National Budget Related to the Education Sector

The Thai government has increased their national education budget to improve the quality of education. They want an education system that focuses on problem

solving and analytical skills rather than only memorization. The budget is being used to increase the number of educational institutes or facilities throughout the country, especially for secondary and tertiary education in rural areas. In 1999, the largest share (25.5 percent) of the national budget allocation went to the education sector. This was 17.9 percent in 1990 (Bureau of the Budget, 1999). Since then, one fourth of national budget has been allocated for education (Ministry of Education, 2004).

2.5.4 Educational Reform and New National Educational Policy

After the economic crisis in 1997 (Thailand Development Research Institute, 1999; Office of the National Educational and Social Development Board, 1998), the Thai government realized the need and importance of quality human resources for the development of the country. Thus, they have taken initiatives for educational reform and formulation of a new national educational policy in which they emphasized secondary and tertiary level education. The Eighth National Education Development Plan (1997-2001), the Constitution of 1997 and the National Education Act of B.E. 2542 (1999) have played vital roles in the development of the Thai educational reform.

As every Thai citizen has a right to education the Thai Government introduced education into the new constitution issued in 1997. This was intended to “improve access to education and to close the gender gap in education”. According to the 1997 constitution, education becomes compulsory not only for the age group 9-12 years but also for both sexes. According to Chapter III, Section 43, of “the Constitution of 1997” the government should provide 12 years of compulsory quality education. It also gives right to education for underprivileged groups (Office of the Council of State, 1997; Office of the National Education Commission, 2003).

Finally, the National Education Act of B.E 2542, the first comprehensive educational law of Thailand, stressed three issues: quality education at all levels, equal access to educational opportunities for all by maintaining a balance between poor and rich, urban and rural and different regions of the country and finally, involvement of parents and communities to ensure their support. The main intention of this act was to develop the full potential of Thai human resources. To ensure access to education, Section 10 of the National Education Act focused on extension of compulsory “free, quality education for all at least for 12 years” (Office of the National Education

Commission, 2001). To ensure parents involvement, Sections 13 and 14 focused on state support and tax incentives such as “tax rebates or exemption on educational expenditures” (Office of the National Education Commission, 2001).

Thus, the National Education Act created opportunities for young people to continue their education especially at the secondary level and was mainly important for those who live in rural areas. During the implementation of this Act, the Thai government was also concerned about the families’ and communities’ economic burden related to educational cost. Thus, since 1996, the government has started an “education loan fund” for poor families to help their children continue to upper secondary education. During the period of 1996 to 2003, 221 million baht has been distributed (Office of the Education Council, 2006). But, unfortunately, this loan fund will be gradually dissolved. The government has arranged special scholarships for underprivileged and poor students.

There are merits and drawbacks with the new educational policy. When education was not compulsory until grade 12, many young drop-outs engaged in paid employment to earn income for their families. Now young people are required to continue their education so this can create financial problems for their family in at least two ways. First, more family income will be used for their educational expenditure. Secondly, their lack of involvement in wage employment will not bring any income for the family.

Thus the new educational policy sets challenges for young people and their families as well as for the government. In order to counter these challenges, the Thai government has taken some initiatives, such as increasing awareness among parents about the importance of the new education policy, and further allocation of government resources to address the extra costs, particularly for poor families (National Education Social Development Board & United Nations Resident Coordinator, 2004). Thus, government financial support is essential to diminish the financial burden of those families who want to continue their children’s further education.

2.5.5 Educational Achievement

i) Primary education

Primary education was compulsory for every Thai child according to the 1980 Primary Education Act (UNESCO, 2000). It resulted in significant achievement in primary school enrolment. In 1990, the gross enrollment ratio[1] was 93 percent (UNESCO, 2000), which increased to 104 percent in 2003 (Office of the Education Council, 2004: 183). It indicates that some children outside the appropriate age groups were enrolled in primary education. In 2005, the gross enrollment rate was 99 percent (Office of the Education Council, 2006:183). The completion rate was high at the primary school level. In 1998, 80 percent of enrolled students completed Grade 6 (Office of the National Education Commission, 2001:106). This increased to 90 percent in 2005 (Office of the Education Council, 2006:184). This achievement at the primary education level does not mean that the Thai Government's efforts were uniformly successful. Many Thai children, who live in disadvantageous situations like "living in remote areas and with disabilities, victims of urban poverty and having no nationality", are still deprived of basic primary education (National Education Social Development Board & United Nations Resident Coordinator, 2004).

ii). Secondary education

Gross enrollment ratio at the secondary educational level has also substantially increased. The overall enrollment ratio was 68 percent in 1998 (Office of the National Education Commission, 2001: 105) and increased to 74 percent in 2004. In 2005, it reduced to 69 percent. (Office of the Education Council, 2006: 183). This achievement is higher at the lower secondary level compared to upper secondary level. At the lower secondary level, the enrollment rate was 85 percent in 1998 (Office of the National Education Commission, 2001: 105). During the period 1999 to 2005, there was a fluctuating trend (See Table A21 of Appendix A). It was 83 percent in 2005 (Office of the Education Council, 2006: 183). A similar fluctuating trend was found at the upper secondary level, but the enrollment level was significantly lower than that of the lower secondary educational level. It was 53 percent in 1998 (Office of the National

[1] Gross enrollment ratio is the percentage of primary grades 1-6 students per population aged 6-11.

Education Commission, 2001: 105) and increased to 60 percent in 2002. It declined to 54 percent in 2005 (Office of the Education Council, 2006: 183).

The transition rate[2] is estimated by surveying students at the end of Grade 9 and 12 in order to see whether they had any intention of studying in the next year or not (Ministry of Education, 1999). In 1998, the transition rate from primary to lower secondary educational level was 91 percent (Office of the National Education Commission, 2001: 106) and increased to 93 percent in 2005 (Office of the Education Council, 2006: 184); whereas, transition rate from lower secondary to upper secondary level was 83 percent in 1998 (Office of the National Education Commission, 2001: 106) and increased to 87 percent in 2005 (Office of the Education Council, 2006: 184).

The transition rate reflects whether children will continue their education. Students in urban area are more likely to continue their education compared to their rural counterparts in the academic stream. But the opposite situation was found in vocational stream. In comparison to males, fewer females want to continue education during the transition from lower secondary to upper secondary, but if they are able to continue, they want to carry on until the end of their higher education (United Nations, 2000c).

The drop-out rate[3] is difficult to measure. School authorities often do not keep accurate records as they are not properly informed on time either by the students or by their guardians about “drop-outs”. Some students have repeated and temporary “leave-return” to school which also creates complexity in recording. Finally, “people who never enrolled in school for a given year” are never included in the calculation (United Nations, 2000c). Thus, retention rates are often used for evaluation.

The retention rate at the secondary level has significantly increased over time. In 1998, it was 86 percent at the lower secondary level and 77 percent at the general upper secondary level (Office of the National Education Commission, 2001: 106) and increased to 92 percent and 80 percent at the lower secondary level and at the general upper secondary level respectively (Office of the Education Council, 2006: 184).

[2] “The transition rate is defined as the number of students in a given school year divided by the number of students in the previous school year.”
[3] The drop out rate can be defined as the number of young people who leave school as a percentage of the number of enrolled for a given year.

From these statistics, it is obvious that education continuation was much higher among young people aged 13 to 15 years than those in the 16 to 18 years age group.

It was found in the "Children and Youth Survey" (National Statistical Office, 1997, cited in United Nations, 2000c: 43) that a majority of students could not continue their education due to lack of financial support. Also, many students (40 percent) had to start work to earn income for their families. So, financial constraints were the major barriers for participating in higher levels of education. Apart from these two main factors, there are other factors such as lack of interest (11.3 percent), transportation problems, physical and mental sickness and disability etc.

Education related expenditure have also increased over time. The minimum expenses for tuition fees and others including uniforms, educational materials also vary at different educational level. They start from 11,200 baht for primary school to 13,600 baht for secondary school (The Thai Farmers Research Centre, 2001, cited in Office of the National Education Commission, 2001: 29).

In the context of Thai society, family economic status is an important factor. It provides the main financial support for the continuation of education. For that reason, many children in poor families cannot continue their education beyond primary school. Therefore the Thai government will need to put more effort to increasing financial support, especially for poor students.

2.5.6 Millennium Development Goals (MDG) and Education in Thailand

Since 1994, the Thai government has made efforts to eliminate the gender gap in education. Some initiatives have been taken to increase female enrolment rates, such as the provision of scholarships for poor female students, especially those living in rural areas, so that they can continue their education. However, the gender gap "in access to education at the primary level" has not reduced and this continuing problem is highlighted in the report of the "Thailand Millennium Development Goals, 2004 (National Education Social Development Board & United Nations Resident Coordinator, 2004).

For Thailand, in order to eliminate the gender gap, the target for MDG goal 2 was 1 for the ratio of girls to boys in primary, secondary and tertiary education by the year 2015. But in the 2004 report, it was found that a gender gap remains at all levels. At the primary school level, boys predominate, whereas in the secondary and tertiary

levels, it is the opposite. According to this report, instead of increasing, the “ratio of girls to boys in primary school” the ratio has declined over time. In 2000, it was 0.93, slightly lower than that (0.95) in 1995. But in the secondary and tertiary levels, females are slightly more likely to be enrolled than males [See Appendix: Table A18]. It means that if females can overcome the barrier to their educational attainment, they continue further and perform better than males.

2.6 General Discussion

2.6.1 Definition of Adolescent and Adolescence

The World Health Organization defines “adolescents as persons between 10-19 years of age” and “adolescence as the period of sexual development from the initial appearances of secondary sex characteristics to sexual maturity, psychological development from child to adult identification and socio-economic development from dependence to relative independence (World Health Organization, 1975)”.

The United Nations Population Fund classifies adolescence into two stages: early adolescence (10-14 years of age), which is characterized by spurts in physical growth and late adolescence (15-19 years of age), which is comprised of wide mood swings, the growing influences of peers, interest in the opposite sex, complete physical change and sexual experimentation (United Nations Population Fund, 2003a: 3). Often, the term “teenager” is used synonymously with the term “adolescents (World Health Organization, 2004).

2.6.2 Global Scenario of Adolescent Population

In 2003, the total number of adolescents reached 1.2 billion (United Nations Population Fund, 2003a). The majority (85 percent) lived in developing countries (World Health Organization, United Nations Children Fund & United Nations Population Fund, 2003). According to the United Nations medium-variant projections, this number will continue to grow, especially in the countries of the South, South-West and South-East Asia and the Pacific region; whereas it will decline in the other parts of the Asian region such as East, North-East, North and Central Asia (United Nations, 2001).

Adolescents comprise a significant proportion of the total population. In 2000, 19.2 percent and 9.2 percent of the total population of the ESCAP region belonged to the age groups of 10-19 years and 15-19 years respectively. The highest proportion of population aged 15-19 years was found in South and South West Asian region. It was 45 percent of the total population. In the Southeast Asian region, this proportion was 16 percent (United Nations Economic and Social Commission for Asia and the Pacific, 2004). In general, adolescence is a healthy stage of life. However, due to presence of risky sexual behaviors, large numbers of young people are at risk of negative sexual and reproductive health outcomes.

Globally, the highest proportion of married adolescent is found in the Asian region followed by African region (World Health Organization & United Nations Population Fund, 2006). The highest proportion of pregnant adolescents is in sub-Saharan African and in some countries of South Asia and Latin America and the lowest proportion of pregnant adolescent is observed in Scandinavian countries, Switzerland, the Netherlands, Japan, Korea and China (World Health Organization, 2004).

2.6.3 Thai Adolescent Profile

In Thailand, according to the population and housing census 2000, the total population was 60.61 million; 5.34 million of these persons were aged 15-19, which comprises 8.81 percent of the population. Among Thai adolescents, 2.7 million were young males and 2.6 million were young females. At the time of the 2000 Census, the total population of Kanchanaburi province was 7.34 million; out of which 3.7 million were female. Out of this total female population, 8.6 percent female were at the age group of 15-19 years (National Statistical Office, 2000). In 2006, the total population of Thailand reached to 64.75 million; 5.23 million were young people at the age of 15-19 years. Among them, 2.6 million were young males and 2.56 million were young females (National Statistical Office, 2006).

The size of the Thai adolescent population segment is now declining, due to a continuous upward trend of contraceptive prevalence rate and the related downward trend in fertility. Although the number of young people is declining, reproductive health problems are mounting as the current young generation is commencing sexual

activity at an earlier age compared to earlier generation and many are increasingly involved in risky sexual behavior.

2.7 Theoretical Perspectives

No theory can alone explain the complex behavior of adolescents. The literature on adolescent marriage and pregnancy suggests that rational choice theory and social control theory have played an important role in explaining behavior regarding early marriage and pregnancy.

2.7.1 Rational choice theory

Rational choice theory explains the role of self-interest in the decision making process. It is based on the idea that all social actions are primarily "rational" in character and that people are rational actors. Before taking any decision they do a rational calculation of the costs and benefits of each action (Turner, 1998; Scott, 2000). They always try to maximize the benefits while minimizing the cost. This cost-benefit analysis helps them to make the right decision at the right time.

All actions of humans are goal oriented and they have a definite purpose to accomplish it. In fact, rational choice depends on chance, choice and maximization of utility. Different people have different choices and opportunities and it is not possible to achieve all of the things that they desire to have. So, they need to make a rational balance between their desire and potential achievements in order to reach their goals, in order to obtain benefit, mental satisfaction and pleasure (Heath, 1976; Carling 1992; Coleman, 1973, cited in Scott, 2000). Coale argued that marital fertility is controlled by three conditions: calculus of conscious choice, availability of effective contraceptive methods and perceived benefits if reduced fertility. Among them, "calculus of conscious choice" reflects rational choice theory (Coale, 1973).

Furstenberg & Crawford (1978) argued that adolescents who can overcome social and economic barriers and desire to achieve their academic potential actively act to discourage marriage and pregnancy during their adolescence period. On the other hand, Hudson & Ineichen (1991) argued that adolescents, who are socially disadvantaged, strategically consider early marriage and pregnancy as a protective shield to have a secure life, as it provides identity and status both in the society and in the family. Adolescents, who cannot continue their formal schooling and are

unsuccessful in their working life, may initiate marriage and pregnancy earlier than those who are pursing educational and employment goals. They may consider their marriage followed by pregnancy as achievable goals. Hence, adolescent sexual behavior is dominated by a rational calculation of the costs and benefits. Individuals make their choices within their cultural context. So, according to this theory, adolescent's early transition to adulthood is a response to underlying socio-structural constraints and opportunities.

2.7.2 Social control theory

Social control theory conceives "adolescence" as a trouble prone period. During this time adolescents are confused about their identity and become puzzled about what to do and what not to do. Therefore, it is the responsibility of their parents to control their behavior and to show them the right direction. According to this theory, adoelscents who live in a father-headed family, have a more controlled life than those who do not have father. This is related to social bonds such as an individual's commitment, attachement, involvement and beliefs. These bonds reduce the likelihood of deviance. Hirschi (1969) claimed that individuals who have weak attachement to parents and with low involvement in conventional instituitions like school, are often inclined towards deviance.

Adolescent sexual behavior also depends on the process of socialization. A child who grows up in a mother-headed family during childhood will be socialized in a different way than those who have father in their family (Miller & Bingham, 1989; Kinnaird & Gerrard, 1986). This relates to less parental supervision and monitoring (Newcomer & Udry, 1983). This situation is also related to the economic conditions of families. Father-headed families typicaly have a better economic condition than those of mother-headed families. Therefore, female adolescents who live with only their mother remain at high risk of early marriage followed by childbirth due to financial instability and an insecure life. This social control perspective acts as important predictors of the likelihood of early transition to adulthood.

2.8 Over view of Adolescent Marriage and Pregnancy

In both developed and developing countries adolescent marriage and adolescent pregnancy is a focus of policy and programming. The following sections

briefly describe the widely divergent situations regarding these two concerns around the world.

2.8.1 Incidence of Adolescent Marriage

Despite increasing delayed age at marriage in recent decades, adolescent marriage exists around the world. It is more common in South Asian region and West African region than in other regions. In South Asian countries, a high proportion of adolescents are married by the age of 19 (Rahman, et al., 1989). The highest proportion of married adolescent girls is found in Bangladesh, where two thirds are married by the age of 18 years.

This proportion is also high in other countries of South Asian region. In India, 40 percent of all women aged 15-19 years are married (Alauddin & MacLaren, 1999). Almost half of the adolescents of Nepal, and Mali also marry by age 18 and at least 40 percent of adolescents of Ethiopia and Nigeria marry before age 15 (Family Health International, 2005a). In the recent decades, the legal age of marriage of many developing countries has remained below 19 years (Alan Guttmacher Institute, 1998). In most sub-Saharan African countries, a majority of adolescent girls marry or enter a formal union by the age of 18 years, and around one-half of adolescent girls of Latin American countries enter into unions (Singh & Samara, 1996).

In contrast, this proportion is 30 percent or less in the North Africa and Middle Eastern countries. In France, the United Kingdom and the United States, around 15 percent of adolescent marry before the age of 18 years. This proportion is very low in Germany and Poland; at less than five percent (Alan Guttmacher Institute, 1998).

2.8.2 Level of Adolescent Pregnancy in Developed Countries

The level of adolescent pregnancy is lower in most developed countries compared to developing countries. In developed countries, the lowest level is found in Japan (four births per 1000 adolescents aged 15-19 per year). The highest level is found in the United States (58 births per 1000 adolescents aged 15-19 per year); although in recent years there has been declines in the level of adolescent pregnancies in the United States (Ventura & Freedman, 2000). Many European countries also have low adolescent pregnancy levels. The Scandinavian countries and the Netherlands, and Switzerland have rates of less than 10 births per 1000 (United Nations, 2002). In

the Asian region, adolescent fertility is low in Korea (four per 1000) and Singapore (five per 1000) (United Nations Children Fund, 1998, cited in World Health Organization, 2004).

2.8.3 Level of Adolescent Pregnancy in Developing Countries

Adolescent pregnancy levels are high in many developing countries. The highest level of adolescent pregnancy is found in the African region. The regional average age specific fertility rate for women aged 15-19 years was 143 per 1000, which is higher than the global average of 65 (World Health Organization, 2004). In most of the countries of sub-Saharan Africa, one in five women age below 20 becomes pregnant. In some African countries, almost half of females adolescents are mothers by the age of 18 (Senanayake & Ladjali, 1994). Few African countries have been able to reduce their adolescent fertility levels. Among these few are Kenya and Senegal (Alan Guttmacher Institute, 1998, cited in Singh, 1998).

A medium level of adolescent pregnancy has been found in Latin America and the Caribbean countries. In this region, the range of adolescent pregnancy rate was between 50 to 100 births per 1000 women, with a regional average level of 78 (World Health Organization, 2004).

In South Asian countries, Bangladesh has the highest level of adolescent fertility, at 144 births per 1000 adolescents (United Nations, 2002). Around one third of adolescent girls in Pakistan and Nepal become pregnant below 17 years of age. In India, 58 percent of the married adolescents become pregnant. Due to the high rate of home deliveries, this number may be considered as underreported (National Family Health Survey-2, 1998-99). In the Southeast Asia region, the highest level of adolescent fertility is found in Lao PDR and East Timor and the lowest in Singapore (United Nations Economic and Social Commission of Asia and Pacific, 2007).

2.9 Relationship between Early Marriage and Pregnancy

There is an obvious relationship between “age at marriage” with the “age at pregnancy”. In developing countries, adolescent pregnancy is most common among those who are married or in a formal union (Singh & Samara, 1996). In most traditional societies, early marriage followed by pregnancy is expected due to social norms and pressure. Hence, a majority of the married adolescent become pregnant

during their adolescence. Commonly, the pregnancy rate is much higher among adolescents aged 18-19 years compared to younger adolescents aged 15-17 years because older adolescents are more likely to get married than are younger adolescents (Singh & Darroch, 2000).

Pregnancy within marriage or any formal union is also found in some developed countries, although the incidence rate is very low. For example, if a Japanese adolescent becomes pregnant, it will nearly always happen within marriage or a formal union. But often pregnancies among adolescents in developed countries occur outside of marriage or a formal union, as they rarely get married before the age of 18 (United Nations, 2002).

The level of pregnancies among unmarried adolescent is now increasing in many countries. This is more common among adolescents in Latin America, the Caribbean, sub-Saharan African and the developed countries (Alan Guttmacher Institute, 1998). For example, 87 percent of pregnant adolescents of Namibia and 75 percent of Botswana were unmarried (Singh, 1998). This phenomenon of non-marital childbearing also occurs in developed countries. The majority of pregnant adolescents in France, Germany, the United Kingdom and the United States are unmarried (Alan Guttmacher Institute, 1998). Non-marital childbearing is less common in Asian region with only two percent of adolescents belong to this group (Alan Guttmacher Institute, 1997).

When a married or unmarried adolescent becomes pregnant, this does not mean that the pregnancy is planned. Many adolescents experience unplanned and unwanted pregnancies, even in those societies where early marriage and childbearing is well accepted. It was found that half of the adolescent pregnancies in Latin America, the Caribbean, in Botswana, Kenya and Namibia was unplanned. Around 20 to 45 percent of adolescent pregnancies in Asian countries are classified as unplanned (Alan Guttmacher Institute, 1998). However, adolescent unplanned pregnancies are more common in developed countries, such as the United States where the highest proportion of unplanned pregnancy was found (Alan Guttmacher Institute, 1997). Unwanted and unplanned pregnancies are more common among unmarried than married adolescents, especially in most of the African countries and some of the Latin American countries (Singh, 1998). Unplanned and unwanted early pregnancies can

occur due to coerced or forced sexual relationships. Several studies have found that a significant number of adolescents become pregnant due to forced sexual relationship with their boyfriends (Jewkes, 2001; Gessner & Perham, 1998; Kenny, et al., 1997).

2.10 Key Determinants of Adolescent Marriage and Pregnancy

The timing of marriage and pregnancy are influenced by many factors at the individual, family and community levels. Age at marriage is an important factor to determine the age at which the first pregnancy occurs. Therefore, most of the determinants of first marriage are common for age at marriage as well as age at pregnancy. Thus, the determinants of the timing of marriage and pregnancy are described in the same section.

2.10.1 Education

Early marriage and pregnancy can be the cause as well as consequence of leaving school. Lloyd & Mensch (2006) argued that premature school leaving is more affected by early marriage compared to early pregnancy. Early marriage limits girls' educational opportunities, as married girls usually do not attend school (Mensch, 2005; Assaad & Zouari, 2002; Malhotra, 1997; Malhotra & Tusi, 1996). Further, adolescents with low levels of education and with few schooling opportunities get married earlier (Haberland, et al., 2004). An exception was found in Latin America, where increasing year of schooling did not significantly affect the age at marriage (Mensch, et. al, 2005).

Schooling is an important key event that affects the timing of marriage and pregnancy. In almost all countries, women who have at least some secondary schooling delay their marriage to a later age more than their counterparts who have less than secondary education (Mensch, et al., 2005). It can be asserted that educational continuation protects adolescents from early marriage. Continuation in secondary education is already common in developed countries, and is becoming more common in developing countries (Lloyd, 2005). Therefore, an individual spends the highest proportion of his/her adolescence in school and spends less time with their families (Ritchie, et al., 2004). Highly educated adolescents undermine their parents and families authority and supervision. They tend to not want tight social control and exercise greater independence (Bledsoe & Cohen, 1993; Zabin & Kiragu, 1998). Thus,

increased schooling not only increases the age at marriage but also puts adolescents at the risk of premarital sex (Mensch, et al., 1999). Personal freedom and peer pressure encourages them to become involved in socially non-sanctioned sexual relationships. As a result, the incidence of premarital sexual relationships and adolescent pregnancy is increasing among highly educated adolescents (Bongaarts & Cohen, 1998).

There is a close relationship between education and fertility, especially in developing countries (Bledsoe, et al., 1999). The timing of pregnancy among adolescents is also influenced by their educational achievement. Young girls who are highly motivated to continue higher education and who place importance on education rather than family formation delay the timing of pregnancy (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2002). It was found that the adolescents in the United States who had less than 12 years of schooling were more likely to become pregnant by the age of 18 compared to those with more schooling (Alan Guttmacher Institute,1998). The higher the level of education the lower the level of adolescent childbearing, as ambitious female adolescents postpone early childbearing until they achieve their desired level of formal education. An early pregnancy would force them to leave school early.

In most of countries, educational institutions do not have a policy to allow pregnant adolescents to continue their education. Lloyd and Mensch (2006) found that pregnant school girls who wanted to continue their pregnancy could not continue schooling due to school policies despite their desire to continue schooling. Pregnant adolescents could not hide their pregnancy due to the physical changes associated with pregnancy. They also feel embarrassed. As a result, they have to leave school (LeGrand & Mbacke, 1993; Pathfinder International, 2002). Many adolescents, who desire to return to school, failed to do so due to legal and social restrictions (Villarreal, 1998).

A study in Chile found that pregnant adolescents had to leave school despite a law supporting their continued education (The Center for Reproductive Law and Policy, 1999). Pregnant adolescents have to leave school due to social stigma and pressure. In Kenya, more than 10,000 girls leave school each year because of pregnancy (Pathfinder International, 2002). Once they drop out of school they lose

their opportunities for education and opportunities throughout their lives (Gage, 1999).

This situation is improving in many developing countries. Adolescent mothers are increasingly encouraged to return to school to continue their education. In Botswana, it was found that young mothers were returning to school after pregnancy (Meekers & Ahmed, 1999); especially those adolescents who had better school performance prior to pregnancy and who had adult women at home to take care of their children (Grant & Hallman, 2006). In Jamaica, special initiatives have been taken to encourage adolescent mothers to return to school (McNeil, 1998, cited in World Health Organization, 2006a).

Lloyd & Mensch (2006) found that sexual experience and fertility were more common among African adolescents who were out of school or who had never been to school than those who were currently in school. Even if enrolled adolescents become sexually active, they were more likely to use contraception compared to non-enrolled adolescents. Thus, they can prevent an untimely pregnancy. Formal schooling enhances educated adolescents ability to change their ideas and values to regulate their reproductive behavior. It increases knowledge about contraceptive methods and can enhance decision making power related to contraceptive choice (Jejeebhoy, 1995).

However, there are exceptions. The fertility rate is higher among adolescents in Sub Saharan African countries in spite of having at least some secondary education (Singh, 1998). Also, educational differences are not significant in Latin America countries, where 40-50 percent of adolescent childbearing occurs to secondary school graduates. One exception is Brazil, where adolescent fertility is very low (Florez & Nunez, 2001). Fertility is much lower among the better educated adolescents of many developing countries like Egypt, Morocco, Turkey, where the levels are even lower than some developed countries like the United States (Alan Guttmacher Institute, 1994). Overall, poor educational achievement either through interruption or discontinuation is strongly associated with adolescent marriage and pregnancy (Swann, 2003).

In contrast, McCarthy and Upchurch (1990) argued that adolescent pregnancy does not always affect young women’s educational attainment. They found that a

significant number of adolescent mothers complete their high school. Also, most female adolescents who dropped out of high school do not do so because they become pregnant. Socioeconomic factors are much more influential.

There are other underlying factors that result in premature departure from school. Poor grades, distance to school, quality and safety of schools and the school environment are also related to school exits or discontinuation of schooling (Mensch, et al., 1998). A study in Bangladesh found that financial incentives such as secondary school scholarships increased adolescent participation in schooling in a context where parents often can not bear educational costs (Amin & Sedgh, 1998).

2.10.2 Work Status

There is a relationship between delayed marriage and female labor force participation. Educational attainment cannot work alone to control adolescent marriage and fertility, until and unless there are increased job opportunity in paid employment. These opportunities will provide an additional incentive to delay early marriage and pregnancy (Singh 1998). Otherwise, young women will not have the motivation to complete high school if they feel they will not have better job opportunities when they complete their studies.

A wage-based labor force is a typical structural change in the labor market associated with economic development. Earning wages encourages increased female participation in the labor forces and promotes financial independence, which can help to reduce the economic value of early marriage. Oppenheimer (1997) argued that economic independence raises women's expectation about acceptable living standards. Also, the probability of being employed in wage work is increased with age, thus this can delay marriage.

Education and labor force participation also strengthen girls decision making power within the family, promotes their social and physical mobility, increases their economic independence and control over resources, all of which enhance their autonomy (Jejeebhoy, 1995). This, in turn, can delay their marriage. Working women are often involved in the process of spouse selection, which can also lengthen the marriage decision-making process as they search for an appropriate spouse. Though a married working woman can contribute to the household economy, many working

women are afraid to marry as they may have to leave their job due to non-cooperation of their husband. A study in Egypt found that young brides were expected to perform only domestic work and had to forgo their career aspirations (Amin & Al-Bassusi, 2003).

Poor economic opportunities also are an important factor relating to unemployment and high levels of adolescent childbearing. Women without economic opportunities have little incentive to avoid pregnancy. Thus, poorly educated and low-income adolescents are vulnerable to early childbearing, as they will have few opportunities to develop their own identities except for motherhood. Lacks of adequate education usually limits the opportunity to obtain paid employment with high occupational status and income (McMorris & Uggen, 2000). In some contexts, adolescents who have a well-paid job may be more likely to experience pregnancy than are non-working adolescents. Employment indirectly increases the risk of early sexual activity and pregnancy as working young women feel that they can support their family as well as their children. Furthermore, employment could raise the risk of early sexual activity or pregnancy simply because young women, who desire autonomy from their parents, prefer not only to work but also to behave as adults (Amin & Al-Bassusi, 2003).

When educated young women have income earning potential, it also encourages their parents to postpone the marriage of their female children (Lindstrom & Brambila Paz, 2001). Work experience in the formal sector also acts as an economic incentive for parents to encourage their daughters to remain single during their economically productive period (Mihalic & Elliot, 1997). Thus, it influences both young women and their parent's desire to postpone marriage.

In many contexts, economic opportunities delay the age at marriage (Haberland, et al., 2004). Even in Bangladesh, where adolescent marriage is common, age at marriage increased among working girls, especially those who worked in wage-based factory work like in the garment industry compared to non-working girls (Amin, et al., 1998).

Studies in Latin America and Sub-Saharan Africa found that unmarried girls who are not in school are often jobless. In contrast, studies in Philippines and Latin America found that greater proportions of married adolescent are economically active.

In many developing countries like Bangladesh, married adolescents remain out of income generating activity due to either being pregnant or having young children (Mensch, et al., 1999). In most traditional societies where young women usually work in their family enterprise without any remuneration, often their level of work effort is ignored (Dixon-Muller, 1985; Lloyd, 1991).

Amin & Al-Bassusi (2003) argued that marriage is facilitated by work. They found that working girls are more likely to marry at the appropriate time than were unemployed girls. They argue that this is not only because they make their own decision but also have financial stability. This finding is different than the findings of another study where they found that young women who were involved in wage-based labor force and were more educated delayed the timing of marriage more than their peers (Villarreal, 1998).

Working experience prior to marriage can affect the timing of marriage. An Indonesian study found that the age of marriage was earlier for young women who did not have any work experience before marriage compared to those who had work experience. Their work experience, as well as higher education, prolonged their duration of being single (Savitridina, 1997). The timing of marriage also varies between those living in agricultural and non-agricultural households. Even in rural areas, adolescents in agricultural households tend to marry earlier than those in non-agricultural households. A Vietnam study found that young women living in non-agricultural households were more likely to delay their timing of marriage to continue education than those young women living of agricultural households (Minh, 1997). Work in the agricultural sector tends to perpetuate the low status of women (Matsumura & Gubhaju, 2001).

2.10.3 Place of Residence

The levels of adolescent marriage and fertility vary widely by place of residence. The amount of variation depends on the process of urbanization, modernization, and availability of educational and employment opportunities. As opportunities in rural areas are limited, rural adolescents are more likely to follow traditional norms of early and universal marriage followed by immediate and continuous childbearing to prove their fecundity.

In most developing countries, the timing of marriage and pregnancy is earlier in rural areas compared to urban areas (Singh, 1998). This is evident in rural African countries like Ghana (Bulley, 1984), and Niger (Locoh, 1994). It also has been observed in India (National Family Health Survey, 1998-99; International Institute for Population Sciences, 2006b), Pakistan (Sathar, et al., 2002) and Bangladesh (Islam & Mahmud, 1996). Many rural residents of African and Asian countries often marry before legal minimum ages at first marriage (Center for Reproductive Law and Policy, 1997).

Even in the predominately Muslim country of Indonesia, age at marriage is higher in urban areas than in rural areas (Palmore & Singaribum, 1992). Marriage is delayed in urban areas due to greater education and economic opportunities for young women and men (World Health Organization, United Nations Children Fund and United Nations Population Fund, 2003). Where employment and education opportunities are available, more value has been given to individual than to family goals (Singh, 1998). In contrast, rural adolescents are more likely to work and less likely to study than their urban counterparts (Jejeebhoy & Bott, 2003).

The greater pace of development in urban areas can also loosen traditional family and community pressures on young women to marry and start producing children (Villarreal, 1998). They are more able to delay their age at marriage and pregnancy compared to rural adolescents (McCauley & Salter, 1995).

Urban-rural differentials are also evident in levels of adolescent fertility. Rindfuss, et al., (1983), in an early study, did not find any significant effect of rural urban origin on the timing of family formation in Asian countries. However, more recent studies indicate that the rural adolescents have higher fertility rates than do urban women. Urban women may delay the timing of their first birth because they have better access to education and job than do rural women.

A study in Peru found that adolescent fertility was lower among urban adolescents compared to rural adolescents due to higher levels of use of contraception. There was, however, variation in the urban/rural differentials in fertility in other countries of Latin America (Florez & Nunez, 2001). The greatest gap in adolescent fertility levels was observed in sub-Saharan Africa (United States Census Bureau,

1996). In Botswana, however, fertility was high for both rural and urban adolescents (Singh, 1998).

Early marriage is common in rural areas, especially in the highland areas, which are typically less developed than lowland areas. It was evident in Nepal (Choe, et al., 2004).

2.10.4 Household Characteristics

There is a relationship between household characteristics and timing of family formation. Household characteristics include household economic status, family structure and characteristics of the household head. Family structure and characteristics of the household head are also related to socioeconomic conditions.

A mounting body of evidence suggests that household headship is an important factor related to household economic condition. In many developing countries, female-headed households tend to be poorer than male-headed households. They have less access to economic resources (Buvinic & Gupta, 1993; 1997). Individuals living in female-headed households may be more likely to suffer from poverty (Asgary & Pagan, 2004; Cagatay, 1998: Chant 2003; Moghadam, 2005).

There are many reasons for the formation of female-headed households. Female can be head of the household as a result of separation, divorce, death of spouse or migration of their spouse. This route to female headship tends to be involuntary. Due to the absence of a father, children in these families may have limited access to economic resources and grow up in poverty. This can contribute to delinquency. In the United States, female headship is higher among African American families, which contributes to high poverty rate for their children (The Annie E. Casey Foundation, 2005, cited in Mather, et al., 2005).

Many studies have found that children living in female-headed families are also vulnerable to poverty. Children, who grow up in this type of household, may repeat the cycle of poverty and disadvantage (Finne, 2001; Asian Development Bank, 2003). They are also disadvantaged in terms of education and are vulnerable to a variety of social problems (Nilufer, 1998; Chant, 2004). A study in Latin America and the Caribbean found a significant positive relationship between the presence of a father in the family and school performance (Buvinic, 1997). A study in the United

States found that children of female-headed households were less likely to graduate high school compared to those of male-headed households (Boggess, 1998).

In female-headed households, older children or adolescents often can not continue their schooling because they need to support younger siblings (McLananhan, 1994). Generally, female-headed households face many economic barriers. Females tend to receive lower income than men, even when they have similar levels of education and training (Dia, 2001; Elson, 1999; Finne, 2001; Kabeer, 2003). Many women in female-headed households are forced to work in the informal sector, where work tends to be less regular, poorly paid and lack of benefits (Brown, 2000; Chant, 1991; Chen, et al., 2004). Thus, they become economically vulnerable.

Due to lack of a male breadwinner, these women may have to work long hours to manage multiple tasks including income generation. They take on extra burdens to cope up with the situation. Thus, their children may be deprived of proper care and supervision, which can lead to lack of discipline. It was found that early drop out of school, delinquency, precocious sexual activity and early parenthood is common among young people in this situation (Safe, 1998). Also, children were more likely to be socially stigmatized or isolated due to negative social attitudes towards them (Lewis, 1993: Chant, 2007: Shanthi, 1994). Adolescents, living in a household without their father, are at greater risk of early family formation because of the socioeconomic disadvantages they face (Sloggette & Joshi, 1998). This adverse situation is not only related to material well being of children; but also to their emotional, psychological and social deprivation (Delamonica, et al., 2004).

Some studies have not observed a relationship between sex of household heads and economic condition of the household (Appleton, 1996; Lewis 1993). Other studies, however, have found that female-headed households are better-off than male-headed households, especially when females become heads due to migration of their husbands.

Female-headed households where women become head of the family by their choice have better economic condition and are less marginalized than those female-headed households that are formed out of necessity (Fiess & Verner, 2004; The World Bank 2003). Children of these female headed families are better off in respect of educational attainment than their counterparts in male-headed families (Blumberg,

1995; Chant, 1997a). In Jamaica, many women self declared them as head of the family, even in presence of their husband (Lloyd, 1995).

The timing of marriage and pregnancy is related not only to household headship but also to socioeconomic status, with ages of these two events tending to be earlier in households with low socioeconomic status (Swann, 2003). Even in developed countries, adolescent pregnancy levels are higher among those who are poorer and living in less advantageous socio-economic situations than their better-off peers (Singh, et al., 2001; Corry, 2000). Their impoverished circumstances provide them either little or no social support for delaying marriage and pregnancy (Berglund, et al., 1997). The World Health Organization (2003) identifies poverty as a source of social deprivation, with poor and socially disadvantage adolescents are more prone to early marriage and pregnancy (World Health Organization and United Nations Population Fund, 2006). The literature reveals that an adolescent growing up in a poor family is more likely to become a parent at an early age than a girl growing up in a middle/high class family (Hayes, 1987).

Poverty deprives adolescents of economic resources to assist them in achieving higher education and a better quality of life. Early marriage is less likely among those from the middle or highest household wealth categories. Also, it was found that young women living in wealthier households are significantly less likely to leave school early (Lloyd & Mensch, 2006). Living in urban areas and living in wealthier households substantially reduces the odds of an early first marriage and first pregnancy. In some societies, poorer families may support the early marriage of their daughters because they consider their daughter as an economic burden rather than as a potential asset (Mensch, et al., 1998). This is one of the factors that are associated to earlier ages of marriage and pregnancy of young rural women compared to young urban women (Singh, 1998).

Education and occupation of the household head are strongly related to socioeconomic status of the family. Usually, parents are the household head of a family. Young women who live in the higher socioeconomic strata of society often delay family formation as they are less traditional. This effect is mainly seen among urban young women. Urban females whose fathers have only a primary level of

education are significantly more likely to postpone their marriage than females whose fathers have no education (Choe, et al., 2004).

Household economic status, which depends on the occupation of the household head, has a strong effect on schooling outcomes of children. Low household income increases the probability of children dropping out from school. Thus, young people from the poorest households are more at risk of school drop-out than those living in wealthier households.

Educated parents are likely to have higher income and thus they are more likely to be able to send their children to school. Highly educated parents realize the importance of education. Thus, parents' educational attainment is strongly associated with their children's school attendance (Dar, et al., 2002). Children's schooling is also affected by their parents' income. Duryea (1998) found a positive relation between parents' permanent income and children's educational attainment. De Ferranti, et al., (2003) also found a strong correlation between children's education and their parents' education. Children of parents with little education also tend to have little education.

Male pride may lead fathers, who have little education, to prevent their daughters to continue their education after basic schooling; because they fear that their own status and authority will be undermined. Girls in poor urban families with a low level of parents' education need to help their families either economically by employment or helping in family work or by looking after their younger siblings (Choe, et al., 2004). They often have to discontinue their education. Thus, it was found that higher levels of parents' education are associated with a lower probability of early marriage among adolescents.

2.10.5 Family Structure

Early family formation is related to family structure (Wu & Martinson, 1993). Due to socio-economic development, the proportions of nuclear families are increasing in many developing countries (Caldwell, 1982). In Thailand, the highest proportions (60.3 percent) of households are nuclear (National Statistical Office, 2002). This changing family structure and way of living especially can affect young people's sexual behaviour (Ojwang & Maggwa, 1991).

In most of the developing world, decision making occurs not only at the individual level but also involves the household. Early marriage and pregnancy is common in an extended family system, where a new couple typically do not need to think about to have a new household and to support children. They begin their married life in their parents' household. In extended families, women's decisions are usually controlled by the adult members, but they also benefit by being members of extended families. They receive family support in terms of economic support and child care, which may not be available in nuclear households (Conrad, et al., 1998).

Evidence suggests that extended families have additional wage earners and can increase income generating activities among other household members (Chant, 1997b). So if female heads of extended households are in a disadvantaged situation in employment and earning, other household members can compensate. In Mexico, more than one-half of females headed household are extended compared to over one-quarter of male headed units (Chant, 1997a). A similar situation was observed in the Dominican Republic (Safa, 1998). The large household size of extended families is also associated with wealth (Gage et al., 1997). Persons in a joint family system usually marry earlier than those in other family systems (Hajnal, 1982).

Although women in a nuclear household structure have greater autonomy and decision making power than those in an extended or joint household structure (Wickrama & Keith, 1990), they are often poorer than those from extended families. They have fewer earning members compared to an extended household.

Adolescents in nuclear families are generally under less pressure to follow traditional norms than those of an extended or joint family (Caldwell, 1996). In a nuclear family system, young couples start their own families upon marriage. To do this, they need to depend on their own earnings. Thus can results in a delay in the timing of marriage, as they work to accumulate wealth before marriage. In Sri Lanka, married couple traditionally stayed with their parents after marriage. Youth are now delaying their marriages as they prefer to have their own independent household and hence they need time to accumulate the necessary resources to set it up (De-Silva, 1997). Urban nuclear family members may be under more pressure to delay marriage and pregnancy because of high living cost, and expensive child care.

Extended families are typically more common in rural areas than in urban areas, especially in traditional agricultural societies. There is strong social and family control in these family systems which can promote early marriage and pregnancy. Adolescents who want a nuclear family need to develop their skills in order to obtain resources. Thus, they have to delay their marriage (Goode, 1963; Dixon, 1971). In Thailand, higher education was found to be related to nuclear family formation (Richter & Podhisita, 1992).

Thai kinship has a bilateral system that consists of both nuclear and extended families. In Thailand, due to matrimonial system, after marriage the husband is expected to move in to live with his wife's parents. Thus, the nuclear family temporarily changes into an extended family. This family extended structure usually lasts until the married daughter has her first child, when the young married couple establishes their own household (Knodel, et al., 1987; Limanonda, et al., 1991).

2.10.6 Migration

Rural to urban migration usually occurs due to differences in socioeconomic development and living standard of populations. Mobility is also related to women's status. Most studies have found that migration delays the age at marriage. Rural to urban migrants can also have a lower likelihood of marriage compared to non migrants. This was evident even among Javanese women in Indonesia (Savitridina, 1997). Women who migrated to urban areas in search of higher education or employment are more likely than other women to delay marriage. Research in Vietnam found later age at marriage among migrants than non-migrants. This was related to the positive selectivity migration of women who had higher education and who were more likely to work in the modern occupation in urban areas (Minh, 1997).

In contrast, early marriage was more common among those women who were uneducated and who temporarily migrated from rural areas to urban areas. In Indonesia, a high proportion of early marriage was found in urban area, especially among migrant women who migrated from rural to urban areas immediately after marriage (Savitridina, 1997). A Bangladesh study also found that females are getting married earlier before they migrated to urban areas. They moved with their husband who had employment in urban areas. Although, females who migrated before

marriage either with their parents or brothers marry early as part of the process of socialization, and also their values related to family formation are different than those who are born and brought up in urban areas (Ahmed, 1982). Usually, migration due to marriage occurs over a short distance (Shanthi, 2006).

One study in Thailand found that young people migrating for study are more likely to delay marriage compared to those migrating for family reasons (Punpuing, et al., 2007). Another study in Thailand found that migration delays the timing of first marriage if migrants move from urban to urban areas, but it enhance the timing if they move from rural to rural areas. The timing of marriage among migrants is also affected by their educational level and occupation status (Phaktoop, 2000).

Several studies found that migration to urban areas significantly delays pregnancy. This situation has been documented in Asian countries such as Thailand, Vietnam, and China and also in sub Saharan Africa (Goldstein and Goldstein, 1983; Goldstein, et al., 1997; White, et al., 2001; Brockerhoff & Yang, 1994; Brockerhoff, 1998). Several other studies found no relationship between migration and the timing of pregnancy (Lee, 1992; Diop, 1985).

Migration also affects school enrollment. It can force a student to quit schools. Conversely, school enrollment decreases the likelihood of migration (Williams, 2006). Migration, when it is related to economic uncertainty and adjustment in a new environment, can delay marriage. Migration may also contribute to earlier marriage through higher earnings and subsequent improved economic stability. Curran, et al., (2003) argued that completing secondary schooling increases the odds of women's migration whereas marriage decreases the odds of migration.

One study in Thailand found that migration has a positive impact on the likelihood of family formation. It encourages women to marry. Individuals who have migration experience are more likely to marry than those who did not have any experience. This may happen due to the financial solvency of migrants which can help them to establish their own family (Jampaklay, 2003). But Zhu (1991) did not find any significant effect of migration on the timing of marriage in China.

2.10.7 Substance Use

Risk behavior includes smoking, drinking, illegal drug use, and unprotected sex. Adolescent pregnancy, which usually results from unprotected sexual relationship, may also be considered as one kind of risk behaviours. The World Health Organization (2004) found that pregnancy is most common among adolescents who are involved in other risk behaviours.

Smoking and drinking can be considered as personal risk factors. The prevalence of smoking and drinking is increasing among young adults (Thapa, et al., 2001). Several studies have documented an increase in the rate of smoking among pregnant adolescents compared to non-pregnant adolescents (Teagle & Brindis, 1998). A study in the United States found that alcohol consumption is a less risky behaviour compared to smoking (Rome, et al., 1998, cited in World Health Organization, 2004).

Individual and family characteristics also affect the likelihood of engaging in risk behaviour. It has been found that prevalence of teenage smoking is higher among those who are from families with lower socioeconomic status or from single parent families. Parents who spend more time supervising their children are less likely to engage in high risk behaviour. In Thailand, one study found that early sexual initiation was most common among those who were from a non-agricultural background, used tobacco and alcohol, and lived in single parent families (Alice, et al., 2006).

Smoking is also related to personal and social disadvantage. Cigarette smoking is related to behavioral problems, school suspension, and alcohol/illicit drug use (Conwell, et al., 2003). Adolescents who have a substance abuse problem often have low aspirations for education and low performance in school. They also are more likely to live in disadvantaged families (Alliance, 1999). Research found that adolescents who are smokers have weaker ties to school and lower levels of educational attainment (Bryant, et al., 2000; White, et al., 2002; Conrad, et al., 1992). Adolescent smokers are less likely to complete high school (Ellickson, et al., 1998; Mensch & Kandel, 1988) and more likely to use alcohol and other drugs (White, et al., 2002).

Substance abuse, living in poverty and adolescent marriage has been identified as the risk factors for teen pregnancy. Smoking has an association with non-traditional attitudes towards sex and marriage. Adolescents who have favourable attitudes

towards premarital sex are more likely to smoke than those who have more traditional attitudes towards sex (Waldron, 1990). Alcohol is a prominent factor in unprotected sex, as drunk teenagers are more likely to forget to use contraceptives. Relationships have been found between risk taking behavior like smoking, drinking and the likelihood of becoming pregnant (Dilworth, 2000). Several studies also suggest that smoking and drinking have a negative influence on sexual risk taking, including early and unprotected sexual activity during adolescence (VanLandingham, 1993).

2.10.8 Contraceptive Use and Premarital Sexual Activity

The probability of pregnancy is significantly affected by contraceptive use. Contraception should be used regularly and effectively to prevent unwanted pregnancy. Many young people become sexually active during their adolescence. But at the global level, adolescents are less likely to use contraceptives than are adults, both within and outside of marriage. So, family planning programs should focus on sexually active teenagers to encourage them to use contraceptives. Also, effective contraceptive methods should be available and accessible to them.

Among the developed countries, contraception is more widely available to adolescents of European countries compared to adolescents in the United States. Thus, adolescent fertility is lower in the European countries despite their early initiation of sexual activity (Darroch, et al., 2001).

Effectiveness of contraceptive methods is an important issue to consider. Due to the use of ineffective methods, discontinuation and failure rates are higher among adolescents than adult women (Singh, 1998). Among teenagers, one study found that the contraceptive failure rate was higher for traditional methods like withdrawal than it was for modern methods. Even in developed countries where the proportion of contraceptive users among adolescents is higher; the majority are inconsistent users. A study in the United States found that 30 percent of adolescent pregnancies were a result of lack of method use and 16 percent occurred due to method failure (Hayes, 1987).

A substantial proportion of adolescents are at risk of unwanted pregnancy as they faced many barriers to the use of contraception. Contraceptive use depends on many factors. It is related to age of sexual initiation. The older the female adolescent

the more likely she is to use contraception at first intercourse. Delayed sexual initiation is related to regular and effective use of contraception when sex begins (Zelnik & Kantner, 1977; Zabin & Clark, 1981; Devaney & Hubley, 1981).

There is an association between the nature of a relationship and contraceptive use. Adolescents who have frequent sexual activity with different partners are more likely to use contraceptives than those who have infrequent sexual involvement and with a steady partner (Luker, 1975). Sexually active young women who have clear educational goals and aspiration are more likely to use contraception consistently to avoid untimely pregnancy than those who do not have these clear aspirations (Devancy & Hubley, 1981).

Acceptance of their sexual behavior also increases regular and effective contraceptive use among adolescents. Lindemann (1974) argued that adolescents who acknowledge their sexual activeness are more likely to use contraceptives. Many teenagers delay use of contraceptives as they do not want to acknowledge their own sexual activeness (Zelnik, et al., 1981). Generally, adolescents with traditional attitudes are poor users of contraceptives as they do not have control of their lives (Cvetkovich & Grote, 1980). Poor contraceptors were found among those adolescents who also have had other risk taking behaviors (McAnarney & Schreider, 1984). Studies found that contraceptive use is more frequent among those adolescents who have parental and family support (Furstenberg, 1976; Flaherty & Maracek, 1982; Fox, 1981). Socioeconomic status and family structure are typically not significantly related to teenage contraceptive use (Hayes, 1987).

A study of contraceptive behaviour among married and unmarried women in rural India found that the attitude of healthcare providers was a barrier in seeking appropriate services. In South Africa, family planning service providers do not support adolescents. They often refuse to provide them with contraceptive services (Kaufman, et al., 2001). Young adolescent mothers often are less motivated to use contraceptives due to difficulties in obtaining reliable contraceptives. So it is a task of the health workers to properly counsel them on contraceptive methods (World Health Organization, 2007)

Knowledge of reproduction and contraception is an important factor in contraceptive use. It was found that knowledge about sex and contraception is highly

associated with the frequency of contraceptive use (Cvetkovich & Grote, 1980). If young people know about the outcomes of a single unprotected sex act, they will be more cautious (Moore et al., 1986; Jenkins, 1983). Often they do not have basic knowledge about reproduction and contraception, which put them at risk (Zelnik & Shah, 1983).

Studies have found that majority of married adolescents have some knowledge of contraception (Pradhan, et al., 1997; International Institute for Population Science and Macro International, 2000). However, in-depth knowledge about specific method is low in India, and Pakistan. In India, low specific knowledge and low use of contraceptives among adolescent results in high fertility levels. Contraceptive knowledge is relatively higher in Thailand and Bangladesh due to their effective family planning programs (Alan Guttmacher Institute, 1998).

There is gap between knowledge and use of contraception among married adolescents. Contraceptive use, either traditional or modern, is often very low. Less than 10 percent of married adolescents in South Asian countries, mainly in India, Nepal, and Pakistan except Bangladesh and Sri Lanka use contraceptive methods (International Institute for Population Science and Macro International, 2000; Pradhan et al, 1997; Hakim, et al., 1998). In Bangladesh and Sri Lanka, one third of married adolescents use contraceptive methods (National Institute of Population Research and Training, Mitra and Associates, 1997). In Southeast Asian countries, relatively higher proportions of married adolescents use contraceptive methods. In Indonesia, the Philippines, and Thailand, the proportion of married adolescents, who used contraceptives, was 45 percent, 22 percent and 43 percent respectively (Alan Guttmacher Institute, 1998).

Higher adolescent fertility may indicate high unmet need for contraception among adolescents. The magnitude of this unmet need among married adolescents varies among countries. In Indonesia and Viet Nam, unmet need was observed for one tenth of currently married adolescents, whereas it was one third in the Philippines and two fifths in Nepal (Pradhan, et al., 1997; Macro International, 2001). Unmet need for contraception is also higher among adolescents of the South Asian region. It was 41 percent in Nepal, 16 percent in Bangladesh, 14 percent in India, 8 percent in Pakistan.

In comparison, it was less than 5 percent in East and Southeast Asian countries (Jejeebhoy & Bott, 2003).

Due to lack of self esteem and poor negotiating skills, female adolescents often fail to convince their partner to use contraception (Jejeebhoy, et al., 1999). Studies in the Asian region have found that females have less negotiating skill than do males. This makes their lives vulnerable. In many countries, induced abortion becomes a substitute for contraception (Alan Guttmacher Institute, 1981). Contraceptive needs of unmarried young people are ignored due to society's denial of premarital sex. Thus, young people are deprived from access to proper services and fail to use contraceptives correctly and constantly.

Early initiation of sexual activity increases the incidence of unwanted pregnancy. Due to limitation of accurate information on premarital sexual activity, it is difficult to present a comprehensive picture of this pattern of adolescent behaviour. Premarital sexual activity appears to be increasing among the young generation of the developing countries. This is evident in almost all developing countries of Africa, Asia, and Latin American region (Mensch, et al., 2002). In India, 10 percent girls were sexually active before marriage (Jejeebhoy, 1996) and in rural Bangladesh, 6 percent of unmarried girls were sexually active (United Nations Population Fund, 1998).

In the United States, unwed pregnancy is a major social problem, as children living in single parent households are more prone to sexual abuse, drug abuse, crime, violence and divorce. Their educational achievement is also poorer and their economic well-being is less than that of children who are raised in two parent households.

In developing countries, especially in Asian societies, there is gender-based double standard regarding premarital sexual activity. Premarital sexual relationship is more acceptable for males than for females (Nhan, 1996; Cadelina, 1998). Yet, in Thailand, early initiation of sexual activity is increasing among young women. Their risk taking behaviour is also increasing. One study in Thailand found that one fourth of 8th grade students had engaged sex for money and almost two-thirds of 8th grade female secondary school students had their first sexual experience with their boyfriends or lovers (Ministry of Public Health, 2004a).

Due to this double standard, unmarried young women are afraid to disclose their sexual activity; this inhibits them from seeking contraceptive services. Due to

lack of self esteem and negotiating skill, they also can not convince their partner to use contraception (Jejeebhoy, et al., 1999). In many African countries, schoolgirl pregnancy due to premarital sex is becoming a public concern (Ajayi, et al., 1991; Agyei & Epema, 1992; Gorgen, et al., 1998). In rural South Africa, premarital fertility accounts for 21 percent of all births. This pattern of high premarital childbearing reflects a low incidence of contraceptive use among adolescents (Garenne et al., 2000).

2.11 Conceptual Framework

The conceptual framework of this study is supported by two theories: Rational choice theory and social control theory. According to social control theory, the sexes of the head of the household and family structure are included as risk factors; as these factors affect the socialization of adolescents.

Timing of first marriage and first pregnancy can be explained by rational choice theory in the following way. Adolescents undertake a cost benefit analysis, based on the existing social structure and opportunities. Educational attainment and occupation of head of household contributes to their children's educational attainments, which in turn affects the age at first marriage as well as first pregnancy. Early age at marriage does not allow adolescents to fulfill their aspirations for higher educational achievement. Socio economic factors, which include strata of residence and household wealth index also influence the rational decision making process that determines whether adolescents will delay their marriage and pregnancy. Socioeconomic factors and educational attainment also affect the work status of adolescents in terms of whether they will start to work, which in turn affects timing of first marriage and pregnancy.

The literature review found that age at marriage is linked to age at pregnancy. The timing of marriage and pregnancy is delayed among those women who are educated, exposed to urban living, and involved in paid employment in the non-agricultural sector. They have greater autonomy and independence to takes decisions to control their sexuality and the timing of family formation. In contrast, the majority of women who are living in rural areas, have low educational attainment, are less

exposed to wage-based non-agricultural employment, and have limited autonomy to make decisions, cannot avoid the traditional norms of early marriage and childbearing.

For that reason, the conceptual framework of this study includes independent variables at the individual level, household level and community level and examines the effect of all these variables on the timing of marriage and pregnancy.

2.12 Research hypotheses

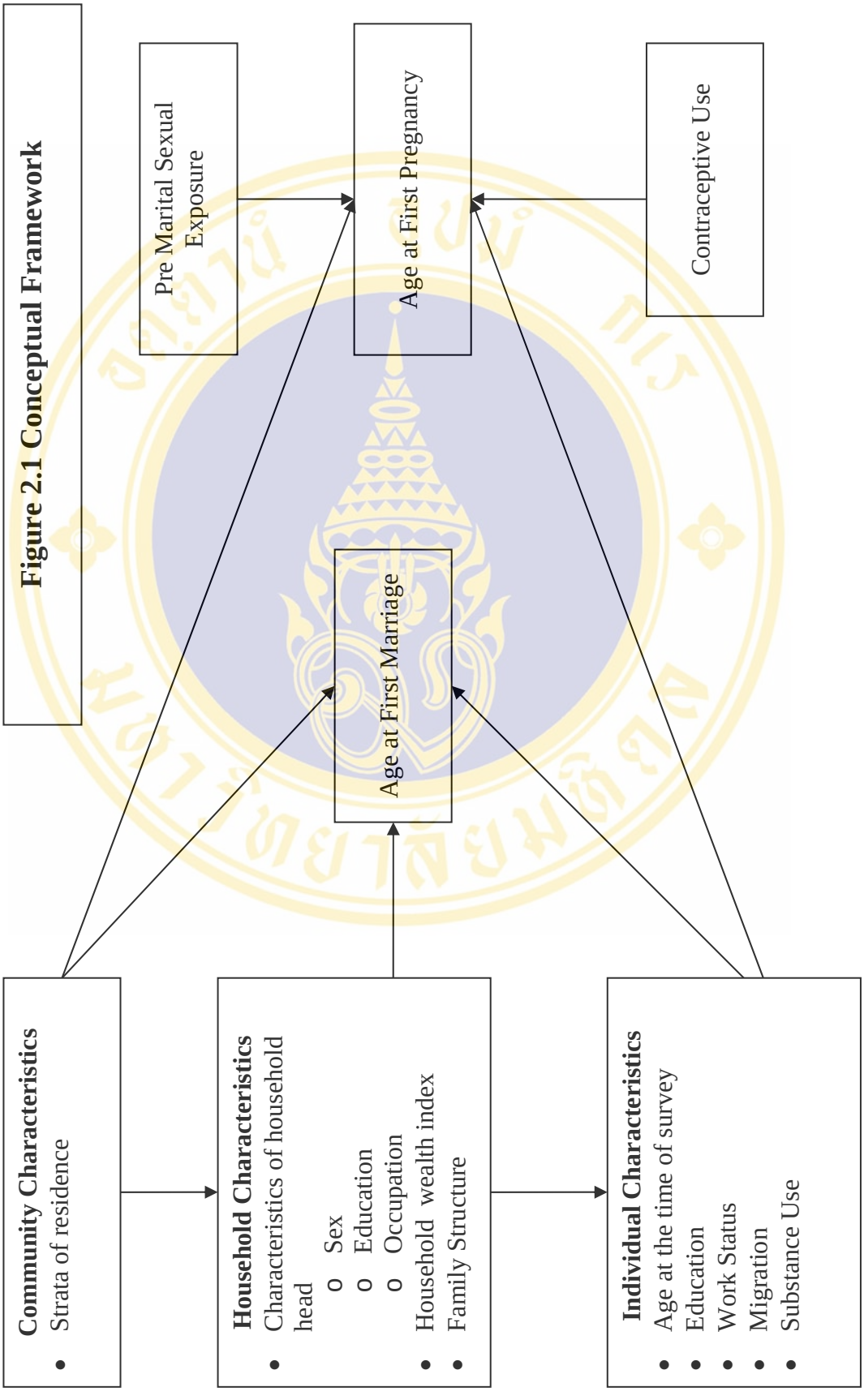
1. The timing of first marriage will be earlier among female adolescents who have no education or less than a primary school level of education than those who have upper secondary or a higher level of education.

2. The timing of first marriage will be later for female adolescents who are in school compared to those who are not in school.

3. The timing of first pregnancy will be later for female adolescents who are in school compared to those who are not in school

4. The timing of first pregnancy will be earlier among female adolescents who do not use a family planning method than those who use a method.

Figure 2.1 Conceptual Framework



CHAPTER III

RESEARCH METHODOLOGY

Detailed information related to the study design and methodology is described in this chapter. At the beginning of this chapter, there is a brief description of the study area, which is followed by information on the source of data for the study. It also includes detailed information on study design, study population and sample size. There is a comprehensive section on information related to different types of data sets and measurement of covariates. Methods of analysis are also described. The limitations of the study and quality of data are discussed and an attempt is made to illustrate potential selection and attrition bias.

3.1 The Study Area

The study area belongs to the "Kanchanaburi Demographic Surveillance Site (KDSS)", which is a demographic surveillance project of the Institute for Population and Social Research (IPSR), Mahidol University (Institute for Population and Social Research, 2001). This project area is located in Kanchanaburi province, which is situated in the western part of the central region of Thailand, with the capital of the province located approximately 120 kilometers west of Bangkok. It is one of the largest of the 76 provinces of Thailand. It shares a long common border with the neighboring country of Myanmar along its northwestern and western borders. Topographically, there is resemblance between Kanchanaburi province and the whole country; each has both plains and highland areas.

The total area of the province is about 19,483 square kilometers, which is divided into 13 districts, 98 sub-districts, and 887 villages (Vong-ek, et al., 2006). According to the 2000 population and housing census, 734,000 people are living in this province (National Statistical Office, 2000). The majority are Thai (96 percent) and 99 percent are Buddhist. Table A1 in the Appendix provides background information of Kanchanaburi province compared to that of the whole country.

The socio-economic characteristics of Kanchanaburi province are also similar to the average of the whole country. It is an important area of plantation crops and has many factories. In addition, it is one of the major tourist destinations of Thailand. Because of its geographical and economic diversity, which is also reflected in people's lifestyles, it is an ideal study site.

3.2 Description of Data

3.2.1 Source of Data

The data collected under the KDSS was used for this study. Kanchanaburi Demographic Surveillance Site (KDSS) was a five year long project that collected data during the period of 2000 to 2004. The primary objective of the KDSS was to collect data on an annual basis from every household and every individual, aged 15 years and above, in the KDSS in order to monitor population change as a result of socio-economic and environmental change. A longitudinal database was established, which was based on the collected information of demographic, economic and social status of the study population**.**

3.2.2 Community Selection

The KDSS used a stratified systematic sampling design to select 100 communities (villages and census blocks) from a sampling frame constructed for the 2000 Census. The primary sampling units for rural and urban areas were villages and census blocks respectively. According to the main occupation of the population and land use patterns, the whole province as well as the study area was divided into five strata. These are urban/semi urban, rice, plantation, upland and mixed economy (Institute for Population and Social Research, 2001).

Initially, 1004 communities, both villages and census blocks, were selected from the national census sampling frame, which were distributed throughout the Kanchanaburi province into these five strata. Later on, twenty communities were systematically randomly selected from each stratum. Thus, the study area consisted of 100 communities: 86 were villages and 14 were census blocks.

Out of these 86 villages, 6 villages were classified as industrial villages. These were located in the urban/semi-urban stratum, where the main occupation was non-agricultural. Therefore the semi-urban stratum consisted of these six industrial

villages. Subsequently, in 2002, one more village was added to the study area due to splitting of one village (Guest & Punpuing, 2004).

The following figure 3.1 shows the distribution of communities both at the province and in the study area.

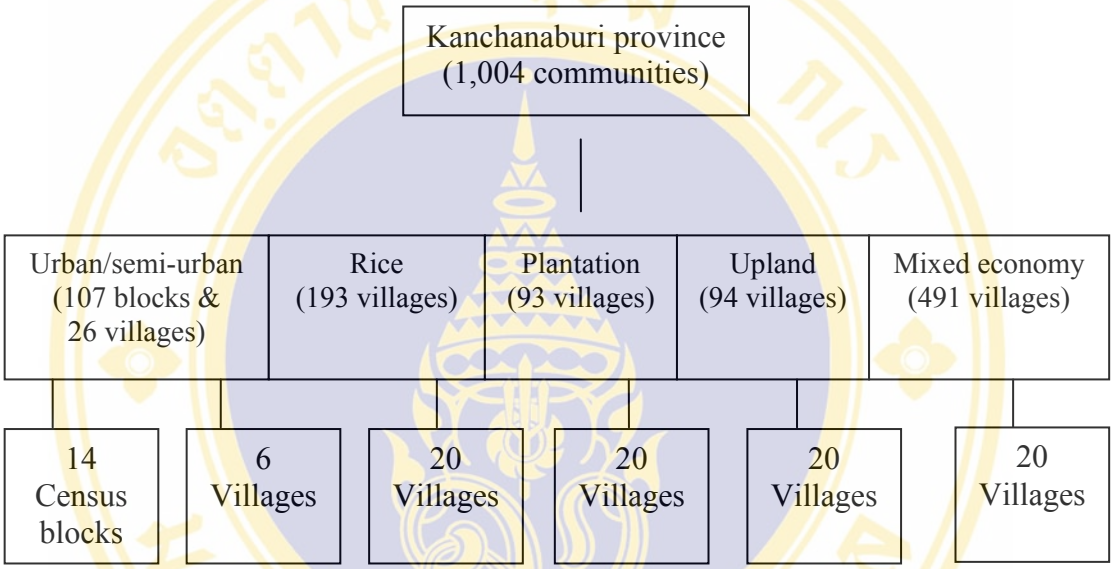


Figure 3.1 Stratified systematic sampling design in Kanchanaburi Demographic Surveillance System

3.2.3 Method of Data Collection

Data collection was done using a household census and interviews of all household members aged over 15. Under this census approach, information on socio-economic and demographic characteristics was collected for household members of all selected 100 communities of the study area. Information was not collected from the individuals if they had migrated out of the KDSS communities. The list of household members was updated annually. Therefore, if a family member, who was in the list of the previous round, has moved out from the household, their information was not collected at the individual level. On the other hand, the information of any new household member who has moved into the current household was included.

Information was collected at all three levels: village, household and individual levels. This study used the information at the household and individual levels only. At the household level, basic information of household members and household characteristics were obtained by interviewing household heads. At the individual level, information was collected by interviewing all available individuals, aged 15 years and over, on their fertility behavior including childbearing, pregnancy history, family planning and health risk behavior along with other socio-economic and demographic characteristics.

3.3 Study Design

There were five rounds of annual repeated cross sectional census conducted in the KDSS, with the first round in 2000 and the fifth round in 2004. Information was gathered about the same individual. Thus, these repeated cross sectional annual censuses form a prospective longitudinal panel study. If an individual remained in the KDSS for the full five years of observation, five rounds of data are available for them

All targeted study populations were continuously monitored to record the exact time of when events occur. Thus, the current study design is prospective observation in terms of the events of interest “first marriage” and “first pregnancy. The Laing Calendar was used to collect reproductive histories. Like other event history or duration data collection, the Laing Calendar allows information on the timing to be calculated. In this study, events associated with the timing of reproduction-related events are collected.

3.3.1 Study Population and Unit of Analysis

The eligible study population is composed of all females aged 15 to 19 years and unmarried at the time of enrollment into the Kanchanaburi DSS. These females were followed from the round they first entered the KDSS to the round they exited the KDSS. Individuals aged 15 years in round 1 in 2000 were 19 years by round 5 in 2004. Five years of data were available if they were followed for all five rounds. For others, information was available for less than five years, depending on the timing of their entry and exit from the KDSS.

3.3.2 Sample Size

The exact age of 15 years was considered as the onset of the period of exposure, since it is the age that is normally taken as the starting point of reproductive ages. Respondents who did not experience the events being studies were included in the sample and are thus considered as part of the study population. There are two types of censored data in this study; left censored and right censored.[1] Information on these individuals is considered to be right censored.

Initially all females, whose aged were 15-19 years (180 -228 months) at the time of enrollment into the KDSS and who were living in the Kanchanaburi project area irrespective of their marital status, were included in this study. Thus, the total number of this initial sample was 2936 individuals. Of these, 370 cases were left censored, as they already had experienced the event of interest at the time of enrolment into the Kanchanaburi DSS i.e. their transition from unmarried state to married state happened prior to the beginning of the observation period. Hence, they were excluded from the current study.

As a result, a total number of 2,566 individuals, which are right censored cases, remained in the study. In KDSS, respondents exited and re-entered the project sites due to migration. Some respondents who migrated out did not return to the KDSS. Thus, data is not available for all rounds of the KDSS for all individuals. This initial sample consisted of all those individuals who had at one or more year of observation period. Almost 43.5 percent (1,116) of the respondents had only one year of observation. As a consequence, respondents' characteristics could not be measured before the event occurs. Thus it is not possible to establish the temporal ordering of events. That is, it is not possible to determine whether or not the assumed causes of the events under study actually occurred before or after the events occurred.

Finally, this 43.5 percent of respondents with only one year of observation were excluded from the total respondents to obtain the primary sample of the study.

[1] Left censoring occurs if the event of interest occurs before the beginning of the observation period. Its means that the subject was never under the observation period and event occurs prior to subject entering the study. Right censoring occurs for many reasons. It mainly occurs when respondents do not experience the event of interest during the observation period. It is assumed that they may experience the event sometime after the end of the study. It also occurs for those who are lost to follow up, due to either migration or marriage or other causes before the event occurs.

This sample consists of 1,450 individuals who had at least two or more years of observation. All the characteristics of these respondents were measured before the event occurrence.

3.4 Method of Analysis

3.4.1 Statistical Technique: Event History Analysis (EHA)

Event history analysis is a method of time-based data analysis (Ruspini, 2002). This analytical method is mainly focused on the study of the timing of the occurrence of an event[2] of interest. It measures the duration (length of time) from the time of exposure to risk of experiencing the event until the event occurs (Singer, and Willett, 2003). Thus, it studies the transition of subjects through successive states including the lengths of the time intervals between entry to and exit from specific states.

This method is applicable to this study because of the focus here on the timing of events over time. In this study, female teenagers are considered at risk of experiencing the events "first marriage" and "first pregnancy" starting from the beginning of their reproductive age i.e. 15 years. Here, the concept of "transition to motherhood" principally includes two types of transitions; the first transition occurs from the unmarried to the married states and the second transition occurs from the married to the pregnant states. This study therefore focuses on the timing to first marriage and timing to first pregnancy. The data, which has been collected annually on the same individual, makes it possible to study these transitions at the individual level.

In causal modeling, it is important to understand the reasons why a particular event occurs to individuals and event history analysis is appropriate to study this causal process. It is typically used to investigate the links to understand causal relations (Blossfeld and Rohwer, 2002). Repeated interviews with the same individual at different points of time assist in creating a temporal ordering of events, which is one of the conditions required to establish causality. The cause must precede the effect in

[2] An event can be defined as a change or a transition from one discrete state to another; a passage which takes place at a specific point in time. So, an event occurs as a result from a transition between states where an individual enters a new status that differs from the status before the transition took place (Ruspini, 2002).

time and this temporal ordering of the designated cause and effect variables is best undertaken with longitudinal data (Rose, 2000: 27).

Hazard model is one form of event history analysis that can be used to explore the factors associated with experiencing an event of interest where the risk of the event occurring varies among individuals (Vermunt & Moors, 2005). Discrete time logistic regression, one of the techniques of event history analysis, is used in this study to deal with time varying predictors. The difference between ordinary and discrete time logistic regression is that time is used to define the sample transitions in discrete time logistic regression. A time varying predictor has "its own value on each occasion". It records an individual's status at each time period in the analysis (Singer, & Willett, 2003).

Unlike ordinary regression analysis, event history analysis is able to handle right censored observation. It can adequately deal with this form of missing information that arises from incomplete observation (Blossfeld & Rohwer, 2002). This study also contains right censored observation, as the timing of the transition cannot be observed for some cases. This right censoring affects the estimation procedure. Thus, event history analysis is used in this study under the "non-informative assumption" which means that event times are independent of the censoring mechanism (Steele, 2005). It also assumes that individuals are not selectively withdrawn from the sample; they are more or less likely to experience the event after the period of observation ends.

The analysis models the transition time and rate to the events of interest "first marriage" and "first pregnancy" among Thai female adolescents. Thus, it uses discrete time event history analysis to describe the time of occurrence of these two non-repeatable target events, which were recorded in a discrete time period[3]. The ultimate aim of this analysis is to estimate the hazard and survival probabilities of these two non repeatable target events by using life table method and to examine the variables related to these transitions by using discrete time logistic model.

[3] Discrete time period means when time is measured in discrete units, which is a fixed interval, such as month or year.

3.4.1.1 Life Table Method

Life table analysis is a non-parametric method. It is used to examine the distributions of individuals across the occurrence of events, i.e. the distributions of time until an event occurs. Thus, it compares respondents at the times when the event occurs. It also takes into account censoring and other characteristics of duration data. Life table analysis estimates the probability of survival past a certain point in time and compares the survival experiences among sub-categories of respondents (Blossfeld & Rohwer, 2002; Steele, 2005). This method is used in this study to describe the timing of getting married and becoming pregnant and how these risks vary by their characteristics.

The life table method estimates survival functions[4] for fixed points of time e.g. monthly or yearly. It is a method well-suited to analyze time-based information, especially where there is censored information. Survival time is calculated for censored cases based on the time that they are observed before censoring occurs (Courgeau & Lelievre, 2002). Thus, this method is appropriate for this study, which is also dealing with censored cases.

In the analysis, life table analysis is used to examine the survival time to the events of occurrence of first marriage and first pregnancy. The survival time is considered as the length of time from beginning of the risk period until the event occurs (Singer & Willett, 2003). Here, the probability of survival in this study is the likelihood that a Thai female adolescent will not experience the event of first marriage as well as first pregnancy until the end of study period. The proportion experiencing the targeted events is the complement of the survival probability, that is, subtracts the survival rate from one. The distribution of probabilities of experiencing the targeted events is estimated for each exact age of occurrence and is compared among the different categories of the independent variables. As a probability in discrete time, hazard and survival rates are bounded by 0 and 1.

[4] Survivor function or survivorship is the reverse cumulative distribution function of T. Here, T is a non-negative random variable, which denotes the time to the event occurs. The survivor function reports the probability of surviving beyond the time *t* i.e. the probability is that event does not occur prior to *t*. So, survival time is equal to one minus failure time. S (*t*) = 1 – F (*t*); S (t) = Pr (T>_t) i.e. probability of T is greater than t. This survivor function is equal to one at t = 0, and then gradually decreases while t increases.

The hazard function or rate is one of the main functions of this analysis. It is also called as transition rate. The discrete time hazard rate[5] is the conditional probabilities that an individual will experience the event within the particular observation period. This discrete time hazard function assesses the conditional risk of event occurrence among those individuals who are still "at risk" of having an event at that particular time. In contrast, a discrete time survival probability is the probability that an individual will not experience the event (Blossfeld & Rohwer, 2002). The hazard rate tells us the probability of event occurrence and the survival rate tells us about the probability of non-occurrence.

3.4.1.2 The Wilcoxon Test

A statistical test is used to examine whether there are any significant differences in the survival distributions. The Wilcoxon test (Gehan, 1965a) is appropriate for this purpose; as it can compare the survival experiences by using the temporal ordering of the failure times. It compares the overall survival functions; thus it compares the survival experience between groups in order to determine whether this overall comparison is statistically significant. It is suitable when the hazard functions are considered to vary in ways other than proportional change. The Wilcoxon (Gehan) test is appropriate for testing the equality of survivor functions across groups as it does not test the equality of the survivor functions at a specific time point. This test can be unreliable if the censoring patterns differ over the test groups.

The Wilcoxon test works by comparing the expected versus the observed number of event for each group at each time of occurrence and then combining these comparisons over all observed times of event occurrences. It works under the null hypothesis that there is no difference in survival among the two groups.

[5] The hazard rate measures the total amount of risk that has been accumulated up to time t. There is a relationship between the probability of survival past a certain time and the amount of risk that has been accumulated up to that time and the hazard rate measures the rate at which risk is accumulated. The risk varies over time, thus, this rate can increase, decrease with time or may remain unchanged or constant over time. Hazard function h (t) = f (t) | S (t)

3.4.1.3 The Quantile Function: Survival Time at 25th Percentile

The quantile function[6] is used to summarize cumulative survival rates. In this study, median survival time[7] often could not be estimated because of the high proportion of censored data. Thus, survival time at the 25th percentile i.e. Q = 0.25 is used to summarize differences in survival between different groups. The 25th percentile can also be used to describe the time at which 25 percent of the group have experienced the event.

3.4.1.4 Discrete Time Logistic Regression

Discrete time logistic regression is used to model the event oriented data in this study. This method regress a set of covariates on survival time. The covariates act on the underlying hazard probability. This method addresses the question about "why events occur at different times for different people" (Singer & Willett, 2003). This method uses the maximum likelihood to estimate the parameters (Agresti, 1996). Discrete time binary logistic regression is undertaken when the outcome of the event is binary (0 or 1) in nature and the occurrence of event depends on a non-linear function of the explanatory variables. It is a parametric method.

3.4.1.5 Odds Ratio

Logistic regression produces odds ratio associated with each predictor. Odds are derived from a regression coefficient, β as Exp (β). An odds ratio provides a metric to interpret the magnitude of an effect. The odds of an event occurring is defined as the ratio of the odds that an event will occur to the odds that the event will not occur. An odds ratio, which is the ratio of two odds, is the most common measure of association in logistic regression. An odds ratio can be either greater or lower than one. If the odds ratio of an event occurring is greater than one, the event is more likely to happen and if the odds ratio is less than one, the event is less likely to happen. The value of odds ratio will be one when there is no difference across values of a covariate of the odds of an event occurring (Agresti, 1996).

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[6] The quantile function is defined to be the inverse of the cumulative distribution function. $Q(u) = F^{-1}(u)$

[7] Median survival time is defined as the 50th percentile of the survival time distribution; Q=0.5

3.5 Organization of Data Set

The data for this study is organized into two data sets: "person-oriented or person level data sets" and "event-oriented or person-period data sets". Person-oriented data set is used for life table analysis. This data set has one row of data for each respondent, regardless of the number of waves of data collection. So, each row contains all the data ever collected for that person. Thus, it can measure the duration when the individuals first enter the risk period to when they experience the event occurrence. But this data set can not be used with time varying predictors whose values vary over time (Singer & Willett, 2003). Thus, there is a need for an event-oriented data set.

For that purpose, the person-level dataset is converted into a person-period or event-oriented data set, which is used for discrete time logistic regression analysis. It is re-organized from one row of data per person to a data set in which each person contributes to several rows; one row for each period in which an individual is observed. Thus, there are multiple records per respondent and the unit of analysis is a “person-year”. In the event-oriented data set, the number of cases is multiplied by the number of observation periods in order to obtain the “total records” i.e. total person years. This data set contains four types of variables: a subject identifier, a time indicators, outcome variable and all predictor variables (Singer & Willett, 2003).

Each year of observation is treated as a separate case for discrete time logistic analysis. A respondent who is interviewed five times during the full length of the KDSS study period has five records. These five records contribute as five cases in this dataset. The event outcomes and all the independent variables are measured at the exact year of observation. In contrast, in the person-oriented data set, all independent variables are measured in the year of observation before the event occurs.

3.6 Laing Calendar

In order to obtain information on the “age at first marriage and age at first pregnancy”, this study has taken advantage of the Laing calendar (Laing, 1985). This method of data collection is used to collect information for women, both single and married, in the reproductive ages (15-49). The Laing calendar contains monthly

information. Since 2001, each round of KDSS census contains at least 18 months of information. Thus, four rounds of census contain at least 72 months of information. Detailed information on the timing of marriage, a pregnancy history including timing of pregnancy and outcome of pregnancy such as live births, abortion etc. was available in this Laing calendar. Information was also available on monthly contraceptive practice i.e. contraceptive use or not, use of specific method of contraceptive, different reasons for not using contraceptive etc. All these information was utilized in this study.

3.7 Overview of Dependent Variables

In event history analysis, the risk of an event occurring within a given period is based on an event variable that indicates whether the event occurred or not during the observation period. It also acts as a censoring indicator. If the event occurs to individual at time t, i.e. uncensored, the value of this variable will be one and if event does not occur, i.e. censored, then its value would be zero (Blossfeld & Rohwer, 2002). In this study, there are two event variables to record whether an individual marries or whether she becomes pregnant during the observation period. These are also considered as the dependent variables.

For life table analysis, the event variable is tied to the time at which the event occurs (Singer & Willett, 2003). For discrete time logistic regression, event variables are created to identify whether individuals have yet experienced the event or not within the observation time period. So, the response variable for discrete time logistic model is the binary indicator of event occurrence at specified times periods.

In both person-oriented data set and event-oriented data set, the number of events is equal, as the events can only occur once. The only difference in these data sets lie in the number of censored cases. The number of censored cases is higher in the event oriented data set than that of the person oriented data set.

3.7.1 Operational Definitions of the Dependent Variables

Two events are investigated in this study; first marriage and first pregnancy.

First Marriage

In this case, the event variable is "first marriage[8]"; which indicates whether the respondents have experience this event during the whole period of observation or not. If any respondent, who was unmarried at the time of enrolment into the survey, married during the observation period; the value of this variable becomes one i.e. event occurred. And, if a respondent, who was unmarried at the beginning of the observation period remained unmarried at the end of the observation period or was lost from follow up before the event occurrence, the value of this variable remains as zero i.e. event did not occur.

In the Laing calendar, the code for unmarried respondents was 82. There were different coding for other events; such as the code for "use of oral pill" was 6, that of the injectable was 4 and for pregnancy was 21 etc. In the Laing calendar, if the code remains unchanged at 82 throughout the whole observation period this means that the respondent did not marry. If the code changed from 82 to any other code, it indicates that the marital status i.e. the event has occurred. For example, if code changed from 82 to 6, it's mean that the respondent got married and has started to use the oral contraceptive pill.

The period of observation starts when an individual turns exact age 15 years i.e. the exact age of 180 month since their date of birth. Thus, the exact age of the respondents at the time of enrollment was strictly maintained. The time of event occurrence was then established. Then it was straightforward to calculate the time from start of observation to the month of the event occurrence. If no event occurred, the time variable was considered at the last month of observation after age 15. After obtaining information on the exact month of marriage and year of marriage, the age at first marriage in months was created. This was then converted into year. For the calculation of age at first marriage, exact month of birth and year of birth were also used. Steps of calculation are described in the Appendix B.

[8] In KDSS, marriage includes both registered and unregistered unions; thus, it is a self reported response by respondents.

First Pregnancy

The variable first pregnancy indicates whether the respondents had experienced this event during the period of observation. If a respondent became pregnant during the observation period she is coded as one i.e. event occurred. If she did not become pregnant by the end of the observation period or was lost from follow-up before the event occurred, she was coded as zero i.e. event did not occur yet. In the Laing calendar, the code for pregnancy was 21. Whenever, the code 21 was found for the first time after the age of 15, the individual was recorded as having experienced her first pregnancy.

The calculation of timing of first pregnancy was similar to the time variable for event first marriage, with the only difference being that the exact month of pregnancy and year of pregnancy were used instead of month and year of marriage. After obtaining the age of first pregnancy information in months, it was converted into years.

3.7.2 Overview of Independent Variables

The study includes time varying covariates[9]. There are covariates at the individual, household and community levels. All these covariates are measured before the event occurrence for the life table analysis and remains at situ at each year of observation for discrete time logistic regression analysis.

Education, work status, migration experience and substance use, such as smoking and drinking, are measured at the individual level. At the household level, the main focus is on the head of household. Sex of head of household along with their overall educational achievement and occupation are included. Household economic condition, indexed by a wealth index and family structure are measured at the household level. Strata as place of residence are measured at the community level. All the covariates are included in the analysis of the events of first marriage and first pregnancy. In addition, three more independent variables are used while focusing on the event of "first pregnancy". These are: use of family planning method before pregnancy, experience of pre marital sex and pattern of contraceptive use.

[9] Time varying covariate means when the value of the covariate changes over time.

3.7.3 Operational Definitions of Independent Variables

Education

At the individual level, information is collected on educational attainment. It measured the completed level of educational achievement. Those, who have never been to school, are considered in the category of "no education". Some individuals, who attended only kindergarten but did not continue their further education, are categorized as "less than primary education". Those who have been to school and achieved some education are categorized accordingly.

In Thailand, there are both formal and non formal education systems. Thus, formal and non formal education is collectively considered at the same level. Therefore, primary education (Pratom) included, both formal and non formal, year of education from 1 to 6; lower secondary (Matayom) education consisted of, both formal and non formal, year of education from 7 to 9. The proportion of individuals who have attended higher education was less than 2 percent. Therefore, the category "upper secondary or higher education" included all those individuals who achieved not only upper secondary education but also further higher education such as bachelor degree etc. The last category "others" included those individuals who had vocational training, religious education, or education in the Myanmar system. Myanmar education means if the individuals have studied abroad like in Myanmar, although this number is negligible in this study.

Education of Head of Household

According to the Thai education system, those, who were born before 1960, attended only four years of primary education. In this study the majority of head of households were born after 1960. Therefore, this variable is also categorized in the same way as respondent's educational achievement. It has five categories: no education and less than primary education, primary education, lower secondary education, upper secondary or higher education and others.

Exact Age of Respondent at the Time of Survey

In each round, the exact age of respondent is recorded as completed year at the time of enrolment into survey. It is categorized into two groups: age 15-16 years and age 17-19 years.

Respondent's Work Status[10]

If respondents are not working and are in school as a student, their status is considered as "in school as a student and not working at all". If they are out of school, their work status is divided into three categories. If they do not have any occupation or are not involved in any economically productive work including housework, it is categorized as "out of school and not involved in any work". If a respondent is involved in any economically productive work, they are classified into two categories; working in agricultural and non agricultural work.

Occupation of Head of Household[11]

This variable has three categories. If the head of households are out of the labor force i.e. if they do not have any job or are not involved in any economically productive work, they are categorized as "not working". If the head of households are involved in any economically productive work, they are categorized into two groups; working in the agricultural sector or in the non agricultural sector.

Sex of Head of Household

This variable has two categories: male or female.

Strata of Residence

The five strata are: urban/semi-urban (industrialized area), rice producing, plantation, upland areas and mixed economy. Municipal and industrialized areas are

[10] Although this information should be taken from the individual level, it was taken from the household level, which has a separate category of "student". This student category is not specifically mentioned at the individual level.

[11] The head of household is the member of the household who is designated by the household respondent as the household head

considered as urban/semi-urban stratum. The lowland areas, where the main occupation is rice cultivation, are considered as rice stratum; those lowlands where the major occupation of the local people is cassava or sugar cane cultivation are placed in the plantation stratum. Three uplands districts comprise the upland stratum. The other respondents who have mixed types of occupation are classified in the mixed economy stratum.

Household Wealth Index

This variable is used as a proxy to describe the household economic status. At the household level, information is collected on ownership of household assets. There is a wide range of types of assets. Out of those, only 16 household assets for which information is available in all five rounds are selected. These are: Color TV, radio, VCD/VDO, satellite disk, mobile phone, home telephone, computer, air condition, washing machine, sewing machine, microwave, refrigerator, bicycle, motor cycle, car and pick up van.

The wealth index is constructed by using the Principal Component Methods[12] (PCA) from the selected items. Initially, this index is ranked into five different wealth quintiles, ranging from lowest quintiles to the highest quintiles. There is equal distribution to each quintile; with each quintile containing 20 percent of the respondents. These five groups are then re-grouped into three categories; which are designated as poor, average and rich. The respondents, who remained in the lowest two quintiles, are combined into poor group; those, who belonged to the middle two quintiles, are joined as an average group; and those individuals, who belonged to the highest quintile, remain as the wealthiest group. This way of constructing a wealth index is extensively used (Filmer & Pritchett, 2001; Amin & Casterline, 2005; Rutstein & Johnson, 2004).

Substance Use

Three variables on substance use were initially considered as risk taking behavior. These are smoking, drinking and drug taking. Drinking behavior was created from the combination of three types of consumption of alcoholic beverage

[12] Principal components analysis provides different weights to different assets based on the correlation among assets.

such as beer, liquor, and traditional liquor, as information on these three alcoholic beverages is available in all five rounds. Each variable is classified as yes and no. The drug variable was not used in the final analysis as the information obtained was primarily about common legal drugs, such as pain killers, rather than narcotics.

Family Structure

This variable has two categories: nuclear family and extended family. The family structure is defined as a "nuclear[13]" when it consists of only three kinds of family member: head of household, spouse and their sons/daughters. In contrast, when the family consists of other family members such as parents-in-law, brother/sister, and son or daughter-in-law, grand child, nephew/niece, friends, relatives and adopted child, along with the head of household, spouse and their sons/daughters, it is considered as an extended family. The variable "relationship to head of household" is used from household level to create this variable at the individual level. In the household level data set, each row contains information on each member of a household. Hence, this data set is restructured to create the variable.

Migration[14] Experience

In the individual questionnaire, there is a question in the migration section "did you ever move to stay somewhere for one month or more, during the last one year". This question is asked to each individual during each round of survey to check whether the individual has any experience of migration during the year prior to the survey. The constructed variable indicates whether the respondent had any migration experience during the observation period. It has two categories: yes and no.

[13] A nuclear family means when the household consists only of a married couple with or without their children.

[14] In the Kanchanaburi demographic surveillance system, migration is defined as "movement in or out of the village of current residence during the 12 months prior to the census survey (Institute for Population and Social Research, 2001)." A minimum of one month duration is required to be a usual resident of a household.

Contraceptive Use

This variable is created from the Laing calendar, which contains information on family planning use, both before and after pregnancy. For this study, family planning use only before pregnancy is considered. There is information on both modern and traditional family planning methods. The proportion of traditional family planning use is negligible; therefore, this study focuses on modern family planning methods. It also has two categories: yes i.e. used and no i.e. not used.

Pattern for Contraceptives Use

In the Laing calendar, there is detailed information on contraception. Information on contraceptive method failure and reason for discontinuation of contraception are available. The range of the reasons varies from side effects to inconvenience of buying contraception. This variable is used as an index of the dynamics of contraceptive use. It has four categories: no contraceptive use which includes all unmarried women; those individuals who start to use family planning methods but become pregnant due to method failure; those individuals who start to use a family planning method but later discontinue using for reasons including desire for pregnancy, side effects, a dislike of the method, have no time or money to purchase, health problems, etc, and those individuals who effectively used family planning method. In the Laing calendar, there is different coding to identify this dynamic pattern of contraceptive use. For example, code 22 to 32 and 34 indicate that pregnancy occurs due to method failure; code 38 to 48, 71 to 75 and 85-86 indicate that the respondents did not use family planning methods due to other reasons. See Table A24 in Appendix A for all coding of the Laing calendar that has been used in KDSS.

Experience of Premarital Sex

No direct information is available on premarital sexual activity, onset of sexual activity, and premarital childbearing in the KDSS data. Hence, this study depends on indirect information to create this variable. It has two categories: have or not have experience of premarital sexual exposure. This variable is created from

available information in the Laing Calendar. Initially, exact age at first marriage and exact age at first birth are constructed in months. If the difference between the timing of these two events is less than seven months, it is considered as an outcome of "premarital sexual exposure". Even if individuals conceive immediately after their marriage, they need a minimum 8[15] to 9[16] months for a birth to occur. If the length of the first birth interval is less than seven months, it means that the women conceived before marriage. Some pregnant respondents were lost from follow up so their age at first birth could not be measured. It is important to note that this covariate underestimates the level of premarital sex, as this study could not identify those individuals who had experience of premarital sex but did not become pregnant.

Table 3.1 Summary of the Measurement Scale of the Variables

Name of the Variables	Measurement Scale
Status variable for the event "first marriage"	Nominal scale
Time variable for the event "first marriage"	Continuous scale
Status variable for the event "first pregnancy"	Nominal scale
Time variable for the event "first pregnancy"	Continuous scale
Respondent's Education	Ordinal scale
Respondent's Work Status	Nominal scale
Respondent's exact age at the time of survey	Continuous scale
Sex of head of household	Nominal scale
Education of Head of household	Ordinal scale
Occupation of Head of household	Nominal scale
Strata of Residence	Nominal scale
Household wealth index	Ordinal scale
Family structure	Nominal scale
Migration experience	Nominal scale
Smoking	Nominal scale

[15] If it is premature delivery
[16] If it is a full term delivery

Table 3.1 Summary of the Measurement Scale of the Variables (Continued).

Name of the Variables	Measurement Scale
Drinking	Nominal scale
Contraceptive use	Nominal scale
Pattern of contraceptive use	Nominal scale
Experience of premarital sex	Nominal scale

3.8 Limitations of the Study

This study has several important limitations. Partners' characteristics, especially partners' education, work status and risk taking behavior contribute as risk factors to the timing of "first pregnancy"; but this information is available only in the last two rounds of KDSS census. Thus, the study could not utilize this information. Similarly, parent's education and occupation, which can influence their children's education, could not be used as this information is also not available in all five rounds. In addition, 30 percent of fathers and 20 percent of mothers are absent at household level so their information is not available. Maternal age at first marriage is an important risk factor for the timing of first marriage among female respondents aged 15-19 years but this information is not available in all five rounds and for all mothers because all mothers are not interviewed at the individual level. Therefore, all these important variables could not be used.

Knowledge on family planning methods is available only in the first round of the KDSS census, thus this study excludes this important variable from the analysis. Due to lack of consistent data, two important variables, namely religion and ethnicity could not be used. Also, due to lack of information, access to family planning services could not be measured. These unobserved individual specific risk factors may lead to unobserved heterogeneity in the hazard.

3.9 Quality of Data

According to the published reports of KDSS census (Institute for Population and Social Research, 2001; Guest & Punpuing, 2003; 2004; Guest & Jampaklay, 2005; Guest, et al., 2007), quality of data was satisfactory. On average, the individual response rate is above ninety percent. The major reasons for non-response are sickness and unavailability to participate due to work commitments. Continuous checking and re-checking of the data before data entry reduced coding errors.

During data analysis, frequent cross checking of data was undertaken to identify and correct errors. While calculating age of first marriage from the Laing calendar, the computed information was cross checked with the available information in the variable ‘age at first marriage”. But, this existing variable “age at first marriage” could not be used in this study due to presence of missing value; because, some of married respondents did not answer this question.

Some variables have different coding in different rounds. For example, the code for “head of household” in round 1 is zero, whereas since round 2, this code is one. Educational variable have different coding in different rounds. In particular, the coding of the first round significantly varies than that of the other four rounds. All these coding differences were standardized before analysis.

All individuals are specified by their own identification (id) variables. So, each record has an identification number of respondent, which helps to identify and to perform cross checking of individuals among data sets, both in the person-oriented and event-oriented data sets. The number of events should be same in both data sets so this information was also used as an indicator to check the quality of data.

3.10 Selection Bias and Attrition Bias

It is difficult for a longitudinal study to be free from selection bias[17] and attrition[18] bias. In social research non random sample selection leads to bias, especially when researchers depend on observational data (Winship & Mare, 1992). Selection bias is generated from systematic differences in characteristics between those who are selected and those who are not selected for a study. Generally, prospective longitudinal studies have selection criteria, which can result in selection bias where the characteristics of non-selected participants may be different than that of selected participants. Also in a longitudinal study, it is not possible to ensure that all participants will complete the study. Many of the selected participants are lost from the study which can result in attrition bias. Attrition bias arises when participants who drop out of study are systematically different than those who continue in the study. Attrition also reduces the sample size and hence affects the efficiency of parameter estimates (Winkels & Withers, 2000). Thus, these biases may pose threats to external[19] and internal [20]validity.

To address these issues, bivariate statistical methods are employed; Chi square is used to test statistical significance (Cuddeback, et al., 2004). Cross tabulation was used to examine the differences between the selected respondents and non-selected respondents in order to identify potential selection bias and to examine the differences between response participants and non-response participants to identify the potential attrition bias. All these potential biases are taken into account in drawing conclusions.

3.10.1 Identification of Selection Bias

In order to identify potential selection bias, the association between selected and non selected respondents by their background characteristics was examined. All respondents were observed at the time of entry into the observation period. The respondents, who had married before the start of the observation period, were not

[17] Selection bias arises when selected participants are systematically different from non-selected participants
[18] Attrition bias arises when the characteristics of the selected participants, who continue are systematically different from those who did not continue
[19] External validity is concerned with the generalization of the study findings
[20] Internal validity is concerned about the unbiased or valid estimate of the study findings

included in this study; thus they were considered as “non selected respondents”. The remainder of the respondents, who were unmarried at the beginning of the observation period, was considered as “selected respondents”.

In the KDSS during the period of 2000 to 2004, the total number of female respondents aged 15 to 19 years, was 2,936. Out of these 2,936 respondents, 370 (12.6 percent) respondents were considered as “non selected respondents” as they had already experienced marriage before starting of the observation period. The total number of pregnancies was 536 among 2,936 total respondents. Out of these, 207 pregnancies occurred before the start of the observation period. These comprised of 39 percent of the total pregnancy cases. More than half of the “non selected respondents” had the experience of pregnancy. The remaining 2,566 (87.4 percent) were selected as respondents of the study.

In the bivariate analysis (See Table D1 of the appendix D), it can be seen that the majority were within the age group of 15 and 16 years; 62 percent of the “non selected respondents” and 74 percent of the “selected respondents” were within this age group. Almost half of the “non selected respondents” did not have any education or had less than a primary level of education; whereas, half of the “selected respondents” had lower secondary level of education. This difference was statistically significant at 0.001 levels. Half of the “non selected respondents” were out of school and were not involved in any work and only less than two percent of the “non selected respondents” were in school; whereas, fifty five percent of the “selected respondents” were in school and only 15 percent of the “selected respondents” were not involved in any work.

A statistically significant difference was found at the 0.05 level for migration status. Almost 40 percent and 33 percent of the “non selected respondents” and “selected respondents” had migration experience respectively. There was a statistically significant difference at 0.001 levels between the two groups and smoking. Fourteen percent of the “non selected respondents” smoked, whereas less than two percent of the “selected respondents” smoked. About 11 percent and seven percent of the “non selected respondents” and “selected respondents” consumed alcohol respectively.

A statistically significant difference at the 0.001 levels was observed between different strata of residence. The highest proportions of the “non selected respondents” (54 percent) had lived in the upland stratum whereas the “selected respondents” were almost equally distributed among all five strata, with a slightly highest proportion (25 percent) in the urban/semi urban stratum. The majority (71 percent) of the “non selected respondents” belonged to poor households, while 48 percent of the “selected respondents” belonged to the average household economic status. Only six percent of the “non selected respondents” belonged to the rich household economic status, compared to 22 percent of the “selected respondents”.

Almost 18 percent of the “non selected respondents” and 30 percent of the “selected respondents” belonged to female headed households. Almost 90 percent of the “non selected respondents” belonged to a household where the head had either no education or a primary school level of education only. In contrast, 61 percent and 12 percent of the “selected respondents” were living in households where head of household had a primary school and post lower secondary level of education respectively.

Almost 70 percent of household heads of the “non selected respondents” were working in the agricultural sector compared to 55 percent of the “selected respondents”. There was no statistically significant difference in the two groups of respondents by family structure

In summary, this analysis documents that almost half of the pregnant adolescents were excluded from this study, as they became pregnant before the beginning of the observation period. Respondents who did not have any education or had less than a primary school level of education, who were out of school and were not involved in any work, who were living in the upland stratum, who were living in poor household economic status, were more likely to be excluded from the study because of left censoring than were their counterparts.

The analysis found that there are associations between selected and non selected respondents according to their background characteristics. The majority of socio-economic and demographic characteristics of the “selected respondents” were significantly different than those of the “non selected respondents”. This clearly indicates the potential presence of selection bias in this study. While there is no means

available to avoid this potential bias, care was taken in interpretation of the study finding.

3.10.2 Identification of Attrition Bias

In order to detect possible attrition bias, bivariate analysis was used to examine the relationship between selected respondents and selected non respondents by their background characteristics. All respondents were observed at the time of entry into the observation period. Initially, the respondents were selected according to the selection criteria that they should be unmarried at the start of observation. But many of these selected respondents disappeared from the study after having only one year of observation. As a result, temporal ordering of events can not be established for these respondents. They were therefore excluded from the final analysis. These groups of respondents were considered as “selected non respondents”. The rest of the selected respondents, who remain in the study and had two or more years of observation, were considered as “selected respondents”. In this discussion special focus is place on those characteristics that may be related to attrition bias.

The number of selected female respondents aged 15 to 19 years and unmarried was 2,566. Of these respondents, 1,116 (43.4 percent) respondents were considered as “selected non respondents” as they had only one year of observation. The remainder 1,450 (56.5 percent) were considered as “selected respondents”.

In the bivariate analysis (See Table D2 of the appendix D), it was found that 10 percent of the “selected non respondents” did not have any education or had less than a primary level of education. Only three percent of the “selected respondents” were in this category. Twenty two percent of the “selected non respondents” was out of school and was not involved in any work whereas only 10 percent of the “selected respondents” were in this category. Around 40 percent of “selected non respondents” were in school, compared to 67 percent of the “selected respondents”.

One-half of the “selected non respondents” had migration experience, compared to only 18 percent of “selected respondents”. There was a statistically significant difference between different categories of participants and family structure. More than the one-half (63 percent) of the “selected non respondents” lived in

extended families, whereas more than the half (54 percent) of the "selected respondents" lived in nuclear families.

In summary, this analysis demonstrated that many respondents who did not have any education or had less than primary education, who were out of school and were not involved in any work, who had migration experience and who lived in extended families moved out of the KDSS after having only one year of observation and hence from this study. The data suggests that migration was a major cause of attrition.

The report of KDSS also found that out-migration was more pronounced than in-migration and young adults aged 15-29 years were highly concentrated among these out-migrants. Though, more male than females had migration experience, both sexes were migrating. Work and marriage were common causes of migration (Institute for Population and Social Research, 2001; Guest & Punpuing, 2003; 2004; Guest & Jampaklay, 2005; Guest, et al., 2007). Another cause of migration was to seek education.

In conclusion, this bivariate analysis had documented that there is an association between "selected respondents" and "selected non respondents" by their background characteristics. Several socio-economic and demographic characteristics of the "selected non respondents" were significantly different than those of the "selected respondents". This clearly indicates the possible presence of attrition bias in this study. The potential presence of attrition bias requires caution in interpretation of the study findings.

CHAPTER IV

THE TIMING OF MARRIAGE

4.1 Introduction

This chapter presents findings related to the timing of marriage in three key sections. In the first section, descriptive analysis focuses on the background characteristics of the study population at the individual, household and community levels. In the second section, life table estimates of the proportion experiencing first marriage by background characteristics are displayed to describe how the timing of marriage varies by background characteristics. Finally, the findings of the discrete time logistic regression are presented to identify the predictors of the timing of first marriage and to estimate the net effect of each of the variable on the odds of the timing of marriage.

In this chapter, findings are based on those respondents who had at least two years of observation period; the values of independent variables thus are measured before the event occurs. The total number of respondents was 1,450. In descriptive analysis and life table analysis, characteristics of those who experience marriage are measured before the event occurred and for censored cases, characteristics are measured at the time of censoring, whereas in discrete time logistic regression, all characteristics are measured at the exact year of observation.

The study findings based on respondents who had at least one year of observation are presented in the Appendix C. The total number of these respondents was 2,566. Approximately one-half of these respondents were observed for only one year. As a result, temporal ordering of variables can not be established. In this case, the results are based on the value of variables at the time the event occurred.

4.2 Study Findings

4.2.1 Descriptive Analysis

The descriptive analysis summarizes the socio-economic and demographic characteristics of the study population by their marital status. Individuals are the unit

of analysis. Eighteen percent of the sample had experienced a first marriage by the end of observation.

At the individual level, the highest proportion (38.6 percent) of married respondents had completed lower secondary education; while the highest proportion of unmarried respondents (53.6 percent) had completed upper secondary or higher education. Twelve percent of the married respondents had either no education or less than primary education, whereas less than two percent of the unmarried respondents were in this education category.

Two thirds of the respondents who had not married were in school, whereas only 18 percent of the married respondents were in school before they married. Twenty eight percent of the married respondents were out of school and were not involved in any work before they married. This compares with only five percent of the respondents of this work status category who remained unmarried. The majority of the respondents who were out of school and working either in agriculture or non agricultural sector were married.

The majority (89.3 percent) of respondents who did not have any migration experience remained unmarried at the end of observation. Slightly less than half of the respondents who had migration experience were married; whereas only 11 percents of the respondents who remained unmarried had migration experience. A slightly higher proportion of the married compared to the unmarried consumed alcohol or tobacco.

Table 4.1 Percentage Distribution of Individual Characteristics by Marital Status

Individual Characteristics	Married	Unmarried	Total Number of cases
Education			
No education or less than primary education	11.6	1.6	49
Primary education	32.4	12.6	234
Lower secondary education	38.6	31.1	470
Upper secondary or higher education	15.4	53.6	678
Other	1.9	1.2	19

Table 4.1 Percentage Distribution of Individual Characteristics by Marital Status (Continued)

Individual Characteristics	Married	Unmarried	Total Number of cases
Work Status			
In school as a student and not working at all	18.5	75.2	944
Out of school and not involved in any work	28.2	4.6	128
Out of school and working in agricultural sector	30.1	11.7	217
Out of school and working in non-agricultural sector	23.2	8.5	161
Migration Experience			
No	55.6	89.3	1208
Yes	44.4	10.7	242
Smoking			
No	94.2	99.7	1432
Yes	5.8	0.3	18
Drinking			
No	89.2	94.0	1350
Yes	10.8	6.0	100
Total in percentage	100	100	
Total in number	259	1191	1450

The majority of the married respondents were living in the mixed economy and uplands strata, while the majority of the unmarried respondents were living in the urban/semi urban and mixed economy strata. Half of the respondents of both married and unmarried groups lived in households with an average economic status. Forty percent of the married respondents were living in households with a poor economic status before they married. Twenty percent of the unmarried respondents were living in households with a poor economic status. Around 30 percent of the unmarried

respondents were living in households with a rich economic status, while only 10 percent of the married respondents were living in rich household before they married. Around 60 percent of the married respondents were living in extended families before they married. More than half of the unmarried respondents were living in nuclear families during their adolescence years. There is no variation between married and unmarried respondents by the sex of household head. In both groups, almost two thirds of respondents were living in male headed households.

The majority of the married and unmarried respondents were living in households where the household heads had a primary school level of education. Less than one third of the married respondents were living in households where the household head had either no education or less than primary school level of education. This compares with only 12 percent of the unmarried respondents were living in household where the head had a low level of educations. Thirteen percent of the unmarried respondents were living in households where the household head had an upper secondary or higher level of education, compared to only four percent of married respondents.

In both married and unmarried groups, the majority of the respondents were living in households where the household head worked in the agricultural sector. One third of the unmarried respondents were living in households where household head worked in the non-agricultural sector.

Table 4.2 Percentage Distribution of Household and Community Characteristics by Marital Status

Background Characteristics	Married	Unmarried	Total Number of cases
Strata of Residence			
Urban/ Semi urban	15.8	25.4	343
Rice field	15.1	20.2	280
Plantation	20.1	17.2	257
Uplands	23.9	14.8	238
Mixed economy	25.1	22.4	332

Table 4.2 Percentage Distribution of Household and Community Characteristics by Marital Status (Continued)

Background Characteristics	Married	Unmarried	Total Number of cases
Household Wealth Index			
Poor	39.8	20.2	344
Average	50.2	51.0	738
Rich	10.1	28.7	368
Family Structure			
Nuclear	41.3	53.8	748
Extended	58.7	46.2	702
Sex of Head of Household			
Male	73.4	70.3	1027
Female	26.6	29.7	423
Education of Head of Household			
No education or less than primary education	27.0	12.2	215
Primary education	61.0	64.7	928
Lower secondary education	6.9	8.1	115
Upper secondary or higher education	4.2	13.4	170
Others	0.8	1.7	22
Occupation of Head of Household			
Not working	9.7	12.9	179
Working in agricultural sector	63.3	54.5	813
Working in non-agricultural sector	27.0	32.6	458
Total in percentage	100	100	
Total number	259	1191	1450

4.2.2 Findings of Life Table Analysis

Respondents who had either no education or less than a primary level of education were more likely to marry than those with higher levels of education. For this group of respondents, the probability of first marriage was highest at the age of 17 years, with a hazard rate of 0.45. Twenty five percent were married by the age of 16.34 years and around two thirds had married by the age of 19 years. The second highest probability of marriage was among female respondents who had a primary school education. Their probability of getting married was highest at the age of 18 years, with a hazard rate of 0.20. By the age of 17.15 years, 25 percent were married. In contrast, the hazard of marriage was lowest for women who had completed upper secondary or a higher level of education. Only 10 percent of these women had married by the age of 19 years. There was a statistically significant difference among educational groups in the timing of first marriage.

Females who were out of school were more likely to marry than those who were in school. The highest hazard of first marriage was found among female adolescents who were out of school and were not involved in any work. At the age of 16.45 years, 25 percent of this group had married. In contrast, the lowest hazard of first marriage was found for those adolescents who were in school and were not involved in any work. Only nine percent of them had married by the age of 19 years. By the age of 19 years, almost half of the respondents who were out of school and were working in either agricultural or non agricultural sectors had married. A statistically significant difference was found among work status groups in the timing of first marriage.

Migration experience has a significant effect on the hazard of first marriage. The marriage hazard was highest among the respondents who had migration experience. At the age of 16.84 years, 25 percent had married and by the age of 19 years, almost 60 percent were married. In contrast, only 17 percent of the respondents who did not have any migration experience were married by the age of 19 years with a low hazard rate of 0.04.

The hazard of marriage was highest among female respondents who consumed tobacco or alcohol. At the age of 16.17 years, 25 percent of those who smoked had married and by the age of 19 years more than two thirds were married. The marriage

hazard is lower among those who drink alcoholic beverage, with only 41 percent marrying by the age of 19 years. In both cases, the differences among groups were statistically significant. It is important to mention that the numbers of these cases are very small.

No statistically significant difference in the timing of first marriage was found between female adolescents who were living in a male headed household and those who were living in a female headed household. At the age of 18 years, 22 percent of female adolescent of both groups were married.

The education of the household head had a statistically significant relationship with the timing of first marriage. The hazard was highest among those who were living in a household where the household head did not have any education, or had less than a primary school level of education. By the age of 17.56 years, 25 percent of female teenagers of these households had married and almost half of them were married by the age of 19 years. The lowest hazard was found among the females living in a household where household head had an upper secondary or higher level of education. Only nine percent of the female adolescents living in these households had married at the age of 19 years.

If the respondents lived in a household where the household head worked in the agricultural sector, the hazard of first marriage was slightly higher than other two groups of respondents. This overall comparison was statistically significant at the 0.01 level. By the age of 19 years, 28 percent of the respondents in households where the household head was working in the agricultural sector had married. In comparison, 19 percent of those in households where the head was not working, and 21 percent of those living in household where the head was involved in the non-agricultural sector, had married.

A statistically significant difference in the timing of first marriage was observed for family structure. Female adolescents living in a nuclear family had a lower hazard of first marriage compared to those who had been living in an extended family. By the age of 18.6 years, 25 percent of those who have been living in an extended family had married, compared to 20 percent of the female adolescents who have been living in a nuclear family had married by the age of 19.

The hazard of marriage was highest among female adolescents who belonged to households with a poor economic status. At the age of 17.57 years, 25 percent of female adolescents living in households with poor economic conditions had married and by the age of 19 years, 40 percent of them were married. In contrast, only 11 percent of the female adolescents living in households with a rich economic status were married by the age of 19 years. The difference among groups is statistically significant.

The highest marriage hazard among strata was found for female respondents who were living in the upland stratum. By the age of 17.89 years, 25 percent had married. The second highest probability of getting married was found among those female respondents who were living in rice and plantation strata. By the age of 19 years, around one third had married. The lowest hazard of first marriage was found among female respondents who were living in urban/semi urban stratum. Only 17 percent of them had married by the age of 19 years.

Table 4.3 Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education ***												
No Education or less than Primary Education	14.29	46.03	57.51	65.74	65.74	0	0.153	0.454	0.238	0.214	16.34	49
Primary Education	7.69	22.93	37.18	41.54	41.54	0	0.080	0.179	0.203	0.071	17.15	234
Lower Secondary Education	5.32	12.9	24.85	32.50	35.64	0	0.054	0.083	0.147	0.107	18.02	470
Upper Secondary or Higher Education	0.15	0.59	4.0	8.08	10.34	0	0.001	0.004	0.034	0.043	20.00+	678
Other Education	5.26	16.75	16.75	34.27	34.27	0	0.054	0.129	0.0	0.235	18.47	19
Work Status ***												
In school as a student and not working	0.74	1.86	4.45	7.80	8.97	0	0.007	0.011	0.026	0.035	20.00+	944
Out of school and not involved in any work	13.28	39.10	59.24	63.53	63.53	0	0.142	0.349	0.396	0.111	16.45	128
Out of school and working in agricultural sector	8.76	18.76	33.34	41.09	43.31	0	0.091	0.116	0.197	0.123	17.43	217
Out of school and working in non-agricultural sector	5.59	20.41	34.16	43.24	47.61	0	0.057	0.170	0.189	0.148	17.33	161

Table 4.3 Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Migration Experience* **												
Never Migrated	2.4	6.13	11.64	15.37	16.86	0	0.024	0.039	0.060	0.043	20.00+	1208
Migrated	9.5	28.03	45.76	57.72	60.54	0	0.099	0.228	0.281	0.248	16.84	242
Smoking ***												
No	3.42	9.06	16.69	21.75	23.60	0	0.034	0.060	0.087	0.062	20.00+	1432
Yes	16.67	66.67	72.22	84.57	84.57	0	0.181	0.857	0.181	0.571	16.17	18
Drinking **												
No	3.48	9.15	16.77	21.97	23.26	0	0.035	0.060	0.087	0.064	20.00+	1350
Yes	5.00	18.57	26.09	32.61	41.03	0	0.051	0.153	0.096	0.092	17.86	100
Sex of Head of Household												
Male Head of Household	3.89	10.60	17.97	22.84	25.29	0	0.039	0.072	0.086	0.061	19.88	1027
Female Head of Household	2.84	7.83	16.07	22.48	22.48	0	0.028	0.052	0.093	0.079	20.00+	423

Table 4.3 Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education of Head of Household ***												
No Education or less than Primary Education	5.58	18.76	29.86	39.82	42.62	0	0.057	0.150	0.146	0.152	17.56	215
Primary Education	3.23	9.09	16.60	21.56	23.42	0	0.032	0.062	0.086	0.061	20.00+	928
Lower Secondary Education	6.09	8.82	16.90	19.09	19.09	0	0.062	0.029	0.092	0.026	20.00+	115
Upper Secondary or Higher Education	0.59	3.05	7.04	8.66	8.66	0	0.005	0.025	0.042	0.017	20.00+	170
Other Education	9.09	9.09	9.09	9.09	9.09	0	0.095	0	0	0	20.00+	22
Occupation of Head of Household **												
Not involved in any work	1.12	5.24	14.75	18.72	18.72	0	0.011	0.042	0.105	0.047	20.00+	179
Agricultural work	5.17	12.11	19.87	24.43	27.64	0	0.053	0.075	0.092	0.058	19.18	813
Non agricultural work	1.75	7.47	14.07	21.21	21.21	0	0.017	0.060	0.074	0.087	20.00+	458
Family Structure ***												
Nuclear Family	2.54	8.29	13.57	18.26	20.50	0	0.025	0.060	0.059	0.056	20.00+	748
Extended Family	4.70	11.40	21.44	27.39	28.69	0	0.048	0.072	0.120	0.078	18.60	702

Table 4.3 Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Household Wealth Index ***												
Poor	5.52	18.20	30.16	37.34	39.58	0	0.056	0.143	0.157	0.108	17.57	344
Average	3.66	9.15	17.43	21.80	24.21	0	0.037	0.058	0.095	0.054	20.00+	738
Rich	1.63	3.34	5.50	10.79	10.79	0	0.016	0.017	0.022	0.057	20.00+	368
Strata of Residence ***												
Urban/Semi Urban	1.46	4.81	11.36	16.97	16.97	0	0.014	0.034	0.071	0.065	20.00+	343
Rice	1.79	7.38	12.59	18.17	26.15	0	0.018	0.059	0.058	0.066	19.86	280
Plantation	7.00	14.41	20.07	23.62	26.67	0	0.072	0.082	0.068	0.045	19.45	257
Uplands	5.04	15.52	26.21	32.04	32.04	0	0.052	0.117	0.135	0.082	17.89	238
Mixed Economy	3.61	9.30	19.15	24.83	24.83	0	0.036	0.060	0.114	0.072	20.00+	332
Total number of cases												1450

* P<0.05 ** P<0.01 *** P<0.001

[1] Characteristics of those who experience marriage are measured before the event occurred and for censored cases, characteristics are measured at the time of censoring.

4.2.3 Findings of Discrete Time Logistic Regression

The findings of the discrete time logistic regression are presented in three models. Model 1 includes socio-economic status variables, model 2 includes characteristics of the household heads and model 3 includes all individual characteristics.

In model 1, strata of residence had a statistically significant relationship with the odds of marriage. The odds of marriage were almost 40 percent less among respondents living in the urban/semi urban and rice field strata compared to respondents living in the mixed economy stratum. This significant relationship was maintained after controlling for the household heads' characteristics, but disappeared after controlling for the individual characteristics. A statistically significant relationship was found between the odds of marriage and family structure. In all three models, the odds of marriage were almost 75 percent less for respondents living in a nuclear family compared to those living in an extended family. This significant relationship remained after controlling for the characteristics of the household heads and individual characteristics.

Model 1 found a statistically significant relationship between household wealth index and the odds of marriage. This relationship remained after controlling the characteristics of the household heads. But it disappeared in the model 3 after controlling the individuals' characteristics. Both in the model 1 and 2, the odds of marriage were three times and two times higher among respondents living in households with poor economic and average economic conditions respectively compared to those living in households with rich economic conditions. This suggests that the effects of household wealth on the timing of marriage work mainly through individual characteristics.

No statistically significant relationship between the characteristics of household heads, especially their sex and occupation, with the odds of marriage was found. The education of the household head had a statistically significant relationship with the odds of marriage. In model 2, the odds of marriage were almost three times higher among respondents living in households where the household head had either a lower secondary level of education or less compared to those living in households where the heads had an upper secondary or higher level of education. But this

significant relationship was not found after controlling the individual characteristics. Again this indicates that the effect was primarily a result of the association between the education of household head and the characteristics of the female adolescent respondents.

In this study, no statistically significant relationship between the age and education of the respondents with the odds of marriage was observed. Work status was strongly related to the odds of marriage. In the final model, the odds of marriage was 96 percent lower among those who were in school as a student and were not working compared to those who were out of school and were working in the non agricultural sector. The odds of marriage was two times higher among those who were out of school and were not involved in any work compared to those out of school and working in the non agricultural sector.

In the final model, migration experience had a significant relationship with the odds of marriage. The odds of marriage were 79 percent less among those who did not have migration experience compared to those who had migration experience. Substance use had a significant relationship with the odds of marriage. In model 3, the odds of marriage were 65 percent lower among those who did not smoke compared to those who smoked and the odds of marriage were almost 50 percent less among those who did not drink alcohol compared to those did drink alcohol. All three models were statistically significant, with a significant increase value of the model chi square and a decreasing value of the log likelihood over each successive model.

Table 4.4 Odds Ratios of First Marriage by Socio-Economic and Demographic Predictors

Socio-Economic and Demographic Predictors	Odds Ratio (S.E)	Odds Ratio (S.E)	Odds Ratio (S.E)
	Model 1	Model 2	Model 3
Strata of Residence			
Urban/ Semi Urban	0.57 (0.221)*	0.61 (0.228) *	0.62 (0.260)
Rice Field	0.65 (0.210)*	0.65 (0.211) *	0.89 (0.242)
Plantation	1.08 (0.197)	1.06 (0.198)	0.83(0.223)
Uplands	1.08 (0.198)	1.03 (0.205)	0.79 (0.242)
Mixed Economy ®			
Family Structure			
Nuclear Family	0.23 (0.158) ***	0.22 (0.161) ***	0.26 (0.186) ***
Extended Family ®			
Household Wealth Index			
Poor	3.26 (0.229) ***	2.98 (0.241) ***	1.16 (0.281)
Average	2.02 (0.207) **	1.87 (0.212) **	1.27 (0.241)
Rich ®			
Sex of Head of Household			
Male Head of Household		1.09 (0.151)	0.98 (0.172)
Female Head of Household ®			
Education of Head of Household			
No Education or less than Primary Education		2.67 (0.357) **	1.04 (0.402)
Primary Education		2.17 (0.329) *	1.28 (0.369)
Lower Secondary Education		3.29 (0.382) **	2.26 (0.441)
Others Education		1.01 (0.793)	0.88 (0.881)
Upper Secondary or Higher education ®			
Occupation of Head of household			
Not doing any economical work		0.72 (0.231)	0.74 (0.267)
Working in agricultural sector		0.91 (0.167)	0.84 (0.203)
Working in non-agricultural sector ®			

Table 4.4 Odds Ratios of First Marriage by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E)	Odds Ratio (S.E)	Odds Ratio (S.E)
	Model 1	Model 2	Model 3
Age at time of the Survey			
15-16 years			0.78 (0.159)
17-19 years ®			
Education			
No Education or less than Primary Education			2.04 (0.379)
Primary Education			0.79 (0.240)
Lower Secondary Education			1.02 (0.229)
Others Education			0.46 (0.685)
Upper Secondary or Higher education ®			
Work Status			
Out of school and not involved in any economical work			1.94 (0.208) **
In school as a student and not working at all			0.04 (0.353) ***
Out of school and working in agricultural sector			1.17 (0.223)
Out of school and working in non-agricultural sector ®)			
Migration Experience			
No			0.21*** (0.159)
Yes ®			
Smoking			
No			0.35* (0.497)
Yes ®			
Drinking			
No			0.54* (0.280)
Yes ®			
Constant	0.073 (0.213) ***	0.038 (0.379) ***	2.57 (0.690)
Model Chi square	158.309***	174.835***	659.114***
-2 Log likelihood	1728.511	1711.985	1227.705

Note: ® reference category and number within brackets refer to standard error.

* P<0.05 ** P<0.01 *** P<0.001

4.3 Summary of Study Findings

In this study, the findings of the life table analysis and discrete time logistic regression support each other. In the final model of logistic regression, a statistically significant relationship was found between the odds of marriage and work status, migration experience, substance use and family structure. These significant relationships were also found in the life table analysis. In addition, life table analysis found statistically significant relationships in timing of first marriage by education, strata of residence, household wealth index, education and occupation of household head. Thus, this study found that risk of teenage marriage was lower among those female adolescents who were able to overcome the socio-economic barrier to continue their education. Hence, the findings of this study support first two hypotheses related to timing of first marriage.

CHAPTER V

THE TIMING OF PREGNANCY

5.1 Introduction

This chapter presents findings related to the timing of pregnancy in three key sections. The background characteristics of the study population at the individual, household and community levels are described in the first section. In the second section, life table estimates of the proportion experiencing first pregnancy by socio-economic and demographic characteristics are presented. Finally, the findings of the discrete time logistic regression are presented to identify the predictors of the timing of first pregnancy and to estimate the net effect of each of the variable on the odds of the timing of pregnancy.

This chapter focuses on the 1,450 respondents who had at least two years of observation and hence the values of the independent variables are measured before the event occurs. In descriptive analysis and life table analysis, characteristics of those who experience pregnancy are measured before the event occurred and for censored cases, characteristics are measured at the time of censoring, whereas in discrete time logistic regression, all characteristics are measured at the exact year of observation.

The study findings based on the 2,566 respondents who had at least one year of observation are presented in the Appendix C. For these respondents the value of independent variables are measured at the time of event occurred.

5.2 Study Findings

5.2.1 Descriptive Analysis

The socio-economic and demographic characteristics of the study population are summarized by their pregnancy status. Eleven percent of the sample had experienced a first pregnancy by the end of observation period. At the individual level, the highest proportion (39.1 percent) of the adolescents who had experienced a pregnancy had completed lower secondary education before they become pregnant, while the highest

proportion (51 percent) of the adolescents who had not experienced a pregnancy had completed either an upper secondary or higher level of education.

Sixteen percent of the respondents who had experienced a pregnancy had either no education or less than a primary school level of education, while only two percent of the respondents who had not been pregnant were in this education category. Almost two thirds (71 percent) of the respondents who had not been pregnant were in school in comparison to only 16 percent of the adolescents who had been pregnant. One third of the young women who had experienced a pregnancy were out of school and was not involved in any work before they become pregnant; whereas only five percent of the respondents who had not been pregnant were in this work status category. A higher proportion of the respondents who were out of school and working either in agricultural (24 percent) or in non agricultural sector (26 percent) had experienced a pregnancy.

The majority (87 percent) of respondents who did not have any migration experience had not had a pregnancy by the end of observation period. Slightly less than half (42 percent) of the respondents who had migration experience had experienced a pregnancy. A slightly higher proportion of adolescents, who had been pregnant, compared to those who had not been pregnant, consumed alcohol or tobacco. Nine percent and 13 percent of the adolescents who had been pregnant consumed tobacco and alcohol respectively. More than half (68 percent) of the respondents who had experienced a pregnancy were exposed to sexual relationship before marriage. It is important to mention that experience of premarital sex was measured in an indirect way. Thus, this study could not identify those respondents who had pre marital sexual exposure but did not become pregnant.

More than half of the respondents who had been pregnant did not use contraceptive before pregnancy. The study also found that 21 percent of the adolescents who had been pregnant had experience of contraceptive method failure and two thirds of respondents who had been pregnant discontinued contraceptive use before becoming pregnant. It is also necessary to mention that the majority (93 percent) of respondents who had not experienced a pregnancy and who did not use contraceptives were unmarried.

Table 5.1 Percentage Distribution of Individual Characteristics by First Pregnancy Status

Individual Characteristics	Non Pregnant	Pregnant	Total Number of cases
Education			
No education or less than primary education	1.9	15.5	50
Primary education	14.3	32.3	236
Lower secondary education	31.6	39.1	470
Upper secondary or higher education	51.0	11.2	675
Other	1.2	1.9	19
Work Status			
Out of school and not involved in any work	5.4	34.2	125
In school as a student and not working at all	70.8	16.1	938
Out of school and working in agricultural sector	14.1	24.2	221
Out of school and working in non-agricultural sector	9.7	25.5	166
Migration Experience			
No	86.6	58.4	1210
Yes	13.4	41.6	240
Smoking			
No	99.6	90.7	1430
Yes	0.4	9.3	20
Drinking			
No	93.7	87.0	1348
Yes	6.3	13.0	102

Table 5.1 Percentage Distribution of Individual Characteristics by First Pregnancy Status (Continued)

Individual Characteristics	Non Pregnant	Pregnant	Total Number of cases
Experience of Pre Marital Sex			
No	100	32.3	1341
Yes	0	67.7	109
Contraceptive Use			
Not Used	93.5	55.3	1294
Used	6.5	44.7	156
Pattern of Contraceptive Use			
Did not use FP method at all	92.8	5.6	1205
FP method used but failed	0	21.1	34
FP method discontinued due to other causes	1.6	72.0	136
Effective use of FP method	5.7	1.2	75
Total in Percentage	100	100	
Total in Number	1289	161	1450

The majority of the respondents who had experienced a pregnancy were living in the upland stratum, while the majority of the respondents who had not been pregnant were living in the urban/semi urban and mixed economy strata. Half of the respondents of both pregnant and non-pregnant groups lived in households with an average economic status. Forty three percent of the respondents who had been pregnant were living in households with a poor economic status before they become pregnant. Twenty seven percent of the respondents who had not been pregnant were living in households with a rich economic status, compared with only 10 percent of the respondents who had been pregnant. Around 62 percent of the respondents who had experienced a pregnancy were living in extended families, while more than half of the respondents who had not been pregnant were living in nuclear families.

There is no variation between respondents by whether they had been pregnant or not by the sex of the household head. In both groups, two thirds of respondents were living in male headed households. The majority of the pregnant and non-pregnant respondents were living in households where the household head had a primary school level of education. One third of respondents who had been pregnant were living in households where the head had either no education or less than a primary school level of education. Thirteen percent of the respondents who had never been pregnant were living in households where the household head had an upper secondary or higher level of education, compared to only six percent of respondents who had experienced a pregnancy. In both groups, more than half of the respondents were living in households where the household head worked in the agricultural sector.

Table 5.2 Percentage Distribution of Household and Community Characteristics by First Pregnancy Status

Background Characteristics	Non Pregnant	Pregnant	Total Number of cases
Strata of Residence			
Urban/ Semi urban	24.4	18.0	343
Rice field	20.1	13.7	281
Plantation	17.5	19.9	257
Uplands	15.0	28.6	239
Mixed economy	23.1	19.9	330
Household Wealth Index			
Poor	21.6	42.9	347
Average	51.2	47.2	736
Rich	27.2	9.9	367

Table 5.2 Percentage Distributions of Household and Community Characteristics by First Pregnancy Status (Continued)

Background Characteristics	Non Pregnant	Pregnant	Total Number of cases
Family Structure			
Nuclear	52.6	38.5	740
Extended	47.4	61.5	710
Sex of Head of Household			
Male	70.1	76.4	1027
Female	29.9	23.6	423
Education of Head of Household			
No education or less than primary education	12.9	32.3	218
Primary education	64.9	55.3	926
Lower secondary education	8.0	5.6	112
Upper secondary or higher education	12.6	6.2	173
Others	1.6	0.6	21
Occupation of Head of Household			
Not working	12.8	7.5	177
Working in agricultural sector	55.1	58.4	804
Working in non-agricultural sector	32.1	34.2	469
Total in percentage	100	100	
Total number	1289	161	1450

5.2.2 Findings of Life Table Analysis

Respondents, who had either no education or less than a primary level of education, were more likely to be have been pregnant than those with higher levels of education. Twenty five percent were pregnant by the age of 17.30 years and 64 percent had pregnant by the age of 19 years. The second highest probability of being pregnant was among female respondents who had a primary school education. Their probability of being pregnant was highest at the age of 18 years, with a hazard rate of 0.12. By the age of 19 years, 36 percent of them had been pregnant. In contrast, the pregnancy hazard was lowest for women who had completed upper secondary or a higher level of education. Only six percent of these women had been pregnant by the age of 19 years. There was a statistically significant difference among educational groups in the timing of first pregnancy.

Female adolescents who were out of school were more likely to be have been pregnant than those who were in school. The highest hazard of first pregnancy was found among female adolescents who were out of school and were not involved in any work. At the age of 17.40 years, 25 percent of this group had experienced a pregnancy. In contrast, the lowest hazard of first pregnancy was found for those adolescents who were in school and were not involved in any work. Only four percent of them had been pregnant by the age of 19 years. A statistically significant difference was found among work status groups in the timing of first pregnancy.

Migration experience has a significant effect on the hazard of first pregnancy. The pregnancy hazard was highest among the respondents who had migration experience. At the age of 17.97 years, 25 percent had become pregnant and by the age of 19 years, almost half of them had been pregnant. In contrast, only 16 percent of the respondents who did not have any migration experience had experienced a pregnancy by the age of 19 years, with a low hazard rate of 0.05.

The hazard of pregnancy was highest among female respondents who consumed tobacco or alcohol. At the age of 16.80 years, 25 percent of those who smoked had been pregnant and by the age of 19 years more than two thirds had been pregnant. The pregnancy hazard was lower among those who consumed alcohol than those who smoked, with only 40 percent were pregnant by the age of 19 years. In both cases, the

differences among groups were statistically significant. It is important to mention that the numbers of these cases are very small.

No statistically significant difference in the timing of first pregnancy was found between female adolescents who were living in a male headed household and those who were living in a female headed household. At the age of 19 years, only 21 percent of female adolescents of both groups had experienced a pregnancy.

The education of the household head had a statistically significant relationship with the timing of first pregnancy. The hazard was highest among those who were living in a household where the household head did not have any education, or had less than a primary school level of education. By the age of 18.64 years, 25 percent of female teenagers of these household had been pregnant and 40 percent of them were pregnant by the age of 19 years. The lowest hazard was found among females living in a household where household head had an upper secondary or a higher level of education. Only 10 percent of these female adolescents had experienced a pregnancy at the age of 19 years. The second lowest hazard was found among females living in a household where the household head had a lower secondary level of education. Only 12 percent of these respondents had been pregnant at the age of 19 years, with a low hazard rate of 0.07.

No statistically significant difference in the timing of first pregnancy by the occupation of the household head was found. By the age of 19 years, only 22 percent of the respondents in households where the household heads were working in the agricultural sector had been pregnant in comparison to 18 percent of those in households where the heads were not working and 21 percent of those living in household where the heads were involved in the non-agricultural sector.

A statistically significant difference in the timing of first pregnancy was found for family structure. Female adolescents living in a nuclear family had a lower hazard of first pregnancy compared to those who had been living in an extended family. By the age of 19 years, 27 percent of those who had been living in an extended family had experienced a pregnancy compared to 15 percent for women who had lived in a nuclear family.

The hazard of pregnancy was highest among female adolescents who lived in household with poor economic status. At the age of 18.93 years, 25 percent of female

adolescents living in households with poor economic conditions had been pregnant and by the age of 19 years, around 40 percent had experienced a pregnancy. In contrast, only nine percent of adolescents who had been living in household with a rich economic status had been pregnant by the age of 19 years. The difference among household wealth index groups is statistically significant.

The highest pregnancy hazard among strata was found for female adolescents who were living in the upland stratum. By the age of 19 years, around 40 percent of them had been pregnant, whereas the lowest hazard of first pregnancy was found among female respondents who were living in the mixed economy sector. Only 15 percent of them had been pregnant by the age of 19 years.

The hazard of pregnancy was highest among female respondents who had sexual exposure before pregnancy. At the age of 16.87 years, 25 percent of them were pregnant, while 10 percent of female respondents without having any pre marital sexual experience had experienced pregnancy by the age of 19 years. Contraceptive use before pregnancy has a significant effect on the hazard of first pregnancy. The pregnancy hazard was highest among the respondents who did not use contraceptives before pregnancy. At the age of 17.65 years, 25 percent of adolescents had been pregnant and by the age of 19 years, around 65 percent of them had experienced a pregnancy. In contrast, only 12 percent of female respondents, who used family planning methods, had been pregnant by the age of 19 years.

The pattern of contraceptive use also had a significant effect on the hazard of first pregnancy. The pregnancy hazard was highest among the respondents who faced contraceptive method failure. At the age of 16.79 years, 25 percent of them had been pregnant. The second highest pregnancy hazard was found among the respondents who discontinued family planning methods due to many other causes. At the age of 16.99 years, 25 percent of them had experienced a pregnancy. In contrast, only four percent of female respondents, who were using contraceptive method effectively, had become pregnant by the age of 19 years.

Table 5.3 Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education ***												
No Education or less than Primary Education	6.0	20.46	35.72	48.32	63.82	0.0	0.061	0.166	0.212	0.217	17.30	50
Primary Education	1.27	7.47	18.26	26.24	36.24	0.0	0.012	0.064	0.123	0.102	18.84	236
Lower Secondary Education	0.85	5.36	13.90	23.85	31.72	0.0	0.008	0.046	0.094	0.122	19.15	470
Upper Secondary or Higher Education	0.0	0.0	1.71	3.47	5.72	0.0	0.0	0.0	0.017	0.018	20.00+	675
Other Education	0.0	5.71	12.45	21.66	21.66	0.0	0.0	0.058	0.074	0.111	20.00+	19
Work Status ***												
Out of school and not involved in any work	3.2	20.57	45.61	48.43	55.31	0.0	0.032	0.197	0.374	0.053	17.40	125
In school as a student and not working	0.32	0.88	2.48	4.46	4.46	0.0	0.003	0.005	0.0163	0.020	20.00+	938
Out of school and working in agricultural sector	0.90	4.18	10.58	20.48	30.67	0.0	0.009	0.033	0.069	0.117	19.44	221
Out of school and working in non-agricultural sector	0.60	5.59	15.24	28.43	44.34	0.0	0.006	0.051	0.107	0.168	18.74	166

Table 5.3 Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Migration Experience* **												
Never Migrate	0.58	2.49	5.93	10.86	15.68	0.0	0.005	0.019	0.035	0.053	20.00+	1210
Migrated	1.25	9.48	25.56	33.09	45.04	0.0	0.012	0.087	0.195	0.106	17.97	240
Smoking ***												
No	0.63	3.27	8.62	13.70	19.30	0.0	0.006	0.026	0.056	0.057	20.00+	1430
Yes	5.00	30.00	50.00	66.70	85.71	0.0	0.0513	0.303	0.333	0.400	16.80	20.0
Drink alcohol **												
No	0.67	3.47	8.66	13.86	19.72	0.0	0.006	0.028	0.055	0.058	20.00+	1348
Yes	0.98	6.11	17.08	25.27	39.51	0.0	0.009	0.053	0.124	0.104	18.97	102
Sex of Head of Household												
Male Head of Household	0.97	4.53	10.51	15.24	21.18	0.0	0.009	0.036	0.064	0.054	20.00+	1027
Female Head of Household	0.0	1.50	6.20	13.46	21.42	0.0	0.0	0.015	0.048	0.080	20.00+	423

Table 5.3 Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education of Head of Household ***												
No Education or less than Primary Education	1.38	7.12	18.41	28.67	40.55	0.0	0.013	0.060	0.129	0.134	18.64	218
Primary Education	0.54	3.03	8.45	12.34	18.39	0.0	0.005	0.025	0.057	0.043	20.00+	926
Lower Secondary Education	0.89	3.71	6.09	12.49	12.49	0.0	0.009	0.028	0.025	0.070	20.00+	112
Upper Secondary or Higher Education	0.58	2.39	3.95	10.00	10.00	0.0	0.005	0.018	0.016	0.065	20.00+	173
Other Education	0.0	5.13	5.13	5.13	5.13	0.0	0.0	0.052	0.0	0.0	20.00+	21
Occupation of Head of Household												
Not involved in any work	0.0	0.60	5.01	8.86	17.76	0.0	0.0	0.006	0.045	0.041	20.00+	177
Agricultural work	1.0	4.64	10.22	14.41	22.24	0.0	0.010	0.037	0.060	0.047	20.00+	804
Non agricultural work	0.43	3.11	9.23	17.39	20.73	0.0	0.004	0.027	0.065	0.094	20.00+	469
Family Structure **												
Nuclear Family	0.68	3.37	6.73	11.34	15.56	0.0	0.006	0.027	0.035	0.050	20.00+	740
Extended Family	0.70	3.94	11.85	18.12	27.04	0.0	0.007	0.033	0.085	0.073	19.77	710

Table 5.3 Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
F												
Poor	1.44	6.65	14.95	25.81	38.47	0.0	0.014	0.054	0.093	0.136	18.93	347
Average	0.54	3.37	9.58	13.22	17.65	0.0	0.005	0.028	0.066	0.041	20.00+	736
Rich	0.27	1.41	3.22	6.53	8.99	0.0	0.002	0.011	0.018	0.034	20.00+	367
Strata of Residence **												
Urban/Semi Urban	0.87	3.01	6.10	11.58	18.56	0.0	0.008	0.021	0.032	0.060	20.00+	343
Rice Field	0.36	2.58	8.16	9.06	16.33	0.0	0.003	0.022	0.059	0.009	20.00+	281
Plantation	0.39	4.50	10.63	17.70	20.87	0.0	0.003	0.042	0.066	0.082	20.00+	257
Uplands	1.26	6.94	14.40	24.21	38.25	0.0	0.012	0.059	0.083	0.121	19.06	239
Mixed Economy	0.61	2.20	8.63	12.94	15.03	0.0	0.006	0.016	0.068	0.048	20.00+	330
Experience of Pre Marital Sex**												
No experience	0.22	1.63	3.89	6.49	10.83	0.0	0.002	0.014	0.023	0.027	20.00+	1341
Yes, have experience	6.42	27.73	65.77	87.50	97.12	0.0	0.066	0.257	0.714	0.930	16.87	109

Table 5.3 Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Family Planning Use ***												
Not used	2.56	13.61	31.02	47.47	64.62	0.0	0.026	0.120	0.224	0.270	17.65	1294
Used	0.46	2.41	6.29	9.24	12.14	0.0	0.004	0.019	0.040	0.034	20.00+	156
Pattern of Contraceptive Use ***												
Did not use FP method at all	0.08	0.61	0.83	0.83	0.83	0.0	0.000	0.005	0.002	0.000	20.00+	1205
FP method used but experienced failure	8.82	29.41	82.35	97.06	100	0.0	0.092	0.254	1.20	1.42	16.79	34
FP method discontinued due to other causes	4.41	25.16	57.07	80.56	93.52	0.0	0.045	0.243	0.541	0.753	16.99	136
Effective use of FP method	0.0	0.0	1.54	3.86	3.86	0.0	0.0	0.0	0.015	0.023	20.00+	75
Total number of cases												1450

* P<0.05 ** P<0.01 *** P<0.001

[1] Characteristics of those who experience pregnancy are measured before the event occurred and for censored cases characteristics are measured at the time of censoring

5.2.3 Findings of Discrete Time Logistic Regression

The findings of the discrete time logistic regression are presented in three models. Model 1 includes socio-economic status variables, model 2 includes characteristics of the household head and model 3 includes all individual characteristics.

In all three models, strata of residence had no statistically significant relationship with the odds of pregnancy. A statistically significant relationship was found between the odds of pregnancy and family structure. In model 1, the odds of pregnancy were almost 81 percent less for respondents living in nuclear families compared to those living in extended families. This significant relationship remained after controlling for the characteristics of the household head and individual characteristics. In model 3, the odds of pregnancy was almost 73 percent less for respondents living in nuclear families compared to those living in extended families.

In Model 1, there is a statistically significant relationship between the household wealth index and the odds of pregnancy. This relationship remained after controlling the characteristics of the household head. But it disappeared in model 3 after controlling for individual characteristics. Both in model 1 and 2, the odds of pregnancy were almost 2.5 times higher among respondents living in households with poor economic conditions compared to those living in households with rich economic conditions. This suggests that the effects of household wealth on the timing of pregnancy mainly work through individual characteristics.

No statistically significant relationship between the characteristics of household heads, especially their sex and occupation, with the odds of pregnancy was observed. The education of the household head had a statistically significant relationship with the odds of pregnancy. In model 2, the odds of pregnancy were almost three times higher among respondents living in households where the household head had either no education or less than a primary education compared to those living in households where the heads had an upper secondary or a higher level of education. But this significant relationship was not found after controlling for individual characteristics in Model 3. Again this indicates that the effect was primarily a result of the association between the education of household head and the characteristics of the female adolescent respondents.

A statistically significant relationship was observed between the respondents' age at the time of the survey with the odds of pregnancy. In the final model, the odds of pregnancy were almost 40 percent less for respondents aged 15-16 years compared to those aged 17-19 years. Completed education level has no statistically significant relationship with the odds of pregnancy.

Work status was strongly related to the odds of pregnancy. In the final model, the odds of pregnancy was 93 percent lower among those who were in school and were not working compared to those who were out of school and were working in the non agricultural sector. The odds of pregnancy was six times higher among those who were out of school and were not involved in any work compared to those out of school and working in the non agricultural sector.

In the final model, migration experience also had a significant relationship with the odds of pregnancy. The odds of pregnancy were 60 percent less among those who did not have migration experience compared to those who had migration experience. Substance use had a significant relationship with the odds of pregnancy. In model 3, the odds of pregnancy were 77 percent lower among those who did not smoke compared to those who smoked and were also 76 percent lower among those who did not drink alcohol compared to those who drink alcohol. The odds of pregnancy were almost 11 times higher among those who did not use contraceptive methods compared to those who used it.

All three models were statistically significant, with a significant increase value of the model chi square and a decreasing value of the log likelihood over each successive model.

5.3 Summary of Study Findings

The findings of the life table analysis and discrete time logistic regression support each other. In the final model of the logistic regression, a statistically significant relationship was found between the odds of pregnancy and age at the time of entry into survey, work status, migration experience, substance use, family structure and contraceptive use. These significant relationships were also found in the life table analysis. In addition, life table analysis found statistically significant relationships in the timing of first pregnancy by education, strata of residence, household wealth index, education and occupation of household head. Thus, we can suggest that risk of teenage pregnancy was lower among those female adolescents who were able to overcome the socio-economic barrier to continue their education. Hence, the findings of this study support last two hypotheses related to timing of first pregnancy.

Table 5.4 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Strata of Residence			
Urban/ Semi Urban	0.70 (0.280)	0.71(0.288)	1.07(0.345)
Rice	0.70 (0.280)	0.70 (0.281)	0.85 (0.347)
Plantation	1.31 (0.254)	1.25 (0.256)	0.96 (0.317)
Uplands	1.59 (0.246)	1.45 (0.256)	1.11(0.331)
Mixed Economy ®			
Family Structure			
Nuclear Family	0.19 (0.213)***	0.18 (0.216)***	0.27(0.270)***
Extended Family ®			

Table 5.4 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Household Wealth Index			
Poor	2.66(0.277)***	2.52(0.294)**	1.16 (0.373)
Average	1.62 (0.252)	1.52(0.259)	1.14 (0.319)
Rich ®			
Education of Head of Household			
No Education or less than Primary Education		2.79(0.422)*	0.86 (0.518)
Primary Education		2.01(0.389)	0.829 (0.474)
Lower Secondary Education		1.87 (0.49)	0.522 (0.623)
Others Education		2.22 (0.71)	1.26 (1.019)
Upper Secondary or Higher education ®			
Sex of Head of Household			
Male		1.22 (0.189)	1.14 (0.237)
Female ®			
Occupation of Head of household			
Not working		0.68 (0.276)	0.70 (0.342)
Working in agricultural sector		0.68 (0.205)	0.65 (0.263)
Working in non-agricultural sector ®			
Completed Education			
No Education or less than Primary Education			2.17(0.511)
Primary Education			1.19 (0.330)
Lower Secondary Education			1.29 (0.320)
Others Education			1.51 (0.729)
Upper Secondary or Higher education ®			

Table 5.4 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Age at time of the Survey			
15-16 years			0.60 (0.226)*
17-19 years ®			
Work Status			
Out of school and not involved in any work			5.97(0.287)***
In school as a student and not working at all			0.07(0.588)***
Out of school and working in agricultural sector			0.92 (0.341)
Out of school and working in non-agricultural sector ®)			
Migration Experience			
No			0.40(0.224)***
Yes ®			
Smoking			
No			0.23(0.586)*
Yes ®			
Drinking			
No			0.24(0.472)**
Yes ®			
Contraceptive Use			
No			10.64(0.237)***
Yes ®			
Constant	0.045***	0.027***	0.599
Model Chi square	117.676***	128.137***	606.408***
-2 Log likelihood	1206.316	1195.855	717.584

Note: ® reference category and number within brackets refer to standard error.

* P<0.05 ** P<0.01 *** P<0.001

CHAPTER VI

DISCUSSION, CONCLUSION AND RECOMMENDATION

6.1 Introduction

In Thailand, a rising age at first marriage, an increasing proportion of never married women and below replacement fertility level camouflage the existence of marriage and pregnancy among female teenagers. However, regionally Thailand has relatively the highest levels of adolescent marriage and pregnancy. In order to understand the factors contributing to early marriage and pregnancy, it is important to investigate the timing of these events by using longitudinal analysis. This helps to identify when individuals are at the highest risk of having an event. The study used event history analysis to examine the timing of first marriage and first pregnancy among Thai female teenagers. This section focuses on discussion of the study findings, followed by the conclusion. At the end of the chapter, recommendations for policy and for further research are provided.

6.2 Discussion

Until 2006, the legal age of marriage in Thailand was 17 years. At this age, an individual obtains social and legal rights to marry. In 2006, the legal age of marriage increased to 20 years (Wimolsiri, 2006, cited in International Planned Parenthood Federations, 2006). Teenage marriage and pregnancy have major negative consequences that can alter the future life of young women. Early transition to marriage limits female adolescents' educational achievements and consequently affects their employment opportunities and income.

A pregnancy can be a traumatic incident when it happens during the teenage years and puts the prematurely developed reproductive organs in a stressful situation. Most components of the female reproductive health system, such as uterus, cervix, ovaries and vagina complete their physical growth and reach functional maturity by the age of 20 years. During this time, the physical developmental process is occurring

due to the influence of rapid hormonal changes. Hence, the adolescent body remains reproductively more immature than that of adults (Lowdermilk & Perry, 2000).

This study found that the risk of teenage marriage and pregnancy was highest among female adolescents who had no education or less than a primary level of education and was lowest among those female adolescents who had an upper secondary or higher level of education. Female teenagers who successfully completed their lower secondary education and moved to upper secondary education delayed their marriage and pregnancy.

Other studies report similar findings (Singh & Samara, 1996; Alan Guttmacher Institute, 1994). Marriage during adolescence is uncommon in those societies where there is universal achievement of secondary school education. The successful transition from lower to upper secondary education encourages young women to postpone their marriage and pregnancy. They realize the benefits of educational continuation. Better education creates opportunity for better employment with more attractive wages and facilitates to have a better quality of life. This study finding also coincides with the findings of other studies where it was found that adolescents with low levels of education married earlier (Mensch, 2005; Assaad & Zouari, 2002; Malhotra, 1997; Malhotra & Tusi, 1996; Haberland, et al., 2004).

This finding is similar to the research in the United States (Alan Guttmacher Institute, 1998), where a high level of adolescent pregnancy among adolescents who have less than 12 years of schooling was found compared to those with more 12 years of schooling. Ambitious female adolescents postponed their marriage and pregnancy until they achieved their desire level of formal education. They realize that an early pregnancy would force them to leave school. Similar findings have also been observed in developing countries (Bledsoe, et al., 1999; Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2002), where female adolescents, who deprived of their rights to compulsory education, looked for an alternative. In the competitive job market, due to lack of minimum educational qualification, they also had less opportunities for desirable jobs. Hence, many seek status through marriage and childbearing.

This study found that female adolescents who continued their schooling remained unmarried even at the end of their adolescence period. On the other hand,

female adolescents who were out of school and even if they were working their probability of getting married was higher compared to those who were in school. This finding is similar to the research findings in both developed and developing countries (Mensch, et al., 2005; Lloyd, 2005; Ritchie, et al., 2004). They also found that adolescents who were in school and realized the benefit of higher education for their bright future delayed the timing of their family formation. In contrast, adolescents who could not carry on their formal schooling and were unsuccessful to have working experience initiated their motherhood earlier. They consider their motherhood as their center of attention.

The study found the highest risk of teenage pregnancy was among adolescents who were out of school and not working compared to those who are out of school and working either in the agricultural or non-agricultural sector. The former category also included those Thai female adolescents who were housewives. Evidence of several studies supports this study finding (Singh & Samara, 1996; Oppenheimer, 1997; Jejeebhoy, 1995). Adolescents who remain out of school have several options. They may remain either inactive or active in the working sector. If they want to work, they have to select their working sectors between agricultural and non-agricultural, based on their choice and opportunities. The job patterns and financial benefits are totally different between these two sectors. Most often, individuals who work in the wage based non-agricultural sector spend a longer time outside the home compared to those who work in the agricultural sector. In contrast those who work in agricultural sector usually work on their family farm. Thus they could conveniently and simultaneously manage their time both at home and at work.

Adolescents who were working in agricultural sector are more prone to get married early than those who working in the non-agricultural sector. This finding is also supported by other study findings (Haberland, et al., 2004; Amin, et al., 1998). Wage based non-agricultural work is competitive. Although they are working and earning income, due to having low educational achievement and insufficient knowledge and training they often do not get a good job and work primarily as unskilled laborers. Earning wages encourages female participation in the labor force and promotes financial independence. This reduces the economic value of early marriage. Thus economic opportunity, especially in wage based labor, delays the

timing of these events. Women without economic opportunities have little incentive to avoid early marriage and pregnancy.

According to this study, the risk of teenage marriage and pregnancy was highest among those who were living in the uplands stratum and was lowest among the urban adolescents. It is important to mention that a high proportion of adolescents who were living in upland stratum got married and become pregnant early even before the beginning of the observation period of this study. In the study area, the fertility of all the strata, except the upland stratum, had already reached to the replacement level. The total fertility rate of the upland stratum was 2.9 in 2003 (Guest and Jampaklay, 2005:71). In contrast, the majorities of adolescents living in urban or semi urban stratum continue their education and avoid teenage marriage and pregnancy.

The place of residence, measured by strata in this study, has an influence in the decision making process related to marriage and pregnancy. The place of residence is linked to availability of opportunities and quality of educational services. The urban/semi urban stratum has better educational opportunities with better quality education compared to other strata, whereas educational opportunities and quality of education is lacking in the upland stratum. Educational opportunities are also not sufficient in the other rural areas. Thus, Thai government has given special emphasis on the establishment of school in the rural areas in the National Education Act of B.E 2542 (Office of the National Education Commission, 2001). In addition, urban/semi urban residents have flexible outlook about the social pressure regarding teenage marriage. In contrast, the uplands inhabitants are not only underprivileged of having better educational opportunities but also they face social pressure towards early marriage and pregnancy.

Similar study findings were found in many developing countries (Bulley, 1984; Locoh, 1994; International Institute for Population Sciences, 2006b; Sathar, et al, 2002; Islam & Mahmud, 1996; Palmore & Singaribum, 1992; McCauley & Salter, 1995). They also found significant variation in the timing of marriage and pregnancy between urban and rural areas. This residential difference is related to socio-economic development. Urban areas usually have higher national economic growth. Thus, there is availability of extensive opportunities for education, transportation and communication. Also, in urban areas, female labor force participation has structurally

shifted towards wage based employment. These similar studies also found that early marriage and pregnancy is the norm among uneducated adolescents of rural areas. Besides, urban areas have weaker traditional family and community pressures on young women to marry and start producing children (Villarreal, 1998). Early marriage was also found common in high land areas of Nepal, which are typically less developed than lowland areas (Choe, et al., 2004).

Florez & Nunez (2001) argued that adolescent fertility is lower among urban adolescents due to higher level of contraceptive use. They found this situation in Latin American countries. In contrast, Singh (1998) argued that fertility could be higher for both rural and urban adolescents if overall fertility level is higher. She found this scenario in Botswana.

The analysis found a significant effect of contraception on the hazard of the timing of a first pregnancy among Thai female adolescents. The hazard was highest among respondents who did not use contraceptives before pregnancy compared to those who used family planning methods. Married female adolescents who effectively used family planning method were able to prevent teenage pregnancy.

Similar findings are reported in the literature. It is argued that adolescent fertility is lower in European countries due to effective use of contraception despite early initiation of sexual activity (Darroch, et al., 2001). In contrast, adolescent fertility is high in many South Asian countries like India, Nepal, and Pakistan due to low contraceptive use (International Institute for Population Science & Macro International, 2000; Pradhan, et al, 1997; Hakim, et al., 1998).

Florez and Nunez (2001) also found a negative relationship between adolescent fertility and contraception. In their Latin American study, a low level of adolescent fertility was found among urban adolescents due to a high level of contraceptive use. This study found that the highest pregnancy hazard among those respondents who experienced contraceptive method failure followed by those respondents who discontinued family planning methods. Even in developed countries, where the proportion of contraceptive users among adolescents is higher; the majority are inconsistent users. In the United States, one study reported that most adolescent pregnancies were a result of lack of method use and method failure (Hayes, 1987).

High levels of adolescent fertility indicate high unmet need for contraception among adolescents. In Thailand contraceptive knowledge and use are relatively high among adolescents (Chayovan, et al., 2003); however, a high incidence of abortion indicates a high unmet need for contraception among Thai adolescents (Warakamin, et al., 2004; Manopaiboon, et al., 2003).

There are many reasons for low contraceptive use. Attitude of healthcare providers is one of them. One study in Thailand found that Thai adolescents frequently use emergency contraceptive (EC) without having appropriate information about the methods. Due to lack of privacy and confidentiality they prefer not to seek services in public hospitals (Boonmongkon, et al., 2000).

This situation is also found in other developing countries. Studies in India and South Africa found that attitudes of service providers act as a barrier for adolescents to seek appropriate family planning service (Kaufman et al., 2001). The World Health Organization (2007b) also found that due to lack of proper counseling of the health workers and lack of reliable contraceptives, young adolescents often have little motivation to use contraceptives.

The analysis found the highest hazard of pregnancy among female adolescents who had pre-marital conception. This study found a high proportion of pregnancies that were conceived before marriage. It can be assumed that this is one of the important factors that dictate the timing of marriage and pregnancy. Although there is under reporting about the prevalence of premarital sexual relationship in Thailand; many studies already mentioned about its existence not only among young men, but also among young women (Chayovan, et al., 2003; United Nations Population Fund, 2005). Anumkul (2004) argued that Thai young men change their preference about their sexual partners since HIV/AIDS epidemic in 1999. Now, they prefer their girl friends instead of commercial sex workers. Many of these informal relationships lead to formal unions as a result of unwanted pregnancy because, still in Thailand, unmarried or single motherhood did not get its acceptance like premarital sex.

Premarital sexual activity among the young generation is evident in many developing countries of Africa, Asia, and Latin American (Mensch, et al., 2002). In India, 10 percent of girls were sexually active before marriage (Jejeebhoy, 1996) and 6

percent of unmarried girls were sexually active in rural Bangladesh (United Nations Population Fund, 1998).

Due to a gender-based sexual double standard, premarital sex was traditionally more acceptable for males than for females in most of the Asian societies including Thailand (Nhan, 1996; Cadelina, 1998; United Nations Population Fund, 2005). In recent decades, the incidence of pre-marital sex has been increasing among Thai young women. A study in Thailand found that almost two-thirds of sexually-experienced 8th grade female secondary school students had their first sexual experience with their boyfriend or lover (Ministry of Public Health, 2004a)

This early initiation of sexual activity increases the level of unwanted pregnancy. Adolescents who have sex before marriage are most at risk of experiencing an unwanted pregnancy. Pregnancy in the student population has also become a public concern in many developing countries (Ajayi, et al., 1991, Agyei & Epema, 1992, Gorgen, et al., 1998). Childbearing as a result of premarital sex also reflects the low incidence of contraceptive use among adolescents (Garenne, et al., 2000). Jejeebhoy, et al., (1999) argued that due to lack of self esteem and negotiating skills, many adolescents can not convince their partners to use contraception. Also, due to sexual double standards, many unmarried young women are afraid to disclose their sexual activity which inhibits them from seeking contraceptive services. It is important to mention that due to lack of direct information, this study obtained information on premarital sexual activity in an indirect way. This information has been obtained only from those adolescents who became pregnant as a result of premarital sex. Thus, the information of premarital sexual activity of those adolescents who did not become pregnant is not captured.

Substance use has a significant effect on the odds of marriage and pregnancy. The hazard of marriage and pregnancy was highest among those respondents who consumed tobacco or alcohol. This risk is higher among those who smoked compared to those who consumed alcohol. Substance use included smoking, drinking, and illegal drug use. Several other studies have reported that smoking and drinking have an influence on sexual risk taking behavior, including early and unprotected sexual activity during adolescence (VanLandingham, 1993). Conwell, et al., (2003) argued that cigarette smoking is related to behavioral problems, school suspension, and

alcohol/illicit drug use. Adolescents who have substance abuse problems usually have low educational aspirations and low performance in school (Bryant, et al., 2000; White, et al., 2002; Conrad, et al., 1992). Adolescent smokers are less likely to continue high school than are non-smokers (Ellickson, et al., 1998; Mensch & Kandel, 1988) and more likely use alcohol and other drugs (White, et al., 2002).

It has also been observed that the prevalence of teenage smoking is higher among those who live in disadvantaged families (Alliance, 1999). In Thailand, one study found that early sexual initiation was common among those from a non-agricultural background, use tobacco and alcohol, and living in single families (Alice et al, 2006). Substance uses, living in poverty and adolescent marriage have also been identified as risk factors for teen pregnancy. Adolescents who have favourable attitudes towards premarital sex are more likely smoke than those who have more traditional attitudes towards sex (Waldron, 1990).

One study in the United States found that alcohol consumption, as it related to sexual behavior, is a less risky behaviour compared to smoking (Rome et al, 1998, cited in World Health Organization, 2004). In Thailand, drinking beer or liquor is generally not considered as a risk taking habit, as it is a part of the socialization process.

Dilworth (2000) argued that there is a relationship between risk taking behaviors like smoking and drinking and the likelihood of becoming pregnant. It was found that alcohol abuse is related to unprotected sex as drunk teenagers may forget to use contraceptives. Poor contraceptive use has also been observed for adolescents who also have other risk behaviors (McAnarney and Schreider, 1984).

Migration experience had a significant relationship with the odds of marriage and pregnancy. The odds of marriage and pregnancy were less among those who did not have migration experience compared to those who had migration experience. In the study area, there is frequent migration among the young people. Many of them move for economic reasons, with a high proportion moving into urban/semi urban stratum from other strata for education purposes. Short distance moves predominated (Guest and Jampaklay, 2005). Other studies also support this finding. Migration facilitates the timing of marriage when young people move a short distance (Shanthi, 2006).

Williams (2006) argued that migration affects school enrollment. It can result in students interrupting or discontinuing their studies. Thus, migration can decrease the likelihood of continuing in school and increases the likelihood of marriage. Rural-urban migration may lead to early marriage as urban earnings improve migrant living standards and economic stability, which contributes to early marriage.

Another study in Thailand found a positive impact of migration on the timing of family formation. Individuals who had migration experience were more likely to marry than those without such experience, because of the improved earnings resulting from migration (Jampaklay, 2003). Phaktoop (2000) argued that in Thailand, migration delays first marriage if migrants move from urban to urban areas, but it enhances the timing if they move from rural to rural areas.

The timing of marriage among migrants is also affected by their educational level and occupation status. Early marriage was found to be more common among those women who were uneducated and who temporarily migrated from rural to urban areas. This situation was found in Bangladesh, where many females married before they migrated to urban areas, as values related to family formation are different from those of young women who were raised in urban areas (Ahmed, 1982).

In contrast, Curran et al (2003) argued that completing secondary schooling increased the odds of female migration, whereas marriage decreases the odds of migrating. However, most studies have found a negative effect of migration on marital timing, especially when women move for economic reasons. This effect is also related to the selectivity of migration, with more educated women being the most likely to move. Migration, when it is related to economic uncertainty and adjustment to a new environment, may also delay marriage (Savitridina, 1997; Hagul, 1985; Minh, 1997).

There was a significant effect of family structure on the timing of marriage and pregnancy. The odds of marriage and pregnancy at each time period were less for female adolescents living in a nuclear family compared to those living in an extended family. This has been observed in other studies as well (Caldwell, 1996; De-Silva, 1997). Young women who prefer to have an independent household are more likely to delay marriage. They need time to accumulate the necessary resources to set up a household. Due to fewer earning household members compared to an extended household, they have to work hard and for longer period to accumulate resources

(Goode, 1963; Dixon, 1971). In extended families young couples typically do not need to be worry about economic support and childcare (Conrad, et al., 1998).

Hajnal (1982) also argued that early marriage and pregnancy is common in an extended family system. Adolescents in an extended family have to share household income among all family members. Thus, they often deprived of financial support for their education. They may have no choice but to get married earlier in order to reduce the financial burden on their family. In contrast, Caldwell (1996) argued that adolescents in a nuclear family are less pressurized to follow traditional norms of marriage than those of an extended or joint family. This is more applicable to those who live in urban nuclear families and who have greater autonomy and decision making power. Urban residents may also delay their family formation due to the high living cost and expensive childcare in urban areas.

In Thailand, there is bilateral kinship system that consists of both nuclear and extended families. After marriage, the husband is expected to live with his wife's parents. This extended family structure usually lasts until the married daughter has her first child, when the young married couples establish their own household (Knodel, et al., 1987, Limanonda, et al., 1991). This bilateral kinship is more common in rural areas. However, family structure has changed drastically. The proportion of nuclear families has increased due to socio–economic development (Foster, 1975; 1984). More than half of households are nuclear. In urban areas, the proportion of nuclear family has increased due to higher education (Richter & Podhisita, 1992). This changing family structure plays a dynamic role in the decision making process.

There was no significant effect of household headship on the timing of marriage and pregnancy. The literature suggests that dropping out of school, delinquency, precocious sexual activity and early parenthood is common among young people who live in female headed families as they are deprived of proper care and supervision. It may be that these relationships do not occur in Thai society because female labor force participation has substantially increased. Thus, both male and female head of households are responsible for earning and could make appreciable economic contribution for the well being of their families (Sunpuwan & Podhisita, 2007).

Besides, in the study area, the majority of the women become head of families by their choice and due to migration of their husband. Literature found that female-headships due to choice have better economic condition and are less marginalized than female-headships due to necessity. Female-headed households are even better-off than male-headed households especially when females become heads due to migration of their husbands. They have better economic condition because of remittances received from migrant male members (Fiess & Verner, 2004; The World Bank 2003).

The study also found a substantial effect of household wealth index on the odds of marriage and pregnancy at each time period. The effects of household wealth mainly work on the timing of marriage and pregnancy through individual characteristics. The odds of marriage and pregnancy were higher among female adolescents living in households with poor economic status compared to those living in households with rich economic conditions.

Other studies support this finding. Hayes (1987) argued that a better household economic condition decreases the probability of childbearing at early ages. Adolescents in affluent families can be supported to complete education. Their parents also have high ambitions for their children's future. In contrast, a female adolescent living in poor economic condition may have to make a decision between education and marriage. Education is costly for them in terms of tuition fees, cost of books, transportation cost and others. Hence early marriage and pregnancy often are the options taken. Poverty deprives these adolescents of social, educational and economic opportunities.

Other studies have found a significant relationship between household economic condition and the marital fertility among adolescents (Lloyd & Mensch, 2006; Mensch, et al., 1998; Singh, 1998; Swann, 2003). They found that living in urban areas and living in wealthier households substantially reduces the odds of an early first marriage and first pregnancy among adolescents. They were also significantly less likely to leave school early. Urban young women who live in the higher socioeconomic strata of society often delay family formation as they have less traditional values.

This study found that the education level of the household head had an effect on the timing of first marriage and pregnancy. The hazard was highest among those

respondents who were living in a household where the household head did not have any education, or had less than a primary school level of education. The lowest hazard was found among the females living in a household where household head had an upper secondary or higher level of education. This effect was primarily a result of an association between the education of household head and the characteristics of the female adolescents.

Dar, et al., (2002) argued that parents' educational attainment is strongly related to their children's school attendance, and also lowers the probability of early marriage among adolescents. Highly educated parents not only realize the importance of education but also typically have higher income, which they can use to support the education of their children. Educated household heads encourage their teenage children to continue their education, which leads to postponement of their teenage marriage. De Ferranti, et al., (2003) found a strong correlation between children's education and their parents' education. Children of parents with little education also tend to have little education. Duryea (1998) found a positive relation between parents' permanent income and children's educational attainment.

Choe, et al., (2004) argued that male pride may lead fathers who have little education to prevent their daughters to continue their education after basic schooling; because they are afraid that their own status and authority will be undermined. Also, girls in poor families with a low level of parents' education may need to help their families either economically by employment or helping in family work or by looking after their younger siblings.

We did not find any effect of household head's occupation on the timing of pregnancy, but did find an effect on the timing of marriage. The hazard of first marriage was slightly higher among the respondents who lived in a household where the household head worked in the agricultural sector than other two occupational groups of respondents. The head of household who has non-agricultural job, compared to a head working in agriculture, usually has more resources. So they can support their children's education and delay the timing of their daughter's marriage

6.3 Conclusion

The objective of this study was to identify the determinants of timing of first marriage and pregnancy among female adolescents in Thailand. Longitudinal data from Kanchanaburi, a western province of Thailand, was used for this purpose. The study found that educational continuation has a greater impact on the timing of marriage and pregnancy than does overall educational achievement. Limited schooling opportunities and low educational attainment puts some Thai female adolescents under pressure to accept early marriage despite the increasing age at marriage in Thailand.

Adolescents living in urban areas and living in nuclear families were more likely to delay their marriage and pregnancy compared to those living in rural areas and in extended families. Individual characteristics are more strongly related to the timing of marriage and pregnancy compared to household characteristics. However, family structure and household economic factors drive the related events of early exit from education and early entry into marriage.

Poverty is one of the important factors related to early marriage and pregnancy. The Thai government has attempted to solve some of the financial barriers face by families by arranging education loans and reducing taxes for their parents (Office of National Educational Commission, 1999: 28). But unfortunately, Thai Government is also planning to dissolve this loan fund (Office of the Educational Council, 2006). Still now, many young girls remain out of school. There is a need for special attention to those in vulnerable situations, as they are not only deprived of their basic right to education but are also at risk of early marriage.

The timing of pregnancy is highly influenced by the contraceptive use. A high proportion of married respondents became pregnant due to either contraceptive method failure or method discontinuation. Young women require special care and correct information regarding the proper use of family planning methods. They need to know what to do when they will face side effects rather than discontinuing use, which often results in unwanted pregnancy.

In conclusion, the study findings suggest that the reproductive health of Thai female adolescents can be protected by fostering delayed marriage through promoting the school attendance of young women and by facilitating delayed pregnancy through

increased effective use of contraceptives. The study provides new insights that potentially make a significant contribution to the prevention and reduction of teenage marriage and pregnancy. The findings contribute not only to the growing literature on these subjects but also enables policymakers to understand some of the underlying causes of the timing of marriage and pregnancy. The timing of first marriage is related to the timing of first pregnancy, and therefore delaying marriage will delay pregnancy. Thus, efforts should continue to reduce teenage marriage and pregnancy in order to meet the current and future needs of Thai female adolescents.

6.4 Policy Recommendations

The Thai Government has attempted to address the issues of early marriage and pregnancy through targeted programs and policies. This study also identified some specific areas where Thai policy makers need to pay special attention. Along with the development and implementation of new programs and policies, the Thai government should give more emphasis to ensure the effective implementation of existing policies.

The National Educational Act of 1999 required 12 years of education. Although the Thai government has attempted to implement this act, progress has been slow. More political will is required to ensure its implementation. Besides, sufficient resources should be allocated to bring secondary schooling within the reach of all young women. The findings of this study provide insight to policy makers to enhance the speed of the implementation process of this education policy, so that Thai teenagers can continue their education until the end of upper secondary level. This will contribute to delay marriage.

Besides, the Thai government should arranged special scholarships for underprivileged and poverty-stricken students. The new educational policy sets challenges for young people and their families as well as for the government. In order to counter these challenges, the Thai government should take some initiatives, such as increasing awareness among parents about the importance of the new education policy, and further allocation of government resources to address the extra costs, particularly for poor families.

The Thai government should also offer services, resources and options to both families and adolescents so that they can delay their marriage. Policy makers ought to design programs for parents, especially in rural areas, to change their attitudes and social norms that support early marriage Awareness raising programs are needed for responsible guidance so that parents can understand the disadvantages of teenage marriage and the importance of education for their children.

Low levels of overall fertility and high levels of educational achievement mask the variation among different groups of adolescent in these indicators. The government should give special attention to those adolescents who are living in uplands areas and to other vulnerable groups and who are often deprived of appropriate information.

Thai government should explore options for providing educational opportunities for married and pregnant adolescents in order that they can return to school to continue their education. The government may promote them to continue education after having their babies.

Marriage undermines the reproductive health needs of adolescents. Married adolescents who discontinue their education at an early age are deprived of reproductive health information. The government should implement sex education programs at the community level. Socially acceptable special clubs can be established to provide information and services in the community. The Thai government may also encourage the private sector to develop suitable programs to provide support to these married adolescents. One of their main focuses should be to delay the age of first pregnancy.

According to the Thai National Reproductive Health Policy, the Government should emphasize the effective implementation of adolescent reproductive health programs. Special attention should also be given to the unmarried in order to protect them from the consequences of unsafe sex. The government should strengthen the friendly adolescent reproductive health service provided through the “Friends Corner”. Proper information and adolescent reproductive health services, especially provision of family planning, should be made accessible.

6.5 Research Recommendations

Adolescent reproductive health programs have been implemented in Thailand. However, many Thai adolescents either discontinue or do not use contraception, despite having high levels of knowledge about contraception. Further study is needed to evaluate this program. Also an evaluation study is required to assess the effectiveness and to find out the challenges of the National Educational Act of 1999. Further research is required to find out the way to ensure the educational continuation of Thai female adolescents. Even though this study identified some risk factors for teenage marriage and pregnancy, many other aspects is yet to be explored. There may be other underlying factors that result in premature departure from school. Poor grades, distance to school, quality and safety of schools and the school environment may also relate to school exits or discontinuation of schooling. Those issues can be explored through further quantitative and qualitative studies.

Further longitudinal study focus on the social and health consequences of teenage marriage and pregnancy is required in order to convince policy makers about the importance of these adverse situations.

The current study was not able to identify adolescents who were living together (cohabitation). Attitudes towards cohabitation and premarital sex are changing in the Thai society. Cohabitation among Thai adolescents, some of who may be in school, is increasing and has become more acceptable among the young. Pregnancy among the unmarried is unlikely to be taken to term and hence are most unlikely to be reported to interviewers. Hence, a comprehensive study, both quantitative and qualitative, is needed to focus on these young women.

BIBLIOGRAPHY

Agresti, A. (1996). An Introduction to Categorical Data Analysis. New York: John Wiley and Sons, Inc.

Agyei, W.K.A. & Epema, E. J. (1992). Sexual Behaviour and Contraceptive Use among 15-24 year olds in Uganda. *International Family Planning Perspective*, 18, 13-17.

Ahmed, A.U. (1982). Marriage and Divorce in Bangladesh, Ph.D. Thesis (unpublished), School of Social Science, University of Chicago, United States.

Ajayi, A.A., Marangu, L.T., Miller, P., & Paxman, J.M. (1991). Adolescent Sexuality and Fertility in Kenya: A Survey of Knowledge, Perception and Practices. *Studies in Family Planning*, 22, 205-216.

Alan Guttmacher Institute. (1981). Teenage Pregnancy: The Problem That Hasn"t Gone Away. New York: AGI.

Alan Guttmacher Institute. (1994). Hopes and Realities: Closing the Gap between Women's Aspiration and Their Reproductive Experiences. New York. AGI.

Alan Guttmacher Institute. (1997). Risks and Realities of Early Childbearing Worldwide. Issues in Brief. New York: AGI.

Alan Guttmacher Institute. (1998). Into a New World: Young Women's Sexual and Reproductive Lives. New York: AGI.

Alauddin. M. & MacLaren, L. (1999). Reaching Newlywed and Married Adolescents. Washington: Focus on Young Adults.

Alice, L., Peter, K., Jenkin, R.A., & Chomnad, M. (2006). Sexual Initiation, Substance use and Sexual Behaviour and Knowledge among Vocational Students in Northern Thailand, *International Family Planning Perspectives*, 32(3),126-135.

Alliance, B.C. (1999). Fall Newsletter: B.C Alliance Concerned with Early Pregnancy and Parenthood and YWCA of Vancouver.

Amin, S. & Al-Bassusi, N.H. (2003). Wage Work and Marriage: Perspectives of Egyptian Working Women. Policy Research Division Working Paper. New York: Population Council.

Amin, S. & Casteline, J.B. (2005). Poverty, Risk, Aspiration and Childbearing. A Paper Presented at the Annual Meeting of the Population Association of America, Philadelphia, March 21- April, 2, 2005.

Amin, S. & Sedgh, G. (1998). Incentive Schemes for School Attendance in Rural Bangladesh. Policy Research Division Working Paper, No 106. New York: Population Council.

Amin, S., Diamond, I., Naved, R.T., & Newby, M. (1998). Transition to Adulthood of Female Garment Factory Workers in Bangladesh. *Studies in Family Planning*, 29(2), 185-200.

Anumkul, N. (2004). Reproductive Health: Action for Adolescents. *Journal of Medical Association of Thailand*, 87(3), 179-80.

Appleton, S. (1996). Women-headed Households and Household Welfare: An Empirical Deconstruction for Uganda. *World Development*, 24(12), 1811-27.

Asgary, N. & Pagan, J. (2004). Relative Employment and Earnings of Female Household Heads in Mexico, 1987-1995. *Journal of Developing Areas*, 38(1), 93-106.

Asian Development Bank. (2003). Poverty in the Philippines: Income Assets and Access. Manila.

Assaad, R. & Zouari, S. (2002). The Timing of Marriage, Fertility and Female Labor Force Participation in Urban Morocco. Paper presented at the Economic Research Forum Ninth Annual Conference, 26-28 October, Sharjah, UAE.

Bacci, A., Manhica, G.M., & Machungo, F. (1993). Outcome of Teenage Pregnancy in Maputo, Mozambique. *International Journal of Gynecological and Obstetrics*, 40 (1), 19-23.

Basow, S.A. (1992). Gender, Stereotypes and Roles. Third Edition. Pacific Grove.

Berglund, S., Liljestrand, J., Marin, F.D.M., Salgado, N., & Zelaya, E. (1997). The Background of Adolescent Pregnancies in Nicaragua: A Qualitative Approach. *Social Science of Medicine*, 44, 1-12.

Berry, E.H., Shillington, A.M., Peak, T., & Hohman, M.M. (2004). Multi-ethnic Comparison of Risk and Protective Factors for Adolescent Pregnancy, *Journal of Behavioral Science*, 17(2), 79-96.

Bledsoe, C., Casterline, J.B., Jennifer, A., Johnson-Kuhn, & Haaga, J.G. (Eds.) (1999). Critical Perspectives on Schooling and Fertility in the Developing World. Washington DC: National Academy Press.

Bledsor, C.H. & Cohen, B. (1993). Social Dynamics of Adolescent Fertility in Sub Saharan Africa. Population Dynamics of Sub Saharan Africa, Washington DC: National Academy Press.

Blossfeld, H.P. & Rohwer, G. (2002). Techniques of Event History Modeling: New Approaches to Causal Analysis. London: Lawrence Erlbaum Associates.

Blumberg, R.L. (1995). Introduction: Engendering Wealth and Well Being in an Era of Economic Transformation. In Blumberg, R.L., Rakowski, C., Tinker, I., & Monteon, M. (Eds.) Engendering Wealth and Well-being: Empowerment for Global Change . Boulder:Westview.

Boggess, S. (1998). Family Structure, Economic Status and Educational Attainment, *Journal of Population Economics*, 11, 205-222.

Bongaarts, J. & Cohen, B. (1998). Adolescent Reproductive Behaviour in the Developing World. *Studies in Family Planning*, 29(2), 99-105.

Boonmongkon, P., Chantima, J., Thsnaisawanyangkook, S., & Limsimphan, S. (2000). Thai Adolescent Sexuality and Reproductive Health: Implications for Developing Adolescents' Health Programs in Thailand. Nakhon Pathom, Thailand: Center for Health Policy Studies, Mahidol University.

Brockerhoff, M. & Yang, X. (1994). Impact of Migration on Fertility in sub Saharan Africa. *Social Biology*, 41, 19-43.

Brockerhoff, M. (1998). Migration and Fertility Transition in African cities. Pp 357-390, In Migration, Urbanization and Development: New Directions and Issues. Norwell, MA: Kluwer Academic Publishers.

Brown, S.F. (2000). Women No Cry: Female Headed Households in the Caribbean. In Judith Mirsky and Marty Radlett (Eds.) No Paradise Yet: The World's Women Face a New Century. London: Panos.

Bryant, A.L., Schulenberg, J., Bachman, J.G., Malley, O, P.M., & Johnston, L.D. (2000). Understanding the Links among School Misbehavior, Academic Achievement and Cigarette Use: A National Panel Study of Adolescents. *Prevention Science*, 1(2), 71-87.

Bulley, M. (1984). Early Childhood Marriage and Female Circumcision in Ghana. Report on a Seminar on Traditional Practices Affecting the Health of Women and Children in Africa, Dakar Senegal, 6-10 February: 211-4, Senegal.

Bureau of Health Policy and Planning. (2001). The Ninth Public Health Development Plan in the National Health Development Plan under the Ninth National Economic and Social Development Plan (2002-2006). Nonthaburi: Ministry of Public Health.

Bureau of Health Promotion. (2001). The Safe Motherhood Project. Bureau of Health Promotion, Department of Health, Ministry of Public Health.

Bureau of Policy and Strategy. (2002). Thailand Health Profile: 1999-2000. Nonthaburi: Ministry of Public Health, Thailand.

Bureau of Policy and Strategy. (2004). Thailand Health Profile: 2001-2004. Ministry of Public Health, Thailand.

Bureau of the Budget. (1999). Expenditure Budget in 1999, No 5. Thailand.

Buvinic, M. & Gupta, G.R. (1993). Responding to Insecurity in the 1990s: Targeting Women-headed Households and Women-maintained Families in Developing countries. Paper presented at the international workshop “Insecurity in the 1990s”: Gender and Social policy in an International Perspectives. London school of economics and European association of development institutes, London, 5-6 April.

Buvinic, M. & Gupta, G.R. (1997). Female Headed Households and Female-Maintained Families: Are they worth targeting to reduce poverty in developing countries? *Economic Development and Cultural Changes*, 45(2), 259-80.

Buvinic.M. (1997). Costs of Adolescent Childbearing in Latin America and the Caribbean, ICRW Working paper no. 5.

Cadelina, C. (1998). Sexual Behaviour and Level of Awareness of STDs: A Survey among College Students. Dumaguete City, Philippines, Department of Sociology/Anthropology, Silliman University (Unpublished final report submitted to the Programme in August).

Cagatay, N. (1998). Gender and Poverty, New York: United Nations Development Programme, Social Development and Poverty elimination Division, Working paper 5.

Caldwell, B. (1996). The Family and Demographic Change in Sri Lanka, *Health Transition Review*, 6, 45-60.

Caldwell, J.C. (1982). Theory of Fertility Declines. London: Academic Press.

Carling, A. (1992). Social Divisions. London: Verso.

Cater, S. & Coleman, L. (2006). Planned Teenage Pregnancy: Perspectives of Young Parents from Disadvantaged background. Bristol: Policy Press.

Center for Reproductive Law and Policy. (1997). Women of the World: Laws and Policies Affecting their Reproductive Lives—Anglophone Africa, New York.

Centers for Disease Control and Prevention, (2002). Vital Statistics Report, CDC, Atlanta.

Chant, S. (1991). Women and Survival in Mexican Cities: Perspectives on Gender, Labour markets and Low income households, Manchester: Manchester University Press.

Chant, S. (1997a). Women-headed Households: Diversity and Dynamics in the Developing world. Houndmills, Basingstroke: Macmillan.

Chant, S. (1997b). Women-headed Households: Poorest of the Poor? Prospective from Mexico, Costa Rica and the Philippines, *IDS Bulletin*, 28(3), 26-48.

Chant, S. (2003). Female-headed Headship and the Feminization of Poverty: Facts, Fictions and Forwards Strategies, LSE Gender Institute, New working paper series issue, London: London School of Economics.

Chant, S. (2004). Female Headship and the Feminization of Poverty. International Poverty Center, UNDP.

Chant, S. (2007). Gender, Generation and Poverty: Exploring the Feminization of Poverty in Africa, Asia and Latin America. Cheltenham: Edward Elgar.

Chayovan, N., Bangkeaw, B., Karcarunubarn, R., Milintangkul, C., Prachuabmoh, V., Rungsohpasakul,P., Siriboon, S., & Wongsith, M. (2003). Economic Crisis, Demographic Dynamics and Family in Thailand: A Research Report. College of Population Studies, Chulalonkorn University, Thailand: Bangkok.

Chen, M.A., Joann, V., & Marilyn, C. (2004). Mainstreaming Informal Employment and Gender in Poverty Reduction: A Handbook for Policy-makers and other stakeholders, London: Commonwealth Secretariat.

Choe, M.K., Thapa, S., & Mishra, V. (2004). Early Marriage and Early Motherhood in Nepal, *Journal of Biosocial Science*, 1, 1-20.

Coale, A.J. (1973). The Demographic Transition. Proceedings of the IUSSP Conference, Liege: 177-211.

Coleman, J. (1973). The Mathematics of Collective Action. London: Heinemann.

Conrad, K.M., Flay, B.R., & Hill, D. (1992). Why children Start Smoking Cigarettes: Predictors of Onset. *British Journal of Addiction*, 87(12), 1711-1724.

Conrad,J.K., Hollenbach, K.A., Fullerton, J.T., & Feigelson, H.S. (1998). Use of Prenatal Services by Hispanic women in San Diego County: A Comparison of Urban and Rural settings. *Journal of Nurse Midwifery*, 43(2), 90-96.

Conwell, L.S., Callaghan, M.J.O., Andersen, M.J., Bor, W., Najman, J.M., & Williams, G.M. (2003). Early Adolescent Smoking and a Web of Personal and Social Disadvantage. *Journal of Paediatrics and Child Heal*th, 39(8), 580-585.

Corry, M. (2000). Trends in Birth Rates for Teenagers in Queensland, 1988 to 1997: An Analysis by Economic Disadvantage and Geographic Remoteness. *Australia and New Zealand Journal of Public Health, 24:316-319.*

Courgeau, D. & Lelievre, E. (2002). Event History Analysis in Demography. Oxford: Clarendon Press.

Cuddeback, G.S., Wilson, E.B., Orme, J.G., & Combs-Orme, T. (2004). Statistical Methods for Detecting and Correcting Sample Selection Bias. *Journal of Social Service Research*, 30 (3), 19-33. Accessed on June 10, 2006, at 12 noon. http://www.casey.org/research/ffa/index.htm.

Curran, S.R., Garip, F., Chung, C., & Tangchonlatip, K. (2003). Migration, Cumulative Causation and Gender, Evidence from Thailand. Paper prepared for conference on African Migration in Comparative Perspective, Johannesburg, South Africa, 4-7 June, 2003.

Cvetkovich, G. & Grote, B. (1980). Psychological Development and the Social Problem of Teenage Illegitimacy. In C. Chilman (Ed.). Adolescent Pregnancy and Childbearing: Findings from Research. Washington. D.C: U.S. Department of Health and Human Services.

Dar, A., Blunch, N.H., Kim, B., & Sasaki, M. (2002). Participation of Children in Schooling and Labor activities: A Review of Empirical Studies. Social Protection Discussion Paper Series no 0221. The World Bank.

Darroch, J.E., Singh, S., & Frost, J.J. (2001). Differences in Teenage Pregnancy Rates among Five Developed Countries: The Roles of Sexual Activity and Contraceptive Use. *Family Planning Perspectives*, 33, 244-250.

De Ferranti, D., Perry, G., Gill, I., Guasch, J., Maloney, W., Sanchez-Paramo, C., & Schady, N. (2003). Closing the Gap in Education and Technology. World Bank Latin American and Caribbean Studies. Washington, D.C: World Bank.

Delamonica, E., Maureen, D., & Alberto, M., (2004). Children Living Only with Their Mothers. Are They Disadvantaged? Report to UNICEF, New York: Unicef.

Department of Health. (1998). Family Planning and Population Fact Sheet: Thailand. National Family Planning Programme. Nonthaburi: Family Planning and Population Division.

Department of Non Formal Education. (2006). Non Formal Education in Thailand. Ministry of Education. Accessed on July 02, 2007 at 9pm [Online]. Available from:www.ilo.org/public/english/employment/skills/hrdr/init/tha_3htm.

De-Silva, W.I. (1997). The Ireland of Asia: Trends in Marriage Timing in Sri Lanka. *Asia-Pacific Population Journal*, 12(2), 3-24.

Devancy, B.L. & Hubley, K.S. (1981). The Determinants of Adolescent Pregnancy and Childbearing. Final report to the National Institute of Child Health and Human Development, Washington D.C: Mathematica Policy Research.

Dia, I.A. (2001). Feminization of Poverty, Informal Sector and Masculinity in a Global Area: The Experience of Senegalese Women. Paper prepared for research committee 19 on poverty, Social welfare and Social policy, University of Oviedo, Spain, 6-9 September.

Dilworth, K. (2000). Literature Review Teenage Pregnancy, Canadian Institute of Child Health. Accessed on April, 10, 2006 a t 7pm. [Online]. Available from: www.phac-aspc.gc.ca/dca-dea/publications/reduce-teenpregnancy.htm

Diop, F.P. (1985). Internal Migrations, Nuptiality and Fertility (Translated) in Nuptialite et Fecondite au Senegal Paris: Presses Universitaires de France.

Dixon, R.B. (1971). Explaining Cross-cultural Variation in Age at Marriage and Proportions Never Marrying, *Population Studies*, 25(2), 215-234.

Dixon-Muller, R.B. (1985). Women's work in Third World Agriculture: Concepts and Indicators. Geneva: International Labour Office.

Duryea, S. (1998). Children's Advancement through School in Brazil: The Role of Transitory Shocks to Household Income. Working Paper 376, Inter-American Development Bank, Office of the Chief Economist.

Ellickson, P., Bui, K., Bell, R., & McGuigan, K. A. (1998). Does Early Drug Use Increase the Risk of Dropping out of high school? *Journal of Drug Issues*, 28(2), 357-380.

Elson, D. (1999). Labour Markets as Gendered Institutions: Equality and Efficiency and Empowerment Issues. *World Development*, 27(3), 611-27.

Family Health International. (2005a). Reproductive Health and HIV/AIDS: Maternal Health Care among Adolescents. YouthLens. March, 2005. Accessed on Februrary, 02, 2007 at 10 am. [Online]. Available from: www.fhi.org/youthnet.

Family Health International. (2005b). Early Marriage and Adolescent Girls. YouthLens on Reproductive Health and HIV/AIDS. Auguest, 2005. Accessed on Februrary, 02, 2007 at 10 am. [Online]. Available from: www.fhi.org/youthnet.

Fiess, M.N. & Verner, D. (2004). The Dynamics of Poverty and its Determinants: The Case of the Northeast of Brazil and its States. Policy Research Working Paper 3259. The World Bank.

Filmer, D. & Pritchett, L.H. (2001). Estimating Wealth Effects without Expenditure Data or Tears: An Application to Educational Enrollments in States of India. *Demography*, 38(1), 115-132.

Finne, G. (2001). Feminization of Poverty. Geneva: World Alliance of YMCAs, Global Programmes and Issues. Accessed on May 03, 2006 at 9pm [Online]. Available from: www.ywca.int/programs.

Flaherty, E. & Maracek, J. (1982). Psychological Factors Associated with Fertility Regulation Among Adolescents. Final Report to the National Institute of Child Health and Human Development. Philadelphia: Philadelphia Health Management Corporation.

Florez, C.E. & Nunez, J. (2001). Teenage Childbearing in Latin American Countries. Research Network Working Papers. New York: Inter-American Development Bank.

Foster, B. (1975). Continuity and Change in Rural Thai Family Structure. *Journal of Anthropological Research*, 31(1), 34-50.

Foster, B. (1982). Microdemographic Variation and Family Composition in four Thai Villages, *Human Ecology*, 10(4), 439-454.

Fox, G.L. (1981). The Family Role in Adolescent Sexual Behavior. In T. Ooms (Ed.) Teenage Pregnancy in a Family Context. Philadelphia: Temple University Press.

Furstenberg, F.F. & Crawford, A. (1978). Family Support: Helping Teenage Mothers to Cope. *Family Planning Perspectives*. 10, 322-333.

Furstenberg, F.F. (1976). Unplanned Parenthood: The Social Consequences of Teenage Childbearing. New York: Free Press.

Gage A.J. (1999). The Social Implications of Adolescent Fertility: In Livi-Bacci, M., De Santis, G. (Eds.). Population and Poverty in the Developing World. Oxford: Clarendon Press.

Gage. A.J., Elisabeth, S.E., & Piani, A.L. (1997). Household Structure and Childhood Immunization in Niger and Nigeria, *Demography*, 34(2), 295-309.

Garenne, M., Tollman, S., & Kahn, K. (2000). Premarital Fertility in Rural South Africa: A Challenge to Existing Population Policy. *Studies in Family Planning*, 31(1), 47-54.

Gehan, E. A. (1965a). A Generalized Wilcoxon test for Comparing Arbitrary Single-Censored Samples. *Biometrica*, 52, 203-223.

Gehan, E. A. (1965b). A Generalized Two-sample Wilcoxon test for Double-censored Data. *Biometrica*, 52, 650-653.

Gessner, B. & Perham, H.K. (1998). Experience of Violence among Teenage Mothers in Alaska. *Journal of Adolescent Health*, 22, 383-388.

Goldstein, S. & Goldstein, A. (1983). Migration and Fertility in Peninsular Malaysia: An Analysis Using Life history data. Rand Corporation Report No, N-1869-AID.

Goldstein, S., White, M., & Goldstein, A. (1997). Migration, Fertility and State policy in Hubei Province, China, *Demography*, 34, 481—491.

Goode, W.J. (1963). World Revolution and Family Patterns. New York: Free Press of Glenoe.

Gorgen, R., Yansane, M.L., & Marx, M. (1998). Sexual Behavior and Attitudes among Unmarried Urban Youth in Guinea. *International Family Planning Perspectives*, 24, 65-71.

Grant, M. & Hallman, K. (2006). Pregnancy-related School Dropout and Prior School Performance in South Africa: Policy Research Division Working Paper. New York: Population Council.

Greenglass, E.R. (1982). A World of Difference: Gender Roles in Perspective. Toronto. New York: John Wiley and Sons.

Guest, P. & Jampaklay, A. (Ed.). (2005). Report of Round 4 Census (2003). Kanchanaburi Project, Institute for Population and Social Research, Mahidol University. Thailand: Nakhon Pathom.

Guest, P. & Punpuing, S. (Ed.). (2003). Report of Round 2 Survey (2001). Kanchanaburi Project, Institute for Population and Social Research, Mahidol University. Thailand: Nakhon Pathom.

Guest, P. & Punpuing, S. (Ed.). (2004). Report of Round 3 Census (2002). Kanchanaburi Project, Institute for Population and Social Research, Mahidol University. Thailand: Nakhon Pathom.

Guest, P., Punpuing, S., & Jampaklay, A. (Ed.). (2007). Report of Round 5 Census (2004). Kanchanaburi Project, Institute for Population and Social Research, Mahidol University. Thailand: Nakhon Pathom.

Haberland N., Chong, E.L., & Braken, H.J. (2004). A World Apart: The Disadvantage and Social Isolation of Married Adolescent Girls. Brief Based on background paper presented for the WHO/UNFPA/Population Council Technical Consultation on Married Adolescents. New York: Population Council.

Hajnal, J. (1982). Two kinds of Pre-industrial Household Formation System, *Population and Development Review*, 8, 449-494.

Hakim, A., Cleland, J., & Bhatti, M.H. (1998). Pakistan Fertility and Family Planning Survey 1996-1997, Preliminary Report. Islamabad, National Institute of Population Studies and the London School of Hygiene and Tropical Medicine.

Hayes, C.D. (Ed.). (1987). Risking the Future: Adolescent Sexuality, Pregnancy and Childbearing (Vol 1). Washington, D.C: National Academy Press.

Heath, A. (1976). Rational Choice and Social Exchange. Cambridge: Cambridge University Press.

Hirschi, L. (1969). Causes of Delinquency. Berkeley: University of California Press.

Hogan, D.P., Berhanu, B., & Hailermariam. A. (1999). Household Organization, Women's Autonomy and Contraceptive Behaviour in Southern Ethiopia, *Studies in Family Planning*, 30(4), 302-314.

Hollos, M. & Larsen, U. (1992). Fertility Differentials among the Ijo in Southern Nigeria: Does Urban Residence Make a Difference? *Social Science and Medicine*, 35, 1199-1210.

Hudson. F. & Ineichen, B. (1991). Taking it Lying Down: Sexuality and Teenage Motherhood. London: Macmillian Education LTD.

Institute for Population and Social Research. (2001). Report of Baseline Survey (2000): Kanchanaburi Project. Mahidol University. Thailand: Nakhon Pathom.

International Institute for Population Sciences & Macro International. (2000). National Family Health Survey-2 India, 1998-1999. Mumbai: International Institute for Population Sciences.

International Institute for Population Sciences. (2006a) Nutritional Status of Children and Prevalence of Anaemia among Children, Adolescent Girls and Pregnant Women. India: Mumbai.

International Institute for Population Sciences. (2006b). District Level Household Survey (DLHS-2), 2002-04. India: Mumbai.

International Planned Parenthood Federations. (2006). Report Card HIV Prevention for Girls and Young Women: Thailand. [Online]. Available from: www.unfpa.org/hiv/docs/report-cards/thailand.pdf . Accessed on July 07, 2007 at 9pm.

Islam, M.M. & Mahmud, M. (1996). Marriage Patterns and Some Issues related to Adolescent Marriage in Bangladesh, *Asia-Pacific Population Journa*l, 11(3), 27-42.

Jampaklay, A. (2003). Migration and Marital Timing: How Does Leaving Home Affect Forming a Family. University of North Carolina, Chapel Hill. Paper

presented in Population Association of America, 2003, Annual meeting Program, Minneapolis, Minnesota, May 1-3, 2003.

Jejeebhoy, S.J. & Bott, S. (2003). Sexual and Reproductive Health of Young People in the Asia Pacific region. Asian Population Studies series No 158: Fifth Asian and Pacific Population Conference: Selected papers. United Nations, New York.

Jejeebhoy, S.J. (1995). Women's Education, Autonomy and Reproductive Behavior: Assessing What We Have Learned. Paper prepared for the workshop on Status of Women and Demographic Change: Assessing what we have learned. Honolulu: East West Center.

Jejeebhoy, S.J. (1996). Adolescent Sexual and Reproductive Behavior: A Review of the Evidence from India, Washington, D.C. International Center for Research on Women (ICRW).

Jejeebhoy, S.J., Bott, S., Shah, I., & Puri, C. (Eds.). (2003). Towards Adulthood: Exploring the Sexual and Reproductive Health of Adolescents in South Asia. Geneva. World Health Organization.

Jejeebhoy, S.J., Shah, I.H., & Yount, K.M. (1999). Sexual and Reproductive Health of Adolescents. WHO Department of Reproductive Health and Research, Annual Technical Report.

Jenkins, R. (1983). Final Report to the National Institute of Child Health and Human Development. Washington D.C: Howard University Hospital.

Jewkes, R. (2001). Relationship Dynamic and Teenage Pregnancy in South Africa. *Social Science and Medicine*, 52, 733-744.

Kabeer, N. (2003). Gender Mainstreaming in Poverty Eradication and the Millennium Develoment Goals: A Handbook for Policy Makers and others Stakeholders, London: commonwealth Secretariat.

Kanchanachitra, C., Podhisita, C., Archavanitkul, K., & Im-em, W. (2005). Thai Health Profile. Thailand: Institute for Population and Social Research and Thai Health Promotion Foundation.

Kaufman, C.E., De Wet, T., & Stadler, J. (2001). Adolescent Pregnancy and Parenthood in South Africa. *Studies in Family Planning*, 32, 147-160.

Kenny, J., Reinholtz, C., & Angelini, P. (1997). Ethnic Differences in Childhood and Adolescent Sexual Abuse and Teenage Pregnancy. *Journal of Adolescent Health*, 21, 3-10.

Kinnaird, K. & Gerrard, M. (1986). Attitudes about Marriage, Divorce and Premarital Sexual Activity as a function of Parent's Marital Status. *Journal of Marriage and the Family*, 48, 757-765.

Knodel, J., Chamratrithirong, A., & Debavalya, N. (1987). Thailand Reproductive Revolution: Rapid Fertility Decline in a Third World Setting. Madison: University of Wisconsin Press.

Kumari, R. (1989). Women-headed households in Rural India. New Delhi: Radiant Publishers.

Laing, J. (1985). Continuation and Effectives of Contraceptive Practice: A Cross-Sectional Approach. Studies in Family Planning, 16, 138-153.

LaMar, C. (2003). Sex, Lies and Internet-based Deception. Published in The Nation. [Online] Available from: www.walnet.org.csis/news/world_2003/nation-030202.html. Accessed on January 07, 2007 at 10.30 am.

Lee, B.S. (1992). The Influence of Rural Urban Migration on Migrants' Fertility Behaviour in Cameroon, *International Migration Revie*w, 26, 1416-47.

LeGrand, N.L. & Mbacke, C.S.M. (1993). Teenage Pregnancy and Child Health in the Urban Sahel. *Studies in Family Planning*, 24, 137-149.

Lewis, D. (1993). Going it Alone: Female-headed Households, Rights and Resources in Rural Bangladesh. *European Journal of Development Research*, 5(2), 23-42.

Limanonda, B., Podhisita, C., & Wongsith, M. (1991). Report on a Thai family and Household Survey. IPS Publication 186/91. Bangkok Institute of Population Studies, Chulalongkorn University.

Lindemann, C. (1974). Birth Control and Unmarried Young Women. New York: Springer.

Lindstrom, D.P. & Brambila Paz, C. (2001). Alternative Theories of the Relationship of Schooling and Work to Family Formation: Evidence from Mexico. *Social Biology*, 48(3-4), 278-297.

Lloyd, C.B. & Mensch, B.S. (2006). Marriage and Childbirth as Factors in School Exit: An analysis of DHS Data from sub-Saharan Africa. Policy Research Division. Working paper. New York: Population Council.

Lloyd, C.B. (1991). The contribution of the World Fertility Surveys to an Understanding of the Relationship between Women's work and Fertility. *Studies in Family Planning,* 22(3), 144-161.

Lloyd, C.B. (Ed.) (2005). Growing Up Global: The Changing Transition to Adulthood in Developing Countries. Panel on Transitions to Adulthood in Developing Countries. National Research Council and Institute of Medicine. Washington DC: National Academic Press.

Lloyd,C.B. (1995). Household Structures and Poverty: What are the Connections? Population Council.

Llyod, C.B., Mete,C., & Grant, M.J. (2006). The Implications of Changing Educational and Family Circumstances for Children's Grade Progression in Rural Pakistan: 1997-2004.

Locoh, T. (1994). Premature Fertility in sub Saharan Africa. Chronique du Ceped, Summer, 14: 1-3, France.

Lowdermilk, D.L. & Perry, S.E. (2004). Maternity and Women's Health Care. USA: Mosby.

Luker, K. (1975). Taking Chances: Abortion and Decision Not to Concept. Berkeley: University of California.

Macro International. (2001). Demographic Health Surveys. North Carolina.

Mather, M., Rivers, K.L., & Jacobsen, L.A. (2005). The American Community Survey., Population Bulletin, 60(3). Washington DC: Population Reference Bureau.

Malhotra, A. & Tusi, A.O. (1996). Marriage Timing in Sri Lanka: The Role of Modern Norms and Ideas. *Journal of Marriage and the Family*, 58 (2), 476-490.

Malhotra, A. (1997). Gender and the Timing of Marriage: Rural-Urban Differences in Java. *Journal of Marriage and the Family*, 59(2), 434-450.

Manopaiboon, C., Kilmarx, P.H., van Griensven, F., Chaikummao, S., Jeeyapant, S., Limpakarnjanarat, K., & Uthaiworavit, W. (2003). High Rates of Pregnant among Vocational School Students: Results of Audio-Computer-Assisted Self

Interview Survey in Chaing Rai, Thailand. *Journal of Adolescence*, 26(5), 517-30.

Matsumura, M. & Gubhaju, B. (2001). Women's Status, Household Structure and the Utilization of Maternal Health Services in Nepal. *Asia-Pacific Population Journal*, 16 (1), 23-44.

McAnarney, E.R. & Schreider, C. (1984). Identifying Social and Psychological Antecedents of Adolescent Pregnancy: The Contribution of Research to Concepts of Prevention. New York: William T. Grants Foundation.

McCarthy, J. & Upchurch , D. (1990). The Timing of a First Birth and High School Completion. *American Sociological Review*, 55, 224-234.

McCauley, A. and Salter, C. (1995). Meeting the Needs of Young Adults. Population Reports, Series J, No 41. Baltimore: Johns Hopkins School of Public Health, Population Information Program.

McLananhan, S. (1985). Family Structure and the Reproduction of Poverty. *American Journal of Sociology*, 90, 873-901.

McLananhan, S. (1994). The Consequence of Single Motherhood. *American Prospect*, 18, 48-58.

McMorris, B.J. & Uggen, C. (2000). Alcohol and Employment in the Transition to Adulthood. *Journal of Health and Social Behavior*, 41(3), 276-294.

McNeil, P. (1998). Preventing Second Adolescent Pregnancies by Supporting Young Mothers.

Meekers, D. & Ahmed, C. (1999). Pregnancy related School Dropouts in Botswana, *Population Studies*. 53(2), 195-209.

Mensch, B. (2005). The Transition to Marriage. In Lloyd, C.B (Ed.). Growing Up Global: The Changing Transition to Adulthood in Developing Countries. Washington D.C.: The National Academic Press.

Mensch, B., Bruce, J., & Greene, M. (1998). The Uncharted Passages: Girls' Adolescence in Developing Countries. New York. The Population Council.

Mensch, B.S. & Kandal, D.B. (1988). Dropping out of High School and Drug Involvement. *Sociology of Education*, 61(2), 95-113.

Mensch, B.S., Clark, W.B., Lloyd, C.B., & Erulker, A.S. (1999). Pre marital Sex and School Drop put in Kenya: Can Schools make a difference? Policy Research Division Working Paper. New York: Population Council.

Mensch, B.S., Clark, W.H., & Anh, D.N. (2002). Pre marital Sex in Vietnam: Is the Current Concern with Adolescent Reproductive Health Warranted? Policy Research Division Working Paper. Population Council, New York.

Mensch, B.S., Singh, S., & Casterline, J.B. (2005). Trends in the Timing of First Marriage among Men and Women. Policy Research Division Working Papers. New York: Population Council.

Mihalic, S.W. & Elliot, D. (1997). Short- and long-term consequences of adolescent work. *Youth & Society*, 28(4), 464-498.

Miller, B.C. & Bingham, C.R. (1989). Family Configuration in Relation to the Sexual Behaviour of Female Adolescent. *Journal of Marriage Family*, 51: 499-506.

Minh, N.H. (1997). Age at First Marriage in Viet Nam: Patterns and Determinants. *Asia-Pacific Population Journal*, 12(2), 49-74.

Ministry of Education. (1987). Curriculum Outline of General Education: Secondary level. Thailand: Bangkok.

Ministry of Education. (2004). National Report 2004, presented in 47 session of the International Conference on Education, Geneva, 8-11 September, 2004.

Ministry of Education. (2007). The Thai Education System in Thailand Available [Online] www.moe.go.th. Accessed on September 05, 2006 at 8pm.

Ministry of Public Health, Thailand & World Health Organization. (2003). Thailand Reproductive Health Profile. Reproductive Health Division, Department of Health. Ministry of Public Health, Thailand and the World Health Organization. Regional Office for South-East Asia, New Delhi.

Ministry of Public Health, Thailand & World Health Organization. (2005). External Review of the Health Sector Response to HIV/AIDS in Thailand. Regional Office for South-East Asia. New Delhi: World Health Organization.

Ministry of Public Health. (2002). Burden of Disease and Injuries in Thailand: Priority Setting for Policy. Bangkok. Thailand: Thai Working Group on Burden of Disease and Injuries. November, 2002.

Ministry of Public Health. (2004a). Report on the HIV/AIDS Situation in Thailand. Bureau of Epidemiology, Department of Communicable Disease Control. Bangkok.

Ministry of Public Health. (2004b). ICPD at 10: Progress and Challenges in Implementing the PoA Bangkok: Ministry of Public Health of Thailand with support from UNFPA.

Ministry of Public Health. (2005). Bureau of Epidemiology. Department of Disease Control, Bangkok. Nonthaburi.

Moghadam, V. (2005). The Feminization of Poverty in International Perspective. *The Brown Journal of World Affairs*, 5(2), 225-48.

Moore, K.A., Waite, L.J., Caldwell, S.B., & Hofferth, S.L. (1986). Choices and Circumstance: Racial Differences in Adolescents Sexuality and Fertility. New Brunswick, N.J: Transaction Books.

National Economic and Social Development Board & Office of the United Nations Residents Coordinator. (2004) Thailand Millennium Development Goals Report 2004. National Economic and Social Development Board, Thailand and United Nations Resident Coordinator.

National Education and Social Development Board. (1997). The Eighth National Economic and Social Development Plan (1997-2001). Thailand: Office of the National Economic and Social Development Board.

National Family Health Survey-2. (1998-99). Background Characteristics of Households Using Standard of Living Index. National Family Health Survey-2. Uttar Prodesh. Mumbai: International Institute of Population Sciences.

National Institute of Population Research and Training, Mitra and Associates. (1997). Bangladesh Demographic and Health Survey 1996-1997. Dhaka, Bangladesh, NIPORT, Macro International Inc.

National Statistical Office. (1970). Population and Housing Census 1970. Office of the Prime Minister; Thailand: Bangkok.

National Statistical Office. (1990). Population and Housing Census 1990. Office of the Prime Minister; Thailand: Bangkok.

National Statistical Office. (1997). Repoty of the Children and Youth Survey. Bangkok.

National Statistical Office. (2000). Population and Housing Census 2000. Office of the Prime Minister. Thailand: Bangkok.

National Statistical Office. (2003). Report of the Children and Youth Survey, 2002. Office of the Prime Minister. Thailand: Bangkok.

National Statistical Office. (2006). Report of 2006 Reproductive Health Survey. Ministry of Information and Social Statistics Bureau. Thailand: Bangkok.

National Statistical Office. (2007). Report of the Survey of Population Change (2005-2006). Ministry of Information and Communication Technology. Thailand: Bangkok.

National Youth Bureau. (1994). The Fourth National Youth Policy. Office of the Prime Minister. Thailand: Bangkok.

Newcomer, S.F. & Udry, J.R. (1983). Adolescent Sexual Behavior and Popularity. *Adolescence*, 18, 515-522.

Nhan, V.Q. (1996). Survey on young adults' reproductive behaviour: KAP study. Hanoi, Viet Nam, National Committee on Population and Family Planning (unpublished final report submitted to the Programme in January, 1996).

Nilufer, C. (1998). Gender and Poverty. Social Development and Poverty Elimination Division, Working Paper Series, UNDP.

Office of the Council of State. (1997). The Constitution of the Kingdom of Thailand B.E. 2540. Office of the Prime Minister. Thailand.

Office of the Education Council. (2004). Education in Thailand 2004; Thailand: Ministry of Education.

Office of the Education Council. (2006). Education in Thailand 2005/2006; Thailand: Ministry of Education.

Office of the National Education Commission. (1999). National Education Act of B.E. 2542 (1999) and Amendments. Office of the Prime Minister. Kingdom of Thailand.

Office of the National Education Commission. (2001). Education in Thailand 2001/2002 Bangkok.

Office of the National Education Commission. (2003). Education in Thailand 2002/2003 Bangkok: Amarin Printing and Publishing.

Office of the National Educational and Social Development Board. (1998). Impact of the Economic Crisis on the Standard of Living in Thailand. Bangkok: National Educational and Social Development Board.

Ojwang, S.B.O. & Maggwa, A.B.N. (1991). Adolescent Sexuality in Kenya. *East African Medicine Journal*, 68, 74-80.

Olukoya, A.A., Kaya, A., Ferguson B.J., & AbouZahr, C. (2001). Unsafe Abortion in Adolescents. *International Journal of Gynecological and Obstetrics*, 75(2), 137-147.

Oppenheimer , V.K. (1997). Women's Employment and the Gain to Marriage: The Specialization and Trading Model, *Annual Review of Sociology*, 23,431-453.

Palmore, J.A. & Singarimbun, M. (1992). The Conflicting Effect of Delayed Marriage and Declining Divorces Rates on Cumulative Fertility in Indonesia. *Asian and Pacific Population Forum*, 6(1), 5-14.

Pathfinder International. (2002). Adolescents-Overview and Facts. A Comprehensive Training Course: Reproductive Services for adolescents. Vol 16. Watertown, MA.

Phaktoop, M. (2000). Impact of Migration on Age at First Marriage of Thai, *Journal of Population and Social Studies*, 8(2).

Podhisita, C. & Pattaravanich, U. (1995). Youth in Contemporary Thailand: Results from the Family and Youth Survey. Institute for Population and Social Research. Nakhon Pathom: Mahidol University.

Poonkhum, Y. (2003). Providing Adolescent-Friendly Reproductive Health Services: The Thai Experience. In Towards Adulthood: Exploring the Sexual and Reproductive Health of Adolescent in South Asia. Geneva: World Health Organization.

Poonkhum, Y., Warakamin, S., Permpaengpun, S., & Mahattano, K. (2002). Friend Corner: The Outreach Approach to HIV Prevention for Thai Adolescents. Nonthaburi: Department of Health.

Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. (2002).World Population Monitoring 2002: Reproductive

Health and Rights: Selected Aspects. Report prepared for the Commission of Population and Development -35th Session. New York.

Population Reference Bureau. (2006). The World's Youth 2006 Data Sheet. Washington, D.C: Population Reference Bureau.

Prachuabmoh, V. & Mithranon, P. (2003). Below Replacement Fertility in Thailand and Its Policy Implications. *Journal of Population Research*, 20(1), 35-50.

Pradhan,A., Aryal, R.H., Regmi, G., Ban, B., & Pavalavalli, G. (1997). Nepal Family Health Survey, 1996. Kathmandu, Nepal and Calverton, Maryland, Ministry of Health (Nepal), New ERA and Macro International Inc.

Punpuing, S., Guest, P., Pattaravanich, U., & Podhista, C. (2007). Association between Migratory Experience and Sexual Behavior among Young Adults in Thailand. Paper presented in Population Association of America, 2007 Annual Meeting Program, March 29-31, 2007 In New York.

Rahman, S., Nessa, F., Rahman, S., Ali, R., & Ara Ali, H. (1989). Reproductive Health of Adolescents in Banngladesh. *International Journal of Gynecological and Obstetrics*, *29, 329-335.*

Richter, K. and Podhisita, C. (1992). Thai Family Demography: A Review and Research Prospects. *Journal of Population and Social Studies*, 3 (2), 1-19.

Rindfuss, R., Parnell, A., and Hirschman, C. (1983.). The Timing of Entry into Motherhood in Asia: A Comparative Perspective. *Population Studie*s, 37, 253-272.

Ritchie, A., Lloyd, C.B., & Grant, M. (2004). Gender Differences in Time Use among Adolescents in Developing Countries: Implications of Rising School Enrollment Rates. Policy Research Division Working Paper. New York: Population Council.

Rose, D. (2000). Household Panel Studies: An Overview. In D Rose (Ed.). Researching Social and Economic Changes: The Uses of Household Panel Studies. Social Research Today Series. London: Rouledge.

Ruspini, E. (2002). Introduction to Longitudinal Research. London: Routledge.

Rutstein, S.O. & Johnson, K. (2004). The DHS Wealth Index. DHS Comparative Report No 6. Calverton, Maryland: ORC Macro.

Safa, H. (1998). Female-headed households in the Caribbean: Sign of Pathology of Alternative form of Family Organization. *The Brown Journal of World Affairs*. 5(2), 203-14.

Santhya, K.G. & Jejeebhoy, S. (2003). Sexual and Reproductive Health Needs of Married Adolescent girls. *Economic Political Weekly*, 38 (41),4370-77.

Santhya, K.G. & Haberland, N. (2005) Empowering Young Mothers in India: Transitions to Adulthood. Brief No.8. New York: Population Council, 2005.

Sariyant, T. (1997). Sex Education and Women's Health: Attitudes of Thai People toward Sex Education. An Unpublished Thesis. Master of Arts in the Department of Women's Studies, Simon Fraser University.

Sathar, Z.A., Haque, M., Faizunnissa, A., Sultana, M., Llyod, C.B., Diers, J.A., & Grant, M. (2002). Adolescents and Youth in Pakistan 2001-2002. A Nationally Representative Survey. Pakistan: Islamabad: Population Council.

Savitridina, R. (1997). Determinants and Consequences of Early Marriage in Java, Indonesia. *Asia-Pacific Population Journa*l, 12(2), 25-48.

Scott, J. (2000). Rational Choice Theory. In G., Halcli, A & Webster, F. (Ed.). From Understanding Contemporary Society: Theories of the Present. Sage Publications.

Senanyake, P. (1990). Adolescent Fertility. In Wallace, H.M. & Giri, K. (Eds.). Health Care of Women and Children in Developing Countries. Oakland: Third Party Publishing.

Senanayake, P. & Ladjali. M. (1994). Adolescent Health: Changing Needs. *International Journal of Gynecological and Obstetric*, 46, 137-143.

Shanthi, K. (1994). Growing Incidence of Female Household Headship: Causes and Cure, *Social Action*, New Delhi, 44:17-43.

Shanthi, K. (2006). Female Labour Migration in India: Insights from NSSO Data. Working Paper, Madras School of Economics, India: Chennai.

Singer, J.D. & Willett, J.B. (2003). Applied Longitudinal Data Analysis, Mediating Change and Event Occurrence. New York: Oxford University Press.

Singh, S. & Darroch, J. (2000). Adolescent Pregnancy and Childbearing: Levels and Trends in Developed Countries: F*amily Planning Perspectives*, 32,14-23.

Singh, S. & Samara, R. (1996). Early Marriage among Women in Developing Countries, *International Family Planning Perspectives*, 2, 148-157.

Singh, S. (1998). Adolescent Childbearing in Developing countries: A Global View. *Studies in Family Planning*, 29(2), 117-136.

Singh, S. Darroch, J.E., & Frost, J.J. (2001). Socioeconomic Disadvantage ad Adolescent Women's Sexual and Reproductive Behavior: The Case of Five Developed Countries. *Family Planning Perspectives*, 33, 251-258.

Sloggette, A. & Joshi, H. (1998). Deprivation Indicators as Predictors of Life Events 1981-1992 based on the UK ONS Longitudinal Study, *Journal of Epidemiology and Community Health*, 52, 228-233.

Smith, G., Kippax, S., & Aggleton, P. (2001). HIV and Sexual Health Education in Primary and Secondary Schools: Findings from Selected Asia-Pacific countries October 2000. National Centre in HIV Social Research, Faculty of Arts and Social Sciences. The University of New South Wales.

Steele, F. (2005). Event History Analysis. A National Centre for Research Methods Briefing Review Paper. Centre for Multilevel Modelling, Graduate School of Education, University of Bristol. Berkeley Square. Accessed on May 05, 2006 9am.www.ncrm.ac.uk/publications/methodsreview/MethodsReviewpaper.pdf.

Suebnukarn, K. & Phupong, V. (2005). Pregnancy Outcome in Adolescents less than 15 Years Old. *Journal of Medical Association of Thailand*, 88 (12), 1758-62.

Sunpuwan, M. & Podhisita, C. (2007). Gender differentials in transition to household headship: Evidence from the Kanchanaburi Demographic Surveillance System, Thailand. Unpublished Ph.D. Thesis. Institute for Population and Social Research. Mahidol University.

Swann, C. (2003). Teenage Pregnancy and Parenthood: A Review of Reviews—Evidence Briefing. London, UK, Health Development Agency.

Taneepanichskul, S., Phuapradit, W., & Chaturachinda, K. (1995). Adolescent Pregnancy with HIV-1 Positive in Ramathibodi Hospital 1991-1995. *Journal of Medical Association of Thailand,* 78(12), 688-91.

Tangmunkongvoraku, A. & Pratima, B. (2004). Gender and Sexual Health of Adolescent Females in Northern Thailand. In Henderson, V. and Yang, E (Ed.).

Researching Sexuality and Sexual Health in Southeast Asia and China. Indonesia: Yayasan Surviva Paski.

Teagle, S.E. & Brindis, C.D. (1998). Substance Use among Pregnant Adolescents: A Comparison of Self reported use and Provider perception. *Journal of Adolescent Health,* 22, 229-238.

Thailand Development Research Institute. (1999). Social Impacts of the Asian Economic Crisis in Thailand, Indonesia, Malaysia and the Philippines. Bangkok: Thailand Development Research Institute.

Thapa, S., Davey, J., Waszak, C., & Bhadra, R. (2001). Reproductive Health Needs of Adolescents and Youth in Nepal: Insights from a Focus Group Study. Family Health International, Population and Reproductive Health Office, Kathmandu, Nepal

The Center for Reproductive Law and Policy. (1999). Women's rights in Chile: Shadow Report 14: New York.

The World Bank. (2003). Urban poverty in East Asia: A Rreview of Indonesia, the Philippines, and the Vietnam. Working Paper no 11. The World Bank.

Turner, J. (1998). Assumptions of Rational Choice Theory. The Structure of Sociological Theory. Belmont, CA: Wadsworth Publishing Company.

UNESCO Institute for Statistics (UIS). (2006). Global Education Database: Montreal, Quebec, Canada. [Online]. Accessed on July 21, 2007 at 6pm Available from: http://stat.uis.unesco.org/ReportFolders/reportsfolders.aspx

UNESCO Institute for Statistics (UIS). (2007). Statistics in Brief: Education in Thailand. May 2007. Montreal, Quebec, Canada. [Online]. Available from: www.uis.unesco.org/profiles/en/edu/countryprofile_en.aspx. Accessed on July 21, 2007 at 6pm

UNESCO Institute for Statistics. (2007). Statistics in Brief: Education in Thailand. May 2007. Canada: Montreal, Quebec. Accessed on July 21, 2007 at 6pm.

[Online]. Available from: www.uis.unesco.org/profiles/en/edu/countryprofile.

UNESCO. (2000). The Education for All 2000 Assessment: Country reports. Accessed on May 05, 2006 at 12 noon Available on online: www.unesco.org/education/wef/countryreports/thailand/rapport_1.html.

United Nations (2001). World Population Prospects. The 2000 Revision, Volume 1: Comprehensive Tables. United Nations publication, Sales No. E.01.XIII.8.

United Nations Children Fund. (1998). The Progress of Nations, 1998. New York.

United Nations Children Fund. (2000). The Progress of Nations 2000, New York: UNICEF. [Online]. Available from: www.unicef.org/pan00/pan2000.pdf. Accessed 5 January 2003 7pm.

United Nations Economic and Social Commission for Asia and the Pacific. (2000). HRD through Adult Education: Innovative Approached Submitted for the 1998 HRD Award. Bangkok: ESCAP.

United Nations Economic and Social Commission for Asia and the Pacific. (2001). Reproductive Health Statistics: Country at a Glance. Population and Reproductive Health Compendium. Accessed on July 17 2007 on 10.30 pm. [Online]. www.unescap.org/esid/psis/population/database/thailanddata.htm.

United Nations Economic and Social Commission for Asia and the Pacific. (2004). The Population Data Sheet 2004. Bangkok: United Nations Economic Social Commission of Asian and Pacific. Accessed on 14th July, 2007 at 7.25 pm. http://www.unescep.org/esid/psis/population/database/data_sheet

United Nations Economic and Social Commission for Asia and the Pacific. (2005). The Population Data Sheet 2005. Bangkok: United Nations Economic Social Commission of Asian and Pacific. Accessed on 14th July, 2007 at 7.45 pm. http://www.unescep.org/esid/psis/population/database/data_sheet

United Nations Economic and Social Commission for Asia and the Pacific. (2006). The Population Data Sheet 2006. Bangkok: United Nations Economic Social Commission of Asian and Pacific. Accessed on 14th July, 2007 at 8.15 pm. http://www.unescep.org/esid/psis/population/database/data_sheet

United Nations Economic and Social Commission for Asia and the Pacific. (2007). The Population Data Sheet 2007. Bangkok: United Nations Economic Social Commission of Asian and Pacific. Accessed on 14th July, 2007 at 8.35 pm. http://www.unescep.org/esid/psis/population/database/data_sheet

United Nations Educational, Scientific and Cultural Organization. (2007). Education for All Global Monitoring Report: Strong Foundations. France: UNESCO.

United Nations Population Fund & EngenderHealth. (2003). Obstetric Fistula Needs Assessments Report: Findings from Nine African Countries. New York.

United Nations Population Fund. (1994). Programme of Action of the International Conference on Population and Development. New York: United Nations Population Fund.

United Nations Population Fund. (1998). Socioeconomic, Demographic and Reproductive Health Profiles of Adolescents in SAARC countries. UNFPA South Asia Conference on the Adolescent, New Delhi, 21-23 July.

United Nations Population Fund. (2003a). State of World Population 2003. Making 1 Billion Count: Investing in Adolescents' Health and Rights. New York: United Nations Population Fund.

United Nations Population Fund. (2003b). Report of the 2003 Field Inquire: Progress in the Implementation of the ICPD Programme of Action. New York: United Nations Population Fund.

United Nations Population Fund. (2005). Reproductive Health of Women in Thailand: Progress and Challenges towards Attainment of International Development Goals. UNFPA Country Technical Services Team for East and South-east Asia.

United Nations. (1995). Population and Development: Programme of Action at the International Conference on Population and Development, Cairo, 5-13 September 1994. United Nations publications, Sales No. E.95.XIII.7.

United Nations. (1999). Review and Appraisal of the Progress made in achieving the Goals and Objectives of the Programme of Action of the International Conference on Population and Development: 1999 Report. United Nations publications, Sales No. E.99.XIII.16.

United Nations. (2000a). World Marriage Patterns 2000. Population Division. Department of Economic and Social Affairs. New York: United Nations.

United Nations. (2000b). United Nations Millennium Declaration: General Assembly resolution 55/2. New York: United Nations.

United Nations. (2000c). Youth in Thailand: A Review of the Youth Situation and National Policies and Programs. New York: United Nations.

United Nations. (2002). World Population Monitoring 2002: Reproductive Rights and Reproductive Health .United Nations publications, Sales No. E.02.XIII.14.

United Nations. (2004). Implementing the ICPD Agenda: 10 years into the Asia-Pacific experience, A Status Report. United Nations publications, Sales No. E.04.II.F.46.

United Nations. (2006). The Millennium Development Goals Report. New York.

US Census Bureau. (1996). World Population Profile. Washington, D.C.

VanLandingham, M., Knodel,J., Saengtienchai, C., & Pramulratana. (1995). Friends, Wives and Extramarital Sex in Thailand: A Qualitative Study of Peer and Spousal Influence on Thai Male Extramarital Sexual Behaviour and Attitudes. Bangkok: Chulalongkorn University.

VanLandingham, M.J., Suprasert, S., Sittitrai, W., Vaddhanaphuti, C., & Grandjean, N. (1993). Sexual Activity among Never-Married men in Northern Thailand, *Demography*, 30(3), 297-313.

Ventura, S.J. & Freedman, M.A. (2000). Teenage Childbearing in the United States, 1960-1997. *American Journal of Preventive Medicine*, 19(1S),18-25.

Vermunt, J.K. & Moors, G. (2005). Event History Analysis. John Wiley and Sons Ltd.

Villarreal, M. (1998). Adolescent Fertility: Socio-cultural Issues and Programme Implications. SDdimenstions, Rome, FAO Women and Population division. Paper prepared for Population Programme Service [Online]. Available from:

Vong-ek, P., Inprom, P., & Santiphop, T. (2006). A Survey of Pregnancy, Birth and Early Life in Kanchanaburi Project (2003), Institute for Population and Social Research, Mahidol University, Thailand.

Vuttanont, U., Greenhalgh, T., Griffin, M., & Boynton, P. (2006). Smart Boys and Sweet Girls---Sex education Needs in Thai Teenagers: A Mixed Method. *Lancet*, 9, 368 (9552): 2068-80.

Waldron, I.L.D. (1990). Relationship between Teenage Smoking and Attitudes towards Women's Rights, Sex roles, Marriage, Sex and Family. *Journal of Women Health*, 16(3), 23-46.

Warakamin, S. & Nongluk, B. (2000). Abortion Situation in Thailand, 1999. Family Planning and Population Division. Department of Health. Ministry of Public Health.

Warakamin, S. & Takrudtong, M. (1998). Reproductive Health in Thailand: An Over View: Fact sheet. Family Planning and Population, 1 (6).

Warakamin, S., Boonthai, N., & Tangcharoensathien, V. (2004). Induced Abortion in Thailand: Current Situation in Public Hospitals and Legal Perspectives. *Reproductive Health Matters*, 12(24), 147-156.

Watcharaseranee, N., Pinchantra, P., & Piyaman, S. (2006) The Incidence and Complications of Teenage Pregnancy at Chonburi Hospital. *Journal of the Medical Association of Thailand*, 89 (suppl 4), 118-23.

White, H.R., Pandina, R.J. & Chen, P.H. (2002). Development Trajectories of Cigarette Use from Early Adolescence into Young Adulthood. *Drug and Alcohol Dependence, 65(2), 167-178.*

White, M.J., Djamba, Y., & Anh, D.N. (2001). Implications of Economic Reform and Spatial Mobility on Fertility in Vietnam, *Population Research and Policy Review*, 20, 207-228.

White, M.J., Moreno, L., & Guo, S. (1995). The Interrelationship of Fertility and Migration in Peru: A Hazard Model analysis, *International Migration Review*, 29, 492-524.

Wickrama, K. & Keith, P. (1990). Use and Evaluation of Healthcare Services by Male and Female Headed Households in Rural Sri Lanka. *Journal of Developing Areas*, 2591, 1-14

Williams, N. (2006). Education, Gender and Migration. Department of Sociology, Population Studies Center, University of Michigan,

Wimolsiri, J. (2006). Thailand Law: Family Law of Thailand. [Online]. Available from: www.thailawforum.com/articles/familywinmol2.html. Accessed on July 21, 2007 at 9.30 am.

Winkels, J.W. and Withers, S.D. (2000). Panel Attrition. in D Rose (Ed.) Researching Social and Economic Changes, The Uses of Household Panel Studies. Social Research Today Series. London: Rouledge.

Winship, C. and Mare, R.D. (1992). Models for Sample Selection Bias. *Annual Review of Sociology*, 18, 327-50.

World Health Organization & United Nations Population Fund. (2006). Married Adolescents: No Place of Safety. Geneva. World Health Organization Publication.

World Health Organization and United Nations Population Fund. (2006). Pregnant Adolescents: Delivering on Global Promises of Hope. Switzerland: Geneva.

World Health Organization, United Nations Children Fund & United Nations Population Fund. (2003). Adolescents: Profiles in Empowerment.Geneva.

World Health Organization. (1975). Pregnancy and Abortion in Adolescence: Report of a WHO Meeting, Technical Report Series 583. Geneva.

World Health Organization. (1998). Regional Health Report: Focus on Women. Southeast Asian Region, New Delhi: World Health Organization.

World Health Organization. (2000). Global Programme on Evidence. Geneva: World Health Organization.

World Health Organization. (2002). Adolescent Friendly Health Services: An Agenda for Change. Geneva. Switzerland.

World Health Organization. (2004). Adolescent Pregnancy: Issues in Adolescent Health and Development. Department of Child and Adolescent Health and Development and Department of Reproductive Health and Research. WHO Discussion Paper on Adolescence. Geneva.

World Health Organization. (2006a). Pregnant Adolescents: Delivering on Global Promises of Hope. Geneva: World Health Organization.

World Health Organization. (2006b). Fact Sheet: Young People and HIV/AIDS. Regional Office for South-East Asia. New Delhi: World Health Organization.

World Health Organization. (2007a). Fact Sheet: Adolescent Health in Thailand. Adolescent Health and Development (AHD) Unit. Department of Family and Community Health. Regional Office for South-East Asia, New Delhi.

World Health Organization. (2007b). Adolescent Pregnancy-Unmet Needs and Undone Deeds: A Review of the Literature and Programmes. WHO Discussion Paper on Adolescence. Geneva: World Health Organization.

Wu, L. & Martinson, B. (1993). Family Structure and the Risk of a Premature Birth, *American Sociological Review*, 58(2), 210-232.

www.fao.org/sd/wpdirect.WPan004.htm. accessed on March, 04, 2007 at 1pm.

www.unescap.org/esid/psis/population/journal/1996/v11n3a3.htm

Xenos, P. & Gultiano, S.A. (1992). Trends in Female and Male Age at Marriage and Celibacy in Asia. Working Papers of the East-West Population Institutes, No 120. Honolulu: East-West Center.

Zabin, L.S. & Kiragu, K. (1998). The Health Consequences of Adolescent Sexual and Fertility Behaviour in Sub Saharan Africa. *Studies in Family Planning*, 29(2), 210-32.

Zabin, L.S. and Clark, S.D. (1981). Why They Delay: A Study of Teenage Family Planning Clinic Patients. *Family Planning perspectives*, 13 (September/October),205-217.

Zelnik, M. & Kantner, J.F. (1977). Sexual and Contraceptive experience of Young Unmarried Women in the United States, 1976 and 1971. *Family Planning Perspectives*, 9, 55-71.

Zelnik, M. & Shah, F.J (1983). First Intercourse among young Americans. *Family Planning Perspectives*, 15, 64-72.

Zelnik, M., Kantner, J., & Ford, K. (1981). Sex and Pregnancy in Adolescence. Beverly Hills, Calif: Sage Publications.

Zhu, N. (1991). A Review of the Historical Relationship between Migration and Marriage, *China Journal of Population Science*, 3(4), 327-39.

APPENDIX

Appendix A

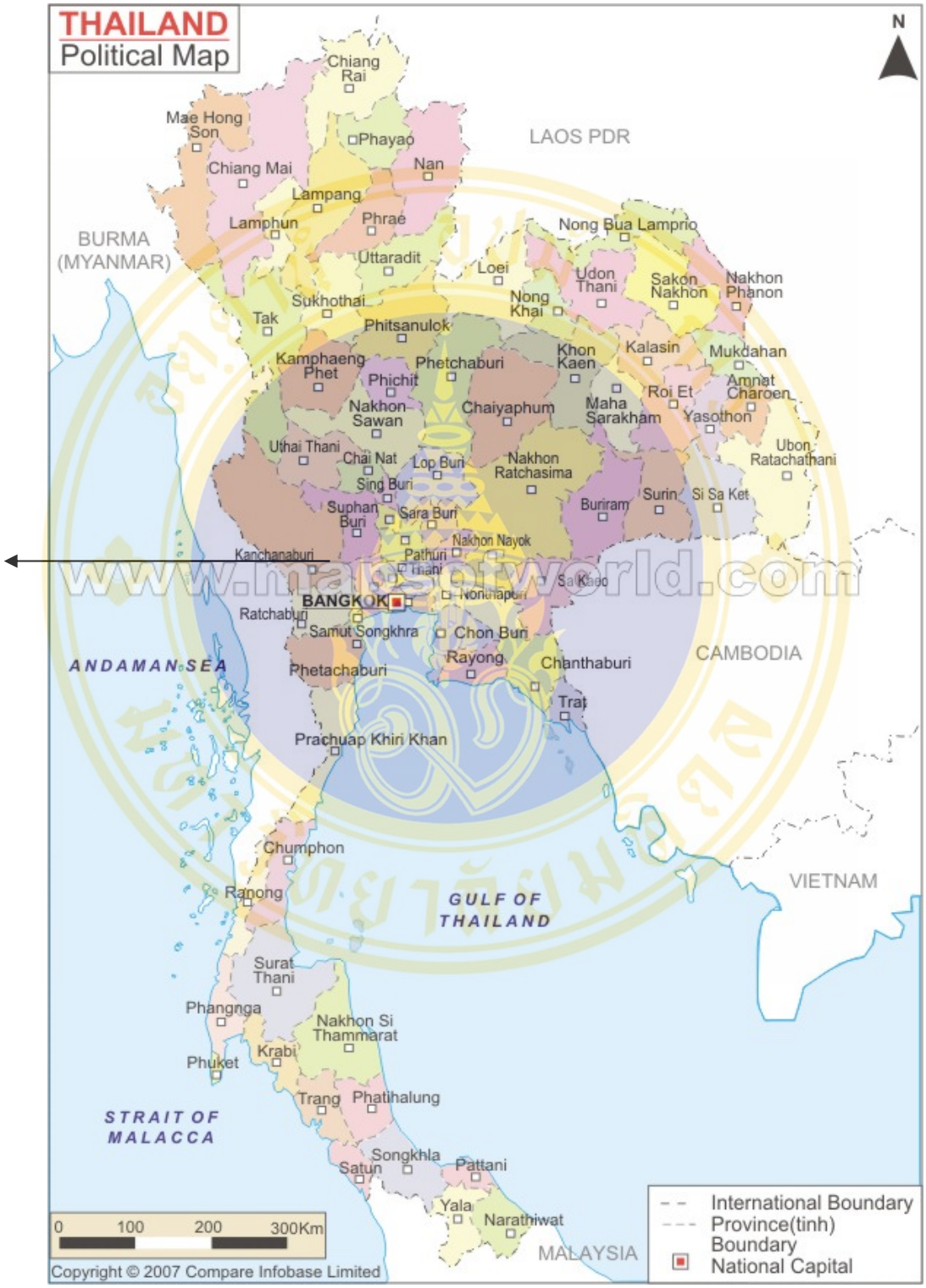

Figure A1 The Map of Thailand

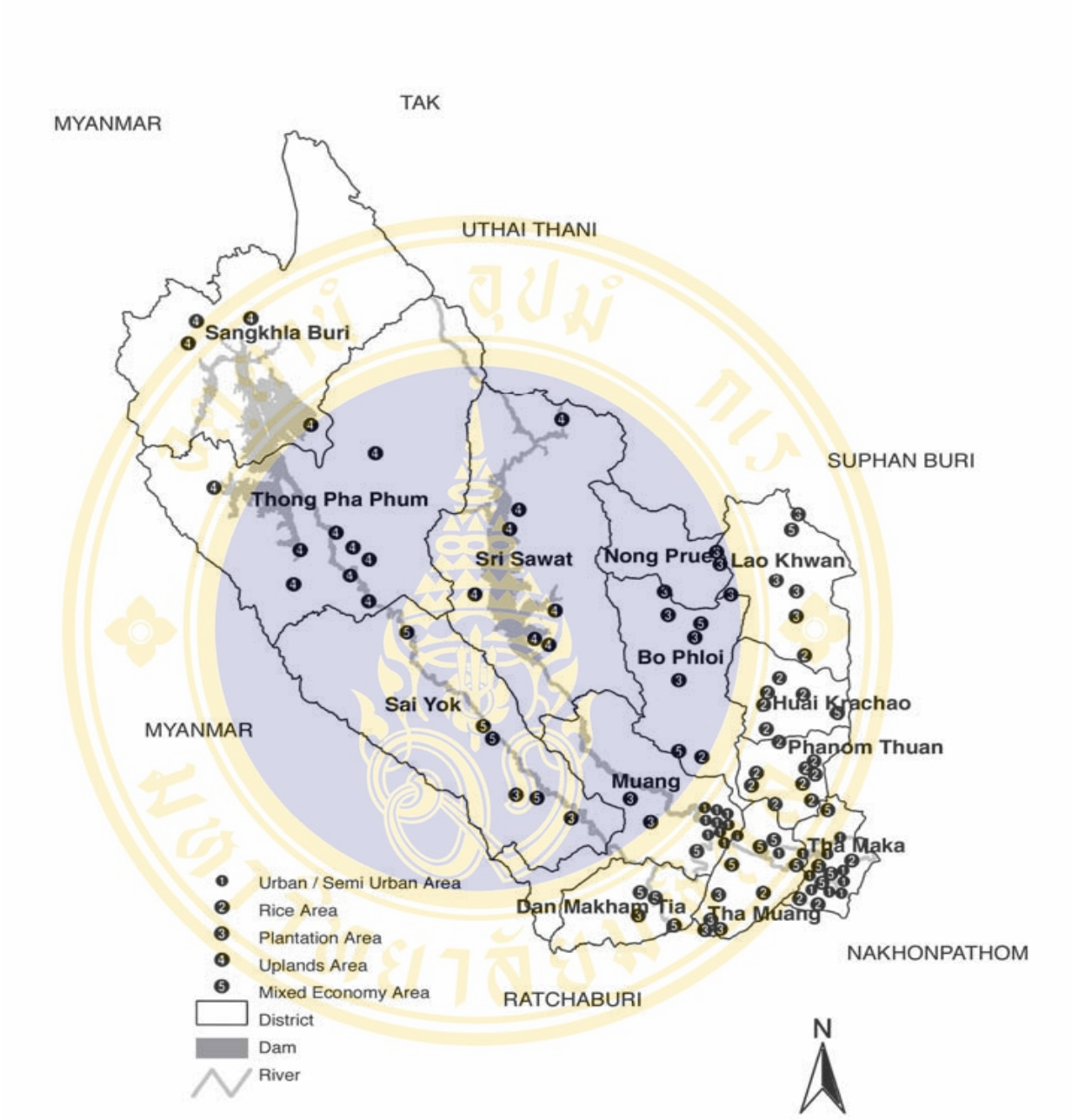

Figure A2 The Map of Distribution of Five Strata in the Study Area, Kanchanaburi Project Area

Table A1 Comparison of the Background Characteristics between Kanchanaburi province and the whole country, Thailand

Background Characteristics	Kanchanaburi Province	Thailand
Population in Municipal Area (%)	23.5	31.1
Nationality, Thai (%)	96	95
Religion, Buddhist (%)	99	94.6
Sex ratio (Males per 100 females)	98.4	97.0
Population, 15-59 years (%)	64.9	66.5
Females' singulate mean age at first marriage (SMAM)	23.4	24.1
Total Fertility Rate per woman	1.88	1.82
Mean number of children ever born (per ever married women 15-49 years)	2.02	1.7
Average years of education attainment of population aged 15 years and over	6.2	7.8
Population aged 6-24 years not attending school (%)	40.8	34.3
Adult Literacy Rate in percent	95.1	98.0
Average years of schooling	7.1	7.2
Population in the agricultural sector (%)	56.7	56.7
Average household size	3.8	3.9
Female headed household (%)	27.2	25.5
Access to improved water source in percent	93.5	92.6
Access to improved sanitation in percent	95.8	97.8
Topography	Plain and High land	Plain and High land

Source: Population and Housing Census, 2000, National Statistical Office and Ministry of Public Health, 2001.

Table A2 Singulate Mean Age at Marriage (SMAM) and Percentage of Ever Married Women Aged 15-19 Years in the Southeast Asian Region

Country	Year of Census or Survey	SMAM	Percentage of Ever Married (15-19)
Thailand	1990	23.5	15.2
Vietnam	1989	23.2	11.1
Philippines	1990	23.8	10.5
Brunei Darussalam	1991	25.1	8.0
Malaysia	1991	24.6	7.6
Myanmar	1997	26.4	6.6
Singapore	1990	27.0	1.2

Source: United Nations, 2000a

Table A3 Mean age at first marriage by Sex and Strata (Round 1)

		Strata (Round 1)				
		Urban/Semi Urban	Rice	Plantation	Upland	Mixed Economy
Sex	Male	25.3	24.1	23.6	23.7	24.2
	Female	22.2	21.3	20.2	19.6	20.9

Source: Report of Baseline Survey (2000) Kanchanaburi Project, Institute for Population and Social Research, Mahidol University

Table A4 Mean age at first marriage by Sex and Strata (Round 4)

		Strata (Round 4)				
		Urban/Semi Urban	Rice	Plantation	Upland	Mixed Economy
Sex	Male	26.6	25.5	24.5	24.2	24.9
	Female	22.6	21.3	20.6	19.5	20.4
Total	Male			25.1		
	Female			20.7		

Source: Report of Round 4 Survey (2003) Kanchanaburi Project, Institute for Population and Social Research, Mahidol University

Table A5 Total Fertility Rate (TFR) and Age Specific Fertility Rate (ASFR) of 15-19 years at the Southeast and South Asian region

Countries And Region	Year							
	2004		2005		2006		2007	
	TFR	ASFR (15-19)	TFR	ASFR (15-19)	TFR	ASFR (15-19)	TFR	ASFR (15-19)
Southeast Asian Region	2.4	43	2.4	42	2.3	40	2.3	34
Brunei Darussalam	2.4	25	2.4	29	2.4	28	2.3	28
Cambodia	4.6	58	3.6	45	3.6	45	3.4	43
Indonesia	2.3	54	2.3	53	2.2	53	2.2	41
Lao People's Democratic Republic	4.6	89	4.6	88	4.4	87	3.3	74
Malaysia	3.0	18	2.8	18	2.7	18	2.6	13
Myanmar	2.8	23	2.3	19	2.2	18	2.1	17
Philippines	3.1	36	3.3	38	3.2	37	3.2	37
Singapore	1.4	5	1.3	5	1.2	5	1.3	7
Thailand	1.7	58	1.7	56	1.6	43	1.6	42
Timor-Leste	3.7	24	7.5	175	7.4	172	6.6	55
Viet Nam	1.9	25	1.9	25	1.9	25	2.1	23
South Asian Region	3.1	51	3.0	72	3.0	71	2.9	64
Bangladesh	3.3	110	3.1	120	3.0	135	2.9	127
India	2.9	43	2.9	71	2.9	68	2.8	63
Nepal	3.7	102	3.6	102	3.5	108	3.3	115
Pakistan	4.9	51	4.0	69	3.9	68	3.6	34
Sri Lanka	1.9	27	1.9	18	1.9	18	1.9	26

Source: UNESCAP Data Sheet
Website: http://unescap.org/esid/psis/population/database/data_sheet , Accessed on July 14, 2007

Table A6 Age Specific Fertility Rate and Total Fertility Rate in Thailand, 1964-2006

Year/ Age	1964-65	1974-76	1985-86	1995-96	2005-06
15-19	**66.4**	**80.8**	**68.3**	**53.8**	**37.2**
20-24	258.9	238.8	166.4	125.7	86.4
25-29	302.6	246.7	141.6	106.6	80.0
30-34	273.1	182.1	86.0	68.4	58.8
35-39	222.4	142.8	56.1	35.9	25.2
40-44	112.3	70.4	21.5	11.4	6.4
45-49	24.1	18.1	6.1	2.8	0.3
TFR	6.2	4.9	2.7	2.02	1.5

Sources: Survey of Population Change, National Statistical Office 1967, 1977, 1987, 1997, 2007

Table A7 Age Specific Fertility Rate per 1000 female by Age Group of Mother, 2000 --2004

Year/ Age	2543 (2000)	2544 (2001)	2545 (2002)	2546 (2003)	2547 (2004)
15-19	**31.1**	**33.7**	**37.9**	**39.2**	**47.3**
20-24	73.6	75.6	75.6	73.1	80.6
25-29	80.3	79.8	76.5	72.6	80.7
30-34	59.9	61.3	53.6	51.1	57.4
35-39	28.4	29.4	25.4	24.8	27.1
40-44	7.4	7.8	6.9	6.7	7.1
45-49	1.0	0.9	0.8	0.7	0.7
50^{+}	0.0	0.0	0.0	0.0	0.0

รวบรวมและวิเคราะห์โดย : กลุ่มข้อมูลข่าวสารสุขภาพ สำนักนโยบายและยุทธศาสตร์

Collected and Analyzed by : Health Information Unit, Bureau of Health Policy and Strategy, Ministry of Public Health, 2005

หมายเหตุ : ปรับฐานข้อมูลเกิด ปี 2542

Note : Adjust data base birth 1999

Source: Health Information Unit, Bureau of Health Policy and Strategy, Ministry of Public Health, 2005

Table A8 Age Specific Fertility Rates (ASFR) of Women Aged 15-19 Years in the Kanchanaburi Project: 2000- 2004

Round	Year	Age Specific Fertility Rate (15-19)
Round 1	2000	78.21
Round 2	2001	69.29
Round 3	2002	64.66
Round 4	2003	68.73
Round 5	2004	77.24

Source: Guest and Jampaklay, 2003: 228; Guest, Punpuing and Jampaklay, 2004:143

Table A9 Age Specific Fertility Rate (ASFR) and Total Fertility Rate by Age group in Different Rounds

Age group	Different Rounds			
	Round 1	Round 2	Round 3	Round 4
15-19	**78.21**	**69.29**	**64.66**	**68.73**
20-24	128.74	133.2	126.44	145.06
25-29	97.8	102.61	105.61	93.91
30-34	61.27	69.13	65.15	60.37
35-39	40.05	35.93	31.99	29.05
40-44	11.06	7.42	10.51	7.83
45-49	1.92	2.79	1.79	0
TFR	2.1	2.1	2.03	2.02

Source: Report of Round 4 Census (2003) Kanchanaburi Project, Institute for Population and Social Research, Mahidol University

Table A10 Age Specific Fertility Rate (ASFR) and Total Fertility Rate by strata in Baseline Survey

Age group	Total ASFR	Age Specific Fertility Rate (ASFR) by Strata per 1000 women				
		Urban/ Semi Urban	Rice	Plantation	Upland	Mixed Economy
15--19	**78.21**	**43.04**	**72.34**	**67.31**	**168.79**	**46.51**
20—24	128.74	78.43	134.92	130.27	177.08	119.72
25—29	97.8	74.67	92.25	96.22	129.87	85.11
30—34	61.27	59.08	64.85	54.49	75.65	51.02
35—39	40.05	20.05	37.45	29.51	66.97	40.7
40—44	11.06	9.85	15.81	3.91	19.02	5.8
45—49	1.92	0	0	0	8.66	0
TFR	2.10	1.43	2.09	1.91	3.23	1.74

Source: Report of Baseline Survey (2000) Kanchanaburi Project, Institute for Population and Social Research, Mahidol University

Table A11 Age Specific Fertility Rate (ASFR) and Total Fertility Rate by strata in End line Census

Age group	Total ASFR	Age Specific Fertility Rate (ASFR) by Strata per 1000 women				
		Urban/ Semi Urban	Rice	Plantation	Upland	Mixed Economy
15--19	**77.24**	**44.22**	**68.63**	**79.21**	**117.02**	**75.00**
20—24	130.98	89.43	111.11	144.51	177.37	115.67
25—29	94.23	82.73	73.36	70.63	124.41	101.54
30—34	67.16	63.25	62.07	47.10	85.83	66.12
35—39	35.62	25.71	32.74	26.42	61.27	24.59
40—44	08.58	02.78	09.80	06.56	14.56	08.40
45—49	02.42	03.45	0	0	03.31	03.75
TFR	2.08	1.56	1.79	1.87	2.92	1.987

Source: Report of Round 5 Census (2004) Kanchanaburi Project, Institute for Population and Social Research, Mahidol University

Table A12 Number of total household, total population and total female population by census rounds

	Round 1	Round 2	Round 3	Round 4	Round 5
Total Household	11612	12657	12680	12356	12462
Total population	42614	46029	45043	42816	42938
Total Female population	22236	23832	23370	22466	22542

Table A13 Percentage of Live Birth by below 20 years Mothers, 1987-2003

Year	Percentage of live birth
1987	13.61
1988	13.32
1989	13.51
1990	13.62
1991	13.59
1992	13.17
1993	13.10
1994	13.16
1995	12.74
1996	12.51
1997	11.99
1998	12.90
1999	12.37
2000	11.66
2001	12.17
2002	12.38
2003	12.99

Source: Public Health Statistics, 1987-2003, Ministry of Public Health, cited in Kanchanachitra, et al., (2005).

Table A 14 Educational system according to the 1992 National Scheme of Education: Formal Education System

Approximate Age	Approximate Grade	Level of Education
3		Pre-elementary Education
4		
5		
6		
7	1	Elementary or Primary level Of education
8	2	
9	3	
10	4	
11	5	
12	6	
13	7	Lower Secondary Education
14	8	
15	9	
16	10	Upper Secondary Education
17	11	
18	12	
19	Year 1	Higher education: Diploma level and Bachelor's Degree level
20	Year 2	
21	Year 3	
22	Year 4	
23	Year 5	Higher education: Graduate Programme level • 1 year Graduate Diploma • 2 year Masters Degree • 3 year Doctoral Degree
24	Year 6	
25	Year 7	
26	Year 8	
27	Year 9	
28	Year 10	

Table A 15 Gross and net secondary enrolment rates by sex for 1992 and 1997

Year	Level	Gross enrolment			Net enrolment		
		Male	Female	Total	Male	Female	Total
1992	Lower secondary	61.5	57.0	59.3	35.7	37.3	36.5
1997	Lower secondary	91.7	91.7	91.7	54.3	56.0	55.1
1992	Upper secondary	18.2	22.2	20.1	12.4	15.3	13.8
1997	Upper secondary	33.4	39.0	36.2	21.0	27.2	24.0

Source: NESDB, 1998a

Table A 16 Gross and net secondary enrolment rates by area for 1992 and 1997

Year	Level	Gross enrolment			Net enrolment		
		Rural	Urban	Total	Rural	Urban	Total
1992	Lower secondary	53.2	76.8	59.3	33.1	46.4	36.5
1997	Lower secondary	93.7	86.8	91.7	53.5	59.2	55.1
1992	Upper secondary	16.5	31.1	20.1	11.7	20.0	13.8
1997	Upper secondary	34.2	41.0	36.2	22.0	29.0	24.0

Source: NESDB, 1998a

Table A 17 Drop-out rates for youth by age group, by sex and by area in 1992 and 1997

Year	Age group	By Sex			By Area		
		Male	Female	Total	Rural	Urban	Total
1992	15 to 17 years	56.9	59.5	58.2	65.0	37.2	58.2
1997	15 to 17 years	32.5	26.5	29.3	31.3	25.4	29.3
1992	18 to 24 years	88.0	88.9	88.4	93.1	75.3	88.4
1997	18 to 24 years	76.7	81.6	79.1	83.2	70.7	79.1

Source: NSO 1992 and NSO 1997

Table A18 Ratio of Girls to Boys in Primary, Secondary and Tertiary Education, 1990-2015 in Thailand

Indicators	1990	1995	2000	2002	MDG target by 2015
Ratio of girls to boys in primary education	0.95 (1991)	0.94 (1996)	0.93	n.a	1
Ratio of girls to boys in secondary education	0.97 (1991)	1.02 (1996)	1.01	n.a	1
Ratio of girls to boys in tertiary education	1 (1991)	1	1.12	1.15 (2001)	1

Source: Thailand Millennium Development Goals Report (2004).

Table A19 Percentage of Spontaneous and Induced Abortions, by age at the time of abortion, select hospitals, Thailand

Age at Spontaneous and Induced Abortion	Total N= 45,990	% of Spontaneous Abortion (n=32,900)	% of Induced Abortion (n= 13,090)
<15	0.5	0.3	0.7
15---19	15.5	13.6	20.3
20---24	25.2	24.9	25.8
25---29	22.6	23.7	19.9
30---34	18.2	18.7	16.7
35---39	12.0	12.4	5.5
>4.0	6.2	6.4	5.5
Total	100.0	100.0	100.0

Source: Warakamin and Nongluk, 2000

Table A20 Rates of Educational Continuation by educational Level, Academic Year 1994 - 2003

Educational Level	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Lower Secondary Education	84.9	87.3	90.1	91.2	88.3	88.0	89.9	92.7	90.0	92.5
Upper Secondary Education	95.7	94.5	92.2	86.0	82.1	84.8	82.5	80.2	88.2	82.0
Higher Education	91.5	96.2	92.5	92.8	83.3	80.7	81.1	80.2	83.1	80.8

Source: Office of the Education Council, Ministry of Education, cited in Thailand Health Profile, 1999-2000 and 2001-2004

Table A21 Gross Enrollment Ratio by Educational Level, Academic Year 1998 – 2005

Educational Level	1998	1999	2000	2001	2002	2003	2004	2005
Lower Secondary Education	85	83.4	82.8	82.2	82.2	84.6	89.9	82.9
Upper Secondary Education	53	55.3	57.4	59.3	60	58.5	58.1	54.5

Source: Office of the Education Council, Ministry of Education

Table A22 Transition Rate by Educational Level, Academic Year 1999 – 2005

Educational Level	1999	2000	2001	2002	2003	2004	2005
Lower Secondary Education	87.8	89.9	92.7	89.8	92.5	97.2	93.2
Upper Secondary Education (Academic stream)	52.9	52.8	51.3	53.5	50.3	48.7	48.4

Source: Office of the Education Council, Ministry of Education

Table A23 Educational Budget for Academic Year 1999 – 2006

Educational Budget	1999	2000	2001	2002	2003	2004	2005	2006
% of GDP	3.7	4.3	4.3	4.2	4.2	4.0	3.7	3.7
% of National Budget	25.1	25.7	24.6	21.8	23.5	24.4	21.0	21.7

Source: Office of the Education Council, Ministry of Education

Table A24 Laing Calendar Codes

Code	Label
1	Ligation
3	Norplant
4	Injection
5	IUD
6	Oral Pill
7	Condom
8	Withdrawal
9	Rhythm
10	Vaginal method
11	Induced abortion
12	Abstinence
13	Rhythm and withdrawal
14	Rhythm and condom
18	Live birth
20	Abortion
21	Confirm Gestation
22	Gestation due to oral pill
23	Gestation due to injection
27	Gestation due to condom
31	Gestation from rhythm
32	Gestation from withdrawal
33	Emergency pill
34	Gestation from rhythm and withdrawal
38	Gestation, due to FP not use
40	Gestation, FP not use, due to bad health
41	Gestation, FP not use, because do not know
44	Gestation, FP do not use
45	Gestation, FP not use, because want baby
46	Gestation, FP not use, because do not know
47	Gestation, FP not use, because afraid of side effect
48	Gestation, FP not use, because dislike method
50	Amenorrhea and pill
51	Amenorrhea and injection
53	Amenorrhea and ligation
55	Amenorrhea and condom
68	No period
69	Amenorrhea
70	Amenorrhea and FP not use
71	FP not use, due to lazy, forget
73	FP not use, Not in a good health
75	FP not use Husband, temporarily separated
76	Widowed, separated
81	Unable to have child
82	Single
83	Desire pregnancy
84	Breast feeding
85	FP not use, afraid of side effect
86	FP not use, dislike method

APPENDIX B

Steps of calculation to obtain True age in months at the time of Entry:

Step 1: Difference between YOE (year of entry) and YOB (year of birth) and multiply by 12 to get the months since birth, **MSB1**

(YOE – YOB) * 12 == **MSB1**

Step 2: Difference between MOB (month of birth) and MOE (month of entry) to get the difference in months, **Diff1**

MOB – MOE == **Diff1**

Step 3: MSB1 minus Diff1 to get TAE (True age at Entry).

TAE in months = MSB1 – Diff1

Steps of calculation to obtain True age in months at the time of Marriage:

Step 1: Difference between YOM (year of marriage) and YOB (year of birth) and multiply by 12 to get the months since birth, **MSB2**

(YOM – YOB) * 12 == **MSB2**

Step 2: Difference between MOB (month of birth) and MOM (month of marriage) to get the difference in months, **Diff2**

MOB – MOM == **Diff2**

Step 3: MSB2 minus Diff2 to get TAM (True age at Marriage).

TAM = MSB2 – Diff2

Steps of calculation to obtain True age in months at the time of Pregnancy:

Step 1: Difference between YOP (year of pregnancy) and YOB (year of birth) and multiply by 12 to get the months since birth, **MSB3**

(YOP – YOB) * 12 == **MSB3**

Step 2: Difference between MOB (month of birth) and MOP (month of pregnancy) to get the difference in months, **Diff3**

MOB – MOP == **Diff3**

Step 3: MSB3 minus Diff3 to get TAP (True age at Pregnancy).

TAP = MSB3 – Diff3

APPENDIX C

Table C1 Percentage Distribution of Individual Characteristics by Marital Status

Background Characteristics	Un Married	Married	Total Number of cases
Education			
No education or less than primary education	2.4	17.4	157
Primary education	14.0	33.7	484
Lower secondary education	27.7	33.4	748
Upper secondary or higher education	53.9	13.6	1126
Other	2.0	1.9	51
Work Status			
In school as a student and not working at all	64.8	3.0	1269
Out of school and not involved in any work	7.7	43.6	426
Out of school and working in agricultural sector	14.3	34.5	495
Out of school and working in non-agricultural sector	13.2	19.0	376
Migration Experience			
No	81.3	32.0	1771
Yes	18.7	68.0	795
Smoking			
No	99.5	93.4	2515
Yes	0.5	6.6	51
Drinking			
No	92.0	91.4	2357
Yes	8.0	8.6	209
Total in percentage	100	100	
Total in number	1928	638	2566

Table C1 Percentage Distribution of Household and Community Characteristics by Marital Status

Background Characteristics	Married	Unmarried	Total Number of cases
Strata of Residence			
Urban/ Semi urban	27.9	14.6	631
Rice field	17.9	11.8	420
Plantation	15.9	18.8	426
Uplands	17.6	32.8	548
Mixed economy	20.7	22.1	541
Household Wealth Index			
Poor	24.2	45.1	755
Average	49.1	42.6	1219
Rich	26.7	12.2	592
Family Structure			
Nuclear	45.6	28.1	1059
Extended	54.4	71.9	1507
Sex of Head of Household			
Male	66.1	75.4	1755
Female	33.9	24.6	811
Education of Head of Household			
No education or less than primary education	14.4	26.0	444
Primary education	60.9	60.5	1560
Lower secondary education	6.5	6.6	167
Upper secondary or higher education	15.9	5.0	339
Others	2.3	1.9	56
Occupation of Head of Household			
Not working	14.2	11.4	346
Working in agricultural sector	50.3	62.1	1366
Working in non-agricultural sector	35.5	26.5	854
Total in percentage	100	100	
Total number	1928	638	2566

TableC.2 Percentage Distribution of Individual Characteristics by Pregnancy Status

Background Characteristics	Non Pregnant	Pregnant	Total Number of cases
Education			
No education or less than primary education	4.5	17.0	157
Primary education	16.6	34.3	484
Lower secondary education	28.6	32.8	747
Upper secondary or higher education	48.2	14.3	1125
Other	2.1	1.5	53
Work Status			
In school as a student and not working at all	56.3	1.8	1265
Out of school and not involved in any work	9.7	68.4	443
Out of school and working in agricultural sector	19.0	18.5	486
Out of school and working in non-agricultural sector	15.0	11.2	372
Migration Experience			
No	74.9	41.3	1811
Yes	25.1	58.7	755
Smoking			
No	98.7	93.6	2516
Yes	1.3	6.4	50
Drinking			
No	91.4	94.5	2355
Yes	8.6	5.5	211
Experience of Pre Marital Sex			
No	100	41.9	2287
Yes	0	58.1	279
Family Planning Use			
Not Used	88.7	61.4	2186
Used	11.3	38.6	380
Pattern of Contraceptive Use			
Did not use FP method at all	86.8	9.1	1971
FP method used but failed	0	21.9	72
FP method discontinued due to other causes	3.0	68.1	292
Effective use of FP method	10.2	0.9	231

Table C.2 Percentage Distribution of Household and Community Characteristics by Pregnancy Status

Background Characteristics	Non Pregnant	Pregnant	Total Number of cases
Strata of Residence			
Urban/ Semi urban	26.2	13.4	631
Rice field	16.9	12.5	420
Plantation	16.0	20.4	426
Uplands	19.2	36.2	548
Mixed economy	21.6	17.6	541
Household Wealth Index			
Poor	26.8	47.1	754
Average	48.6	39.2	1217
Rich	24.6	13.7	595
Family Structure			
Nuclear	43.5	25.2	1056
Extended	56.5	74.8	1510
Sex of Head of Household			
Male	67.3	74.8	1752
Female	32.7	25.2	814
Education of Head of Household			
No education or less than primary education	16.0	26.1	444
Primary education	60.9	60.2	1561
Lower secondary education	6.4	6.4	164
Upper secondary or higher education	14.4	5.2	340
Others	2.2	2.1	57
Occupation of Head of Household			
Not working	13.7	12.2	346
Working in agricultural sector	52.0	59.9	1360
Working in non-agricultural sector	34.3	28.0	860
Total number	2237	329	2566

Table C 3: Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics[1]

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education ***												
No Education or less than Primary Education	19.23	41.35	70.68	77.63	82.11	0	0.212	0.317	0.666	0.269	16.26	157
Primary Education	10.09	25.67	50.03	61.29	64.33	0	0.106	0.189	0.392	0.254	16.96	484
Lower Secondary Education	7.29	20.96	42.86	59.10	68.36	0	0.075	0.159	0.321	0.331	17.18	748
Upper Secondary or Higher Education	0.45	1.49	6.50	11.99	15.29	0	0.004	0.010	0.052	0.060	20.00+	1126
Other Education	1.98	10.69	23.45	27.10	37.51	0	0.020	0.093	0.153	0.048	18.42	51
Work Status ***												
In school as a student and not working	15.75	35.76	64.44	77.08	82.27	0	0.171	0.269	0.574	0.432	16.46	426
Out of school and not involved in any work	0.25	0.75	1.76	2.66	4.01	0	0.002	0.005	0.010	0.009	20.00+	1269
Out of school and working in agricultural sector	9.51	24.07	45.97	56.85	61.87	0	0.099	0.175	0.336	0.224	17.04	495
Out of school and working in non-agricultural sector	4.66	13.84	31.36	43.70	48.66	0	0.047	0.101	0.226	0.197	17.64	376

Table C 3: Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Migration Experience* **												
Never Migrated	2.85	6.62	13.31	18.06	19.96	0	0.028	0.039	0.074	0.056	20.00+	1771
Migrated	10.82	28.02	55.16	70.07	77.87	0	0.114	0.213	0.464	0.398	16.82	795
Smoking ***												
No	4.89	12.79	26.24	35.36	40.92	0	0.050	0.086	0.167	0.131	17.91	2515
Yes	27.45	49.62	82.48	88.85	88.85	0	0.318	0.360	0.967	0.444	15.89	51
Drinking **												
No	5.22	13.48	27.53	36.92	41.73	0	0.053	0.091	0.176	0.138	17.82	2357
Yes	6.86	14.74	28.65	34.59	45.49	0	0.071	0.088	0.177	0.087	17.74	209
Sex of Head of Household												
Male Head of Household	6.33	14.99	29.99	39.01	45.43	0	0.065	0.096	0.193	0.137	18.59	1755
Female Head of Household	3.23	10.50	22.21	31.41	34.05	0	0.032	0.078	0.140	0.125	18.30	811

Table C 3: Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education of Head of Household ***												
No Education or less than Primary Education	9.82	23.88	40.84	51.49	59.58	0	0.103	0.169	0.250	0.197	17.07	444
Primary Education	4.88	12.88	27.41	36.74	41.47	0	0.05	0.087	0.181	0.137	17.83	1560
Lower Secondary Education	6.83	13.28	31.80	37.33	37.33	0	0.070	0.071	0.239	0.084	17.63	167
Upper Secondary or Higher Education	0.92	3.74	9.55	15.88	22.23	0	0.009	0.028	0.062	0.072	20.00+	339
Other Education	5.61	12.12	23.46	34.01	34.01	0	0.057	0.071	0.137	0.148	18.15	56
Occupation of Head of Household **												
Not involved in any work	3.63	10.60	22.28	30.54	40.12	0	0.037	0.075	0.139	0.112	18.33	346
Agricultural work	7.15	17.35	32.34	41.70	45.09	0	0.074	0.116	0.199	0.148	17.51	1366
Non agricultural work	3.17	8.71	22.13	31.09	37.93	0	0.032	0.058	0.158	0.122	18.32	854
Family Structure ***												
Nuclear Family	3.54	9.38	20.19	25.69	27.61	0	0.036	0.062	0.126	0.071	18.87	1059
Extended Family	6.61	16.51	32.63	43.90	51.35	0	0.068	0.111	0.213	0.182	17.53	1507

Table C3: Life Table Estimates of Proportion Experiencing First Marriage by Background Characteristics (Continued)

Background Characteristics	Proportion Experiencing of Marriage at Age at First Marriage					Hazard Rate at Age at First Marriage					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Household Wealth Index ***												
Poor	8.38	21.35	43.35	54.44	59.56	0	0.087	0.152	0.325	0.217	17.17	755
Average	4.78	11.66	23.98	32.72	39.76	0	0.049	0.074	0.149	0.122	18.12	1219
Rich	2.65	7.57	14.53	21.12	22.88	0	0.026	0.051	0.078	0.080	20.00+	592
Strata of Residence ***												
Urban/Semi Urban	2.32	5.77	16.49	23.64	27.96	0	0.023	0.035	0.120	0.089	19.31	631
Rice	2.74	9.63	17.79	28.07	42.17	0	0.027	0.073	0.094	0.133	18.70	420
Plantation	7.78	17.26	31.11	40.34	42.47	0	0.080	0.108	0.182	0.143	17.56	426
Uplands	9.84	22.84	42.93	52.25	59.71	0	0.103	0.155	0.299	0.177	17.11	548
Mixed Economy	4.44	13.35	29.26	39.06	40.71	0	0.045	0.097	0.202	0.148	17.73	541
Total number of cases												2566

* P<0.05 ** P<0.01 *** P<0.001

[1] Characteristics of those who experience marriage are measured at the time of event occurred and for censored cases, characteristics are measured at the time of censoring.

Table C4: Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics[1]

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education ***												
No Education or less than Primary Education	3.85	13.16	23.83	41.33	53.55	0	0.039	0.101	0.130	0.259	18.07	157
Primary Education	2.37	9.18	21.92	34.04	45.46	0	0.024	0.072	0.150	0.168	18.25	484
Lower Secondary Education	1.80	8.13	20.02	35.17	41.82	0	0.018	0.067	0.138	0.209	18.33	747
Upper Secondary or Higher Education	0	0.470	2.87	7.03	9.46	0	0.00	0.005	0.024	0.043	20.00+	1125
Other Education	0.0	0.0	4.94	15.50	15.50	0	0.0	0.0	0.050	0.117	20.00+	53
Work Status ***												
Out of school and not involved in any work	5.76	18.97	41.33	65.34	73.34	0.0	0.059	0.150	0.320	0.515	17.27	443
In school as a student and not working	0.08	0.29	0.72	0.72	0.72	0.0	0.0008	0.002	0.004	0.0	20.00+	1265
Out of school and working in agricultural sector	0.63	3.74	10.01	16.88	25.81	0.0	0.006	0.031	0.067	0.079	19.91	486
Out of school and working in non-agricultural sector	0	2.52	6.75	14.71	21.47	0.0	0.0	0.025	0.044	0.089	20.00+	372

Table C4: Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Contd.)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Migration Experience* **												
Never Migrate	0.52	2.83	6.37	13.15	19.24	0.0	0.005	0.023	0.037	0.075	20.00+	20.00+
Migrated	2.73	9.14	23.09	37.50	45.26	0.0	0.027	0.068	0.166	0.206	18.13	18.13
Smoking ***												
No	1.12	4.49	11.28	20.45	26.69	0.0	0.011	0.034	0.074	0.109	19.73	2516
Yes	4.00	16.26	25.69	45.08	65.67	0.0	0.040	0.136	0.119	0.300	17.93	50
Drink alcohol **												
No	1.20	4.84	11.92	21.87	29.16	0.0	0.012	0.037	0.077	0.119	19.43	2355
Yes	0.98	3.81	8.30	13.10	16.88	0.0	0.009	0.029	0.047	0.053	20.00+	211
Sex of Head of Household												
Male Head of Household	1.49	5.65	13.09	22.16	28.71	0.0	0.015	0.043	0.082	0.110	19.43	1752
Female Head of Household	0.52	2.79	8.31	18.85	26.85	0.0	0.005	0.023	0.058	0.122	19.77	814

Table C4: Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Contd.)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Education of Head of Household ***												
No Education or less than Primary Education	1.64	7.28	16.35	29.93	40.59	0.0	0.016	0.059	0.102	0.176	18.64	444
Primary Education	1.21	4.54	11.93	20.69	27.30	0.0	0.012	0.034	0.080	0.104	19.65	1561
Lower Secondary Education	1.90	6.29	11.33	21.97	27.75	0.0	0.019	0.045	0.055	0.127	19.55	164
Upper Secondary or Higher Education	0.31	1.72	4.62	9.91	9.91	0.0	0.003	0.014	0.029	0.057	20.00+	340
Other Education	0.0	4.30	7.12	21.05	36.84	0.0	0.0	0.044	0.029	0.162	19.25	57
Occupation of Head of Household												
Not involved in any work	0.61	4.13	10.53	19.55	24.36	0.0	0.006	0.036	0.069	0.106	20.00+	346
Agricultural work	1.84	6.24	13.06	22.24	31.70	0.0	0.018	0.045	0.075	0.111	19.29	1360
Non agricultural work	0.360	2.63	9.76	20.02	23.33	0.0	0.003	0.023	0.076	0.120	20.00+	860
Family Structure **												
Nuclear Family	0.790	2.85	6.85	13.94	17.42	0.0	0.008	0.021	0.042	0.079	20.00+	1056
Extended Family	1.45	6.08	14.87	25.93	35.02	0.0	0.014	0.048	0.098	0.139	18.92	1510

Table C4: Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Contd.)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Household Wealth Index ***												
Poor	2.48	7.22	17.08	32.90	40.85	0.0	0.025	0.049	0.112	0.211	18.50	754
Average	0.51	3.90	9.87	17.14	24.74	0.0	0.005	0.034	0.064	0.084	20.00+	1217
Rich	0.88	3.34	8.07	12.56	15.90	0.0	0.009	0.025	0.050	0.050	20.00+	595
Strata of Residence **												
Urban/Semi Urban	0.500	2.43	5.55	12.67	16.93	0.0	0.005	0.019	0.032	0.078	20.00+	631
Rice Field	0.25	3.42	10.78	15.15	25.92	0.0	0.002	0.032	0.079	0.050	19.91	420
Plantation	1.71	6.49	13.91	26.21	32.36	0.0	0.017	0.049	0.082	0.153	18.90	426
Uplands	2.84	8.47	18.30	33.31	44.64	0.0	0.028	0.059	0.114	0.202	18.45	548
Mixed Economy	0.580	3.27	10.46	17.79	20.75	0.0	0.005	0.027	0.077	0.085	20.00+	541
Experience of Pre Marital Sex**												
No experience	0.55	2.32	5.70	9.70	15.50	0.0	0.005	0.017	0.035	0.043	20.00+	2287
Yes, have experience	6.20	22.73	49.68	79.57	86.91	0.0	0.064	0.193	0.422	0.845	17.08	279

Table C 4: Life Table Estimates of Proportion Experiencing First Pregnancy by Background Characteristics (Contd.)

Background Characteristics	Proportion Experiencing of Pregnancy at Age at First Pregnancy					Hazard Rate at Age at First Pregnancy					Survival time at 25th percentile	Number of case
	15	16	17	18	19	15	16	17	18	19		
Family Planning Use ***												
Not used												
Used												
Pattern of Contraceptive Use ***												
Did not use FP method at all	0.43	1.13	2.03	2.19	2.19	0.0	0.004	0.007	0.009	0.001	20.00+	1971
FP method used but experienced failure	5.56	26.39	65.28	92.28	100	0.0	0.06	0.247	0.717	1.125	16.93	72
FP method discontinued due to other causes	5.83	22.92	49.35	79.00	89.31	0.0	0.060	0.199	0.413	0.827	17.08	292
Effective use of FP method	0.0	0.47	1.05	1.92	1.92	0.0	0.0	0.004	0.006	0.008	20.00+	231
Total number of cases												

* P<0.05 ** P<0.01 *** P<0.001

[1] Characteristics of those who experience pregnancy are measured at the time of event occurred and for censored cases characteristics are measured at the time of censoring.

Table C5 Odds Ratios of First Marriage by Socio-Economic and Demographic Predictors

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Strata of Residence			
Urban/ Semi Urban	0.63 (0.145)**	0.71 (0.152) *	0.77 (0.191)
Rice Field	0.58 (0.154)***	0.57 (0.15)***	0.83 (0.197)
Plantation	1.07 (0.138)	1.03 (0.032)	0.85(0.172)
Uplands	1.32 (0.130)*	1.20 (0.179)	0.72 (0.179)
Mixed Economy ®			
Family Structure			
Nuclear Family	0.36 (0.096) ***	0.32 (0.09) ***	0.36 (0.13) ***
Extended Family ®			
Household Wealth Index			
Poor	3.50 (0.149) ***	3.48 (0.15) ***	1.20 (0.203)
Average	1.73 (0.139) **	1.67 (0.14)***	1.17 (0.180)
Rich ®			
Sex of Head of Household			
Male Head of Household		1.62 (0.11)***	1.51 (0.135)**
Female Head of Household ®			
Education of Head of Household			
No Education or less than Primary Education		2.45 (0.22)***	0.96 (0.28)
Primary Education		1.91 (0.20)**	1.22 (0.246)
Lower Secondary Education		2.21 (0.25)**	1.65 (0.318)
Others Education		1.72 (0.38)	0.84 (0.493)
Upper Secondary or Higher education ®			
Occupation of Head of household			
Not doing any economical work		0.70 (0.161)*	0.90 (0.201)
Working in agricultural sector		0.86 (0.112)	0.85 (0.153)
Working in non-agricultural sector ®			

Table C5 Odds Ratios of First Marriage by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E)	Odds Ratio (S.E)	Odds Ratio (S.E)
	Model 1	Model 2	Model 3
Age at time of the Survey			
15-16 years			0.51 (0.117)***
17-19 years ®			
Education			
No Education or less than Primary Education			3.58 (0.261)***
Primary Education			1.00 (0.184)
Lower Secondary Education			1.16 (0.178)
Others Education			1.00 (0.412)
Upper Secondary or Higher education ®			
Work Status			
Out of school and not involved in any economical work			2.71 (0.157) ***
In school as a student and not working at all			0.05 (0.270) ***
Out of school and working in agricultural sector			1.44 (0.169)*
Out of school and working in non-agricultural sector ®)			
Migration Experience			
No			0.13*** (0.114)
Yes ®			
Smoking			
No			0.42* (0.347)
Yes ®			
Drinking			
No			0.65* (0.189)
Yes ®			
Constant	0.126 (0.145) ***	0.057 (0.243) ***	2.346 (0.502)
Model Chi square	309.550***	358.982***	1669.210***
-2 Log likelihood	3463.840	3414.408	2104.180

Note: ® means reference category and number within brackets refer to standard error.

* P<0.05 ** P<0.01 *** P<0.001

Table C6 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Strata of Residence			
Urban/ Semi Urban	0.72 (0.209)	0.77(0.216)	0.99(0.255)
Rice	0.84 (0.212)	0.84 (0.213)	1.22 (0.256)
Plantation	1.52 (0.189)*	1.49 (0.190)*	1.49 (0.227)
Uplands	1.85 (0.179)**	1.74 (0.19)**	1.25 (0.229)
Mixed Economy ®			
Family Structure			
Nuclear Family	0.33 (0.133)***	0.30(0.136)***	0.42(0.167)***
Extended Family ®			
Household Wealth Index			
Poor	2.60(0.193)***	2.67(0.206)***	1.07 (0.251)
Average	1.28 (0.184)	1.25(0.189)	0.82 (0.223)
Rich ®			
Education of Head of Household			
No Education or less than Primary Education		2.14(0.297)*	0.71 (0.354)
Primary Education		1.88 (0.271)*	0.93 (0.317)
Lower Secondary Education		2.00 (0.342)*	1.11 (0.415)
Others Education		1.73 (0.481)	0.72 (0.584)
Upper Secondary or Higher education ®			
Sex of Head of Household			
Male		1.50 (0.14)**	1.20 (0.172)
Female ®			

TableC6 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Occupation of Head of household			
Not working		0.69 (0.208)	0.79 (0.252)
Working in agricultural sector		0.73 (0.148)*	0.83 (0.184)
Working in non-agricultural sector ®			
Age at time of the Survey			
15-16 years			0.41 (0.155)***
17-19 years ®			
Completed Education			
No Education or less than Primary Education			2.05 (0.325)*
Primary Education			1.18 (0.233)
Lower Secondary Education			1.06 (0.227)
Others Education			0.79 (0.554)
Upper Secondary or Higher education ®			
Work Status			
Out of school and not involved in any work			7.40 (0.210)***
In school as a student and not working at all			0.07(0.465)***
Out of school and working in agricultural sector			0.97 (0.249)
Out of school and working in non-agricultural sector ®)			

TableC6 Odds Ratios of First Pregnancy by Socio-Economic and Demographic Predictors (Continued)

Socio-Economic and Demographic Predictors	Odds Ratio (S.E) Model 1	Odds Ratio (S.E) Model 2	Odds Ratio (S.E) Model 3
Migration Experience			
No			0.45(0.145)***
Yes ®			
Smoking			
No			0.65(0.365)
Yes ®			
Drinking			
No			0.47(0.279)**
Yes ®			
Contraceptive Use			
No			2.81 (0.1)***
Yes ®			
Constant	0.060***	0.032***	0.224
Model Chi square	184.585***	206.277***	1002.625***
-2 Log likelihood	2215.821	2194.128	1397.781

Note: ® means reference category and number within brackets refer to standard error.
* P<0.05 ** P<0.01 *** P<0.001

APPENDIX D

Table D1: Relationship between Selected and Non-Selected Respondents by Socio-Economic and Demographic Characteristics

Characteristics	Selected Respondents		Non Selected Respondents		Chi Square
	Number	Percentage	Number	Percentage	
Marriage					
Censored, event did not occur	1928	75.1	0	0	0.000
Event occurred	638	24.9	370	100	
Pregnancy					
Censored, event did not occur	2237	87.2	163	44.1	0.000
Event occurred	329	12.8	207	55.9	
Exact Age of Respondent at the time of census					
15-16 years	1896	73.9	229	61.9	0.000
17-19 years	670	26.1	141	38.1	
Education					
No education and less than primary education	161	6.3	155	41.9	0.000
Primary education	515	20.1	138	37.3	
Lower secondary education	1263	49.2	62	16.8	
Upper secondary or higher education	600	23.4	609	20.7	
Others	27	1.1	6	1.6	
Working Status					
Out of school and have no economical job	378	14.7	181	48.9	0.000
Student	1410	54.9	6	1.6	
Working in agricultural sector	464	18.1	132	35.7	
Working in non-agricultural sector	314	12.2	51	13.8	
Migration Experience					
Ever migrated	849	33.1	144	38.9	0.016
Never migrated	1717	66.9	226	61.1	

Table D1: Relationship between Selected and Non-Selected Respondents by Socio-Economic and Demographic Characteristics (Contd.)

Characteristics	Selected respondents		Non selected respondents		Chi square
	Number	Percentage	Number	Percentage	
Smoking					
Yes	48	1.9	53	14.3	0.000
No	2518	98.1	317	85.7	
Drinking					
Yes	187	7.3	39	10.5	0.021
No	2379	92.7	331	89.5	
Strata of Residence					
Urban/ Semi urban	631	24.6	39	10.5	0.000
Rice field	420	16.4	28	7.6	
Plantation	426	16.6	42	11.4	
Uplands	548	21.4	198	53.5	
Mixed economy	541	21.1	63	17.0	
Family Structure					
Nuclear	1203	46.9	177	47.8	0.386
Extended	1363	53.1	193	52.2	
Household Wealth Index					
Poor	778	30.3	263	71.1	0.000
Average	1228	47.9	86	23.2	
Rich	560	21.8	21	5.7	
Sex of Head of Household					
Male	1788	69.7	303	81.9	0.000
Female	778	30.3	67	18.1	
Education of Head of Household					
No education and less than primary education	453	17.7	167	45.1	0.000
Primary education	1568	61.1	179	48.4	
Lower secondary education	186	7.2	8	2.2	
Upper secondary or higher education	307	12.0	10	2.7	
Others	52	2.0	6	1.6	
Occupation of Head of Household					
No economical work	328	12.8	29	7.8	0.000
Working in agricultural sector	1425	55.5	250	67.6	
Working in non-agricultural sector	813	31.7	91	24.6	
Total	**2566**	**100**	**370**	**100**	

Table D2: Relationship between Selected Respondents and Selected Non-Respondents by Socio-Economic and Demographic Characteristics

Characteristics	Selected Respondents		Selected Non Respondents		Chi Square
	Number	Percentage	Number	Percentage	
Exact Age of Respondent at the time of Survey					
15-16 years	1213	83.7	683	61.2	0.000
17-19 years	237	16.3	433	38.8	
Education					
No education and less than primary education	42	2.9	119	10.7	0.000
Primary education	252	17.4	263	23.6	
Lower secondary education	779	53.7	484	43.4	
Upper secondary or higher education	368	25.4	232	20.8	
Others	9	0.6	18	1.6	
Work Status					
Out of school and has no work	134	9.2	244	21.9	0.000
Student	971	67.0	439	39.3	
Working in agricultural sector	212	14.6	252	22.6	
Working in non-agricultural sector	133	9.2	181	16.2	
Migration Experience					
Ever migrated	260	17.9	589	52.8	0.000
Never migrated	1190	82.1	527	47.2	
Smoking					
Yes	12	0.8	36	3.2	0.000
No	1438	99.2	1080	96.8	
Drinking					
Yes	86	5.9	101	9.1	0.002
No	1364	94.1	1015	90.9	

Table D2: Relationship between Selected Respondents and Selected Non-Respondents by Socio-Economic and Demographic Characteristics (Contd.)

Characteristics	Selected Respondents		Selected Non Respondents		Chi square
	Number	Percentage	Number	Percentage	
Strata of Residence					
Urban/ Semi urban	337	23.2	294	26.3	0.000
Rice field	281	19.4	139	12.5	
Plantation	258	17.8	168	15.1	
Uplands	241	16.6	307	27.5	
Mixed economy	333	23.0	208	18.6	
Family Structure					
Nuclear	785	54.1	418	37.5	0.000
Extended	665	45.9	698	62.5	
Household Wealth Index					
Poor	351	24.2	427	38.3	0.000
Average	760	52.4	468	41.9	
Rich	339	23.4	221	19.8	
Sex of Head of Household					
Male	1035	71.4	753	67.5	0.018
Female	415	28.6	363	32.5	
Education of Head of Household					
No education and less than primary education	216	14.9	237	21.2	0.000
Primary education	933	64.3	635	56.9	
Lower secondary education	120	8.3	66	5.9	
Upper secondary or higher education	157	10.8	150	13.4	
Others	24	1.7	28	2.5	
Occupation of Head of Household					
No work	167	11.5	161	14.4	0.011
Working in agricultural sector	840	57.9	585	52.4	
Working in non-agricultural sector	443	30.6	370	33.2	
Total	**1450**	**100**	**1116**	**100**	

BIOGRAPHY

NAME: Mrs. Nowrozy Kamar Jahan

DATE OF BIRTH: October 10, 1968

PLACE OF BIRTH: Dhaka, Bangladesh

INSTITUTIONS ATTENDED: MBBS (1993)
Sylhet Medical College
Chittagong University, Bangladesh
M.A in Population and Reproductive Health Research(2003)
Institute for Population and Social Research (IPSR)
Mahidol University, Thailand
Ph.D. in Demography (2007)
Institute for Population and Social Research (IPSR)
Mahidol University, Thailand

SCHOLARSHIP: MEASURE Evaluation Project
Carolina Population Center
University of North Carolina
The United States
The Wellcome Trust
The United Kingdom

HOME ADDRESS: 17/A West NakhalPara, Tejgaon
Dhaka, Bangladesh
Phone # 88-02-8123268
Email address: nowrozy99@yahoo.com