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Determinants of Induced Abortion and Reproductive Health in Some Selected Areas of Rajshahi

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University of Rajshahi

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Determinants of Induced Abortion and Reproductive Health in Some Selected Areas of Rajshahi

A Dissertation Submitted to the University of Rajshahi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Department of Population Science and Human Resource Development

Submitted by

Md. Golam Mostofa

University of Rajshahi
August, 2007

Department of Population Science
and Human Resource Development
University of Rajshahi, Bangladesh

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A Dissertation Submitted to the University of Rajshahi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Department of Population Science and Human Resource Development

Submitted by

Md. Golam Mostofa

Under the Supervision of

Dr. Md. Aminul Hoque

Associate Professor
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University of Rajshahi
August, 2007

Department of Population Science
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DEDICATED

TO

MY BELOVED PARENTS

Certificate

I have the pleasure in certifying the thesis entitled "Determinants of Induced Abortion and Reproductive Health in Some Selected Areas of Rajshahi" submitted by Mr. Md. Golam Mostofa, Assistant Professor, Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh to the Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh, for the degree of Doctor of Philosophy in Population Science and Human Resource Development.

I do hereby certify that the works embodied in this dissertation were carried out by the candidate and to the best of my knowledge Mr. Mostofa used primary data and his work is original and genuine. No part of this study has been submitted in substance for any higher degree or diploma.

I wish him a bright future and every success in life.

Supervisor

M. A. Hoque 29.08.2007

(**Dr. Md. Aminul Hoque**)

Associate Professor
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Declaration of Originality

This dissertation entitled "Determinants of Induced Abortion and Reproductive Health in Some Selected Areas of Rajshahi" submitted by me in the Department of Population Science and Human Resource Development, University of Rajshahi for the degree of Doctor of Philosophy is based on my research work

To the best of my knowledge, this research work neither in part nor in full has been submitted to any other University or Institution for the award of any degree.

29-08-07

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The Author

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1.1 Introduction

In Bangladesh, advancement of medical science and easy access to modern medical facilities, the death rates specially child mortality have declined significantly during the last few decades. On the other hand women's ability to control their fertility is limited. Though family planning methods are available everywhere in the country, a woman may not use them because of financial constraints, personal beliefs, opposition family members or concern about the perceived adverse effects on health or future fertility. Fertility and mortality is not accompanied with each other. As a result population growth is becoming unmanageable and have resulted serious challenges to the achievement of national objectives and targets with regard to socio-economic development.

Human reproductive processes are mainly influenced by contraception and sometimes by induced abortion where contraceptive practice is less use effective. Common sense and an elementary understanding of the biological determinants of human reproduction indicate that contraception and induced abortion represent alterative means of achieving the same aggregate level of fertility in a particular population. But induced abortion is harmful and sometimes dangerous to maternal health. So the levels of contraceptive use and the incidence of induced abortion continue to provoke heated discussion.

An induced abortion is the deliberate termination of pregnancy by artificially inducing the loss before the viability of the fetus. Pregnancy is a critical phase

in women's life and for obvious reason it can not be avoided. However, for smooth management of health, sometimes pregnancy is required to be avoided by contraceptive use or terminating pregnancy to save the life of mother from the unwanted pregnancy in the initial stage of pregnancy. Generally, when family planning measures fail, the outcome of the ultimate baby make the family size larger otherwise induced abortion is done to keep the family size unchanged. In Bangladesh, a study reveals that among the unintended pregnancies that are due to contraceptive failure 31 percent undergo menstrual regulation (MR), 4.9 percent seek for induced abortion and remaining 55 percent gives unintended birth (Akhter, 1997).

Abortion, legal or illegal, is being practiced in all most all countries of the world. However, variation in the level of abortion across countries depends not only on legality of the procedure but also on religious restrictions, cultural acceptance and also awareness about the odd consequences of abortion effect. According to the Penal Code of 1860, induced abortion is illegal in Bangladesh except to save life of the mother (Bhiwandiwala et al. 1982). Since the late 1970s, the law allows menstrual regulation in the early stages before pregnancy status is clinically confirmed (Akhter and Rider, 1983; Ali et al. 1978). Such interpretation of the law, along with the decline in the desired family size and availability of menstrual regulation services has contributed to an increase in the incidence of abortion (Dixon-Muller 1988).

Before the introduction of MR practice in 1970s in Bangladesh, when the law was strict, induced abortions were usually performed either by self or untrained indigenous practitioners which was very serious for maternal health. For this reason the MR practice was allowed legally and consequently menstrual regulation service has become available both in the public and the private sectors. The government managed health facilities providing abortion services

are: Family Welfare Centre, Upazila Health Complex and District Hospital while non-government facilities are private clinics located mainly in cities and towns. Despites all these facilities, huge number of abortions are still being performed either by the client herself or with the help of indigenous practitioners (Ahmed et al. 1998; Ahmed et al. 1996), and many of those who sought modern abortion facilities had experienced traditional method initially (Bhuiya et al. 1999; Caldwell et al. 1999).

Although availability of abortion service has contributed to a substantial increase in abortion in many countries, little increase is observed in many others. This is mainly because of social stigma and religious prohibition against abortion. However, an unsafe abortion may lead to untold physical and mental distress or death. A survey in 1978 estimated that about 21,600 pregnancy-related deaths occurred during the year in Bangladesh, and of these deaths 25.8% were due to complications of induced abortion (Rochat et al. 1981). Another study reported that a considerable proportion of hospital resources, in terms of time, bed occupancy, transfusions given, and antibiotics was used or consumed for the management of abortion-related cases (Measham et al. 1981).

A study based on Matlab data showed that abortion was higher in the comparision area, where quality of family-planning services is poor, than in the Maternal Child Health and Family Planning Program (MCH-FP) area, and abortion was positively associated with socio-economic status (Ahmed et al. 1998). Another study based on Matlab data also documented that lack of use or lack of use-effectiveness of the family-planning method resulted in unwanted pregnancies, and thus, finally they decided to get abortion (Bhuiya et al. 1999). Desire for more children was negatively associated with subsequent abortion

particularly in the early age of the women. That is, women who wanted no more children had more abortion than those who wanted more (Razzaque et al. 2001).

A survey of the world abortion situation from the available data reveals that abortion has been the most widely practiced method of fertility control in every country, irrespective of culture, socio-economic or religion. In several countries abortion become the main method for birth control. In Russia, Hungary and other east European countries, the majority of women and men who wanted to limit the family size accepted abortion as a safe method of fertility regulation. In Vietnam, abortion services are part of national family planning policy to control population growth. In Sweden a woman on average gives birth to two children and that every second woman has an abortion during her reproductive life (Henshaw et al. 1999). People have easy access to modern contraceptives and abortion on request. Though abortion is widely practiced but there are alarming incidence of mortality and morbidity in relation to period of gestation. Period of gestation is one of the most critical determinants of the sequel of induced abortion. There is progressive increase in several complications such as hemorrhage, shock and hypertension with increasing period of gestation. Morbidity and mortality associated with second trimester abortion are several folds higher than morbidity and mortality following first trimester abortion. Mortality rates showed a similar trend. Various factors are responsible for the growth of second trimester abortion. One of them is sex selective abortion. Abortion is one of the most serious and neglected health issues in the world today. It is also an area where the inequality in health is most obvious. The abortion related morbidity and mortality are highest in the countries, where women do not enjoy equal right and control over sexuality and reproduction, where abortion is legally restricted, and where reproductive health services are insufficient.

The relationship between contraceptive and induced abortion is a long debated and difficult one. The difficulty arises from the complex interaction of several interrelated factors that range from social, cultural, religious and economic influences. A study reveals that the decision for the pregnancy termination depends on husband or on other family members. As the socio-cultural beliefs regarding abortions are very restrictive in terms of the existing general abortion law of the country, induced abortion is viewed as a shameful act because it is frequently done to end illicit pregnancy (Maloney et al. 1981). In Bangladesh even though menstrual regulation is legal women are required to have their husband's permission before menstrual regulation (Rob and Piet-Pelon, 2001). So the relationship between levels of contraceptive use and the incidence of induced abortion continued to provoke heated discussion with some observers arguing that incidence of abortion decreases as contraceptive prevalence rises and others claiming that increased use of family planning methods causes abortion incidence to rise (Cohen 1998; Bongarts et al. 2000; Marston et al. 2003). Another study reveals that termination of pregnancy is one of the oldest and commonest forms of fertility control. No human community has ever shown a marked fall in its birth rate without a significant resource to induced abortion and it is unlikely that contraceptive procedures alone will provide a sufficient measure of population control in developing nations wishing to lower their birth rate (Potts et al. 1977). The contraceptive method failure as a reason for seeking menstrual regulation services must be highlighted because of its implication on a national level (Population Council, 1999). According to Bongaart (1978) an induced abortion always averts less than one birth. There are two principal explanations for this finding. First, an induced abortion may be unnecessary because a spontaneous abortion or stillbirth would have prevented the pregnancy from ending in a live birth. Second, and more importantly, after an induced abortion a woman resumes ovulation much sooner

than would have been the case if she had carried the pregnancy to term, especially if pregnancy is followed by a period of lactation. At the International Conference on Population and Development in 1994 (United Nations, 1995a) delegations agreed that "In no case should abortion be promoted as a method of family planning. --- Prevention of unwanted pregnancies must always be given the highest priority and every attempt should be made to eliminate the need for abortion. --- In all cases, women should have access to quality service for the management of complications arising from abortion. Post abortion counseling, education and family planning services should be offered promptly, which will also help to avoid repeat abortion."

At the United Nations International Conference on Population and Development (ICPD) in Cairo in 1994, governments identified unsafe abortion as a public health problem. The chances of receiving a safe abortion vary widely and are determined by a variety of socio-economic, legal and cultural factors. Though when an abortion performed by trained providers in sanitary conditions, abortion is one of the safest medical procedures. Timing of induced abortion is also a burning issue of Bangladesh. Under the Panel Code dating back to 1860, induced abortion is permitted in Bangladesh only to save the life of the mother. Accordingly a therapeutic abortion requires the approval of two physicians and must be performed by a qualified physician in a hospital. No approval is required in the case of menstrual regulation, as the procedure is considered a family planning method rather than an abortive technique. Menstrual regulation may be performed, within eight weeks of the last menstrual period, by paramedical personnel on an out-patient basis. Legalization of first trimester abortion on broad medical and social grounds was proposed in 1979, but legislators did not take action. In 1979, however, the Bangladesh Government included menstrual regulation in the national family planning program and encouraged doctors and paramedics to provide menstrual

regulation in all government hospitals and health and family planning complexes (Bangladesh, Population Control and Family Planning Division, 1979). Timing of induced abortion depends on different factors. Variations in the timing of induced abortions related with maternal age, number of living children, women's education, dwelling space, residence, religion, occupations, and age at marriage etc.

Birth intervals in human population offer an interesting, fruitful and intriguing area for scientific enquiry into fertility patterns. In traditional societies, birth spacing has been probably the most effective means of regulating reproductive capacity. Also, the analyses of birth intervals provide a useful framework for examining biological and social factors determining the level of fertility in human populations. First birth interval provides fecundity level of a woman. Most recent birth interval reflects the current reproductive performance of women and also it represents the dividing line between above and below replacement level of fertility. Fertility histories include data on the timing of various significant events in the life cycle of a woman, such as her marriage and the dates of first, second and the last live birth. These data permit calculation and analysis of birth intervals, which can be categorized into two broad types. Closed birth interval, which is the interval between the successive live births of a woman and the open birth interval, which is the interval from the date of last live birth to the date of survey, calculated for each woman. The study of birth intervals both closed and open has gained considerable importance as they are used as sensitive indices of fertility and for detecting current changes in the natality pattern of women who are still in reproductive ages.

1.2 Conceptual Framework

There are no known conceptual frameworks for the determinants of induced abortion in developing countries. Adapting a framework developed recently to explore the determinants of abortion in a developed country (Rossier et al. 2003), Figure 1.1 depicts abroad conceptual model of the determinants of induced abortion in developing countries.

There are three elements for this conceptual model which have particular attention. First, abortion is portrayed as the result of several conditional and interrelated behaviors and events – namely, sexual intercourse, contraceptive use and pregnancy – each with its own risk and precipitating factors. While these risk and precipitating factors may overlap across behaviors and events, the importance or direction of their effects may differ at the various stages of the process leading to abortion. Explicitly acknowledging the relationship between them provides a more nuanced and comprehensive assessment of the determinants of induced abortion. Indeed, a high likelihood of abortion among a sub-group of women may be explained by a variety of factors. For example, many women in that group may be exposed to sexual intercourse; those who are exposed to sexual intercourse may be unlikely to use contraception; those who use contraception, as well as those who do not, may be especially likely to become pregnant; or those who do become pregnant may be especially likely to have abortions. To distinguish between these possibilities, this conceptual model decomposes the probability of abortion into a chain of interrelated and sequential events and behaviors that should be analyzed simultaneously. In doing so, the model posits that these events and behaviors are jointly determined with the decision to have an abortion. Second, both pregnancies reported by women as intended and those reported as unintended may end in induced abortion. One reason for this is that pregnancies that were originally

intended may be terminated if subsequently the fetus is found to be malformed or otherwise non-desirable for socio-cultural reasons. As an example, in the Asian context, an ultrasound revealing a female fetus may lead to what was initially an intended pregnancy being terminated? Additionally, in countries where women have little autonomy, the decision to terminate a pregnancy may be made by other family members, including husbands and mother-in-laws, and thus women may report pregnancies as intended but may also report terminating them. Third, this conceptual model depicts abortion and its antecedent events as a function of the interrelated effects of community, contextual, household and individual characteristics. Included under contextual- and community level factors are norms concerning sexuality, family size, contraception and induced abortion, as well as access to and quality of care, not only of abortion services, but also family planning services. At the household and individual levels, the primary constellations of determinants are socio-economic status and life-cycle factors. Below, we summarize the developing-country, community-based literature, and when relevant the developed-country literature, on the impact of each of these factors on induced abortion.

Community- and contextual-level effects

The literature on the effects of community factors on induced abortion comes almost exclusively from developed countries and mainly from the United States, where policy analysts have long been concerned with the impact of state legislation (including mandatory delay and parental involvement laws), government reimbursement of abortion, government prenatal and pediatric benefits, and the availability of abortion services on pregnancy resolution, particularly among adolescents. Community-based studies examining the effect of legislative restrictions and government funding on abortion have found mixed results. The majority have documented decreased odds of abortion when

state legislative restrictions are in place (Joyce and Kaestner, 1996), as government funding for abortion is restricted (Lundberg and Plotnick, 1990; Currie et al, 1996; Levine et al. 1996; Argys et al. 2000), or as government funding of prenatal and pediatric care is expanded (Joyce and Kaestner, 1996). A few, however, have found no effects at all (Averett et al. 2002), or effects only in sub-populations (Currie et al. 1996). In contrast, studies examining the relationship between access to abortion services and pregnancy termination have shown a uniformly positive association: Whether measured by the percentage of the population living in counties with high-volume providers of abortion, the ratio of obstetrician-gynecologists to births per county or the distance to an abortion provider, increased access to services has been positively correlated with the likelihood that a pregnancy will end in abortion (Joyce, 1988; Lundberg and Plotnick, 1990; Currie et al, 1996; Brown et al. 2000).

Only two studies have examined the impact of community factors on pregnancy termination in developing countries (Ping and Smith, 1995; Rahman et al. 2001). Survey data from a large sample of married women in rural China were used to examine the effect of regional differences in the enforcement of national family size policies on the likelihood of a given pregnancy ending in abortion. Pregnancies to women residing in counties where implementation of the policies had been relaxed were significantly less likely to be terminated than those to women residing in counties were the policies where strictly enforced, even after controlling for individual and household socio-demographic factors (Ping and Smith, 1995). Rahman and colleagues (2001) combined data from a longitudinal demographic surveillance system and a cross-sectional survey in Matlab, Bangladesh, where a controlled, large-scale family planning experiment has been in place since 1977, to examine the effect of improved access to family planning services on abortion. While abortion rates were

significantly lower in the area with better family planning services than in the area with the standard government services, this was attributed to a decrease in unintended pregnancy rates in the treatment area, rather than to any difference in the propensity to abort unintended pregnancies.

With regard to contextual factors – norms regarding abortion at the community level – the literature is particularly scant and pertains exclusively to developed countries (Currie et al. 1996; Brown et al. 2000; Averett et al. 2002). Moreover, the contextual measures used to date have been somewhat distally related to abortion and, not surprisingly, have shown weak effects. For example, a recent study of the determinants of abortion in the United States, which used the predominance of Catholicism in the respondent's county of residence as a proxy for conservative attitudes towards abortion, found no empirical support for an association between community norms regarding abortion and the likelihood of pregnancy termination (Averett et al. 2002).

Household- and individual-level effects

Relative to community and contextual factors, an extensive body of literature exists on the effects of household and individual factors on induced abortion in developing countries, largely from studies conducted in Asia and Sub-Saharan Africa. Regardless of the wide geographic variation in settings, these studies have repeatedly highlighted socio economic factors as important determinants of induced abortion. Indeed, higher socioeconomic status – whether measured by household standard of living, literacy, educational attainment, employment status or caste – has shown a consistently positive relationship with the likelihood of abortion (Nair and Kurup, 1985; Shapiro and Tambashe, 1994; Agadjanian and Qian, 1997; Ahmed et al. 1998; Babu et al. 1998; Okonofua et al. 1999; Ahiadeke, 2001; Calves, 2002; Geelhoed et al. 2002; Guillaume and Desgrees du Lou, 2002; Razzaque et al. 2002; Bose and Trent, 2003; Malhotra

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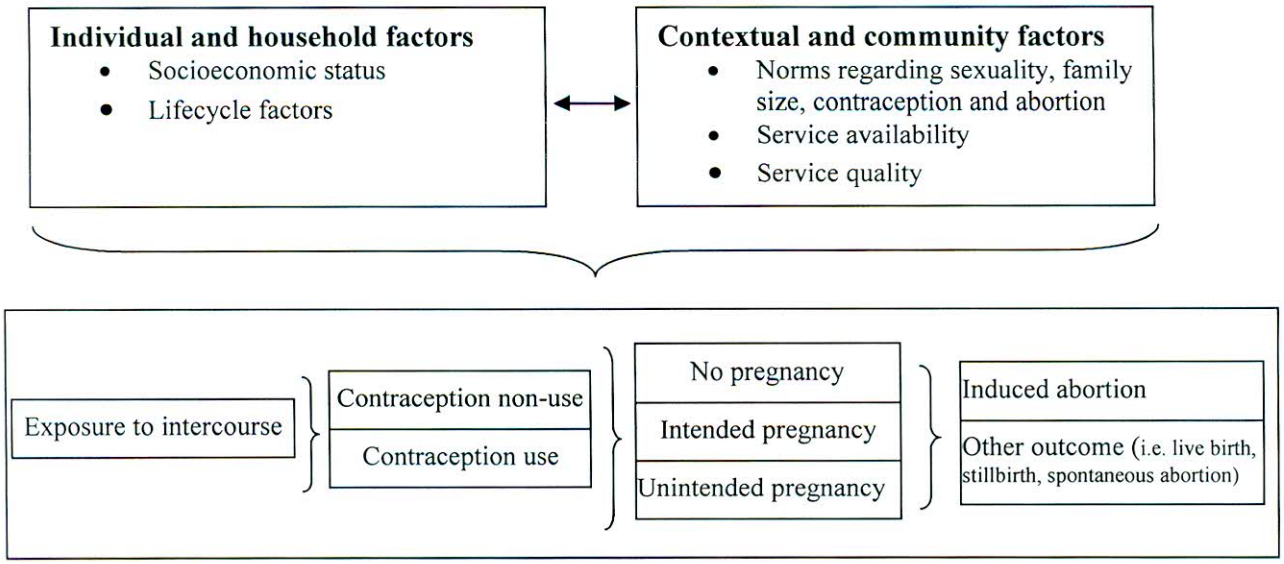
et al. 2003; DaVanzo et al. 2004a; DaVanzo et al. 2004b). Another measure of socio-economic status – urban residence – has shown a positive relationship with abortion in four of the six studies that included both rural and urban respondents and no relationship in the other two, raising the question of whether urbanization is a proxy for improved socio-economic status or other unmeasured and unobservable factors, including differences in access to services (Babu et al. 1998; Okonofua et al. 1999; Ahiadeke, 2001; Geelhoed et al. 2002; Bose and Trent, 2003; Malhotra et al. 2003).

Life cycle factors have also emerged as important individual-level predictors of abortion in developing countries. Most studies have reported an increase in the odds of abortion with increasing age of the woman or an increase followed by a decrease in the late reproductive years, with exceptions coming from studies of adolescents or those conducted in settings where pre-marital intercourse is believed to occur more frequently (Shapiro and Tambashe, 1994; Alvarez et al. 1999; Ahiadeke, 2001; Calves, 2002; Guillaume and Degrees du Lou, 2002; Razzaque et al. 2002; Bose and Trent, 2003; DaVanzo et al. 2004a; DaVanzo et al. 2004b). In those cases, the woman's age has been inversely related to her probability of having an abortion and, similarly, unmarried women or those in less formal/shorter unions have been found to have significantly higher odds of termination (Shapiro and Tambashe, 1994; Alvarez et al. 1999; Ahiadeke, 2001; Calves, 2002; Guillaume and Degrees du Lou, 2002). Studies have also linked increased parity to pregnancy termination (Ping and Smith, 1995; Ahmed et al. 1998; Ahiadeke, 2001; Bairagi, 2001; Calves, 2002; Malhotra et al. 2003; DaVanzo et al. 2004a), and in the Asian context, son preference (Ping and Smith, 1995; Bairagi, 2001; Malhotra et al. 2003). The desire to space or limit family size and short pregnancy intervals have also been associated with increased odds of abortion (Ahmed et al. 1998; Razzaque et al. 2002; Malhotra et al. 2003; DaVanzo et al. 2004a; DaVanzo et al. 2004b).

The effect of women's autonomy – a construct based on the interaction of socioeconomic status and life cycle factors – on the propensity to terminate a pregnancy has received surprisingly little attention in the developing-country literature. Two recent studies in developing countries which did include measures of women's autonomy, however, found it to be an important individual-level predictor of abortion. Indeed, in Turkey and in India, higher levels of emotional autonomy and mobility, respectively, were associated with increased odds of abortion (Akin, 1999; Malhotra et al. 2003).

While our conceptual framework posits that contraceptive use is jointly determined together with sexual activity, pregnancy and abortion, many researchers examining the determinants of induced abortion in developing countries have treated it as an exogenous variable. Not surprisingly, when included as an individual-level covariate, contraceptive use has shown a consistent and strong relationship with induced abortion in developing countries. For example, in Bangladesh, Cuba and Nigeria, current use of family planning was associated with increased odds of abortion, while in India, ever use of contraception was found to increase the likelihood of abortion (Alvarez et al. 1999; Okonofua et al. 1999; Razzaque et al. 2002; Bose and Trent, 2003). As the measurement of contraceptive use did not necessarily precede pregnancy in those studies, however, it is unclear whether the observed association resulted from increased pre-pregnancy family planning among women who obtain abortions or rather more family planning use post-abortion among those women. Results from the two studies which relied on time-varying measures of contraceptive use suggest that the relationship may in fact reflect a strong desire to control fertility among certain women: Use of contraception in a given pregnancy interval was associated with increased odds of that pregnancy ending in abortion in both studies (Malhotra et al. 2003; DaVanzo et al. 2004a).

Figure 1.1: Conceptual framework for the determinants of induced abortion

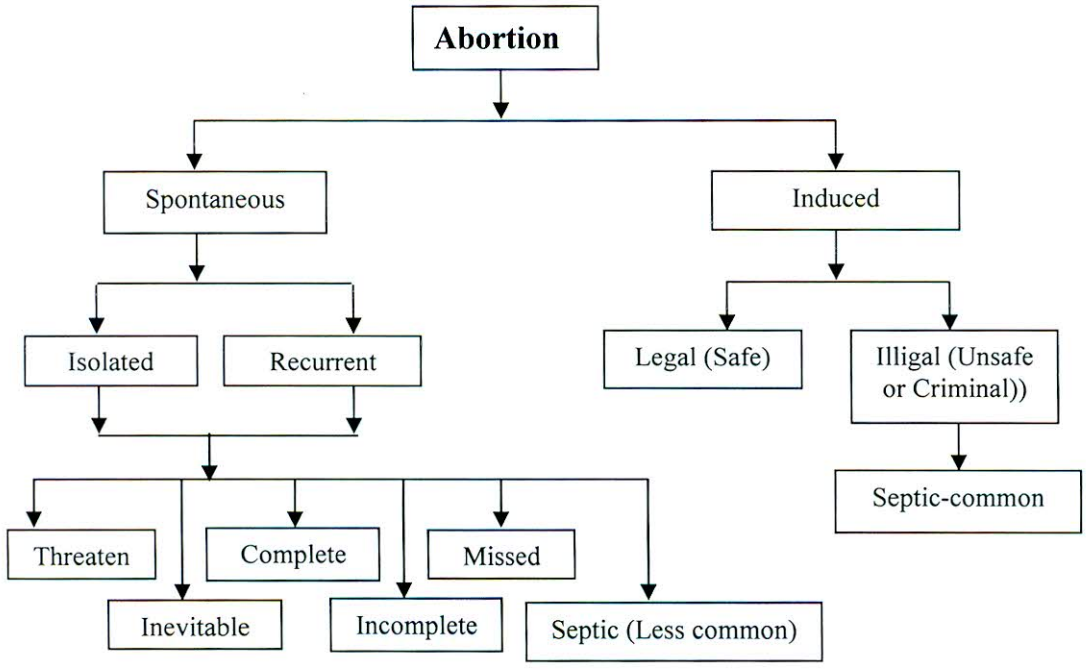


1.3 Classification of Abortion

Definition: Abortion is the termination of pregnancy before the period of viability which is considered to occur at 28th week. However, for international acceptance, the limit of viability is brought down to either 20th or fetus weighing 500 gm. If the expelled fetus weighs less than 500 gm, it is called abortus. The term miscarriage, which is mostly used, is synonymous with abortion.

Classification of Abortion: Broadly abortion is classified as of two types viz. (1) spontaneous and (2) induced. Again spontaneous abortion is of two types viz. (a) isolated and (b) recurrent. These two types i.e. isolated and recurrent abortion together are of six types such as (i) threatened, (ii) inevitable, (iii) complete, (iv) incomplete, (v) missed and (vi) septic. On the other hand induced abortion is of two types such as (i) legal and (ii) illegal. The classification of abortion can be showed in the following diagram.

Figure 1.2: Classification of abortion



Methods of Termination of Pregnancy: With respect to the length from gestation there are two trimester based induced abortion one is first trimester (up to 12 weeks) and another is second trimester (13-20 weeks) (Dutta, D.C. 1998).

First trimester based methods are

(i) menstrual regulation (MR)

(ii) suction evacuation and/or curettage

(iii) dilatation and evacuation (a) rapid method and (b) slow method

(iv) prostaglandins

(v) mifepristone and

(vi) methotrexate.

Second trimester based methods are

(i) intrauterine instillation of hypertonic solution (a) intra-amniotic and (b) extra-amniotic

(ii) prostaglandins $F_{2\alpha}$ or E_2 and their analogues

(iii) oxytocin infusion and

(iv) hysterotomy.

First Trimester

Menstrual regulation (MR): Menstrual regulation (MR) is the aspiration of the endometrial cavity within 14 days of the missed period in a previously normal cycle when the presence of an early pregnancy cannot be diagnosed accurately.

Suction evacuation and/or curettage: This improved method consists of a suction machine fitted with a cannula either plastic or metal available in various sizes.

Dilatation and evacuation: This method can be done in two way viz. rapid method and slow method.

- **Rapid method:** This can be done as an outdoor procedure with diazepam sedation and paracervical block anaesthesia.
- **Slow method:** Slow dilatation of the cervix is achieved by inserting laminaria tents (hygroscopic dilators) into the cervical cannel. This is followed by evacuation of the uterus after 12 hours.

Prostaglandins: Before surgical methods of termination, cervical ripening can be achieved by use of 1 mg PGE_1 vaginal pessary (gemeprost) in the posterior fornix. This is done 3 hours before the procedure. This is also used as an adjunct to mifepristone and methotrexate therapy.

Mifepristone: This is a progesterone antagonist. Termination is effective up to 9 weeks of pregnancy. A single dose of 600 mg is given orally.

Methotrexate: Termination is effective up to 8 weeks of pregnancy. A single dose methotrexate IM, followed by prostaglandin E_1 analogue 800 μg vaginally is given.

Second Trimester

Second trimester is divided into two term such as (i) between 13-15 weeks and (ii) between 16-20 weeks.

Between 13-15 weeks: With the available resources, it is difficult to terminate the pregnancy with reasonable safety as in first trimester termination. The following principles may be employed.

» To allow the pregnancy to continue, so that the uterus will be enlarged to about 16 weeks when the available intrauterine instillation techniques using pharmacological agents can be employed.

» Prostaglandins and their analogues are very much effective. They are extensively used specially in the second trimester. They act on the cervix and the uterus.

» Transcervical intra-amniotic instillation of hypertonic saline (20%) or extra-amniotic instillation of 0.1% ethacrydine lactate may be tried with limited success.

» Hysterotomy is usually done abdominally but can also be done vaginally. Concurrent sterilization is almost a must.

Between 16-20 weeks:

Intra-uterine instillation of hypertonic solution: This is also of two types viz. (i) Intra-amniotic and (ii) Extra-amniotic.

(i) Intra-amniotic:

» Intra-amniotic instillation of hypertonic saline (20%) is the commonly used method in many parts of the world. It is instilled predominantly through the abdominal route, as such the uterus should be at least 16 weeks size. It is commonly employed amongst the unmarried or mothers of one child.

» Intra-amniotic instillation of hyper osmotic (40%) urea solution along with syntocinon drip or intraamniotic prostaglandins instillation has been claimed to be effective with minimal complications and toxicity.

(ii) Extra-amniotic:

» Extra-amniotic instillation of 0.1% ethacrydine lactate is done transcervically through a No. 16 Foley's catheter. The catheter is passed up the cervical canel for about 10 cm above the internal os between the membranes and myometrium and the balloon is inflated with saline. It is removed after 4 hours.

Prostaglandins: Prostaglandins and their analogues are very much effective. They are used extensively, specially in the second trimester. They act on the cervix and uterus.

Oxytocin infusion: Oxytocin is administered by intravenous drip method along with any of the chemicals used either intra-amniotic or extra-amniotic space in an attempt to augment the abortion process.

Hysterotomy: The operation is performed through abdominal route.

The choice of an appropriate abortion method will depend largely on the length of time a woman has been pregnant. A variety of techniques may be used to induce abortion safely (Alan Guttmacher Institute, 1999) and is presented in Table 1.1.

Table 1.1: Medical and surgical abortion technologies

Pregnancy stage	Method	What is it?	Haw does it work?
Up to 7-9 weeks	Mifepristone and misoprostol	An antiprogestin and a prostaglandin	Mifepristone prevents progesterone from supporting the pregnancy, and misoprostol causes contractions, leading to expulsion of products of conception.
Up to 7-9 weeks	Methotrexate and misoprostol (used only in United States and Canada)	An antimetabolite and a prostaglandin	Methotrexate stops growth, and misoprostol causes contractions, leading to expulsion of products of conception.
Up to 12 weeks	Manual vacuum aspiration	Uterine evacuation procedure using a hand-held vacuum syringe	Uterine contents are evacuated through a cannula into a syringe; local anesthesia is commonly used.
Up to 13-14 weeks	Electric vacuum aspiration	Uterine evacuation procedure using a cannula attached to an aspirator	Suction action of machine empties the uterus; local or general anesthesia may be used
Up to 13-14 weeks	Dilation and curettage	Uterine evacuation procedure using small forceps and curette	The cervix is dilated using laminaria or a prostaglandin, and the uterine contents are removed with forceps and curette; in most situations, general anesthesia is used.
13 or more weeks	Dilation and evacuation	Uterine evacuation procedure using small forceps, curette and suction cannula	The cervix is dilated using laminaria or a prostaglandin; forceps and curette are used to remove the fetus; a suction cannula is used to evacuate amniotic fluid and remaining tissue; general anesthesia is often used.
13 or more weeks	Medical induction or instillation	Procedure to induce contractions to expel the fetus	Contractions are induced by prostaglandin or by injection of saline or urea solution into the amniotic fluid; the woman experiences labor and delivery, as in a miscarriage. The procedure is usually done in a hospital with general anesthesia.
13 or more weeks	Hysterotomy	Mini-cesarean section	A surgical procedure is performed, commonly under general anesthesia, to remove the fetus.

1.4 Review of Literature

Due to interesting popularity of induced abortion in fertility control extensive study has been done on induced abortion. Of late, in many countries liberalization of abortion laws and abortion as a measure of fertility regulation has received considerable attention among researchers. Ahmed at al. (1996) discussed the liberalization of Medical Termination of Pregnancy (MTP) in Bangladesh, about poor facilities of MTP services, the consequence of a social stigma and religious prohibition against induced abortion in Bangladesh, also they discussed in detail the trend of abortion and identify risk groups of women who are prone to abortion and the pattern of contraceptive use following abortion. Omran (1971) has discussed in detail the prevalence of induced abortion in transitional societies, low fertility determinates and abortion, the consequence of suppressing abortion and the need for liberalization of abortion law. Fikree et al. (2001) in their work stressed about the socio-economic and demographic background of the abortionist in Karachi, the method and the reasons for the induced abortion, knowledge attitudes and practices of contraception prior to and after induced abortion and morbidity occurring consequent to the abortion were discussed. Singh et al. (1991) have examined socio-economic and demographic background of abortion seekers in Chandigarh. They discussed the reasons for seeking MTP, knowledge, attitudinal and perceptual dimensions of abortion, the decision making process and its psychosocial implication in seeking MTP and the contraceptive practices of abortion seekers in detail. Henshaw et al. (1999) have discussed about the countries with highly restrictive laws, global incidence and the countries where abortion is legal and where is illegal. They mentioned that approximately 26 million legal and 20 million illegal abortions were performed world wide in 1995, resulting in a world wide abortion rate 35 per 1000 women aged 15-44

years. Among the sub regions of the world, Eastern Europe had the highest abortion rate (90 per 1000) and Western Europe the lowest rate (11 per 1000). Among countries where abortion is legal without restriction as to reason, the highest abortion rate, 83 per 1000 was reported for Vietnam as lowest rate 7 per 1000 for Belgium and Netherlands. Abortion rates are no lower overall areas where abortion is legally permitted. Orobaton et al. (1996) examined the effect of induced abortions on the decline of total fertility rates in two African countries- Egypt and Zimbabwe. Also discussed the implication of rising induced abortion rates for maternal health within the content of restrictive legal environments and suggested recommendations for reducing the incidence of abortion related maternal deaths. Agadjanian et al. (1997) analyzed ethnic differences in induced abortion among ever married women in Kazakstan drawing on data from the 1995 Kazakstan Demographic and Health Survey. The implications of the results for induced abortion trends and family planning policy in Kazakstan are discussed in addition to other findings. Goto et al. (2000) in their study, recent trend in the incidence of induced abortion are analyzed in order to identify the target group and its requirements for family planning policy in Japan. They observed that the abortion ratio remained the highest among women aged 40-44 years. An increase in the abortion ratio was seen in the two youngest groups (younger than 20 and 20 to 24), specially among those who were born after 1955. The proportion of abortion experienced by women younger than 25 increased from 18 percent between 1976 and 1989 to 30 percent between 1991 and 1995, and the slight increase was also observed among women aged 40-44 years. The proportion of abortions performed after eight weeks of a pregnancy for the two youngest groups remained higher than that for older age groups during 1975-95. The analysis demonstrated that women younger than 25 years should be the principal concern of family planning policy in Japan. Thapa et al. (2001) have discussed about the

incidence and reason of induced abortion in urban Nepal. They observed that women in Nepal desire a small family size, specially those living in urban areas. Although significant numbers of women practice contraception, induced abortion is also used, primarily to contract family size and for birth spacing. The primary motivation for seeking abortion for no more children, women in urban areas who had ever had an induced abortion tended to be younger of lower party and more educated than those in rural areas.

The relationship between levels of contraceptive use and the incidence of induced abortion continues to provoke heated discussion. Marston et al. (2003) examined the relationships between contraception and abortion and he revealed that rising contraceptive use results in reduced abortion incidence in settings where fertility itself is constant. The parallel rise in abortion and contraception on some countries occurred because increased contraceptive use alone was unable to meet the growing need for fertility regulation in situations where fertility was falling rapidly. Senlet et al. (2001) examined the role of changes in contraceptive use in Turkey. The analysis included a number of simulations that examine what abortion levels might be in different contraceptive use scenarios. His study revealed that the decline in abortion is due to a decrease in the number of abortions associated with traditional method failure. This decrease is related to three factors: a shift from traditional method use to modern method, a decline in the traditional method failure rate and a decline in the proportion of pregnancies resulting from traditional method failures that are aborted. Victor Agadjanian (2002) discussed how abortion related views reflect the long-standing ethno cultural differences between the indigenous Kazakhs and Kazakhstan's residents of European roots, as the latter continue to have significantly higher levels of abortion. In addition, the analysis points to some generational differences in views concerning abortion and contraception.

Finally, the study demonstrated parallels in attitude toward contraception thereby questioning straightforward assumptions about the replacement of abortion with contraception. Bongaarts et al. (2000) examined the potential role of further increases in contraceptive prevalence and effectiveness in reducing abortion rates.

Variation and complication in relation to period of gestation of induced abortion has received considerable attention among researchers (Tietze and Henshaw 1986; Henshaw 1990; Anderson et al. 1993; Ahmet Icduygu 1996). Also some researchers concentrate on fatal loss and the absolute magnitude and shape of the risk function during gestation (Shapiro et al. 1962; James 1970; Abramson 1973; Bakketing et al. 1978; Wilcox et al. 1988; Hilden 1991).

A study on birth control measures suggests that among the various factors of fertility determinants none has a more direct effect on the individual than the use of contraceptive methods (Ross 1983). So the determinants and variation in relation to the use of family planning method has received considerable attention among researchers (Rajaretnam 1995; Philips, 1997; Fikree et al. 2001; Bora et al. 2001; Roy et al. 2003). Bora et al. (2001) examined the factors influencing the use of contraception in rural Delhi. His finding suggested that the persistence of son preferences was the primary cause of low intention to practice family planning. In addition, factors like women's age, literacy, number of living children, number of living sons and visits to the health centers have turned out to be significant or important in explaining in contraceptive use. Fikree et al. (2001) have discussed in detail about the factors influencing contraceptive use among young women in urban squatter settlements of Karachi, Pakistan. Their study revealed that the long term goals of improving women's education levels and economic status are important for increasing contraceptive prevalence in Pakistan. A study on affects of son preference on

contraceptive use, abortion and fertility in Matlab Bangladesh was conducted by Bairagi (2001). His study concluded that sex preference does not have a strong effect on contraceptive use in Matlab. Its absence, however, would probable increase to abortion, which is used to limit fertility once couples have the number of sons they desire. The effect of sex preference on childbearing is becoming stronger as fertility declines, because couples must achieve their desired number of sons within a smaller over all number of children. Mishra et al. (1999) examined factors influencing the main reasons for not intending to use contraception. This paper on the other hand considered some more important factors in the analysis of intention not to use contraception on the whole. Ghosh (2001) also carried a comparative study of Northern and Southern states of India on intention not to use contraception. This study found that husband's approval of contraceptive use is one of the major factors influencing intentions regarding future contraceptive use. Education emerges out as another factor that encourages contraceptive use. This study rather not surprisingly found that desire for future child is one of the patent variables which increases the likelihood of intentions not to use contraception in future in states which have not reached replacement level of fertility. To predict the need for contraceptive services, family planning program managers often rely on levels of unmet need desired from measures of childbearing intentions. However, women's intention to use a method has not received as much attention as a measure of contraceptive demand. In India use of both contraceptive and child bearing intentions predicts contraceptive demand better than use of either indicator alone and may thus help program planners estimate future demand for contraceptives services (Roy et al. 2003). Ross et al (2001) emphasized the need to consider women's intention to use contraceptives instead of or in addition to assessing unmet need. According to Casterline et al. (2000) intentions to practice contraception may be a more valid indicator of the

demand for family planning than unmet need. Even after adjustment for women who state that they will use contraceptives but might fail to do so. Vlassoff (1990) found that women usually stopped having children when they reached or approached their ideal number of sons. Hence in predicting contraceptive demand, family planning program planners need to determine how well women's child serving behavior to intentions.

Realizing the fact that birth intervals are inversely related to complete family size, in recent years an increasing number of demographers are turning their attention towards the study of birth interval data. Birth interval is an indicator of reproductive health. Regulation of fertility seems to be the major solution that can improve reproductive health. The data on birth intervals are taken as indicator of reproductive performance and considered to reflect the differential pattern of reproduction (Sheps and Perrin, 1964).

The length of first birth interval is one of the strongest and most persistent factor affecting fertility with longer intervals usually associated with lower fertility. Bumpas et al. (1978), and Milman and Hendershot (1980) have demonstrated that the length of first birth interval subsequently influences the spacing and childbearing pattern. Analyzing data from a 15 years follow up serving in Illions, Marini (1981) has found that the older the age at marriage and longer the interval between entry into marriage and parenthood, the smaller is the number of children. Freedman et al. (1959), Bumpass (1969), Presser (1971), Busfield (1972), Cutright (1973), U. S. Bureau of Census (1975), Bumpass and Mburugu (1977) have realized that both age at marriage and first birth interval bear a negative relationship to the completed family size. However, Bayer (1968), Bumpass (1969), Elder and Rockwell (1976), Marini (1981) revealed that a major difficulty in attempting to study the effect of timing of these events and the number of births may be due to the association of

these variables with some other causal factors. Kalam and Udry (1986) examined the effects of a number of covariates on the length of the first birth interval for non-contraceptive population based in world fertility survey data from nine developing countries. Analyzing data from a traditional society of India, Nath et al. (1993) contributed knowledge to the pattern of fertility and first birth interval through analysis of several co-varieties such as age at marriage, mother's education, female occupation etc. The closed birth intervals are treated quite sensitive to reflect current and abrupt changes in the underlying fertility behavior of women than the conventional fertility rates. Data on closed birth intervals can be used for the estimation of various biological parameters such as fecundability, postpartum amenorhoea and for incidence of fetal waste through suitable probability models. These models are of crucial importance for detecting the current changes in fertility of women who are still in reproductive ages. The first birth interval, the time between marriage and the first live birth and last but one birth interval can be considered as a closed birth interval. A number of social scientists (Sheps and Perrin, 1964; D'Souza, 1974) have derived probability models for closed birth interval assuming that the length of marital duration is sufficiently long. In this context Sheps and Menken (1972, 1973) proposed some theoretical continuous time models for closed birth interval for any specific order with fixed marital duration. Though the collection and analysis of retrospective birth interval data in underdeveloped countries is of special significance, yet the collection of such data in these countries suffers from non-sampling errors arising out of recall lapse on the part of the respondent (Rindfuss et al. 1982). In this context data on most recent birth interval (MRBI), which is defined as the interval between last and last-but-one birth prior to the survey data, seems to be less affected by such memory biases. Thus they will be more reliable for analysis of fertility changes among married women compared to other closed birth intervals (Sing et al.

1988; Mukherjee et al. 1991). Nath et al. (1994) studied the most recent birth interval of a traditional society of Assam and found that covariates such as age at first marriage of women, parity of the mother, survival status of the last but one birth and family income have significant effects on the duration of this interval. Singh et al. (1988) have derived a parity dependent probability distribution for the most recent birth interval.

To deal with conceptive delay, various probability models under different sets of assumptions have been proposed. Starting with Shep's (1964) work in which he used Type-I geometric distribution to describe data on the time of first conception. Singh (1964) derived a continuous time model for the waiting time of first conception and applied it to an observed distribution relating to females of a rural locality in India. Potter and Parker (1964) and Singh (1968) have also suggested geometric and Type-I geometric distribution of waiting time for first conception and obtained moments and Best Asymptotically Normal estimates of the parameters. Sheps (1964); Mazumder and Sheps (1970); have given Type-I geometric, compound geometric and truncated Type-I geometric distribution and have estimated the parameters by the methods of moments and maximum likelihood.

1.5 Rationale of the Study

From the literature review it is clear that induced abortion has some odd effects on health. Lot of complicacies arises from induced abortions. Still induced abortion is a common phenomenon in all societies. Bangladesh is no exception to that and a lot of induced abortions happen in Bangladesh. That is why we have selected this topic as our study area. Further most analyses of the determinants of abortion in developing countries have considered only the abortion is spontaneous or induced. Several studies have been done on the basis

of the data from memory of the women whether they reported the abortion was induced or spontaneous. Though in some cases researchers investigated only the induced abortion, they considered the controlled field only. But in our country, it is difficult to sign out whether the abortion is induced or spontaneous due to misreporting or weak reporting system. So, realizing the fact and the importance of induced abortion and reproductive health in fertility control present study was planned and a survey was conducted during the year 2005 in Rajshahi District of Bangladesh. Finally taking into consideration induced abortion is a reality we are specially interested to know the timing of induced abortion and its determinants.

1.6 Objectives

Keeping the above discussion in view the objectives of the present study are:

- ☆ To examine the pattern and level of timing of induced abortion according to socio-economic and demographic variables of the women who come to seek induced abortion and to take treatment for pregnancy related complicacies during her pregnancy stage.
- ☆ To examine the correlates of timing of induced abortion and reasons for induced abortion. That is, it is to identify the relative effects of the correlates that distinguish pregnant women who elect induced abortion in the early period of her pregnancy from those who delay abortion to the late period of pregnancy.
- ☆ To estimate the relative significance of factors that affecting current use of contraceptive methods in different socio-economic and demographic settings.
- ☆ To identify the different socio-economic and demographic factors that influences the length of first birth and last birth intervals.

1.7 Organization of the Study

The research work of this dissertation is organized into seven chapters in order to achieve the aforesaid objectives. A brief discussion of the organization of this dissertation is as follows:

Chapter one is the current one, which apparently dealt with the research perspectives, discussion of the need of the present study, conceptual framework, a review of literature, rationale of the study, objectives of the study and a brief account of organization of this dissertation.

Chapter two consists the most important and difficult part of any retrospective study- the collection of data regarding the study. This chapter describes objective of the survey, background characteristics of the study areas, nature and source of data, designing the ultimate questionnaire of the data, method of data collection and a brief discussion of the major statistical techniques used in the analyses.

In chapter three an attempt is made to investigate the pattern and level of timing of induced abortion according to some socio-economic and demographic characteristics of the respondents.

Chapter four is the first analytical chapter in which correlates of timing of induced abortion are examined. Differentials within and between first trimester and second trimester based induced abortion are also investigated with respect to some selected socio-economic variables. The major goal is to identify some of the determinants of having an induced abortion in the second trimester which distinguish pregnant women who elect abortion in the early period of her pregnancy from those who delay abortion to the late period of pregnancy. A logistic regression analysis is used to identify the determinants of induced abortion.

In chapter five an attempt is made to investigate the variation in the use of different contraceptive methods, the difference between the characteristics of users and non-users of the contraceptive methods and the factors influencing use of contraceptive among couples. A logistic regression analysis is used to estimate the relative impact of some selected socio-economic and demographic variables on contraceptive use.

Chapter six provides a discussion based on first birth and last birth intervals. In this chapter, the effects of some selected socio-economic and demographic factors on the length of first birth and last birth interval have been examined. The median first birth and last birth interval are also examined with respect to some selected socio-economic and demographic variables. The proportional hazard model is used to identify the impact of the factors of first birth and last birth interval.

The last chapter constitutes summary findings, conclusions, policy implication and further works which would be done in future.

Chapter Two

Data and Methodology

2.1 Introduction

Induced abortion, contraception and reproductive health are the important determinants in fertility regulation. Realizing the importance of induced abortion and reproductive health in fertility control an increasing number of demographers are turning their attention towards the study of induced abortion and reproductive process but unfortunately the main obstacle in the study is the lack of reliable information and systematic data compilation by any organization in developing countries. So the prime objective of this retrospective survey is to collect reliable and up to date information on induced abortion, family planning method, reproductive health and fertility behavior.

2.2 Background Characteristics of the Study Area

Rajshahi district of Bangladesh with an area of 2407.01 sq. km, is bounded by Naogaon district on the north, Padma river on the south, Natore district on the east and Nawabganj district on the west. The region consists of Barind tract, Diara and Char lands. Total population of this district is 2262483; of the them 51.20 percent male, 48.80 percent female; Muslim 93 percent, Hindu 5 percent, Christian 1.5 percent and others 0.5 percent ; Santal 2.34 percent of the total population, they have their own language. Average literacy rate of this district is 30.61 percent. Male literacy rate is 37.6 percent and female literacy rate is 23.2 percent. The district has one city corporation, 9 upazilas, 70 union parishads, 1678 mouzas and 1858 villages. The main occupation of people of Rajshahi district are agriculture 38.73 percent, agricultural laborer 23.64

percent, wage laborer 3.50 percent, commerce 12.44 percent, service 8.81 percent, transport labor 2.36 percent and others 10.52 percent. Among the peasants, 31 percent are landless, 47 percent small, 19 percent intermediate and only 3 percent are rich; cultivable land is 0.07 hector per head. The main crops of this district are paddy, wheat, jute, sugarcane, turmeric, oil seed, onion, garlic, potato, betel leaf and mulberry plant. Communication facilities of this district are 896 km roads is pucca, semi pucca is 686 km and mud road is 4726 km, railways 70 km and one airport. Silk mill, textile mill, flour and rice mill, cold storage etc are the main industries of this district. This region is famous for the production of cocoon and silk fabrics. In Rajshahi district one medical college hospital, 16 other hospitals, 9 upazilla health complexes, 77 health and family welfare centers, one maternity and child welfare center and 88 satellite clinics (Banglapedia, 2003).

2.3 Nature and Sources of Data

The data of this study was collected under the project entitled "Strengthening the Department of Population Science and Human Resource Development" organized by the Department of Population Science and Human Resource Development of Rajshahi University in collaboration with UNFPA. Information was collected from Upazila Health Complexes of the five Upazilas and one medical college hospital in Rajshahi City Corporation of Rajshahi district. The Upazilas are Durgapur, Putia, Charghat, Bagmara and Paba. The information have been collected from 1230 women of reproductive age who were coming for pregnancy related treatment and seeking abortion during the time of survey by personal interview method. Out of the total respondents 200 were from Durgapur Upazila Health Complex, 162 were from Putia Upazila Health Complex, 184 were from Charghat Upazila Health Complex, 176 were from Bagmara Upazila Health Complex, 168 were from Paba Upazila Health

Complex and the remaining 340 were from Rajshahi medical college hospital in Rajshahi City Corporation. There were 610 women who came to hospital or health complex with confirm decision and already performed induced abortion (exposure group) and remaining 620 women who came to hospital or health complex without decision for induced abortion and expecting better treatment rather than that and ultimately did not perform induced abortion (control group). All these information were taken by purposive sampling method from January 2005 to December 2005.

2.3.1 Questionnaire

According to the goal of this research problem, a questionnaire was made. Data have been collected through individual questionnaire. The questionnaire was designed considering the following characteristics; (i) number of questions in the questionnaire should be limited; (ii) a respondent should adequately be assumed that her identity will not be against her interest; (iii) avoid long and confusion questions and formulate simple and short questions; (iv) start with easy questions then slowly put the difficult ones but maintain the sequences which are essentials in the questionnaire for the research work.

To avoid unnecessary trouble and hazardous situation pre-testing of the schedule were done and modification of the contents of the schedule were made in the light of pre-testing. A draft questionnaire was first prepared and pre-testing of the same was completed. It was then finalized for field survey by eliminating the anomalies and consistencies present in the draft questionnaire. Questions were arranged in logical sequence and all questions relating to one aspect are grouped under one sub-head.

Most of the questions are closed ended and the answer chosen by the respondents were indicated by the tick mark. Some open-ended questions are

included to find out the opinions of the respondents with having space provided for writing in answers. Considering the difficulties of analysis of open-ended questions, we kept the number of open-ended questions to minimum. While designing the questionnaire, attention was given to the word of the questions so that the respondents found it simple and understand it easily. In certain situation local dialect of some terminology are used.

The questionnaire was used to collect information from the reproductive aged women who were coming for pregnancy related treatment for her complicacies and also who were seeking abortion or wastage her pregnancy in the hospital or health complex. The women were asked questions on the following six different specifications as explained below:

Respondents' own background: In this section the questions regarding respondents' age, education, health conditions etc. were covered.

Respondents' household background: In this section the questions regarding religion, location, area of residence, type of house, type of family, occupation of husband, household income, education of the household members, social status, economic status, possession of household goods and prestigious items etc. were included.

Marriage record: In this section questions related to marriage such as date of marriage, order of marriage, age at marriage etc. were recorded.

Birth record: In this section information regarding first birth and last birth, the birth order and parity were recorded. Here questions such as total number of children ever born to the couple, parity of birth, type of birth, their sex composition, date of birth, survival status, age of the child at present, age of the mother at the time of delivery, duration of breast feeding, reason for early weaning, duration of post-partum amenorhoea etc. were included.

Abortion and reproductive health record: Under this section questions such as number of spontaneous abortion occurred, number of induced abortion performed by the women and after which parity the abortion was performed, knowledge of side effect of abortion, present reproductive status, date of abortion, age at the time of abortion, timing of abortion (i. e. at which week the pregnancy was terminated), the reasons for induced abortion, problem faced after induced abortion, the place where abortion was performed and also questions regarding gynecological problems were recorded.

Family planning record: To get the idea of family planning awareness and practice of family planning method, question such as which family planning method used at present, duration of the method used, reason for using, reason for leaving the method, source of knowledge about it, the method practiced before and after abortion etc. were included.

2.3.2 Data Collection

The data should be collected keeping in view the objective of the study. The editing of the completed questionnaires helped in amending and recording errors or eliminating data that are obviously erroneous and inconsistent. All kinds of mistakes have been corrected where they were found in questionnaires and all answers have been observed carefully. As a result, there is no irrelevant information. The tendency should not be collected too many data, but the important one and some of which are never subsequently examined and analyzed. The process of data collection depends upon the kind of research.

In this survey the method of direct interview was used. The enumerators were mainly responsible to collect information and recorded them properly. Attention was given to record actual and true statement made by the respondents.

Before procuring information, we went to the various mentioned Upazilla Health Complexes and talked with the head of the health complex regarding the

objectives of this research. The head of the health complex agreed to provide information in the concern topic and did spread out his assistance in the completion of collecting data. Later, we approached our demand from the doctors and the health workers and abortion practitioners.

A wide discussion about the coverage and contents was made with the doctors and the health workers and abortion practitioners. They were given necessary instruction regarding ways of collecting data and in the art of putting questions in such a tactful way that maximum responses and reasonably accurate information could be obtained under all circumstances. All concepts and definitions used were clearly explained and information actually to be collected was vividly shown to the enumerators by uses of clear instruction and mock interview. The enumerators were also given the field training as well.

2.4 Analytical Methods

In this section, for assessment of respondents' reproductive behavior, the study variables are described in extensive form. For the assessment of socio-economic status of the respondents Household Asset Index method is used. Bivariate analysis of reproductive behavior for selected independent variables (Demographic and Socio-economic) is undertaken to examine their interrelationship. Multivariate analysis such as, Multivariate Logistics Regression, Proportional Hazard Model analysis was performed to assess the net and interaction effects of the independent variables on induced abortion.

2.4.1 Bivariate Analysis

To determine which of the factors influence the reproductive behavior among women in the study population, the percentage distribution of aborted women has been analyzed by categories of several variables. Although examining of percentages in a bivariate analysis is useful for first step in studying the

relationship between two variables, these percentages do not allow for quantification or testing of that relationship. In this study, some of the independent variables are quantitative. In order to perform differential analysis, it is required to make these variables into categorical variables by differentiating each quantitative variable into various categories. In this study, different quantitative variables are number of antenatal care visits etc. These variables are categorized into different groups on the basis of their respective standard ranges.

2.4.2 Household Asset Index

Theoretically, socio-economic status comprises two broad definitions: *socio-economic class and position* (Krieger, Williams et al. 1997).The former refers to social groups arising from interdependent economic, social and legal relationships among a group of people living in the economy such as employers, employees, self-employed and unemployed. The latter including both resource-based and prestige-based measures stands for the diverse components of economic and social well being that differentiate persons of different social classes (Morris, Carletto et al. 2000). Some social scientists prefer using the term 'socio-economic position' to the more commonly used phrase 'socio-economic status' because the latter blurs distinctions between two different aspect of socio-economic positions, actual resources and prestige-related characteristics (Krieger, Williams et al. 1997). According to these definitions, methods for assessing household socio-economic position can be categorized into two major groups: *money-metric measure and non-monetary measure approaches*. The first category is traditionally used by the economists because it is easy to measure in a monetary definition and is widely well understood by the public. Its concept relies on the assumption that a person's material standard of living largely determines their well-being. Thus the poor are defined as those who engage in a material standard of living measured by

income and expenditure below a certain level – the poverty line (Falkingham and Namzie 2001). However, practical problems associated with the accuracy in quantifying income or expenditure specially in developing countries have arisen and led to a search for non-monetary proxies of household welfare. An alternative approach known as non-monetary measures namely household *Asset Index* has been developed due to a need of assessing household welfare in a comprehensive and broader concept (Krieger, Williams et al. 1997; Filmer and Pritchett 1998).

Asset index is constructed by using Principal Component Analysis (PCA) with the help of housing characteristics, household durable and semi-durable assets. PCA is a statistical technique closely related to factor analysis. PCA can determine the weight as a factor score for each asset variable. It seeks a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. This is called the Principal Axis Method and results in orthogonal (uncorrelated) factors. Actually, PCA often provides a good approximation to common factor analysis. The first principal component is the linear index of variables with the largest amount of information common to all of the variables. We can write a result of the asset index derived from PCA for each household asset with the following formula:

$$A_j = \sum_{i=1}^{n} f_i (a_{ji} - a_i) / S_i$$

Where, A_j is an asset index for each household (j=1, 2, ... ,m)

f_i is the scoring factor for each durable asset of household (i=1, 2, … ,n)

a_{ji} is the ith asset of jth household (i=1, 2, … ,n ; j=1, 2, ... ,m)

a_i is the mean of ith asset of household (i=1, 2, … ,n)

S_i is the standard deviation of ith asset of household (i=1, 2, ... ,n)

Derived from PCA, scoring factors of the first principal component (the efficient component) would be used for constructing the asset index of each household. This means a new factor which has a linear correlation with original variables would be developed. A weight is assigned to each variable (asset) in order to maximize variation of new variable, subject to number of constraints. The mean value of the index is zero by construction. Since all asset variables are dichotomous and take only a value of zero or one, then the weight is easy to be interpreted. A move from 0 to 1 changes the index by f_i/S_i. Using the asset index computed by this formula, each household would be assigned into quartiles. The first quartile is low, second quartile is medium and third quartile is high category of social status.

2.4.3 Logistic Regression Analysis

The logistic regression analysis is made to identify the risk factors for incidence of induced abortion. Cox (1958) is the pioneer of logistic regression model. Subsequently this model was illustrated by Walker and Duncun (1967) and Cox (1970) himself. More recently Lee (1980), Fox (1984) and Cox (1984) himself have further illustrated the Cox's pioneer model. The logistic regression model may be briefly described as follows:

Let y be the dichotomous dependent variable, which takes on values 1 and 0. So that,

$$p_i = E\{y_i = 1 \mid X_i\} = \frac{1}{1+e^{-(\beta_0+\beta_1 x_i)}}$$, where X_i is explanatory variable and

$$1-p_i = E\{y_i = 0 \mid X_i\} = 1 - \frac{1}{1+e^{-(\beta_0+\beta_1 x_i)}}$$

$$= \frac{e^{-(\beta_0+\beta_1 x_i)}}{1+e^{-(\beta_0+\beta_1 x_i)}}$$

Therefore, we can write

$$\frac{p_i}{1-p_i} = \frac{1}{1+e^{-(\beta_0+\beta_1 x_i)}} \frac{1+e^{-(\beta_0+\beta_1 x_i)}}{e^{-(\beta_0+\beta_1 x_i)}} = e^{-(\beta_0+\beta_1 x_i)} \tag{2.1}$$

Now if we take the natural log of the equation (2.1) we obtain

$$L_i = \log_e\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_i \tag{2.2}$$

Here, $p_i/(1-p_i)$ given in (2.1) is simply the odds ratio and L_i given in (2.2) is known as log-odds.

Instead of single explanatory variable we can count two or more explanatory variables. Let X_{i1}, X_{i2}, ... , X_{ik} be the vector of k independent explanatory variables for the i-th response. The logarithm of the ratio of p_i and $(1-p_i)$ gives the linear function of X_{ij} and the model (2.2) becomes,

$$L_i = \log_e \frac{p_i}{1-p_i} = \sum_{j=0}^{k} \beta_j X_{ij} \tag{2.3}$$

Where we consider $X_{i0} = 1$ and β_j is the parameter relating to X_{ij}.

The function (2.3) is the linear function of both the variables X and the parameters β. L is called the logit and hence the model (2.3) is called the logistic regression model.

Estimation of the Parameters

In order to estimate the unknown parameters we can not use the standard OLS method. Because in that case we must face some special problems as non-normality of the disturbance terms, heteroscedastic variance of the disturbance terms, non-fulfillment of the axiom i.e. $0 \le p_i = E(Y_i \mid X) \le 1$ and questionable value of R^2 as a measure of goodness of fit.

To eliminate the above problem, Cox suggested the maximum likelihood estimation method in place of standard OLS method and proposed the following function:

$$L(\beta_0, \beta_1, \ldots, \beta_k) = \frac{\prod_{i=1}^{n} \exp\left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right)}{\prod_{i=1}^{n} \left\{ 1 + \exp\left(Yi \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\}}$$

$$= \frac{\exp\left\{ \sum_{i=1}^{n} \left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\}}{\prod_{i=1}^{n} \left\{ 1 + \exp\left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\}}$$

$$= \frac{\exp\left\{ \sum_{j=0}^{k} \beta_j \sum_{i=1}^{n} X_{ij} Y_i \right\}}{\prod_{i=1}^{n} \left\{ 1 + \exp\left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\}}$$

$$= \frac{\exp\left\{ \sum_{i=1}^{n} \beta_j t_j \right\}}{\prod_{i=1}^{n} \left\{ 1 + \exp\left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\}}, \quad \text{where } t_j = \sum_{i=1}^{n} X_{ij} Y_i \text{ , j = 0, 1, ... , k}$$

The log-likelihood function is given by

$$\log_e L(\beta_0, \beta_1, \ldots, \beta_k) = \sum_{j=0}^{k} \beta_j t_j - \sum_{i=1}^{n} \log_e \left\{ 1 + \exp\left(Y_i \sum_{j=0}^{k} \beta_j X_{ij} \right) \right\} \qquad (2.4)$$

In order to estimate the parameters of this function, the logistic regression procedure of the statistical package SPSS for windows base 10.0 version may be used.

Interpretation of Parameters

Interpretation of parameters in logistic regression model is not so straight forward as in linear regression model. So it is relevant to present a little discussion about it. Since the logit transformation $L_i = \log_e \frac{p_i}{1 - p_i}$ is linear in parameters, we can interpret the parameters using the arguments of linear regression. Thus the interpretation may be described as follows:

We have $L_i = Log_e \frac{p_i}{1-p_i} = \beta_0 + \beta_1 X_1 + \ \ldots \ + \beta_k X_k$ is a linear function in parameter. where, $p_i = \frac{e^{\beta_0+\beta_1 x_1+ \ \ldots \ +\beta_k x_k}}{1+e^{\beta_0+\beta_1 x_1+ \ \ldots \ +\beta_k x_k}}$

So, arguing analogously as in the case of linear model we can say that β_j (j=1, 2, ... , k) represents the rate of change in $\log_e(\frac{p_i}{1-p_i})$ for one unit change in X_i (other variables remaining constant). The interpretation of parameters in logistic regression has another interesting aspect. In fact, this is the proper interpretation for the parameters of qualitative variable coefficient. To describe this we first consider that the independent variable (X_j) is dichotomous. This case is not only simplest but it gives the conceptual foundation for all other situations. The description is given below:

We have, $Log_e \frac{P_i}{1-P_i} = \beta_0 + \beta_1 X_1 + \ldots + \beta_j X_j + \ldots + \beta_k X_k$

Now, if X_j is a dichotomous variable taking values 0 and 1, then the odds ratio 'O' (say) for $X_j = 1$ against $X_j = 0$ is (keeping all other X's fixed).

$$O = \frac{p_i(Y_i = 1 \mid X, X_j = 1)/\{1 - p_i(Y_i = 1 \mid X, X_j = 1)\}}{p_i(Y_i = 1 \mid X, X_j = 0)/\{1 - p_i(Y_i = 1 \mid X, X_j = 0)\}}$$

$$= \frac{e^{\beta_0+\beta_1 X_1+ \ldots +\beta_j X_j+ \ldots +\beta_k X_k}}{e^{\beta_0+\beta_1 X_1+ \ldots 0.\beta_j+ \ldots +\beta_k X_k}} = e^{\beta_j}$$

$$\Rightarrow Log_e O = \beta_j$$

So, we can directly estimate the coefficient of a logistic regression model as $\log_e$ 0 and hence can interpret. If a qualitative independent variable has m categories, we introduced only (m-1) dummy variables and the remaining one is taken as reference category.

2.4.4 Proportional Hazard Model

In survival analysis several survival distributions are often considered for modeling the survival experience of a homogeneous population. One such model introduced by D.R. Cox in 1972 is termed as Cox's Proportional Hazards Model, which is based on the assumption of proportional hazard function. Before proceeding on the computational details of this model it is important to know what a hazard function really means. A hazard function is defined as the failure rate during a very short interval (t, t+Δt) conditional upon the individual surviving to the beginning of the interval t. For instance, for interval (t, t+Δt), the hazard function can be expressed as

$$h(t) = \frac{\Pr\{an\ individual\ \ fails\ to\ survive\ during\ the\ \text{interval}\ (t, t+\Delta t)\}}{\Delta t}$$

Where, Δt is an infinitesimal interval of length t.

The proportional hazards model is non-parametric in that sense that it involves an unspecified function in the form of an arbitrary base-line hazard function. This model is comparatively more flexible and appropriate for the analysis of survival data with or without censoring and with or without tied failure time. This model assumes that the hazard of the study group is proportional to that of the underlying survival distribution. The Cox's proportional hazards model specifies that

$$h(t;z) = h_0(t)\, e^{z\beta} \qquad (2.5)$$

Where, $h_0(t)$ is an arbitrary unspecified base-line hazard function for continuous failure time T and $\beta' = (\beta_1, \beta_2, \ldots, \beta_p)$ is a vector of p regression parameters and z is a vector of covariates. In this model, the covariates act multiplicatively on the hazard function. If $h_0(t) = h$, equation (2.5) reduces to the exponential regression model,

$$h(t;z) = h\, e^{z\beta} \qquad (2.6)$$

The weibull regression model is the special case of proportional hazards model with $h_0(t) = h\, p(ht)^{p-1}$

Then the conditional hazard is

$$h(t;z) = h\, p(ht)^{p-1} e^{z\beta} \tag{2.7}$$

The conditional density function for T given Z corresponding to (2.5) be

$$f(t;z) = h_0(t)e^{z\beta} \exp\left[- e^{z\beta} \int_0^t h_0(u)du \right] \tag{2.8}$$

The conditional survivor function for T given Z is

$$s(t;z) = [s_0(t)]\exp(z\beta) \tag{2.9}$$

where, $s_0(t) = \exp\left[- \int_0^t h_0(u)du \right]$

Thus the survivor function of t for a covariate value z is obtains by raising the base-line survivor function $s_0(t)$ to a power. The set of models produced by this process is sometimes referred to as the class of Lehmann alternatives.

For arbitrary $h_0(.)$, the model (2.5) is sufficiently flexible for many applications. There are, however, two important generalizations that do not substantially complicate the estimation of β. First, the nuisance function $h_0(t)$ can be admitted to vary in specific subsets of the data and the second important generalization allows the regression variable to depend on time itself.

The model (2.5) assumes continuous failure time T, which may not be practical since in practice it is quite likely that the data will be recorded in a form informing ties. To cover this probability, a discrete proportional hazards model was proposed by Cox, 1972 and specifies a linear log odds model for the hazard probability at each potential failure time. Cox generalized (2.5) formally to discrete time by

$$\frac{h(t;z)dt}{1-h(t;z)dt} = \frac{h_0(t;z)dt}{1-h_0(t;z)dt} \exp(z\beta) \tag{2.10}$$

In the continuous case this model reduces to (2.5), in discrete time h(t;z)dt is a non-zero probability and (2.10) is a logistic model.

Methods of Estimation and Tests

The mathematical form of proportional hazards model is given as follows:

$h(t;z) = h_0(t)e^{z\beta}$

where, z is a row vector of p measured covariates, β is a column vector of p regression parameters, $h_0(t)$ is an unspecified base-line hazard function and T is the associated failure time.

The survivor function and density function of T are also given by,

$$s(t;z) = \exp[-\int h_0(u)e^{z\beta}du] \quad \text{and} \tag{2.11}$$

$$f(t;z) = h(t;z)\, s(t;z) \tag{2.12}$$

There are several methods for estimating and testing the set of parameters in the model. However, the method of partial likelihood is the most commonly used method, which we discuss below.

Method of Partial Likelihood

The general method of partial likelihood was proposed by Cox, 1975. The partial likelihood technique makes useful inference in the presence of many nuisance parameters. Let us suppose that the data consist of a vector of observations from the density f(y;Θ,β), β is the vector of parameters of interest, and Θ is a nuisance parameter and typically of very high or infinite dimension. In some applications, Θ is in fact a nuisance function as, for example, the hazard function $h_0(.)$ in the proportional hazards model. Let us suppose that the data y are transformed into a set of variables A_1B_1, A_2B_2, …, A_mB_m in a one to one manner and let $A^{(j)} = (A_1, A_2, \ldots, A_J)$ and $B^{(j)} = (B_1, B_2, \ldots, B_J)$. Suppose that the joint density of $A^{(m)}$, $B^{(m)}$ can be written

$$\prod_{j\neq 1}^{m} f(b_j \mid b^{(j-1)}, a^{(j-1)}; \theta, \beta) \prod_{j\neq 1}^{m} f(a_j \mid b^{(j)}, a^{(j-1)}; \beta)$$

The second term of this function is called the partial likelihood of B based on A in the sequence (A_J , B_J), that is the partial likelihood B based on A in the sequence (A_J , B_J) is

$$L(\beta) = \prod_{J\neq 1}^{m} f(a_j | b^{(j)}, a^{(j-1)}; \beta) \qquad (2.13)$$

where, the number of terms m could be random or fixed. In this case it is important to note that the partial likelihood is not a likelihood function in the ordinary sense. In fact, (2.13) cannot in general, be given a direct probability interpretation as either a conditional or a marginal probability statement.

Now in order to apply the partial likelihood method to estimate the parameters of proportional hazards model let us consider the model (2.5),

$h(t;z) = h_0(t)e^{z\beta}$

Let us consider a sample of n individuals, which are observed to fail at t_1, t_2, …, t_n with corresponding covariates z_1, z_2, …, z_n. Let us assume that the sample consists of k distinct failure times $t_{(1)} < t_{(2)} < \ldots < t_{(k)}$ and for this moment ignore the case of ties. The remaining n-k observations are right censored. Further let $z_{(i)}$ be covariate corresponding to $t_{(i)}$ be the risk set at time $t_{(i)}$, that is, $R(t_{(i)})$ is the set of individuals at risk at $t_{(i)} - 0$, and $r_{(i)}$ be the number of individuals in $R(t_{(i)})$.

Let $z_{(i)}$ be the value of the covariate z for the item failing at $t_{(i)}$. Now let B_i specify the censoring and covariate information in $[t_{(i-1)}, T_{(i)}]$ plus be information that an individual fails at $t_{(i)}$, A_i specifies the particular individual that fails. Thus in this case the ith term in the partial likelihood (2.13) is

$$L_i(\beta) = f(a_i | b^{(i)}, a^{(i-1)}) = \frac{h(t_{(i)}; z_{(i)})}{\sum_{l \in R(t_{(i)})} h(t; z_l)} = \frac{\exp[z_{(i)}\beta]}{\sum_{l \in R(t_{(i)})} \exp[z_l \beta]}$$

which is same as the conditional probability that item (i) fails at $t_{(i)}$ is at risk and that exactly one failure occurs at $t_{(i)}$.

Thus for the proportional hazards model (2.5) the partial likelihood is given by

$$L_i(\beta) = \prod_{i\neq 1}^{k} = \frac{\exp[z_{(i)}\beta]}{\sum_{1\in R(t_{(i)})}\exp[z_1\beta]} \tag{2.14}$$

If ties are present in the data, the partial likelihood can be obtained by applying a similar argument to the discrete logistic model (2.10). For this model, the hazard relationship is given by

$$\frac{h(t;z)dt}{1-h(t;z)dt} = \frac{h_0(t;z)dt}{1-h_0(t;z)dt}\exp(z\beta)$$

where, $h_0(t)$ is an unspecified discrete hazard giving positive contributions at the observed failure time $t_{(1)}$, $t_{(2)}$, …, $t_{(k)}$. A direct generalization of the above argument can then be used to compute, at each failure time, the probability that the d_i failure should be those observed given the risk set and the multiplicity d_i and the partial likelihood function for discrete case is given by

$$L(\beta) = \prod_{i\neq 1}^{k} = \frac{\exp[s_{(i)}\beta]}{\sum_{1\in R_{d_j}(t_{(i)})}\exp[s_1\beta]} \tag{2.15}$$

where, $s_{(i)}$ is the sum of the covariates associated with the d_i failures at $t_{(i)}$, $s_1 = \sum_{j=1}^{d_j} z_{1j}$ and $1=(1_1, 1_2, \ldots, 1_d)$; $R_{d_i}(t_{(i)})$ is the set of all subsets of d_i items chosen from the risk set $R(t_{(i)})$ without replacement.

It the ties arise the partial likelihood (2.15) does not give a consistent estimator of the parameter β in (2.5). This inconsistency in the partial likelihood occurs since (2.15) must be thought of as arising from the discrete model equation (2.10) and so estimates the odds ratio of parameter β in the model. Since (2.10) does not arise as a grouping of the continuous model, the two parameters do not have same interpretations. These two parameters agree if the failure time grouping is fine; they will become more disparate, however, as the failure time grouping becomes more severe.

Chapter Three

Characteristics of the Study Population

3.1 Introduction

In the previous chapter, the details of data collection and methodologies were discussed and the present chapter discusses about the characteristics of the study population regarding pattern and level of timing of induced abortion. Socio-economic and demographic variables play an important role on abortion, specially on induced abortion. Timing is very much important factor for induced abortion as timing increases the complexity for implementing the induced abortion also increases. There are two types of respondents in our study. One is exposure group (having decision and already performed induced abortion) and another group is controlled group (coming without decision for induced abortion and expecting better treatment rather than induced abortion and ultimately did not do induced abortion). We are mainly interested to examine the pattern and level of exposure group of respondents. In this chapter an attempt has been made to study the pattern and level of timing of induced abortion according to some selected background variables.

3.2 Characteristics of the Survey Population

Socio-economic and demographic variables play an important role in this type of study. The variables which reflect the picture of social and economic status of a community are termed as socio-economic variables. To see the pattern and level of timing of pregnancy duration, in Tables 3.1 to 3.20 and Figures 3.1 to 3.19 the percentage distribution of the respondents and the mean length of pregnancy duration for exposure group and control group according to some selected socio-economic and demographic characteristics are presented.

Timing of Abortion

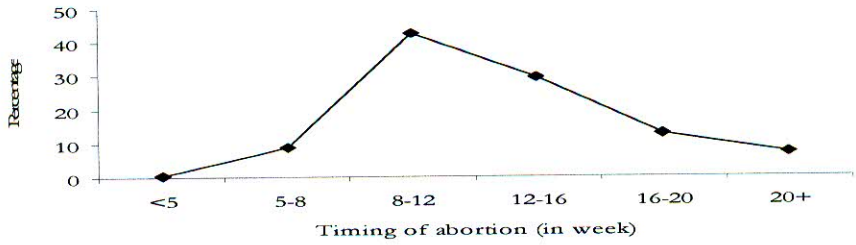
The abortion seekers are classified into six groups based on pregnancy period as (i) within first 5 weeks, (ii) abortion within 5 weeks to 8 weeks, (iii) abortion within 8 weeks to 12 weeks, (iv) abortion within 12 weeks to 16 weeks, (v) abortion within 16 weeks to 20 weeks and (vi) 20+ weeks of pregnancy. The percentage distribution according to timing of abortion is given in Table 3.1 and Figure 3.1.

Table 3.1: Percentage distribution of the respondents by their timing (in weeks) of abortion

Duration (in weeks)	Frequency	Percentage
Duration ≤5	2	0.3
5<Duration ≤8	52	8.5
8<Duration ≤12	256	42.5
12<Duration ≤16	178	29.2
16<Duration ≤20	77	12.6
Duration>20	42	6.9
Total	610	100.0
Mean	12.53 weeks	

In our study it is seen that 0.3 percent abortion were done before first five weeks, 8.5 percent within 5-8 weeks, 42.5 percent within 8-12 weeks, 29.2 percent within 12-16 weeks, 12.6 percent within 16-20 weeks and 6.9 percent within 20+ weeks respectively. Further the mean length of pregnancy duration before induced abortion is 12.53 weeks. It can be noted that maximum percentage of respondents is within 8-12 weeks group and Figure 3.1 shows that the distribution of the respondents by their timing of abortion is approximately symmetric.

Figure 3.1: Percentage distribution of the respondents by timing (in weeks) of abortion



Current Age of the Respondents

The age pattern of the respondents is crucial for a better understanding of the demographic behavior of any research work. The respondents are classified into eight groups by their current age as (i) <15 years, (ii) 15-19 years, (iii) 20-24 years, (iv) 25-29 years, (v) 30-34 years, (vi) 35-39 years, (vii) 40- 44 years and (viii) 45 years and above. Though in the literature 15-49 years age is considered as the reproductive age but in this study we found some respondents are of less than 15 years of age and hence we consider the another age group <15 years in our study.

Table 3.2: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to current age

Current age group	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
<15	13.57	0.3	-	-	13.57	0.2
15-19	12.26	14.6	14.15	6.9	12.88	10.7
20-24	12.36	31.0	13.80	30.5	13.08	30.7
25-29	12.71	32.3	14.71	31.8	13.71	32.0
30-34	12.55	12.3	15.81	13.4	14.26	12.8
35-39	13.42	7.0	13.83	10.3	13.66	8.7
40-44	11.04	2.3	12.90	5.8	12.38	4.1
45+	12.86	0.2	14.93	1.3	14.70	0.7

The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to the current age group is presented in Table 3.2 and Figures 3.2 and 3.3. It is seen from the Table 3.2 that for exposure group the maximum (13.57 weeks) and minimum (11.04 weeks) mean lengths of pregnancy duration are in the age group <15 years and 40-44 years respectively whereas the maximum (90.2%) respondents belong to 15 and 34 years age and a minimum of the respondents belong to both tail end age groups. Regarding health security it is very harmful as greater length of pregnancy duration of induced abortion seekers at the early age of life and which is found in this study. On the other hand for control group the maximum (15.81 weeks) and minimum (12.90 weeks) mean lengths of

pregnancy duration are in the age groups 30-34 years and 40-44 years respectively whereas the maximum (86%) respondents belong to 20 and 39 years of age. For overall respondents the maximum (14.70 weeks) and minimum (12.38 weeks) mean lengths of pregnancy duration are in the age group 45+ and 40-44 years respectively but the absolute majority (95%) respondents belong to 15 and 39 years of age.

Figure 3.2: Mean length of pregnancy duration according to current age of the respondents

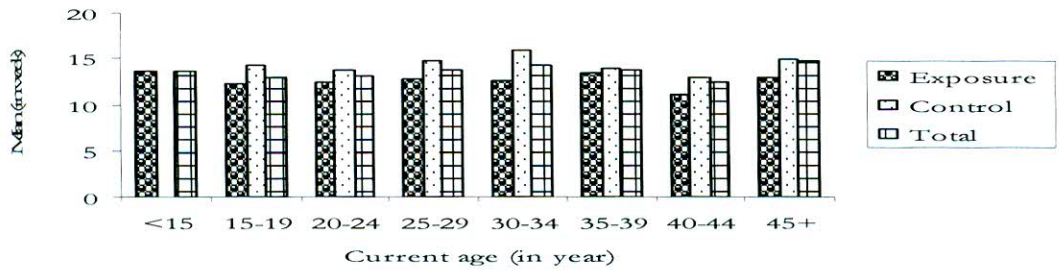
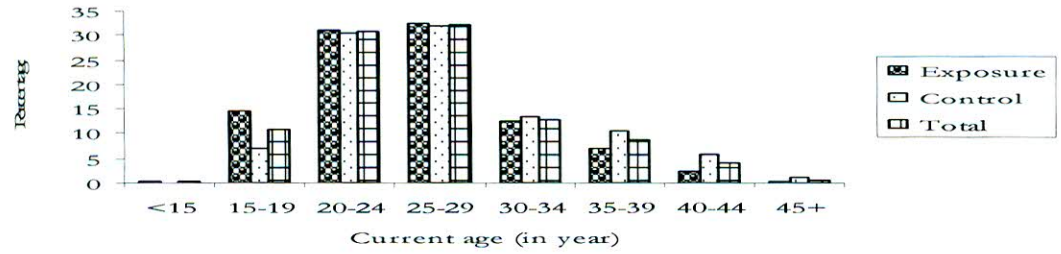


Figure 3.3: Percentage distribution of the respondents according to current age



Respondent's Education

Education is the key determinant of the life style and status of individuals in a society. It affects almost all aspects of human life, including demographic and health behavior. To know the educational qualification of the respondents, years of schooling are considered. The surveyed women are classified into five categories viz. (i) illiterate who have had no education i.e., can not read or write any simple sentence, (ii) primary educated who have had 1 to 5 years of schooling, (iii) secondary educated who have had 6-10 years of schooling, (iv) higher secondary who have had 11-12 years of schooling and (v) higher educated group who have had more than 12 years of schooling.

Table 3.3: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to respondent's education

Respondent's education	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Illiterate	12.93	14.8	14.02	17.3	13.52	16.0
Primary	13.09	18.2	14.12	22.7	13.67	20.5
Secondary	12.49	44.6	14.79	38.1	13.56	41.3
Higher secondary	11.41	14.4	13.74	13.7	12.55	14.1
Higher	12.75	8.0	14.69	8.2	13.74	8.1

The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to the respondent's education is presented in Table 3.3 and Figures 3.4 and 3.5. It is seen from the Table 3.3 that for exposure group the maximum (13.09 weeks) and minimum (11.41 weeks) mean lengths of pregnancy duration are of the respondents having primary and higher secondary level of education respectively. So, necessary publicity should be needed among the less educated women about the ill consequence of delayed induced abortion. On the other hand the maximum (14.79 weeks) and minimum (13.74 weeks) mean lengths of pregnancy duration for the respondents having secondary and higher secondary level of education respectively for control group. In case of overall respondents the maximum (13.74 weeks) and minimum (12.55 weeks) mean lengths of pregnancy duration are of the respondents having higher and higher secondary level of education respectively.

Figure 3.4: Mean length of pregnancy duration according to respondent's education

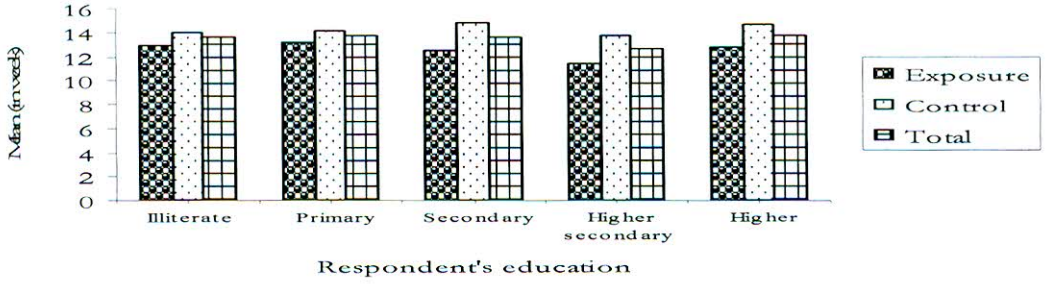
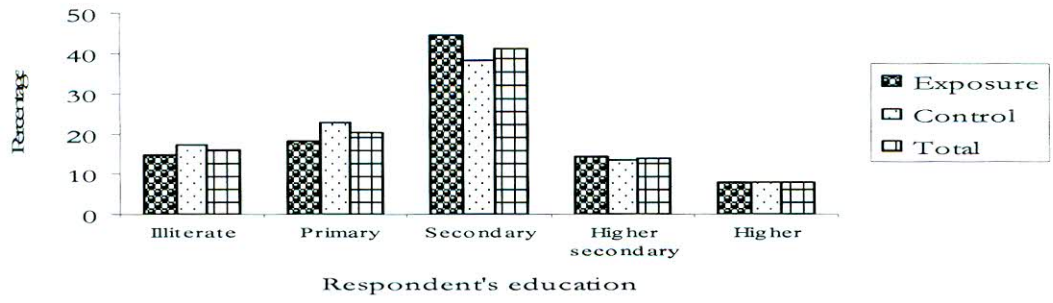


Figure 3.5: Percentage distribution of the respondents according to respondent's education



Husband's Education

Husband's education influences the overall behavior of the married women. Husband's educational status is classified into five categories as mention in the case for the respondents. The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to their husband's education is presented in Table 3.4. From this table it is seen that insignificant variation in mean lengths of pregnancy duration exists among exposure, control and total groups at different educational levels of the husbands.

Table 3.4: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to husband's education

Husband's education	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Illiterate	12.58	16.0	13.74	15.8	13.18	15.9
Primary	12.58	16.2	14.13	16.9	13.40	16.6
Secondary	12.87	35.2	14.42	34.0	13.66	34.6
Higher secondary	12.30	12.5	14.10	11.6	13.20	12.1
Higher	12.14	20.0	15.0	21.6	13.68	20.9

Respondent's Occupation

The employment status women reflect her position in the family as well as their status in the society. This also influences women's sense of personal security and consequently affects their reproductive decisions. Employment status of the respondents also appears to be related to knowledge of family planning in the

developing countries. Oni and McCarthy (1986) found that work status of the women could often be considered to be a major determinant of her fertility aspiration and behavior and hence, some strong association with contraceptive use is expected. In this study, respondent's occupations are classified into six groups as (i) housewife, (ii) service, (iii) business, (iv) professional (includes advocates, doctors, engineers), (v) labor (includes maids, manual workers) and (vi) student.

Table 3.5: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to respondent's occupation

Respondent's occupation	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
House wife	12.74	77.9	14.39	88.5	13.63	83.3
Service	11.40	10.2	13.85	10.3	12.64	10.2
Business	8.57	0.2	-	-	8.57	0.1
Professional	10.36	0.3	12.71	0.5	11.77	0.4
Labor	13.51	0.8	17.71	0.6	15.38	0.7
Student	12.09	10.7	-	-	12.09	5.3

The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to respondent's occupation is presented in Table 3.5. This table shows that for exposure group the maximum (13.51 weeks) and minimum (8.57 weeks) mean lengths of pregnancy duration for those women whose occupation are labor and business respectively but the maximum (77.9%) respondents are house wife. On the other hand for control group the maximum (17.71 weeks) and minimum (12.71 weeks) mean lengths of pregnancy duration for labor and professional respectively but the maximum (88.5%) respondents are house wife. For overall respondents the maximum (15.38 weeks) and minimum (8.57 weeks) mean lengths of pregnancy duration for labor and business women respectively but maximum (83.3%) respondents are housewives.

Husband's Occupation

Respondents' husband occupation are classified into six categories as (i) farmer, (ii) business, (iii) service, (iv) labor (includes agricultural labor and non-agricultural labor), (v) professional (includes advocate, doctor, engineer) and (vi) student. The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to husband's occupation is presented in Table 3.6. This table shows that there is insignificant variation in mean lengths of pregnancy duration between exposure and control group for different occupations of husbands.

Table 3.6: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to husband's occupation

Husband's occupation	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Farmer	12.31	37.8	13.72	35.6	13.02	36.7
Business	12.97	25.4	14.62	27.3	13.86	26.4
Service	12.53	18.6	15.75	17.9	14.17	18.3
Labor	12.67	12.6	13.96	12.7	13.08	12.6
Professional	12.07	2.4	12.57	2.3	12.32	2.3
student	12.29	3.1	14.09	4.2	13.35	3.7

Religion

Religion has great importance on belief and culture and for this reason it has a remarkable value in the society. Most of the people of Bangladesh are Muslim and in our study population the same is seen. So the respondents are classified into two categories as (i) Muslim whose religion is Islam and (ii) Non-Muslim (includes Hindus, Christian and Buddhists etc).

Table 3.7: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to religion

Religion	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Muslim	12.62	92.6	14.42	92.3	13.53	92.4
Non-Muslim	11.37	7.4	13.53	9.7	12.48	7.6

The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to religion is

presented in Table 3.7 and Figures 3.6 and 3.7. This table shows that the mean length of pregnancy duration of Muslim women is greater than that of non-Muslims.

Figure 3.6: Mean length of pregnancy duration according to respondent's religion

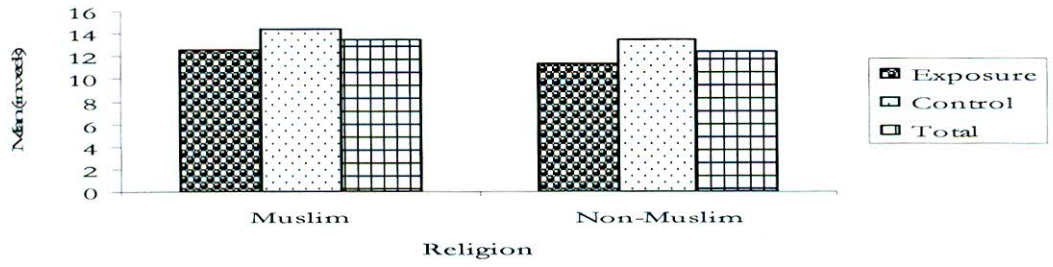
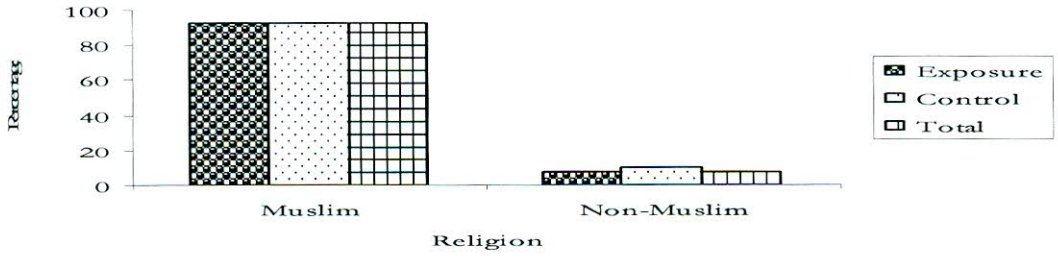


Figure 3.7: Percentage distribution of the respondents according to respondent's religion



Place of Residence

The place of residence is one of the important factors in the reproductive health study, specially in the abortion study. For our study purpose, we divide the place of residence in three areas namely, rural, urban and sub-urban. These classifications are important because of the differences in access to health facilities, cultural beliefs, living standard and opportunities.

Table 3.8: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to place of residence

Place of residence	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Rural	12.78	76.9	14.37	77.1	13.58	77.0
Urban	12.11	14.8	15.07	14.2	13.57	14.5
Sub-urban	10.99	8.4	13.04	8.7	12.04	8.5

The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to their place of residence is presented in Table 3.8 and Figures 3.8 and 3.9. This table depicts maximum (12.78 weeks) and minimum (10.99 weeks) mean lengths of pregnancy duration for rural and sub-urban women respectively for exposure group. On the other hand the maximum (15.07 weeks) and minimum (13.04 weeks) mean lengths of pregnancy duration are noted for urban and sub-urban women respectively for control group.

Figure 3.8: Mean length of pregnancy duration according to place of residence

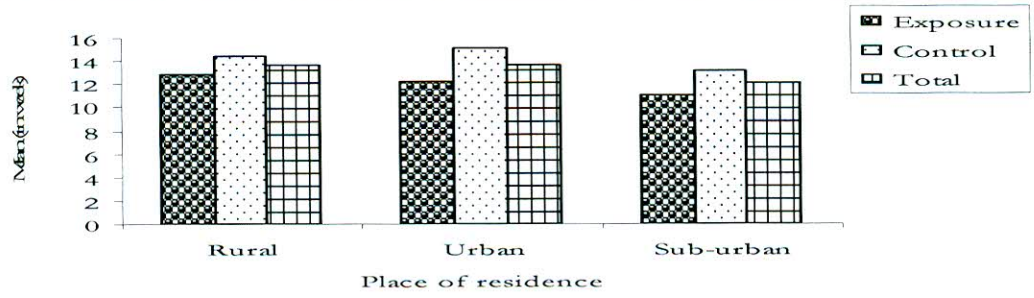
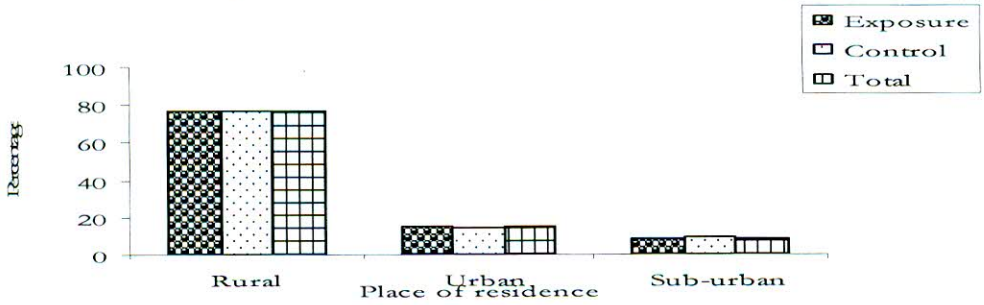


Figure 3.9: Percentage distribution of the respondents according to place of residence



Type of Family

Family is a social institution which reflects and regulates the behavior and other characteristics of a person. Considering the type of family, households are classified into two groups as (i) nuclear and (ii) joint family. The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to type of family is presented in Table 3.9. This table shows that there exists insignificant variation in mean lengths of

pregnancy duration for exposure, control and overall group for different types of families.

Table 3.9: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to type of family

Type of family	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Nuclear	12.59	77.5	14.37	79.5	13.50	78.5
joint	12.31	22.5	14.29	20.5	13.26	21.5

Construction Condition of House

On the basis of construction of house, households are classified into five categories as (i) Kutcha, (ii) Pucca, (iii) Half pucca, (iv) Tin and (v) Chon (Straw). The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to the construction condition of their houses is presented in Table 3.10. This table shows that there exists an insignificant variation in mean lengths of pregnancy duration for exposure group but a significant variation is shown for control and overall group.

Table 3.10: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to housing condition

Housing condition	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Katcha	12.63	57.2	13.95	57.6	13.30	57.4
Pucca	12.09	17.9	13.78	17.4	12.93	17.6
Half-pucca	12.69	20.3	15.77	20.5	14.25	20.4
Tin shade	12.21	4.4	15.57	4.4	13.89	4.4
Chon (Straw)	12.86	0.2	6.43	0.2	9.64	0.2

Socio-economic Status

Socio-economic possession of household is measured by household asset index which is based on possession of durable and semi-durable goods. Respondents are classified into three socio-economic status groups as (i) low, (ii) medium and (iii) high.

Table 3.11: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to socio-economic status

Socio-economic status	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Low	12.47	24.3	13.98	23.9	13.23	24.1
Medium	12.87	40.2	14.55	40.0	13.72	40.1
High	12.19	35.6	14.37	36.1	13.29	35.8

The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to socio-economic status is presented in Table 3.11 and Figures 3.10 and 3.11. This table depicts that socio-economically medium class women have maximum mean length of pregnancy duration.

Figure 3.10: Mean length of pregnancy duration according to socio-economic status

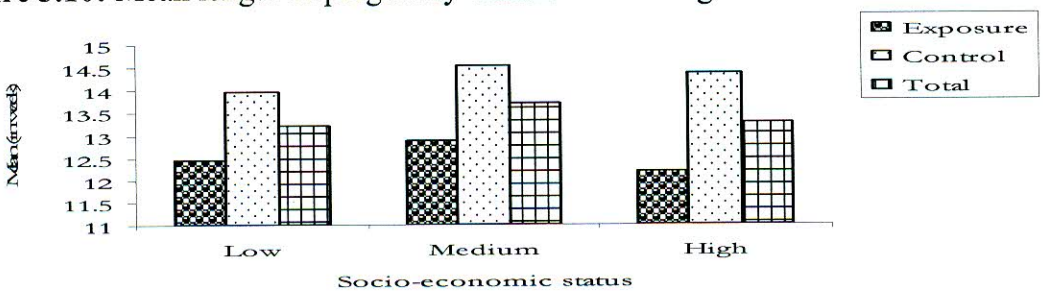
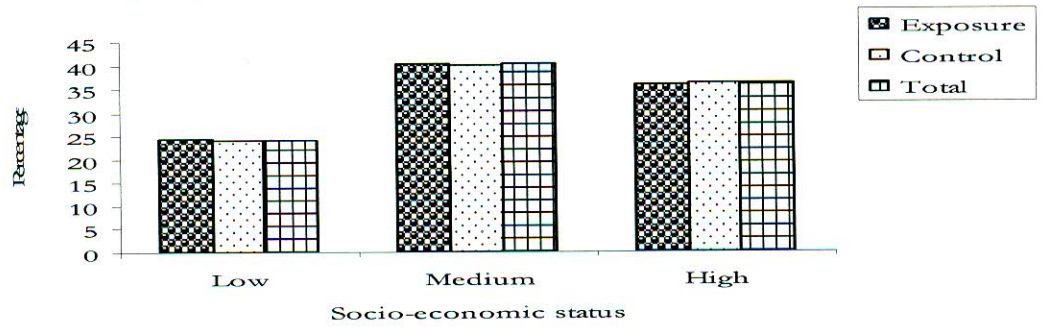


Figure 3.11: Percentage distribution of the respondents according to socio-economic status



Marital Status

Marital status is a demographic characteristic involving biological, social, economic, and in many cases, religious aspects. Marital status is the most important factor in the late adolescent and among adult group. Classifications of

marital status vary from country to country in accordance with prevailing marriage laws and customs. The United Nations includes the following categories in its minimum list: (a) single (never married), (b) married and not legally separated, (c) widowed and not remarried, (d) divorced and not remarried, and (e) married but legally separated. In our study marital status of the respondents are classified into five groups as (i) married, (ii) unmarried, (iii) divorced, (iv) separated and (v) widowed. It appears from the Table 3.12 that in exposure group maximum (17.14 weeks) mean length of pregnancy duration is for divorced respondents but the percentage of this group is very low (0.2%). On the other hand for control group the mean length of pregnancy duration for married women is 12.57 weeks and the percentage of this group is absolutely maximum (93.8%).

Table 3.12: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to marital status

Marital status	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Married	12.57	93.8	14.35	100.0	13.50	96.9
Unmarried	11.93	5.7	-	-	11.93	2.8
Divorced	17.14	0.2	-	-	17.14	0.1
Separated	8.00	0.2	-	-	8.00	0.1
Widowed	8.00	0.2	-	-	8.00	0.1

Age at First Marriage

Age at first marriage is one of the important factors in demography as it is directly related to fertility. Through fertility, age at marriage has an important effect on the rate of population growth, specially in a society where contraception is not generally practiced and births do not generally occur outside marriage (Islam, 1996). The respondents are classified into four groups as (i) <15 years, (ii) 15-19 years, (iii) 20-24 years and (iv) 25 and above years.

Table 3.13: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to age at marriage

Age at marriage	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
<15	13.12	9.6	14.22	8.5	13.66	9.0
15-19	12.58	60.5	14.39	57.4	13.50	58.9
20-24	12.29	23.5	14.13	27.6	13.31	25.6
25+	12.73	6.4	15.15	6.5	13.99	6.4
Mean	18.43 years					

The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to age at first marriage is presented in Table 3.13 and Figures 3.12 and 3.13. It is seen from Table 3.13 that for exposure group maximum (13.12 weeks) and minimum (12.29 weeks) mean lengths of pregnancy duration according to the age at marriage group <15 years and 20-24 years respectively whereas the maximum (84%) respondents are between 15 and 24 years of age at marriage group and a minimum of the respondents belong to both tail end age groups. On the other hand for control group maximum (15.15 weeks) and minimum (14.13 weeks) mean lengths of pregnancy duration in the age at marriage group 25+ years and 20-24 years respectively whereas the maximum (85%) respondents belong between 15 and 24 years of age at marriage for control group. For overall respondents the maximum (13.99 weeks) and minimum (13.31 weeks) mean lengths of pregnancy duration in the age at marriage group 25+ and 20-24 years respectively but the maximum (84.5%) respondents are between 15 and 24 years of age at marriage. Further the mean age at first marriage is 18.43 years.

Figure 3.12: Mean length of pregnancy duration according to age at marriage of the respondents

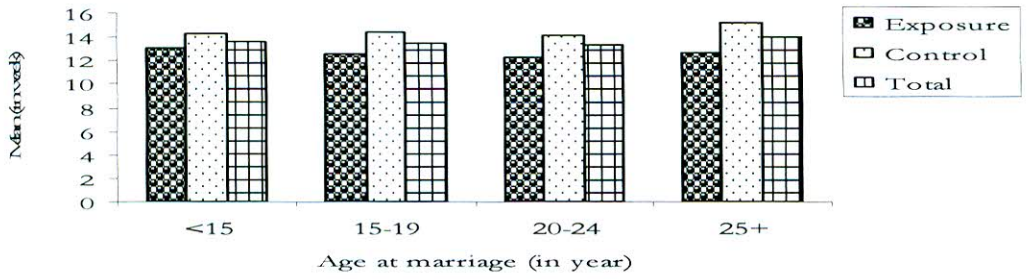
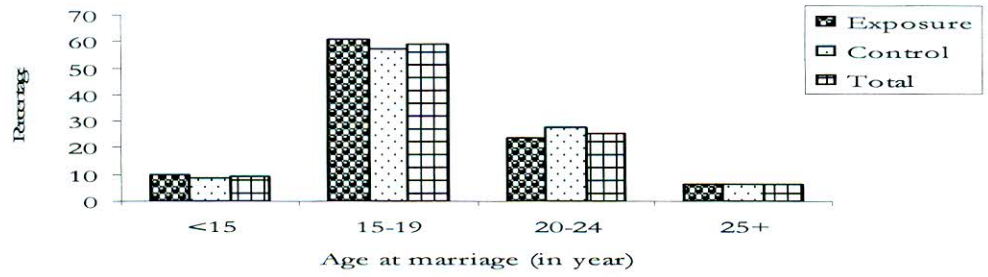


Figure 3.13: Percentage distribution of the respondents according to age at marriage of the respondents



Age at First Birth

Age at first birth is an important factor because of the first birth can be considered as the insertion into the motherhood and thereby the beginning of the reproductive process. The respondents are classified into four groups according to their age at first birth as (i) <15 years, (ii) 15-19 years, (iii) 20-24 years and (iv) 25+ years.

Table 3.14: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to age at first birth

Age at first birth	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
<15	12.65	2.6	12.34	1.0	12.56	1.7
15-19	13.00	48.3	14.62	45.1	13.81	46.6
20-24	12.12	37.7	14.26	42.5	13.30	40.2
25+	11.40	11.5	14.08	11.4	12.79	11.4
Mean	20.14 years					

Figure 3.14: Mean length of pregnancy duration according to age at first birth

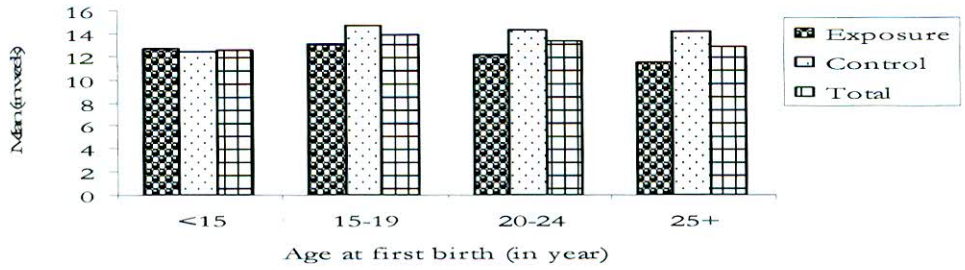
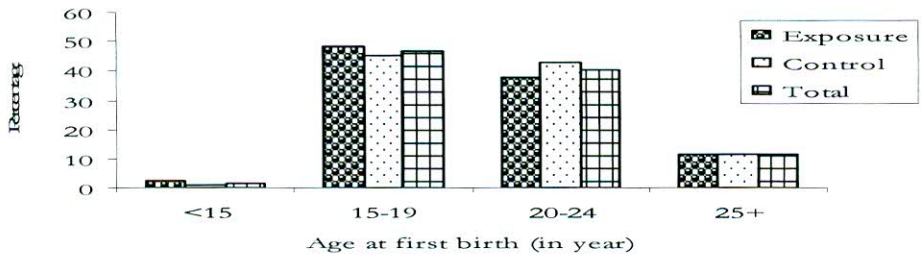


Figure 3.15: Percentage distribution of the respondents according to age at first birth



The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to the age at first birth is presented in Table 3.14 and Figures 3.14 and 3.15. This table shows that for exposure group maximum (13.00 weeks) and minimum (11.40 weeks) mean lengths of pregnancy duration according to the age at first birth group 15-19 years and 25+ years respectively. On the other hand for control group maximum (14.62 weeks) and minimum (12.34 weeks) mean lengths of pregnancy duration according the age at first birth group 15-19 years and <15 years respectively for control group. For total respondents the maximum (13.81 weeks) and minimum (12.56 weeks) mean lengths of pregnancy duration in the age at first birth group 15-19 years and <15 years respectively. Further the mean age at first birth is 20.14 years.

Age at Last Birth

The respondents are classified into two groups by their age at last birth as (i) <25, and (ii) 25+. The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to age at last birth is presented in Table 3.15.

Table 3.15: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to age at last birth

Age at last birth	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
<25	12.54	65.1	14.37	57.6	13.44	61.2
25+	12.35	34.9	14.41	42.4	13.52	38.8
Mean	23.80 years					

It is seen from the Table 3.15 that there is insignificant variation in the mean lengths of pregnancy duration for exposure group, control group and in overall women. Further the mean age at last birth is 23.80 years.

Children Ever Born (CEB) and Number of Living Children

The number of children a woman has ever borne is a cohort measure of fertility. Because it reflects the past, it provides some what different picture of fertility levels, trends, and differentials than do period measures of fertility such as crude birth rate (CBR) and the total fertility rate (TFR). It is obvious that fertility is directly proportional to current age. That is, for women of higher ages, number of children ever born (CEB) and number of living children will be high as compared to women of younger ages. The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to children ever born and number of living children are presented in Table 3.16 and Table 3.17.

Table 3.16: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to children ever born

Children ever born	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
0	12.61	23.4	14.15	17.6	13.28	20.5
1	12.02	29.8	14.36	30.2	13.21	30.0
2	12.78	28.4	14.40	30.3	13.62	29.3
3	12.59	13.1	14.15	15.5	13.45	14.3
4	14.12	3.6	16.69	4.4	15.54	4.0
5	12.25	1.3	11.10	1.8	11.59	1.5
6	12.86	0.2	16.43	0.2	14.64	0.2
8	10.00	0.2	14.29	0.2	12.14	0.2

It is seen from these tables that for exposure group maximum (14.12 weeks) and minimum (10.00 weeks) mean lengths of pregnancy duration are of women having 4 and 8 ever born children respectively and the maximum (14.18 weeks) and minimum (11.43 weeks) mean lengths of pregnancy duration are of women having 4 and 6 living children respectively. On the other hand the maximum (16.69 weeks) and minimum (11.10 weeks) mean lengths of pregnancy duration are of women having 4 and 5 ever born children respectively and the maximum (15.65 weeks) and minimum (10.33 weeks) mean lengths of pregnancy duration are of women having 4 and 5 living children respectively for control group. For total respondents the maximum (15.54 weeks) and minimum (11.59 weeks) mean lengths of pregnancy duration are of women having children ever born 4 and 5 respectively and the maximum (14.63 weeks) and minimum (11.73 weeks) mean lengths of pregnancy duration are of women having number of living children 4 and 5 respectively

Table 3.17: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to number of living children

Number of living children	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
0	12.61	23.4	14.19	17.7	13.30	20.6
1	12.21	33.0	14.48	33.4	13.36	33.2
2	12.66	28.5	14.31	30.3	13.51	29.4
3	12.61	10.5	14.24	12.9	13.52	11.7
4	13.43	3.6	15.65	4.2	14.63	3.9
5	14.18	0.7	10.33	1.1	11.73	0.9
6	11.43	0.3	15.36	0.3	13.39	0.3

Desire for More Children

Desire for children is a predictor of abortion and the predictive power gets stronger as intensity to limit family size increases. It is negatively associated with the risk of subsequent abortion in recent year (Razzaque et al. 2002). The respondents are classified into three categories as they (i) do not desire more children, (ii) desire one child and (iii) desire more than one child.

Table 3.18: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to desire for more children

Desire for children	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
No	12.69	57.7	14.46	60.3	13.63	59.1
One more	12.40	31.1	14.25	30.2	13.35	30.5
More than one	12.38	11.3	14.01	9.5	13.15	10.4

The percentage distribution and mean length of pregnancy duration for exposure and control group of the respondents according to desire for more children is presented in Table 3.18 and Figures 3.16 and 3.17. It is seen from the Table 3.18 that for exposure group maximum (12.69 weeks) and minimum (12.38 weeks) mean lengths of pregnancy duration are for the categories "desire no more children" and "desire more than one child" respectively. On the other hand the maximum (14.46 weeks) and minimum (14.01 weeks) mean lengths of pregnancy duration are for the categories "desire no more children" and "desire more than one child" respectively for control group. For total respondents the maximum (13.63 weeks) and minimum (13.15 weeks) mean lengths of pregnancy duration are for "desire no more children" and "desire more than one child" categories respectively. It is noted that almost 60 percent of the respondents desire no more children for all the categories.

Figure 3.16: Mean length of pregnancy duration according to desire for more children

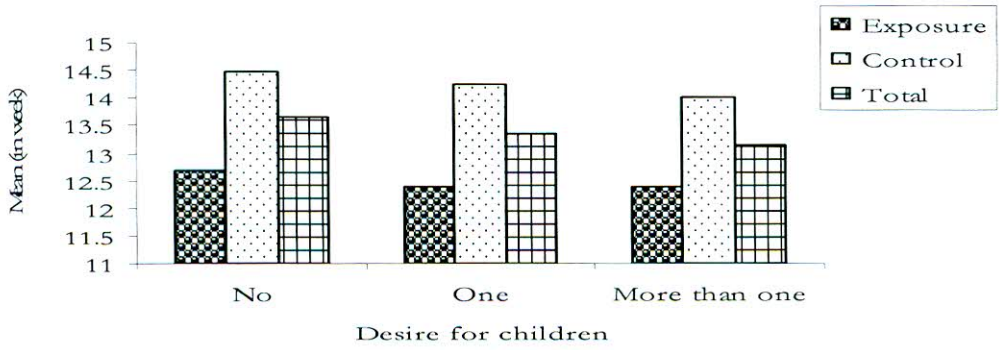
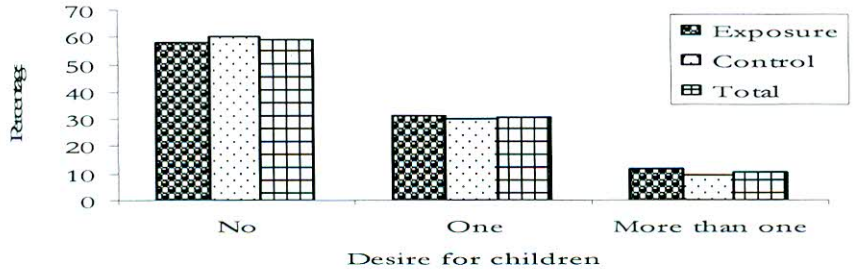


Figure 3.17: Percentage distribution of the respondents according to desire for more children



Current Contraceptive Use Status

Considering the current contraceptive use status, the respondents are classified into two groups as (i) current user and (ii) non-user. Never user and past user but not presently users have been included in the non-user group. On the other hand currently users and discontinuous users have been included in the contraceptive users group.

Table 3.19: Percentage distribution and mean length (in weeks) of pregnancy duration of the respondents according to contraceptive practice

Using method	Exposure group		Control group		Total	
	Mean	Percentage	Mean	Percentage	Mean	Percentage
Non-user	13.02	17.5	14.24	17.3	13.63	17.4
Pill	12.27	57.5	14.37	57.6	13.34	57.6
Condom	11.55	15.1	13.39	15.6	12.50	15.4
Injection	14.93	7.9	15.80	7.7	15.37	7.8
IUD	12.71	0.5	15.52	0.5	14.12	0.5
Vasectomy	8.00	0.2	12.14	0.2	10.07	0.2
Azol (natural method)	14.48	1.3	17.61	1.1	15.94	1.2

The percentage distribution and mean length of pregnancy duration for exposure and control groups of the respondents according to the current contraceptive use is presented in Table 3.19 and Figures 3.18 and 3.19. It is seen from the Table 3.19, the maximum (14.93 weeks) and minimum (8.00 weeks) mean lengths of pregnancy duration are for injection users and the women whose husband did vasectomy categories in case of exposure group. On the other hand the maximum (17.61 weeks) and minimum (12.14 weeks) mean lengths of pregnancy duration are for natural method (Azol) users and the women whose husband did vasectomy categories respectively for control group. Among the total respondents the maximum (15.94 weeks) and minimum (10.07 weeks) mean lengths of pregnancy duration are for natural method (Azol) user and the women whose husband did vasectomy categories respectively.

Figure 3.18: Mean length of pregnancy duration according to contraceptive use

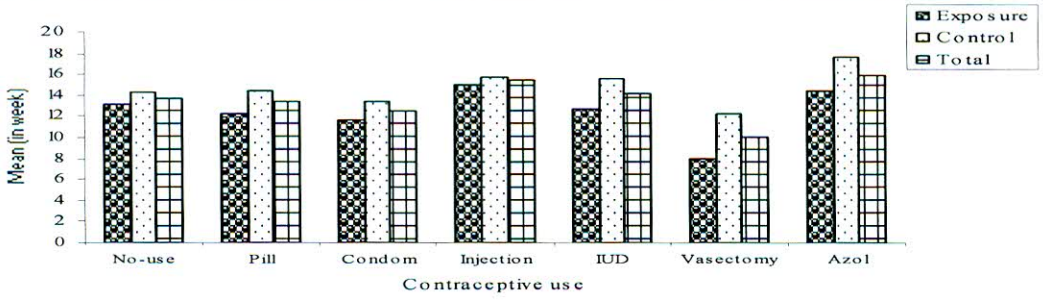
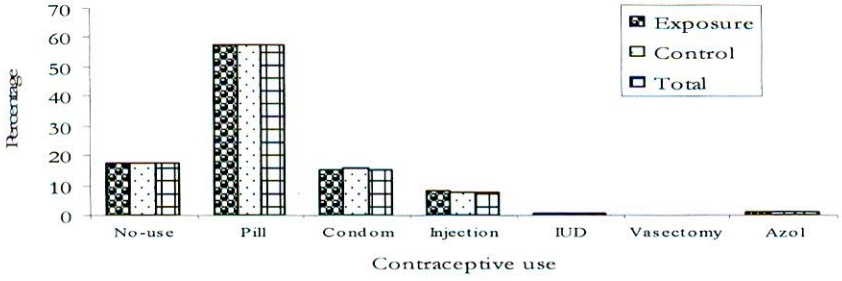


Figure 3.19: Percentage distribution of the respondents according to contraceptive use



Chapter Four

Correlates of Timing of Induced Abortion

4.1 Introduction

In the previous chapter, the details of the pattern and level of the characteristics of the study population were discussed and the present chapter discusses about the correlates of timing of induced abortion and that the factors affecting the timing of induced abortion. Abortion has been drawing increasing attention in Bangladesh under the reproductive health issues as an increasing rate of abortion has been observed every year. In Bangladesh, the penal code permit induced abortion only to save a woman's life. However, menstrual regulation (MR) by vacuum aspiration is not regulated by the code and is considered to be an "interim method for establishing non-pregnancy." The procedure is allowed up to 10 weeks since the last menstrual period but in practice, it is sometimes provided up to 12 weeks (Akhter, 1988). Depending upon the period of gestation abortion classified as. i) First trimester (early up to 12 weeks). ii) Second trimester (late 13 to 28 weeks). For both Akhter's (1988) suggestion and trimester based condition we take in to consideration up to 12 weeks as safely period of pregnancy termination in our study. Though induced abortion is widely practiced in the World or even in Bangladesh but there are complexities also. One of these complexities is the question of timing of abortion.

The period of gestation is one of the most critical determinants of the sequel of induced abortion. A survey in 1978 in Bangladesh established that about 21600 pregnancy-related deaths occurred during the year in Bangladesh. Of these

deaths, 25.8% were due to induced abortion-related complications (Rochat et al. 1981). Singh et al. (1997) developed a methodology to estimate the number of induced abortions in Bangladesh relying to a large extent on data from health facilities. They estimated that a total of 468000 procedures took place in 1995 in government hospitals and Health and Welfare Centers and in clinics of private organizations. An estimated additional 26200 clandestine (and unsafe) abortions were induced by traditional providers. The total number of abortions in 1995 was thus estimated at 730000 leading to an abortion rate of 28 per 1000 women aged 15-44 or an abortion ratio of 18% of known pregnancies (Sing et al. 1997). Though trimester based study of induced abortion in Bangladesh is rare. A study reveals that about one-third of the Bangladeshi women seeking legal manual vacuum aspiration, a most useful and popular Medical Termination of Pregnancy (MTP) within the first 12 weeks (first trimester) of the gestation, are turned away from clinics or hospitals because of their pregnancies has exceeded the legal requirements of 12 weeks' gestation (Kamal et al. 1994; Begum et al. 1987 and Kamal et al. 1990). As a result, even though menstrual regulation is allowed, many unsafe abortions may still occur. So an alarming proportion of women go through induced which may takes place in first trimester or even second trimester beyond their knowledge about the complexities increase substantially with each week of gestation regardless of medical care. An analysis of MTP in India (ICMR, 1981) data shows that four-fifth of termination takes place in the first trimester. India already has one of the highest proportions of second trimester abortions amongst countries with no legal restrictions. Further, second trimester mortality rates in India are noted to be twelve times higher than first trimester. Studies (Tietze, 1983; ICMR, 1986 and Chhabra, 1996) have also noted extensive use of private sector facilities, as also the homes of clients for second trimester abortions, the latter making for a most deadly setting for such a major intervention. The growth of second

trimester abortions further raises issues concerning two disturbing and also growing phenomenon. The limited available evidence of sex selection based pregnancy termination and teenage pregnancy termination indicates that both these trends yet constitute only a fractional part of the overall demand pattern. This continues to remain firmly rooted in the exhausted, multifarious mother phenomenon. But the growing shadow cast by both these trends cannot and must not be ignored. Sex confirmation is usually arrived at after ten-twelve weeks of gestation, while the unmarried girl tends to postpone her moment of irrevocable realization thus constituting a high risk category.

Data from all over the world indicate that the MTP in the second trimester is hazardous. The second trimester abortions are therefore rare in European countries. This trend probably reflects the abortions and the increasing availability of abortion services (Tieze, 1983). Variation and complication in relation to period of gestation of induced abortion has received considerable attention among researchers (Cates and Tieze, 1978; Tieze and Henshaw, 1986; Henshaw, 1990; Anderson et al. 1993; Ahmet I., 1996). Also some researchers concentrate on fetal loss and the absolute magnitude and shape of the risk function during gestation (Shapiro et al. 1962; James, 1970; Abramson, 1973; Bakketeig et al. 1978; Wilcox et al. 1988; Hilden et al. 1991). But with a few notable exceptions, it has rarely been examined in detail. As often noted, the question of available information extends to all aspects of induced abortion (Barreto et al. 1992; Huntington, 1993).The timing of abortion is not an exception. One reason for the relative neglect of the studies of the timing of induced abortion is the difficulty in obtaining systematic and detailed information. Not only lacking of available data, but also substantial under reporting and misreporting are obstacles for the construction of such studies. Difficulties in identification and lack of complete and reliable data make it hard

to study social contrasts in risks of fetal loss. One need a data set that comprise an unbiased selection of pregnancies with all types of outcomes, including both induced and spontaneous abortions etc. There should also be a minimal risk of misclassification between induced and spontaneous abortions. Many countries have national system for medical registration of births but most exclude induced abortions, introducing problems at gestational ages where such information is important.

Focusing on the variation of induced abortion in relation to period of gestation in the content of the case studies, it is possible to argue that the mechanism and the dynamics affecting the timing of abortion are quite complex, involving both simultaneous and sequential operations of a considerable variety of interacting factors. Here in this chapter an attempt has been made to focus on the subject that distinguishes pregnant women who elect abortion in the first trimester from those who elect abortion in the second trimester and later. Also the factors affecting the differences in the period of gestation at which the pregnancy is terminated has been examined. The grounds on which women come to seek termination of pregnancy in the first trimester or in the second trimester and some of the socio-economic correlates of these reasons are examined.

4.2 Data

For analysis of the correlates of timing of induced abortion the retrospective survey data described in chapter two of this dissertation has been used here. In analysis the timing of abortions, here some abortion related background variables and the gestational age etc are considered, which are relevant for the purpose. The timing of abortion is the central variable throughout the study, and it is classified as having (i) abortion before 12^{th} weeks of pregnancy and (ii) abortion after 12^{th} weeks of pregnancy. Covariates which affecting the timing of

abortions considered here, current age, education of the respondents, respondent's occupation, age at marriage, place of residence, type of family, contraceptive use, number of living children at present, social status and reasons for induced abortion. To observe the effect of current age on timing of induced abortion respondents are classified into four groups by their current age as (i) Age<19 years (ii) 19 ≤Age <25 years (iii) 25 ≤Age<30 years and (iv) Age ≥30 years. Respondents' education is classified as (i) illiterate, (ii) primary, (iii) secondary, (iv) higher secondary and (v) higher educated. The occupation of respondents is classified as (i) housewife, (ii) working women and (iii) student. Age at marriage of the respondents are classified into four groups as (i) <15 years, (ii) 15-19 years, (iii) 20-24 years and (iv) 25 and above (25+) years. The respondents are categorized into three groups by their places of residence as i) rural, ii) urban and (iii) sub-urban. Also respondents are classified into two groups by the type of family as (i) nuclear and (ii) joint family. On the basis of contraceptive use the respondents are classified into two groups as (i) user and (ii) non-user. Respondents are classified into two groups by their number of living children they have at present as (i) number of child ≤3 and (ii) number of child >3. Respondents are classified into three groups by their social status as (i) low, (ii) medium and (iii) high. Also respondents are classified into seven groups by the reasons for induced abortion as (i) very soon after marriage, (ii) take in latter, (iii) desire no more child, (iv) illegal child, (v) social problem (vi) husband's pressure and (vii) doctor's advice.

4.3 Analytical Methods

In this chapter both bivariate and multivariate (logistic regression) analyses are used. To observe the differentials within and between first trimester and second trimester based abortion for various covariates bivariate analysis is used. In multivariate analysis to estimate relative impact of some selected demographic and socio-economic variables on the probability that a pregnancy will be ended by an induced abortion before the end of 12^{th} weeks of pregnancy logistic regression is used. A detailed discussion on the methodology of logistic regression models has been presented in chapter two. In the multivariate analysis (logistic regression), those variables are included as independent variables which seem to be significantly associated with the timing of abortion. These are age at abortion, respondent's education, age at marriage, place of residence, type of family, contraceptive use, number of living children at present, social status and reason for abortion. The dependent variable takes the value 1 (one) if a respondent has an abortion after the 12^{th} weeks and later of pregnancy and 0 (zero) if she has an abortion in the first trimester (before first 12 weeks of pregnancy). A backward step wise procedure is applied. The resulting estimation shows that respondent's education, number of living children at present, type of family, place of residence, contraceptive use and reason for abortion have significant effect on timing of abortion. Table 4.1 presents the differentials within and between first trimester and second trimester based abortion for various covariates and Table 4.2 presents the coefficients of the independent variables and their odds ratio in the logistic regression estimations.

4.4 Results and Discussions

4.4.1 Bivariate Results

The differentials within and between first trimester and second trimester based abortion for various covariates is calculated with respect to percentage and presented in Table 4.1. The figures in the parentheses represent the percentages on the basis of row total. There are 610 women who obtained induced abortion in our study which we called exposure group. From this table it is seen that 313 women have abortions before the 12^{th} week of pregnancy (first trimester) and 297 women have abortions after 12^{th} week of pregnancy (second trimester). That is 51.31% women have induced abortions in the first trimester and the rest 48.69% women have induced abortion in the second trimester. The mean length of pregnancy duration until the termination of pregnancy for first trimester and second trimester are 9.3 weeks and 15.9 weeks respectively and the mean length of pregnancy duration for the overall case is 12.5 weeks. Considering current age of the respondents 8.6%, 35.5%, 33.2% and 22.7% women obtained induced abortion in the first trimester for the age groups <19, 19-24, 25-29 and 30+ respectively. On the other hand 10.1%, 37.7%, 31.3% and 20.9% women obtained induced abortion in the second trimester for the age groups <19, 19-24, 25-29 and 30+ respectively. This picture for overall trimester based induced abortions 9.3%, 36.6%, 32.3% and 21.8% women who obtained induced abortion are in the age groups <19, 19-24, 25-29 and 30+ respectively. This can be argued that there are not so differences in the distributional pattern within first trimester and second trimester by the current age of the respondents except the age group <19. But the percentages in the parentheses for almost all groups of current age of the respondents show that approximately 5 percent differences exists between the first trimester and second trimester based abortion. With respect to respondent's education, in the first trimester, 10.2% 16.3% 45.4%

18.5% and 9.6% women who obtained induced abortion are illiterate, primary, secondary, higher secondary and higher educated respectively. On the other hand in the second trimester, 19.5%, 20.2%, 43.8%, 10.1% and 6.4% women who obtained induced abortion are illiterate, primary, secondary, higher secondary and higher educated respectively. For over all cases 14.8% 18.2% 44.6%, 14.4% and 8.0% women who obtained induced abortion are illiterate, primary, secondary, higher secondary and higher educated respectively. From this it is observed that secondary educated women have had maximum percentage of induced abortion within the first trimester and second trimester. Also figures in the parentheses show that among the different levels of education there are significant differences present between the two trimesters. From this table it is also revealed that illiterate and primary educated women are more likely having their abortion in the second trimester than that of first trimester. On the other hand secondary and above educated women shows the reverse case. This is due to the fact that education plays an important role for the timing of abortion. In case of respondent's occupation housewives, working women and student having induced abortion 72.2%, 14.6% and 13.2% in the first trimester respectively; the corresponding figure in the second trimester are 83.8% 8.1% and 8.1% respectively and regardless of trimester these amount are 77.9%, 11.4% and 10.7% respectively. From this result it is observed that among the abortion seekers most of the respondents are housewife within the first trimester and second trimester. While from the figure in the parentheses among the working women and students there are remarkable differences between the two trimesters. So awareness needs to be created among the socially less active women. Among the abortion seekers whose age at marriage are <15, 15-19, 20-24 and 25+ have induced abortion 8.0%, 54.6%, 25.6% and 5.8% in the first trimester and 10.7%, 62.9%, 19.6% and 6.8% in the second trimester respectively. Whereas overall percentage in these age groups are

9.6%, 60.5%, 23.5% and 6.4% respectively. From this it is clear that more than half of the respondents have terminated their pregnancy whose age at marriage is 15-19 years and there is a significant difference within the trimesters for different age groups. The results in the parentheses show that there is no significant difference between the percentages of abortion of the trimesters for different groups of age at marriage. Among the place of residence 70.0%, 16.9% and 13.1% women from rural, urban and sub-urban areas having induced abortion in the first trimester and the corresponding amount are 84.2%, 12.5% and 3.4% in the second trimester respectively. Irrespective of trimester these amount are 76.9%, 14.8% and 8.4% respectively. From this analysis it is observed that about three-fourth of the respondents who did abortion are from rural areas and there is a significant difference within the trimesters in the percentage of abortion for different place of residence. The results in the parentheses show that among the urban and sub-urban women there is a significant difference between first trimester and second trimester abortion. This may be due to the fact that in rural areas medical facilities are limited. Regarding type of family 75.7% and 24.3% women are from nuclear and joint family who perform their abortion in the first trimester, the corresponding results are 79.5% and 20.5% in the second trimester. Over all women having induced abortion 77.5% and 22.5% are from nuclear and joint family respectively. From this result it may be argued that due to the absence of elderly female member in the family about three-fourth of all the abortion seekers belonging to the nuclear family go for induced abortion and there is a significant difference in the percentage of abortion within the trimesters. Further there is insignificant difference in the percentage of abortion between trimesters for the women of joint family. Taking the variable use of contraceptive we noted that 88.2% and 11.8% users and non-users who did abortion in the first trimester and that of the corresponding percentages are

76.4% and 23.6% in the second trimester respectively. So more than 80 percent of the women who had induced abortion reported the use of family planning methods (conceived while using the methods) and thus the perceived failure is prevalent among users of family planning methods. This may be due to the fact that discontinuous or reckless use of contraception of the women. The results in the parentheses show that there is a significant difference present among the non-user group between first trimester and second trimester abortion. In the case of number of living children, the percentages of women who performed their abortion in the first trimester are 97.1% and 2.9% and the corresponding percentages in the second trimester are 94.3% and 5.7% for the group who have had less than or equal to 3 children and more than 3 children respectively. So almost all the abortion seekers have had 3 or less children and there is significant difference within the first trimester and second trimester abortion when the respondents are categorized by their living children. Further there is a significant difference between first trimester and second trimester for the abortion seekers who have had more than 3 living children. This may be due to the fact that women who have had more than 3 children take decision earlier to keep their family size unchanged and thus go for induced abortion in the first trimester. Taking the criterion "reasons for abortion" from the last group of Table 4.1 we can infer that significant variation for induced abortion exists within and between trimesters.

Table 4.1: Differentials (in %) within and between trimesters based abortion (percentages in the parentheses are on the basis of row total)

Variable	1st trimester	2nd trimester	Total
Mean pregnancy duration (in weeks)	9.3	15.9	12.5
Overall	(51.31)	(48.69)	(100)
Current age			
<19	8.6 (47.4)	10.1 (52.6)	9.3 (100)
19-24	35.5 (49.8)	37.7 (50.2)	36.6 (100)
25-29	33.2 (52.8)	31.3 (47.2)	32.3 (100)
30+	22.7 (53.4)	20.9 (46.6)	21.8 (100)
Respondent's education			
Illiterate	10.2 (35.6)	19.5 (64.4)	14.8 (100)
Primary	16.3 (45.9)	20.2 (54.1)	18.2 (100)
Secondary	45.4 (52.2)	43.8 (47.8)	44.6 (100)
Higher secondary	18.5 (65.9)	10.1 (34.1)	14.4 (100)
Higher	9.6 (61.2)	6.4 (38.8)	8.0 (100)
Respondent's occupation			
Housewife	72.2 (47.6)	83.8 (52.4)	77.9 (100)
Working women	14.6 (65.7)	8.1 (34.3)	11.5 (100)
Student	13.2 (63.1)	8.1 (36.9)	10.7 (100)
Age at marriage			
<15	8.0 (45.5)	10.7 (54.5)	9.6 (100)
15-19	54.6 (49.3)	62.9 (50.7)	60.5 (100)
20-24	25.6 (59.3)	19.6 (40.7)	23.5 (100)
25+	5.8 (48.6)	6.8 (51.4)	6.4 (100)
Place of residence			
Rural	70.0 (46.7)	84.2 (53.3)	76.9 (100)
Urban	16.9 (58.9)	12.5 (41.1)	14.8 (100)
Sub-urban	13.1 (80.4)	3.4 (19.6)	8.4 (100)
Type of family			
Nuclear	75.7 (49.9)	79.5 (50.1)	77.5 (100)
Joint	24.3 (55.5)	20.5 (44.5)	22.5 (100)
Contraceptive use			
User	88.2 (54.9)	76.4 (45.1)	82.5 (100)
Non-user	11.8 (34.6)	23.6 (65.4)	17.5 (100)
Number of living children			
0-3	97.1 (49.6)	94.3 (50.4)	95.7 (100)
4+	2.9 (68.5)	5.7 (31.5)	4.3 (100)
Social status			
Low	20.1 (42.6)	28.6 (57.4)	24.3 (100)
Medium	37.7 (48.2)	42.8 (51.8)	40.2 (100)
High	42.2 (60.8)	28.6 (39.2)	35.6 (100)
Reasons for abortion			
Very soon after marriage	9.9 (51.7)	9.8 (48.3)	9.8 (100)
Take in latter	50.5 (53.9)	45.5 (46.1)	48.0 (100)
Desire no more children	21.4 (58.3)	16.2 (41.7)	18.9 (100)
Illegal child	7.0 (55.0)	6.1 (45.0)	6.6 (100)
Social problem	2.3 (41.2)	3.3 (58.8)	2.8 (100)
Husband's pressure	5.4 (47.2)	6.4 (52.8)	5.9 (100)
Doctor's advice	3.5 (22.4)	2.8 (77.6)	8.0 (100)

4.4.2 Multivariate Results

We would like to examine the relationship between a dichotomous dependent variable timing of abortion (trimester based induced abortion) and a set of explanatory variables. The independent variables for the analysis of the timing of abortion using binary logistic regression analysis are current age, respondent's education, age at marriage, place of residence, type of family, contraceptive use, number of living children at present, social status and reasons for abortion. The main feature of this analysis is to identify the factors that effect timing of abortion of a woman and to analyze the direction of their differentials between first trimester and second trimester abortion. Results under these explanatory variables are presented on Table 4.2 such as the estimates of the effect and their odds ratio of all the explanatory variables. Since the dependent variable timing of abortion is coded as 1 (one) if the woman perform her abortion in the second trimester and is coded 0 (zero) if she perform her abortion in the first trimester. So the positive coefficient indicates that the woman more likely to terminate her pregnancy in the second trimester, on the other hand negative value indicates the reverse case. The odds ratio of the covariate is the antilog of the estimated coefficient. From Table 4.2, though age groups have no significant effect, it is clear that the age groups 19-24, 25-29 and 30+ all have positive coefficients. So, all the above mentioned age groups have more likely to perform induced abortion in the second trimester relatively to the women in the age group <19 (reference group). Regarding education of the respondents, all educational levels of women have negative significant effect than the illiterate (reference group) women. Primary, secondary, higher secondary and higher educated women have 36%, 41%, 59% and 58% less likely to perform induced abortion in the second trimester as compared to illiterate women (reference group). This may be due to the fact that illiterate or even less educated women have lack of knowledge regarding the

safety of late period abortion. The factor age at marriage has no significant effect on timing of abortion. Age at marriage group 15-19 and 20-24 have negative effect and 25+ group has positive effect than the women whose age at marriage in the group <15 (reference group). In case of place of residence significant difference is found. Women in urban areas have 11% less likely to perform induced abortion in the second trimester than that of women in rural areas (reference group) and women in sub-urban areas have 70% less likely to perform induced abortion in the second trimester than that of women in rural areas (reference group). This may be due to the fact that lack of sufficient medical termination of pregnancy facilities in rural areas and also lack of financial resources to reach the hospitals may be the reason for delay in timing of abortion in rural areas. In case of type of family, women belonging to nuclear family have positive significant effect on timing of abortion. Women belonging in nuclear family have 60% more likely to perform induced abortion in the second trimester than that of women belonging in the joint family (reference group). This may happen because of the fact that in nuclear family there is no elderly female member to give them proper and adequate advice about the safety of early abortion. Contraceptive use has a significant effect on timing of abortion. Women who use any of the family planning methods have 64% less likely to perform induced abortion in the second trimester than that of the women who did not use any family planning method (reference group). This may happen due to the fact that women practicing contraception are eager to keep the family size under control but when failure of contraception happens this group of women immediately take step and go for induced abortion in the first trimester. The factor number of living children has a significant positive effect on the timing of abortion women. Women who have had 3 or less children have 50% more likely to perform induced abortion in the second trimester than that of women having more than 3 living children (reference

group). It might refer to the argument that women having 3 or less living children generally can not take decision about their complete family size and they have difficulty in deciding whether to continue the pregnancy or to have an abortion, would go for late period abortion ultimately when conceived unwillingly. There is also a strong significant effect of reasons for abortion on the timing of abortion. Women performing induced abortion for the reasons for very soon after marriage, take in later, desire for no more children, illegal child, social problem and husband's pressure have 79%, 85%, 87%, 87%, 95% and 79% less likely to perform induced abortion in the second trimester than that of women who took doctor's advice (reference group). This is due to the fact that women go to the doctor when they do not have any other way to avoid pregnancy or when they fall in a tremendous situation may be the reasons for late period abortion. Table 4.2 shows that social status has no significant effect on timing of abortion. This may be due to the fact that adequate knowledge on appropriate timing of induced abortion could not reach up to the social status.

Table 4.2: Results of logistic regression model for the timing of induced abortion

Variables	Parameters	Odds ratio
Intercept	3.204 ***	24.632
Current age		
<19 [r]		
19-24	0.182	1.200
25-29	0.240	1.272
30+	0.008	1.008
Respondent's education		
Illiterate [r]		
Primary	-0.445	0.641
Secondary	-0.526 *	0.591
Higher secondary	-0.888 **	0.412
Higher	-0.870 *	0.419
Age at marriage		
<15 [r]		
15-19	-0.410	0.663
20-24	-0.478	0.620
25+	0.130	1.139
Place of residence		
Rural [r]		
Urban	-0.119	0.888
Sub-urban	-1.202 ***	0.300
Type of family		
Nuclear	0.472 **	1.603
Joint [r]		
Contraceptive use		
Non-user [r]		
User	-1.019 ***	0.361
Number of living children		
0-3	0.408 *	1.503
4+ [r]		
Social status		
Low [r]		
Medium	0.154	1.167
High	-0.189	0.828
Reasons for abortion		
Very soon after marriage	-1.545 ***	0.213
Take in latter	-1.880 ***	0.153
Desire no more children	-2.041 ***	0.130
Illegal child	-2.058 ***	0.128
Social problem	-3.014 **	0.049
Husband's pressure	-1.577 ***	0.207
Doctor's advice [r]		

[r] Reference group; * significant at 0.1, ** significant at .05 and * significant at .01**

4.5 Conclusions

Several important results emerge from the contingency study. This study reveals that approximately equal tendency of induced abortion at both the first and second trimester among the women. About 49 percent women underwent abortion after third month of pregnancy. This trend probably reflects the negative awareness among the women regarding the safety of mother's pregnancy health condition. The differential pattern between first and second trimester based abortions is noticed significantly in respondent's education, contraceptive practice and place of residence and also respondent's occupation, type of family, number of living children and reasons for abortion have some impact on the timing of induced abortion. On the other hand, there is no impact of the variables current age, age at marriage and social status of the respondents on the timing of induced abortion.

The findings of the multivariate logistic regression analysis on timing of abortion show a significant effect of respondent's education, place of residence, type of family, contraceptive use, number of living children and reasons for abortion. Women having no education have more risk of having late period abortion. Also less educated women (educated up to primary level) have lack of knowledge regarding the safety of early abortion and they choose for late period abortion. In rural areas, lack of sufficient facility of medical termination of pregnancy, lack of financial resources to reach the hospital may be the reasons for late period abortion. Long waiting period, lack of privacy, impersonal atmosphere and inadequate follow up may be the other reasons for late period abortion in rural areas. In joint family where there are some experienced elderly female members who can give a proper and adequate advice regarding the safety of early abortion. This may be one of the reasons that nuclear families may have chosen late period abortion. Contraceptive non-users or even

discontinuous users are associated with increasing risk of induced abortion in the second trimester. It might be referred to the argument that the reckless behavior about contraceptive practice leads to unwilling pregnancy. When there is a small (3 or less) number of living children in the family women have difficulty in deciding timing of abortion leading to late period abortion. For taking the advice of doctor's earliest decision should be taken otherwise delay in seeking doctors advice would lead to late period abortion.

Chapter Five

Factors Influencing the Use of Contraception

5.1 Introduction

In previous chapter the analysis of correlates of timing of induced abortion has been discussed. Nowadays the relationship between contraceptive use and incidence of induced abortion continues to provoke a heated discussion on literature. Any deliberate practice to reduce the risk of conception is considered as contraception, i.e.; contraception is the prevention of conception by which a woman can prevent unwanted pregnancies. Breast-feeding and postpartum abstinence, while they affect fertility by increasing child spacing, are not included as contraception as their aim is primarily the protection of maternal health and child development rather than regulation of conception. Induced abortion is not in contraception method as it is performed after a conception to interrupt the normal course of gestation.

Contraceptive use is one of the crucial factors mediating between sexual activities and conception and it is one of the oldest and fruitful methods of fertility reduction. The use of contraceptive is the most important factor that directly affects fertility. Although contraceptive prevalence among currently married women of reproductive age increasing rapidly in many developing countries, the rates have not yet reached those of developed countries. The level of contraceptive use in most developing countries is higher among women in their thirties and, typically, lowest among teenage women and women in their forties (United Nations, 1987). The use and effectiveness of contraceptive may

be different for adolescents than that of their older counter parts. This difference may be attributed to the maturity, higher knowledge and experience among the young adults than among the adolescents. Such considerations as desired family size and child spacing influence contraceptive prevalence among married women at the individual level, while at the micro level, laws and regulations and social policies that are aimed at the easy accessibility of contraceptives are the most important factors that make a significance difference between the adults and adolescents in terms of the use and effectiveness of contraceptives (United Nations, 1989). In many developing countries, unmarried men and women do not have easy access to contraception and in the cases of married women; sometimes the consent of their spouses may be sought. This is to say, in those countries a minimum age for the eligibility of certain kinds of contraception services is specified (Roemer, 1985). Some laws relate specifically to female teenagers, both married and unmarried adolescents face the added obstacles of legal cultural restrictions with limit their access to family planning services. However, unwanted pregnancies resulting from lack of contraceptive use have led to an increasing number of abortions among young women. In many part of world, despite the fact that young women are often denied access to legal abortion services, both the number and the proportion of abortions performed for young women have been increasing over time (Islam and Mahmud, 1995). Aside from external influences at the socio-cultural and policy levels that affect an adolescent's contraceptive behavior, factors which vary at the individual level are also important, such as whether or not contraception occurs within a stable relationship, and whether or not either partner has had previous experience with contraception. In this society, adolescent girls often face unwanted pregnancy either through failure of contraceptive methods or by non-use. Moreover, because of early marriage, childbearing is the common norm; unintended pregnancies are not deemed very

unusual (Pachauri, 1998). The decision for the pregnancy termination depends on husband or on other family members. As the socio-cultural beliefs regarding abortions are very restrictive in terms of the existing general abortion law of the country, induced abortion is viewed as a shameful act because it is frequently done to end illicit pregnancy (Maloney and Aziz, 1981).

Jejeebhoy(1995) states that contraceptive use depends, to a large extent, on a woman's age, fertility, and duration of marriage, the education contraception relationship should ideally be viewed with these factors controlled. A Matlab study findings indicate that "contraception discontinuation was 73 percent higher among parents with no surviving sons and 72 percent higher among parents with no surviving daughters, compared with parents who have children of both sexes (Rahman et al., 1992). The Contraceptive Prevalence Rate (CPR) for married women aged 10-49 was on 30.8 percent, 39.9 percent, 44.6 percent, 49.2 percent, 53.8 percent and 58.1 percent in the year 1989, 1991, 1993-94, 1996-97, 1999-2000 and 2004 respectively (BFS, 1989; CPS, 1991; BDHS, 1993-94; BDHS, 1996-97; BDHS, 2000 and BDHS, 2004). This indicates that much of the increase in contraceptive prevalence is attributable to higher rates of contraceptive use and family planning acceptance among reproductive aged women. Married women aged less than 25 years, however, represent over one-third of the country's women of reproductive age. Social factors particularly pressure to have children soon after marriage, will need to be addressed. The average age at marriage of women has risen steadily from 16.3 years in 1975 to 18.0 years in 1989. This increase in mean age at marriage has contributed to the decrease in fertility at young ages. However, the demographic importance of this group cannot be denied, considering the relatively young age structure of the population, and current contraceptive trends. Clearly, a better understanding of this population subgroup with respect to family planning service requirement is needed (ICDDR, B, 1994).

Studies on birth control measures suggest that among the various factors of fertility determinants none has a more direct effect on the individual than the use of contraceptive methods (Ross, 1983). A number of socio-economic, demographic and cultural factors contribute to the level of contraceptive use rates. However, the influential factors that affect the use of methods include age at marriage, education, and ideal numbers of living children, spacing between successive births, employment, poverty, health and status of women. These factors in turn increase contraceptive use among the couples when structural changes such as socio-economic development of or modernization takes place (Coale, 1979). Shariff (1989) concluded that substantial improvement in education and decentralization of the family planning strategy in India are a few interventions to increase contraceptive use rate. The education of women is found to be one of the most important factors in many other countries as well. Ullah et al. (1993) found in Bangladesh that women with secondary education are almost three times as likely to practice contraception as those who had no education. The World Fertility Survey, which was conducted in a number of developing countries, also found that education is closely associated with contraceptive use at national level.

Determinants and variation in relation to the use of family planning method has received considerable attention among researchers (Rajaretnam, 1995; Phillips et al. 1997; Fikree et al. 2001; Bora et al. 2001; Roy et al. 2003). Also some researchers concentrate on the role of service of family planning program. Goyal (1987) reported that proper management of available resources is more important than increasing the outlays on the program. Richard et al (1995) demonstrated that the influence of family planning on the number of children ever born is lower than the influence of age at marriage even after adjusting for current age and is true in both the rural and urban areas. Also he suggests that

increase of age at marriage should be advocated more vigorously for faster reduction in fertility. Again Raju et al. (1995) exhibit that the stagnation in fertility decline was not due entirely to non-adoption of temporary methods or due to the choice of family planning methods. Strong cultural preference for sex composition of living children or parental attitude to achieve desired number of male and female children was the major determining factor while accepting methods, specially at the higher level of adoption.

A study conducted by Steele et al (1996) in China on discontinuation of contraception, they observed that the women's age at the start of use of the method, cohort during which use was started, number of living children, method of contraception used, level of education and region of residence are significant reason for most types of discontinuation. Hoque et al (1995) have examined the trends and differential in contraceptive use in rural and urban Bangladesh and their analysis demonstrates that contraceptive practice rates in Bangladesh vary among region.

The relationship between levels of contraceptive use and the incidence of induced abortion continued to provoke heated discussion with some observers arguing that incidence of abortion decreases as contraceptive prevalence rises and others claiming that increased use of family planning methods causes abortion incidence to rise (Cohen, 1998; Bongarts et al, 2000; Marston et al, 2003) Rising contraceptive use results in reduced abortion incidence in settings where fertility itself is constant. The biological determinants of human reproduction indicate that contraception and induced abortion represent alternative means of achieving the same aggregate level of fertility in population. If fertility and its other determinants (sexual exposure, lactation and pathological infertility for example) remain constant, a rise in contraceptive use or ineffectiveness of use must lead to a decline in induced abortion and vice

versa (Marston et al, 2003). At a given total fertility rate, reliance on abortion rises with the proportion of women using traditional methods. Where modern contraceptive are the principal methods used, abortion rates are far lower. Thus the risk of unwanted births is largely influenced by the unreported years of exposure to pregnancy. So, if the couples accept a proper method very early, it is possible not only to avoid a large number of unwanted births but also to reduce the fertility. So there is a need to do more intensive study on the factors influencing the use of contraception.

Although the contraceptive use rate is gradually increasing in Bangladesh, it is still very low compared with any developed country and many developing countries. Socio-economic development produces changing 'value of children', the numbers of children desired by couples decline, they may also resort to abortion. In developing countries, where abortion is associated with high maternal risks, this is undesirable. Unfortunately little exclusive and comprehensive study on the contraceptive behavior of aborted women in Bangladesh has been undertaken; therefore, in view of the importance of this matter, an attempt has been made in this study to investigate the factors influencing the use of contraceptive.

5.2 Data

For analysis of factors influencing the use of contraception the retrospective survey data described in chapter two of this dissertation has been used. Here we consider some contraceptive related variables to analyze the effects of different factors on contraceptive practice among the women. Current contraceptive use status is the central variable for which women are classified into two groups as (i) current users and (ii) non-users (past users and who discontinue have been included in the non-user group). The covariates which affecting the contraceptive practice considered here are respondent's age, education and

occupation; husband's education and occupation, place of residence, number of living children, delay to take pregnancy, desire for more children, age at marriage and socio-economic status. The women are classified into four groups by their current age as (i) age<20 years, (ii) 20-24 years, (iii) 25-29 years and (iv) 30 years above. Also women are classified into three groups by their occupational status as (i) housewife, (ii) working women and (iii) students. On the basis of age at marriage of women are classified into four categories as (i) <15 years, (ii) 15-19 years, (iii) 20-24 years and 25 years and above. The women are classified into two categories regarding desire for more children as (i) desire no more child and (ii) desire one or more children. Also women are classified into two groups by their number of living children as (i) number of living children ≤2 and (ii) number of living children >2. All the remaining variables of this chapter are categorized in such a way that described in chapter two.

5.3 Analytical Methods

In our study, we apply logistic regression technique to estimate the effects of some selected socio-economic and demographic factors on current contraceptive practice of the respondents. A detailed discussion on the methodology of logistic regression analysis has been presented in chapter two. The logistic regression model is fitted by considering current use of contraception before last menstrual period as the dependent variable which we dichotomized by assessing 1 if the respondent is using any method of contraception and 0 for not using any method. The explanatory variables considered in the model are as respondent's current age, respondent's education, respondent's occupation, husband's education, husband's occupation, place of residence, tried for delaying pregnancy, desire for more children, number of living children and socio-economic status. All of the above

mentioned explanatory variables are categorical and a brief discussion on category of these variables is given in previous section of this chapter.

5.4 Results and Discussions

5.4.1 Variation in Use of Contraceptive Methods

The role of service of family planning program can be viewed as an important factor in varying with different family planning methods. The variation may be due to gender disparity and/or selectivity of the methods as they choose. Also the choice may be vary with respect to health sensitivity or even due to the proper knowledge and information about different methods. In this study we have examined the variation in relation to the current use of contraceptive methods. The term "current use" refers to the method that was being used by an individual client at the time of last menstruation. Thus any respondent (or her spouse) using a family planning method before last menstruation reported at the time of survey was regarded as a current user.

Intuitively, it seems that increasing contraceptive use would reduce the number of abortion cases by reducing the number of unwanted pregnancies, but in fact, abortion and contraceptive use sometimes increase simultaneously in developing countries. User of contraception had higher subsequent abortion than non-user (Razzaque et al. 2001) A contraceptive user who want to limit family size can subsequently be pregnant either for discontinuation due to side-effects of methods, change in family-size desire or use-failure (Caldwell et al. 1999). As the changing value of children throughout the socio-economic development, the numbers of children desired by couples decline day by day. If couples are unable to effectively limit their child-births through contraception, they may also resort to abortion.

Current use of family planning methods are varied by various socio-economic, demographic and geographic variables. Table 5.1 shows that the percentage distribution of current use of contraception before the time of last menstruation of the surveyed women. The distribution includes only the method of contraception by the spouse. Some methods are not included here because of their not use reason. As stated in chapter three, among the respondents or her spouse, 82.6 percents are user of different contraceptive method before the last menstruation and the remaining 17.4 percents are non-user any contraceptive method. From the Table 5.1 we also see that, among the individual methods, oral pill is used 69.8 percent, condom is used 18.6 percent, injection is used 9.4 percent, I.U.D is used 0.6 percent, Azol is used 1.4 percent and Vasectomy is used 0.2 percent. From these results it is revealed that pill is the most used method followed by condom and the injection. From the above discussion we also see that husbands are less interested in using contraception rather than that of their counterpart about the use of contraception.

Table 5.1: Percentage distribution of women by their contraceptive use

Using Methods	**Percentage**
Pill	69.8
Injection	9.4
I.U.D.	0.6
Azol	1.4
Condom	18.6
Vasectomy	0.2
Total	**100.0**

5.4.2 Differentiation of Contraceptive Use

In this section an attempt has been made to examine the differentials between contraceptive user and non-user by a set of socio-economic, demographic and geographic characteristics. They are useful to identify among the subgroups of population that may in need of more care and attention in the service delivery of family planning devices. The socio-economic, demographic and geographic variables used in this case are respondent's age, education and occupation; husband's education and occupation, place of residence, number of living children, delay to take pregnancy, desire for more children, age at marriage and socio-economic status. Table 5.2 summarizes various socio-economic, demographic and geographic differentials pattern in current use of contraception.

Percentage distribution of the respondents of their contraceptive practice by some selected characteristics has been presented in Table 5.2. According to the current age of the respondents it is seen that among the non-user respondents 24.3, 41.1, 19.6 and 15.0 percent are belonging to the age groups <20, 20-24, 25-29 and 30+ respectively. On the other hand among the user respondents 8.1, 28.5, 34.6 and 28.8 percent are belonging to the age groups <20, 20-24, 25-29 and 30+ respectively. Thus it is illustrated that there is a remarkable differential between non-user and user of contraceptive along with the lower age group. Specially, the teenager women have less likely to use any contraceptive method. This may be due to the fact that this group has less knowledge and/or less experience about contraceptive use. In case of respondents' education Table 5.2 shows that among the non-users 27.6, 22.4, 31.3, 12.6 and 6.1 percent are illiterate, primary, secondary, higher secondary and higher educated respectively. On the other hand among the users 13.6, 20.1, 43.4, 14.4 and 8.6 percent are illiterate, primary, secondary, higher secondary and higher educated

respectively. It is clear that there is a strong differential for the illiterate and secondary educated respondents. So it may be revealed that education may play a most important role to access family planning method. Regarding the occupation of the respondents from Table 5.2 it is shown that among the non-users 81.3, 6.1 and 12.6 percent are housewife, working women and students respectively, where as among the users 83.7, 12.6 and 3.7 percent are housewife, working women and students respectively. Here we have seen a slight differential of contraception practice among working women and students. According to the education of the husbands it is seen from Table 5.2 that among the illiterate husband of the respondents have a slight difference of contraceptive practice. For the occupation of the husbands among the non-users 20.9, 24.6, 17.8, 17.8, 7.9 and 11.0 percent are farmer, businessman, service holder, labor, professional and students respectively, where as among the users 39.7, 26.7, 18.3, 11.7, 1.3 and 2.3 percent are farmer, businessman, service holder, labor, professional and students respectively. So among the husband of the respondents farmer, labor, students and professional have a remarkable differentials of contraceptive practice. Place of residence has no remarkable differentials in the case of contraceptive practice. In case of the number of living children among the non-users 77.1 and 22.9 percent have less than or equal two living children and more than two living children respectively. On the hand among the users 84.5 and 15.5 percent have less than or equal two living children and more than two living children respectively. From this it is revealed that among the contraceptive practice group there is a remarkable differential regarding number of living children. In the case of age at marriage among the non-users 6.3, 77.0, 14.1 and 2.6 percent are in the <15, 15-19, 20-24 and 25+ groups respectively on the other hand among the users 9.6, 55.4, 27.8 and 7.2 percent are in the <15, 15-19, 20-24 and 25+ groups respectively. There is a remarkable differential of contraceptive practice regarding age at

marriage. So age at marriage should up lift as a suitable position. From Table 5.2 among the non-users 84.1 percent respondents did not try for delaying pregnancy and 15.9 percent are tried for delaying pregnancy, where as among the users 48.3 percent respondents did not try for delaying pregnancy and 51.7 percent respondents are tried for delaying pregnancy. So there is a strong significant difference of contraceptive practice for delaying pregnancy. This may be due to the fact that the user group has discontinuous or ineffective practice of contraception. With respect to the factor desire for more children there is a slight difference in contraception practice for the women who did not want any more children and for that of wanted more than one child. This may be revealed that the respondent who want no more children and want more than one could not take any proper decision about their family size. Regarding socio-economic status the non-users 45.8, 23.8 and 30.4 percent are lower, medium and higher social status group respectively, where as 19.5, 43.5 and 37.0 percent are lower, medium and higher social status group respectively. So there is a significant difference in the contraceptive practice for lower and medium social group. This may be reduced by structural change specially, socio-economic status.

Table 5.2: Percentage distribution of women on the basis of contraceptive use by some socio-economic and demographic variables

Characteristics	Non-user	User	Total
Respondent's current age	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
<20	24.3	8.1	10.9
20-24	41.1	28.5	30.7
25-29	19.6	34.6	32.0
30+	15.0	28.8	26.4
Respondent's education	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
Illiterate	27.6	13.6	16.0
Primary	22.4	20.1	20.5
Secondary	31.3	43.4	41.3
Higher secondary	12.6	14.4	14.1
Higher	6.1	8.6	8.1
Respondent's occupation	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
Housewife	81.3	83.7	83.3
Working women	6.1	12.6	11.4
Student	12.6	3.7	5.3
Husband's education	**100.0 (N=191)**	**100.0 (N=1016)**	**100.0 (N=1194)**
Illiterate	23.6	14.5	15.9
Primary	15.2	16.8	16.6
Secondary	31.9	35.1	34.6
Higher secondary	11.0	12.3	12.1
Higher	18.3	21.3	20.9
Husband's occupation	**100.0 (N=191)**	**100.0 (N=1003)**	**100.0 (N=1194)**
Farmer	20.9	39.7	36.7
Business	24.6	26.7	26.4
Service	17.8	18.3	18.3
Labor	17.8	11.7	12.6
Professional	7.9	1.3	2.3
Student	11.0	2.3	3.7
Place of residence	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
Rural	80.4	76.3	77.0
Urban	12.6	14.9	14.5
Sub-urban	7.0	8.9	8.5
Number of living children	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
≤2	77.1	84.5	83.2
4 +	22.9	15.5	16.8
Age at marriage	**100.0 (N=191)**	**100.0 (N=1003)**	**100.0 (N=1194)**
< 15	6.3	9.6	9.1
15-19	77.0	55.4	58.9
20-24	14.1	27.8	25.6
25 +	2.6	7.2	6.4
Tried for delaying pregnancy	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
Did not try	84.1	48.3	54.6
Tried for delaying	15.9	51.7	45.4
Desire for more children	**100.0 (N=191)**	**100.0 (1003)**	**100.0 (1194)**
No more	50.8	60.7	59.1
One more	29.8	30.7	30.5
More than one	19.4	8.6	10.4
Socio-economic status	**100.0 (N=214)**	**100.0 (N=1016)**	**100.0 (N=1230)**
Low	45.8	19.5	24.1
Medium	23.8	43.5	40.0
High	30.4	37.0	35.9

5.4.3 Factors Affecting the Current Contraceptive Use

The estimates of logistic regression coefficients and their corresponding odds ratios for the independent variables are given in Table 5.3. The odds ratio has a clear interpretation and is straightforward. An odds ratio of greater than 1.00 suggests an increased likelihood of the event occurring (i.e. current use), while an odds less than 1.00 indicates a decreased likelihood of the event occurring. The category with the relative odds of 1.00 represents the reference category for that categorical variable.

From the results of logistic regression analysis, it appears that respondent's age, education, husband's education, husband's occupation, tried for delaying pregnancy, desire for more children, number of living children and socio-economic status has significant effect on contraceptive practice. In case of respondent's age group 20-24, 25-29 and 30+ have 3.202, 6.911 and 16.115 times more likely to practice contraception than the age group <20 years (reference category) respectively. This may be due to the fact that the teenagers have not enough knowledge and experience about contraceptive practice. It might refer to the argument that the adolescents have lake an adequate understanding about the maturation process, fertile periods and risk of unprotected sex regarding contraception (Akhter, 2000). Regarding respondent's education primary, secondary, higher secondary and higher educated women have 1.958, 6.503, 7.992 and 7.174 times more likely to practice contraception than the illiterate respondents (reference category) respectively. This may be due to the fact that specially, education of women have a crucial impact on contraceptive use of both the husband and wife. It might refer to the argument of Ullah et al. (1993) that women of Bangladesh with secondary or more education are almost three times as likely to practice contraception as those who had no education. Though respondents' occupation

has no significant effect on contraceptive practice, working women and students have 1.258 and 1.217 times more likely to practice contraception than that of the housewives (reference category) respectively. Respondents whose husbands are primary, secondary, higher secondary and higher educated have 1.279, 1.962, 2.815 and 3.593 times more likely to practice contraception than that of the respondents with illiterate husband (reference category) respectively. This is the fact that not only women's education contributes the contraceptive practice but also husband's education is needed to enhance the contraceptive practice. Considering occupation of respondents' husband businessman, service holder, professional and student have 2.956, 3.781, 9.061 and 8.741 times more likely to practice contraception than the farmer (reference category) respectively, on the other hand respondents whose husbands are labor have (1-0.740)x100=26% less likely to practice contraception than that of the farmer (reference category). This may be due to the fact that the persons who engaged in a non-agricultural work have more likely to use contraceptive. In case of place of residence, respondents in urban and sub-urban areas have 1.207 and 1.192 times more likely to practice contraception than the respondents in rural (reference category) area. This is the fact that rural women have negative relationship with contraceptive use. This may be due to the fact that the availability of modern facilities, distance between home and family planning center, the use of the birth control measures results the rural-urban differences in contraceptive use. Respondents who have tried for delaying pregnancy have 6.054 times more likely to practice contraception than the respondents who did not try for delaying pregnancy. This may refer the fact that women who are more conscious about birth control may have easy and early access to contraceptive. Also may be in some cases they seek the advice from doctors/nurses to accept the family planning methods which are suitable for them. The respondents who desired for more children have (1-0.74)x100=26%

less likely to practice contraception than the respondents who did not desire any more children. Respondents with two or less living children two have (1-0.132)x100=86.6% less likely to practice contraception than the respondents who have had three or more living children. It would reflect the cause that couples prefer to have at least two children before initiating the contraceptive use. Regarding socio-economic status respondents of medium and higher class have 3.456 and 2.755 times more likely to practice contraception than the respondents whose status are low (reference category) respectively. It may be due to the fact that the women with comparatively much higher socio-economic status have access more contraceptive methods. It would also reflect the fact that they have had more financial solvency and consume other prestigious goods.

Table 5.3: Results of logistic regression model for current contraceptive use

Variables	Coefficient	Odds Ratio
Respondent's current age		
<20 [r]	-	1.000
20-24	1.164***	3.202
25-29	1.933***	6.911
30+	2.780***	16.115
Respondent's education		
Illiterate [r]	-	
Primary	0.672**	1.958
Secondary	1.872***	6.503
Higher secondary	2.078***	7.992
Higher	1.970***	7.174
Respondent's occupation		
Housewife [r]	-	
Working women	0.230	1.258
Student	0.196	1.217
Husband's education		
Illiterate [r]	-	
Primary	0.246	1.279
Secondary	0.674 *	1.962
Higher secondary	1.035 **	2.815
Higher	1.279 **	3.593
Husband's occupation		
Farmer [r]	-	
Business	1.084 ***	2.956
Service	1.330 ***	3.781
Labor	-0.302	0.740
Professional	2.204 ***	9.061
Student	2.168 ***	8.741
Place of residence		
Rural [r]	-	
Urban	0.188	1.207
Sub-urban	0.176	1.192
Tried for delaying pregnancy		
Did not try [r]	-	
Tried for delaying	1.801 ***	6.054
Desire for more children		
Desire no more [r]	-	
Desire for one or more	-0.300	0.74
Number of living children		
Number of child > 2 [r]	-	
Number of child ≤ 2	-2.021 ***	0.132
Socio-economic status		
Low [r]	-	
Medium	1.240 ***	3.456
High	1.013 ***	2.755

Note: [r] Reference category, **Significance level:** *** p<0.01, ** p<0.05, * p<0.1

5.5 Conclusions

Use of contraception is relatively high among the women or their husbands in the study area. The percentage of couples currently using any method is 82.6 percents. Variation in use of different contraceptive methods shows most widely used method is pill (69.8%) followed by condom (18.6%) and then injection (9.4%). This has been suggested to be a consequence of gender disparity in the use of contraception.

Differential pattern in the current use of contraception by some selected characteristics shows remarkable differentiation in the case of current age specially, for teenagers, education of both husband and wife, occupation of husband, tried for delaying pregnancy, number of living children and socio-economic status. From this it has been suggested that adequate knowledge, experience and proper education should be put out to the community and at the same time socio-economic position should be lift up.

The multivariate logistic regression analysis of the determinants of current use among the women or their life partners showed comparatively higher age group are more likely to use contraception than that of their younger part. Similarly, the lower education of both husband and wife are less likely to use contraception. The women having more than two living children are more likely to use contraception. So we can infer that women with more than two children choose to keep their family size static. Socio-economic status should be up lifted to promote the contraception use. It is interesting to note that women working status and place of residence have no significant effect on contraception behavior which is a contradiction with other findings. Thus we can infer that lot of mass communication and counseling has been made and people from all profession and all areas are equally knowledgeable regarding contraception. We can also infer that proper supply of contraceptives is

expected to produce tremendous positive effect on our family planning programs. Trying for delaying pregnancy has significantly positive influence on the use of contraception. This is another indicator that reasonable mass communication and or advertisement have occurred in our society regarding family planning programs.

Chapter Six

Impact of the Factors of Birth Intervals

6.1 Introduction

In the previous chapter the details of factors influencing the use of contraception have been discussed. Birth intervals in human population have been interested to Demographers and Biosocial Scientist for understanding the family building process and life course. Birth interval is an indicator of reproductive health. Reproductive health can be attributed to the differences in the length of the reproductive life of women and differences in the length of time between births when women are exposed to the risk of conception. Analysis of those factors influencing the span and those affecting the fertility has proven useful, since in many cases they appear to vary quite substantially across populations (Rodriguez et al. 1984). In recent years, policy makers and planners have focused a great deal of attention on the birth interval and its determinants. The reasons are that not only does the number of births a woman may have during her reproductive span depend on the spacing between the births but also there is a significant link between birth spacing and maternal and child health (Miller et al. 1992). Thus, the spacing of births through a deliberately prolonged interval between births and a delay in child bearing following marriage could be logical alternative strategies for fertility control. Consequently, the induced abortion may be reduced in tolerable limit. The role of birth interval analysis in the study of reproduction is well documented as it offers rich and more detailed information for the analysis of reproductive behavior than do the data on number of births (Henry, 1953). Data on birth

intervals are also useful in studying biological aspect of human reproduction such as fecundability, postpartum amenorrhoea, and fetal loss (Sing et al. 1964). Analysis of birth intervals provides information on the progression from one parity to the next higher parity and on the time it takes to make the transition (Rodriguez and Hobcraft, 1980). The trends and differentials in fertility level of a particular community governed by a composite result of the interaction of intermediate variables, leading to a variation in the chance of conception and life birth. The important intermediate variables viz. marriage, conception, fetal loss and prevalence of the pattern of breast feeding, together determine the length of the postpartum infertility period and hence the birth interval (Bongart, 1978; Davis and Blakel, 1956; Jain et al. 1979 and Srinivasan et al. 1989). Further all these intermediate variables, within a given length of birth interval, have varying effects on birth interval depending on several socio-economic, demographic and cultural characteristics of the mothers (Battacharya et al. 1987, 1994 and Nath et al.1994b). Coale (1957) have demonstrated that mean length of the interval between two births is connected to mean generational length of the population i. e. the age of the mother at the birth of the median child, which in turn is related to the intrinsic rate of growth of population. Hence, changes in the spacing patterns will have an influence in the rate of intrinsic growth of population. As a result the spacing between births can be viewed as a measure determinant of the population change. The factors, which determine the timing of birth of particular child, are not usually the same as those, which determine the specific number of children. Each birth may alter the family situation and so affects the probability and timing of future births.

Birth interval is an important factor: the length of time between a child's birth and a previous and/or subsequent child's birth. Birth interval can be lengthened through various approaches, but are principally increased through the use of family planning methods, extended exclusive breastfeeding, and/or spontaneous

or induced abortions. Longer spacing between two births allows for the optimum use of the parent time inputs and resources for each child, which, in turn, improves child health. Analyzing the data of nineteen national demographic and health surveys from around the world, Sommerfelt (1991) found that children born less than 24 months compared with those born more than 24 months after a previous child were physically shorter. There is disagreement, however, about the effects of birth interval on malnutrition in children. Using data from Kenya, Boerma and Van Vianen (1984) found that children with short previous or short subsequent birth intervals were not at higher risk either for mortality or growth retardation during the perinatal period or first 2 years of life compared with children with longer birth intervals. The negative effects of short birth interval are most clearly demonstrated in areas where infant mortality is high. Information on the effects of birth spacing on malnutrition in Bangladesh, however, is inadequate. Swenson (1984) reported that the proportion of Bangladeshi children in the severely malnourished category is almost twice as high among children born within 12 months of a younger child than those children born more than 12 months. Roy (1996) found that, among other factors, subsequent birth interval in Matlab has a significant effect on child nutritional status. Longer birth intervals are healthier for mothers and their children, enable parents to devote more of their time to each child in the early years, give parents more time for activities other than childrearing and often ease pressure on family finances. These are not only factors that couples consider in making decisions about child spacing, however. In Canada, Ethiopia and Nigeria (Hogan et al. 1999; Oheneba et al. 1993 and Rahim et al. 1993) research finds that women who work outside the home tend to space their children more closely to complete their families quickly and thus minimize their out of the workforce, or to compress the economic and physical burdens of child rearing. Other couples space their births based on whether or not childcare

is available and affordable. In Taiwan, for instance, couples often space their children close together while they live with husband's parents because the parents provide childcare (Hogan et al. 1999). In some countries, as women tend to marry at older ages, they may have children sooner rather than later. In Canada for example women who marry later tend to have their children in rapid succession (Gyimah, 2002). Women may also speed up child bearing, as they get older to have as many children as possible before menopause in India (Pathak et al. 1998). Couples and individuals need to make their own spacing decisions based on accurate information and a range of contraceptive options. Health care providers and programmers have a responsibility to help them. Regardless of how long couples choose to wait between births, programmers and providers need to respect and support their decisions.

Few researchers analyzed birth interval data to understand the action and interaction effects of a complex factor on fertility behavior of women within a sequential framework by using stochastic models (Perrin and Sheps, 1964; Sheps and Menken, 1973 and Pathak and Pandey, 1993). Sheps (1963) and Bhattacharya et al. (1983) analyzed waiting time of conception in the life table form. Perrin and Sheps (1964) derived a comprehensive analytical model to illustrate human reproduction process as a stochastic process. Srinivasan (1966) developed a discrete probability distribution for the time interval between any two successive live births, which accounts for intervening fetal wastages. Bhattacharya et al. (1988) extended the above model by incorporating the effect of some social factors. The findings of Easterlin (1975) and Bongaarts (1978, 1982) demonstrate that the childbearing process is not only biological in nature but it is affected by social, cultural and economic factors. Some researchers concentrate on the study of the socio-economic and demographic determinants of birth intervals and estimate the effect of covariates on event under study (Rodriguez and Hobcraft, 1980; Rajaram et al. 1994; Singh et al. 1993 and Nath

et al. 1994b) examined a substantial effect of socio-economic variables in child spacing after controlling for the major intermediate variables. They reported that age at marriage and sex of the previous child influence the timing of births. Nath et al. (1994a) have shown that age at marriage, length of preceding birth intervals, age of mother and household income have strong effects on the length of the third birth interval.

Over the years different studies have been examined various issues and identified different risk factors contributing to the length of birth intervals. Rodriguez et al. (1984) compared results of identical structural models for nine countries and found that a woman's education, age and previous birth interval had substantial effects on the subsequent birth interval. Analyzing World Fertility Survey (WFS) data from Indonesia, Malaysia and the Philippines, Trussell et al. (1985), unlike Rodriguez and her colleagues, found that socio-economic factors do not have any independent effect on the birth interval; rather, these factors mainly extend their influence through biological or proximate determinants of the birth interval such as breastfeeding behavior, contraceptive use, coital frequency and induced abortion. The positive association between breastfeeding and the length of post-partum amenorrhoea is well documented from the experience of many countries (Chen et al. 1974). A study of child spacing in Asia by Rindfuss et al. (1984) revealed that ethnicity, age at birth and urban experience have a substantial effect on birth spacing.

The analysis of first birth interval provides fecundity level of women i.e. future patterns and outcomes of female reproductive life span. The first birth interval has an immense importance in fertility study. Since the first birth can be considered as the insertion into motherhood and thereby the beginning of the reproductive process. In modern society many couples want their first child

after a few years of marriage. Also in some cases young people marry at an early age and usually want to complete their education and lunch a working carrier before the child. But due to the adequate knowledge of family planning, conception took place and they go for induced abortion. Various socio-economic and demographic factors effect on the length of the first birth interval. Rao (1987), Rao and Balkrishna (1988) have shown that several socio-demographic variables can significantly influences the length of first birth interval. Riley et al. (1992) suggests that both biological and social factors affect first birth intervals in Bangladesh. Their findings demonstrate that time since menarche and to a lesser extent age at marriage and a number of socio-economic factors interact in complex way to influence the timing of first birth in Bangladesh. Bhattacharya et al. (1994) have tried to highlight the importance of early timing of first birth for a woman in traditional Indian society. On the other hand the negative aspects of early child bearing have been discussed in various researches to have adverse effect on the health of the mothers and infant (Sing et al. 1971; Menken, 1975; Pandey et al. 1998). Nath et al. (1993) demonstrated that compared to Western Society, the average length of first birth interval is much longer in traditional Indian society and age at marriage has a great role on first birth interval. Again Nath et al.(1999) and Saika (1996) revealed that female belonging to high social status and having higher age at marriage have much longer median length of first birth interval. Also they observed that higher age at marriage of females the longer is the waiting time for the birth and lower is the risk of bearing the child. The first birth interval and the family size are negatively related (Bushfield 1972; Bumpass and Mburugu, 1977). Bumpass et al. (1978), Millman and Menken (1978) and Trussell and Menken (1978) demonstrated that the length of the first birth interval subsequently influences the spacing and childbearing pattern of a family. Several studies have done internationally on first birth interval but in

Bangladesh, specially, through studies of the first birth interval are lacking, perhaps because of non-availability of appropriate classified data. In this chapter an attempt has been made to examine the effect of different socio-demographic covariates of first birth interval through proportional hazard model.

Last birth interval is one of the strongest and persistent factors affecting fertility. It is directly influenced by contraceptive use and induced abortion. It is also influenced by death of index child in infancy or early childhood. Some times, parents consciously plan a new pregnancy to replace a lost child. There could be additional gain to child health by increasing the spacing between births to a minimum of three years (Da Vanzo, 2004; Rutstein, 2002; Conde-Agudelo and Belizan, 2000). A more recent analysis of data from Matlab, Bangladesh indicates that with short or very long inter-pregnancy intervals are at a significantly higher risk of maternal complications (Da Vanzo et al. 2004). Maternal age at the birth of the index child is associated with last birth interval. In general, older mother tend to have longer subsequent intervals (Chakraborty, Sharmin and Islam, 1996; Mturi, 1997; Setty-Venugopal, V. and U.D. Upadhyay, 2002). Women are also likely to be less fertile leading to long spacing. The mother's health and nutritional status at the start of pregnancy affects the outcome of the pregnancy, her ability to breastfeed and the health of the baby. A long but optimum last birth interval helps to promote the health and survival of women, infant and children in last day of life span.

6.2 Data

The present study is based on the data that was collected through a retrospective survey, which is described in chapter two of this dissertation. To analyze the effect of different factors on first birth and last birth intervals we consider here some birth related background variables. These variables are age at marriage, mother's age at first birth and last birth, education and occupation of the respondents and their husbands, place of residence, type of family, socio-economic status and group (exposure and control group). To observe the effect of age at marriage on first birth and last birth intervals respondents are classified into four groups viz. (i) age<15 years, (ii) 15 ≤ age <20 years, (iii) 20 ≤ age <25 years and (iv) age ≥ 25 years. The effect of age of mother at first birth has been examined by grouping women into four groups viz. (i) age<15 years, (ii) 15 ≤ age <20 years, (iii) 20 ≤ age <25 years and (iv) age ≥ 25 years and the age at last birth is classified into two groups as (i) age<25 years and (ii) age ≥ 25. The education level of the respondents and their husbands are classified into five groups as (i) illiterate, (ii) primary, (iii) secondary, (iv) higher secondary and (v) higher educated. According to working status of the respondents are classified into three groups as (i) house wife, (ii) working women (including service, business, professional workers and labors) and (iii) students. Similarly the work status of husbands is classified into six groups as (i) farmer, (ii) business, (iii) service, (iv) labor, (v) professional and (vi) student. The respondents are categorized into three groups by their place of residence as (i) rural, (ii) urban and (iii) sub-urban. Considering the type of family respondents are classified into two groups as (i) nuclear and (ii) joint. On the basis of socio-economic status respondents are classified into three groups as (i) low, (ii) medium and (iii) high. Respondents are classified into two groups as (i) exposure group and (ii) control group. Respondents are divided into two categories as (i) exposure group and (ii) control group.

6.3 Analytical Methods

Median first birth and last birth intervals are calculated for some selected characteristics. As the length of the first birth and last birth intervals depends on many factors, so the use of single decrement life table is not sufficient for the analysis. To investigate the partial effect of multiple factors on the time of first birth and last birth intervals the hazard regression model, a non-linear regression technique is used. The proportional hazard model possesses all the merits of life table as well as regression techniques. The hazard function allows estimation of relative risks of other groups in relation to baseline group by the exponent of the regression coefficient exp (.). Each exponential coefficient represents the effect of a covariate on the hazard function relative to a reference group. The exponential of reference group is termed as unity. Values greater than unity indicate the relative risk of greater birth interval for the group, compared with the reference group. On the other hand values less than unity indicates a decrease in the risk of the birth interval than that of reference group.

6.4 Results and Discussions

The frequency distribution of the respondents for different groups regarding first birth and last birth intervals are presented in Table 6.1 and Table 6.2 respectively. From Table 6.1 it is seen that about 70 percent of the women have first birth interval less than or equal to 2 years and 90 percent have first birth interval less than or equal to 3 years. So we can infer that majority of our study couples take their first child within three years. Taking time differentials for first birth intervals we see that 43.2 percent , 26.9 percent and 21.6 percent of the respondents have had first birth interval of one year or less, more than one year but less or equal to two years and more than two years but less or equal to three years respectively. And rest of the respondents (8.3 percent) have had first birth interval more than three years.

On the other hand, from Table 6.2 it is seen that about 50 percent of the women have last birth interval less than or equal to four years. Taking time differentials for last birth intervals we see that 5.75 percent, 20.47 percent, 23.35 percent, 18.11 percent and 14.90 percent of the respondents have had last birth interval of more than one year but less or equal to two years, more than two years but less or equal to three years, more than three years but less or equal to four years, more than four years but less or equal to five years and more than five years but less or equal to six years respectively. And rest of the respondents (17.42 percent) have had last birth interval more than six years. From this distribution of the time intervals for last birth it can be opined that absolute majority (76.83 %) of the couples choose a span of 2-6 years as their last birth interval. On the other hand an interval of less than or equal to two years occurred with only 5.75 percent of the last births, 11.00 percent last birth occurred in the interval 6-8 years and a few women have last birth interval above eight years. From this it is reveal that consciousness have grown with the couples regarding health hazards of taking child in a short span of time and also taking child at matured ages of mothers.

Table 6.1: Frequency distribution of length (in years) of first birth interval

First birth interval (in year)	Frequency	Percentage	Cumulative percentage
interval ≤1	423	43.17	43.17
1< interval ≤2	264	26.94	70.11
2< interval ≤3	212	21.63	91.74
3< interval ≤4	40	4.08	95.82
4< interval ≤5	17	1.74	97.56
5< interval ≤6	12	1.22	98.78
6< interval	12	1.22	100.00
Total	980	100.00	

Table 6.2: Frequency distribution of length (in years) of last birth interval

Last birth interval (in year)	Frequency	Percentage	Cumulative percentage
1< interval ≤2	34	5.75	5.75
2< interval ≤3	121	20.47	26.22
3< interval ≤4	138	23.35	49.57
4< interval ≤5	107	18.11	67.68
5< interval ≤6	88	14.90	82.58
6< interval ≤7	37	6.26	88.84
7< interval ≤8	28	4.74	93.58
8< interval ≤9	10	1.70	95.28
9< interval ≤10	11	1.86	97.14
10< interval ≤11	12	2.02	99.16
11< interval ≤12	3	0.50	99.66
12< interval ≤13	1	0.17	99.83
13< interval ≤14	1	0.17	100.00
Total	591	100.00	

The median lengths of the first birth and last birth intervals are presented in Table 6.3 and 6.4 respectively. From these two tables it is seen that over all median length of first birth and last birth intervals are 20.88 months and 49.44 months respectively. The median first birth intervals are 22.25 months, 19.42 months, 22.98 months and 23.48 months for the respondents whose age at marriage group less 15 years, 15-19 years, 20-24 years and 25 years and above respectively. The median last birth intervals are 51.18 months, 46.44 months, 42.60 months and 60.90 months for the respondents whose age at marriage group less 15 years, 15-19 years, 20-24 years and 25 years and above respectively. This may be argued that women whose age at first birth high and got married late have smaller first birth interval but in case of last birth interval

there is no such type of effect. On the basis of age at first delivery the median first birth intervals are 16.14, 16.75, 24.49 and 26.78 months for the age at first delivery of <15 years, 15-19 years, 20-24 years and 25+ years age group respectively. Similarly for the median last birth intervals are 54.60, 51.00, 41.40 and 56.04 months for the age at first delivery of <15 years, 15-19 years, 20-24 years and 25+ years age group respectively. It is seen from Table 5.4 that the last birth intervals are 41.76 and 51.96 months whose age at last birth are <25 years and 25+ years respectively. Higher age at last birth have longer last birth interval. The respondent with illiterate, primary, secondary, higher secondary and higher education have had median first birth intervals 15.33 months, 22.58 months, 19.56 months, 28.35 months and 27.65 months respectively. On the other hand the last birth intervals are 43.92 months for the illiterate mother, 43.86 months for the primary educated mother, 51.00 months for the secondary educated mother, 49.56 months for the higher secondary educated mother and 47.34 months for the higher educated mother. Regarding working status the median first birth interval for housewife is 20.42 months, 23.27 months for the working women and 24.68 months for the students and the last birth interval for housewife is 45.00 months, 53.40 months for the working women and 50.76 months for the students. This may be the fact that working women and students have longer first birth and last birth intervals because they engaged in a routine work. In case of husband's education the first birth intervals are 15.87, 18.26, 20.22, 26.20 and 27.12 months for the illiterate, primary, secondary, higher secondary and higher educated husbands respectively, on the other hand the corresponding last birth intervals are 42.00, 49.78, 49.80, 54.72 and 43.92 months respectively. This may be due to the fact that couples with high educational attainment have longer first birth and last birth intervals. The median first birth intervals are 19.87, 21.22, 25.80, 13.87, 25.67 and 23.12 months for the respondents whose husbands are farmer, businessman, service holder, laborer, professional (including lawyer, doctor) and students.

respectively and the corresponding figure for same professions are 51.00, 51.00, 44.94, 42.24, 41.76 and 41.52 months respectively in case of last birth interval. On behalf of place of residence the median first birth intervals are 20.19, 24.22 and 23.77 months and the median last birth intervals are 46.08, 51.48 and 50.40 months for rural, urban and sub-urban respectively. Generally, in urban and sub-urban areas different types of modern facilities such as contraception, advice from nurses/doctors etc. are available. Consequently the birth interval may be longer in these areas than that of rural areas. In case of type of family the median first birth intervals are 20.41 and 22.83 months and the median last birth intervals are 49.80 and 41.52 months respectively. The median first birth intervals are 18.78, 20.98 and 22.31 months and the median last birth intervals are 43.80, 50.28 and 50.70 months for the respondents with low socio-economic, medium socio-economic and high socio-economic status respectively. This result may be indicated that women belonging to the higher social status group have the longer median length of first birth and last birth interval. The median first birth interval for the respondents of the control group and exposure group are 20.72 and 20.99 months and the median last birth interval for control and exposure group are 49.26 and 49.80 months respectively.

Table 6.3: Distribution of median length of first birth interval (in months) of the respondents by some covariates

Covariates	Median first birth interval	Number of respondents
Over all	20.88	980
Age at marriage		
Age < 15	22.25	102
15≤ Age< 20	19.42	571
20≤ Age< 25	22.98	247
Age ≥ 25	23.48	60
Age at first birth		
Age < 15	16.14	17
15≤ Age< 20	16.75	457
20≤ Age< 25	24.49	394
Age ≥ 25	26.78	112
Respondent's education		
Illiterate	15.33	182
Primary	22.58	222
Secondary	19.56	408
Higher secondary	28.35	117
Higher	27.65	51
Working status		
House wife	20.42	861
Working women	23.27	112
Student	24.68	7
Husband's education		
Illiterate	15.87	178
Primary	18.26	181
Secondary	20.22	350
Higher secondary	26.20	106
Higher	27.12	165
Husband's occupation		
Farmer	19.87	400
Business	21.22	256
Service	25.80	171
Labor	13.87	121
Professional	25.67	25
Students	23.12	7
Place of residence		
Rural	20.19	789
Urban	24.22	117
Sub-urban	23.77	74
Type of family		
Nuclear	20.41	825
Joint	22.83	155
Socio-economic status		
Low	18.78	252
Medium	20.98	411
High	22.31	317
Group		
Control group	20.72	510
Exposure group	20.99	470

Table 6.4: Distribution of median length of last birth interval (in months) of the respondents by some covariates

Covariates	Median last birth interval	Number of respondents
Over all	49.44	591
Age at marriage		
Age < 15	51.18	88
15≤ Age< 20	46.44	366
20≤ Age< 25	42.60	101
Age ≥ 25	60.90	36
Age at first birth		
Age < 15	54.60	15
15≤ Age< 20	51.00	310
20≤ Age< 25	41.40	201
Age ≥ 25	56.04	65
Age at last birth		
Age< 25	41.76	259
Age ≥ 25	51.96	332
Respondent's education		
Illiterate	43.92	143
Primary	43.86	160
Secondary	51.00	204
Higher secondary	49.56	62
Higher	47.34	22
Working status		
House wife	45.00	517
Working women	53.40	73
Student	50.76	1
Husband's education		
Illiterate	42.00	125
Primary	49.78	119
Secondary	49.80	213
Higher secondary	54.72	55
Higher	43.92	79
Husband's occupation		
Farmer	51.00	255
Business	51.00	149
Service	44.94	98
Labor	42.24	70
Professional	41.76	15
Students	41.52	4
Place of residence		
Rural	46.08	495
Urban	51.48	52
Sub-urban	50.40	44
Type of family		
Nuclear	49.80	520
Joint	41.52	71
Socio-economic status		
Low	43.80	171
Medium	50.28	236
High	50.70	184
Group		
Control group	49.26	303
Exposure group	49.80	288

For additional analyses, Cox proportional hazard models are used to see the effect of some selected covariates on birth intervals. The variables chosen as the covariates for the analyses of first and last birth intervals are mother's age at marriage, mother's age at first birth, educational and occupational level of both husband and wife, place of residence, type of family, socio-economic status and the group of the respondents on first birth and last birth intervals. Age at last birth is used for the analysis of last birth interval. The results under these covariates are presented in Table 6.5 and Table 6.6. These results indicate that age at marriage, age at first birth, education of the women and group of the respondents have significant effects on the first birth interval. On the other hand age at first birth, age at last birth, age at marriage, education of both husband and wife, exposure of the respondents have significant effect on last birth interval.

From the Table 6.5 it is indicated that while controlling the other variables respondents whose age at marriage is 15 $\leq$ age <20 years has 0.45 times likely to smaller first birth interval and for the age group 20 $\leq$ age <25 years and age $\geq$ 25 years tend to have a risk of 3.141 and 5.328 times more longer first birth interval than the respondents whose age at marriage is less than 15 years (reference group) respectively. This may be due to the fact that women who got married late have also longer waiting time for the first birth but the age group 15 to 19 years is immature due to the marital experience and thus resulting smaller first birth interval. Considering age at first birth Table 6.5 indicates that while controlling the other variables respondents whose age at first delivery are 15 $\leq$ age <20 years, 20 $\leq$ age <25 years and age $\geq$ 25 years tend to have a risk of 1.462, 2.790 and 6.190 times more longer first birth interval than the respondents whose age at first delivery is less than 15 years (reference group) respectively. This is mainly due to the fact that women who got married either just before or after they reached puberty they have inadequate knowledge,

experience and information about contraceptive and thus take their first baby in a comparatively smaller length of time. On the basis of educational status respondents who are primary, secondary, higher secondary and higher educated tend to have a risk of 1.412, 1.399, 2.184 and 1.687 times more longer first birth interval than the respondents who are illiterate (reference group) respectively. Though insignificant the educational status of the respondents whose husbands are primary, secondary, higher secondary and higher educated tend to have a risk of 1.069, 1.053, 1.019 and 1.016 times more longer first birth interval than the respondents whose husbands are illiterate (reference group) respectively. This might be the cause of the higher the education longer the first birth interval. It is observed that on the basis of respondents' occupation, working women and students tend to have a risk of 1.092 and 1.263 times more longer first birth interval than those of housewives (reference group) respectively. Similarly the respondents whose husbands are businessman, service holder, professional and student tend to have a risk of 1.106, 1.041, 1.001 and 1.409 times more longer first birth interval but laborer has 0.148 times less longer first birth interval than those of the respondents whose husbands are farmer (reference group) respectively. This may be due to the fact that through increasing employed outside the home of both husbands and wives and thus becoming an income-producing member of the family, a couple more likely longer spacing of child. From Table 6.5 the result indicates that while controlling the other variables respondents living in the urban and sub-urban areas tend to have a risk of 1.151 and 1.080 times more longer first birth interval than the respondents living in the rural (reference group) areas respectively. On the basis of type of family the respondents who belong to the nuclear family tend to have a risk of 1.082 times much longer first birth interval than the respondents who belong to the joint family (reference group). With regarding socio-economic status medium and higher classes tend to have a risk

of 1.139 and 1.079 times longer first birth interval than those of lower (reference group) class respectively. This is revealed the fact that women belonging to the higher social status group have higher median length of first birth interval. This may be the consequence of the women with higher social status having high purchasing power, possessing enough household goods and good educational attainment than women of lower social status. From Table 6.5 it is revealed that exposure group respondents have positive significant effect on the length of first birth interval. This group has 1.289 times more longer birth interval as compared to control group.

It has been shown from Table 6.6 that while controlling the other variables respondents whose age at marriage are 15 ≤ age <20 years, 20 ≤ age <25 years and age ≥ 25 years tend to have a risk of 1.166, 1.462 and 2.003 times longer last birth interval than the respondents whose age at marriage is less than 15 years (reference group) respectively. This argument may be explained the fact that early marriage can not provided an adequate knowledge and experience of proper birth spacing. The same incidence is also seen in the case of first birth interval. From the Table 6.6 it is indicated that while controlling the other variables respondents whose age at first birth are 15 ≤ age <20 years, 20 ≤ age <25 years and age ≥ 25 years tend to have a risk of 2.105, 3.403 and 2.057 times more longer last birth interval than the respondents whose age at first birth is less than 15 years (reference group) respectively. This may be due to the fact that women who take their first baby at early stage of life they also take their last baby as early than of the older part of the women. On the basis of age at last birth the respondents whose age at last birth is greater than or equal to 25 years has likely to 2.467 times much longer last birth interval than the respondents whose age at last birth is less than 25 years (reference group). This may be due to the fact that women who are 25 years and above likely to complete their family size at a reasonable time and thus got delayed their last

baby. Regarding educational status respondents who are primary educated have 1.453 times more longer last birth interval than the illiterate respondents, on the other hand secondary, higher secondary and higher educated tend to have a risk of (1-0.915)=0.085, (1-0.745)=0.255 and (1-0.761)=0.239 times less longer last birth interval than the respondents who are illiterate (reference group) respectively. Considering the educational status of the husbands primary, secondary, higher secondary and higher educated husbands tend to have a lower risk of (1-0.656)=0.344, (1-0.792)=0.208, (1-0.538)=0.462 and (1-0.787)=0.213 less longer last birth interval than the respondents whose husbands are illiterate (reference group) respectively. This may be due to the fact that more educated couple start their parenthood in a late time and then wish to finish in a possible early length of time. It is observed that on the basis of respondents' occupation, working women and students tend to have a risk of 1.010 and 1.886 times more longer last birth interval than those of housewives (reference group) respectively. The respondents whose husbands are businessman, service holder, labor, professional and student tend to have a risk of 1.090, 1.239, 1.129, 1.751 and 1.583 times more longer last birth interval than those of the respondents whose husbands are farmer (reference group) respectively. From Table 5.6 the result indicates that while controlling the other variables respondents living in the urban areas tend to have a risk of (1-0.75)=0.25 times less last birth interval than the respondents living in the rural (reference group) but the respondents living in sub-urban areas tend to have a risk of 1.057 times longer last birth interval. On the basis of type of family the respondents who belong to the nuclear family tend to have a risk of (1-0.0.810)=0.19 times less longer last birth interval than the respondents who belong to the joint family (reference group). This might be due to the fact that women in a nuclear family have no supporting member for raring child and thus they go for the decision to take in a shorter length of time for last child.

Table 6.5: Results from proportional hazard model for first birth interval

Covariates	Parameter	Hazard ratio
Age at marriage		
Age < 15 [r]	-	-
15≤ Age< 20	-0.600 ***	0.549
20≤ Age< 25	1.145 ***	3.141
Age ≥ 25	1.673 ***	5.328
Age at first birth		
Age < 15 [r]	-	-
15≤ Age< 20	0.380	1.462
20≤ Age< 25	1.026 ***	2.790
Age ≥ 25	1.823 ***	6.190
Respondent's education		
Illiterate [r]	-	-
Primary	0.345 ***	1.412
Secondary	0.336 ***	1.399
Higher secondary	0.781 ***	2.184
Higher	0.523 **	1.687
Working status		
House wife [r]	-	-
Working women	0.088	1.092
Student	0.234	1.263
Husband's education		
Illiterate [r]	-	-
Primary	0.067	1.069
Secondary	0.051	1.053
Higher secondary	0.019	1.019
Higher	0.016	1.016
Husband's occupation		
Farmer [r]	-	-
Business	0.101	1.106
Service	0.040	1.041
Labor	-0.160	0.852
Professional	0.001	1.001
Students	0.343	1.409
Place of residence		
Rural [r]	-	-
Urban	0.141	1.151
Sub-urban	0.077	1.080
Type of family		
Nuclear [r]	-	-
Joint	0.079	1.082
Socio-economic status		
Low [r]	-	-
Medium	0.130	1.139
High	0.076	1.079
Group		
Control [r]	-	-
Exposure	0.254 ***	1.289

[r] Reference group; * significant at 0.1, ** significant at .05 and * significant at .01**

Table 6.6: Results from proportional hazard model for last birth interval

Covariates	Parameter	Hazard ratio
Age at marriage		
Age < 15 [r]	-	-
15≤ Age< 20	0.154	1.166
20≤ Age< 25	0.380 **	1.462
Age ≥ 25	0.694 ***	2.003
Age at first birth		
Age < 15 [r]	-	-
15≤ Age< 20	0.744 ***	2.105
20≤ Age< 25	1.225 ***	3.403
Age ≥ 25	0.721 **	2.057
Age at last birth		
Age< 25 [r]	-	-
Age ≥ 25	0.903	2.467
Respondent's education		
Illiterate [r]	-	-
Primary	0.374 **	1.453
Secondary	-0.089	0.915
Higher secondary	-0.294	0.745
Higher	-0.273	0.761
Working status		
House wife [r]	-	-
Working women	0.010	1.010
Student	0.634	1.886
Husband's education		
Illiterate [r]	-	-
Primary	-0.422 **	0.656
Secondary	-0.234	0.792
Higher secondary	-0.620	0.538
Higher	-0.240	0.787
Husband's occupation		
Farmer [r]	-	-
Business	0.086	1.090
Service	0.257	1.293
Labor	0.121	1.129
Professional	0.560	1.751
Students	0.459	1.583
Place of residence		
Rural [r]	-	-
Urban	-0.288	0.750
Sub-urban	-0.055	1.057
Type of family		
Nuclear [r]	-	-
Joint	-0.210	0.810
Socio-economic status		
Low [r]	-	-
Medium	0.014	1.014
High	0.154	1.166
Group		
Control [r]	-	-
Exposure	0.171 **	1.187

[r] Reference group; * significant at 0.1, ** significant at .05 and * significant at .01**

As stated in the case of first birth interval higher social status of women tend to the longer first birth interval than that of the women of lower social status, regarding socio-economic status medium and higher classes also tend to have a risk of 1.014 and 1.166 times more risk of longer last birth interval than those of lower (reference group) class respectively. From Table 6.6 it is revealed that exposure group respondents have positive significant effect on the length of first birth interval. This group has 1.187 times more longer last birth interval as compared to control group.

6.5 Conclusions

The present study estimates the median length of the first birth interval is 20.88 months and last birth interval is 49.44 months. From this study it is clear that the significant differentials are shown within education and occupation of husband and wife, age at first birth, place of residence and social status for median first birth interval. On the other hand, there is a significant differential exists within education of both husband and wife, working status of women, place of residence and social status for last birth intervals. Further women belonging to high social status, living in urban areas and with good education have much longer median length of first birth and last birth interval and thus have a better reproductive health situation.

The proportional hazard regression analyses revealed that women's education, age at marriage, age at first birth and the exposure group to induced abortion are the key factors that affect the length of the first birth interval, while both husband and wife's education, age at marriage, age at first birth and exposure group to induced abortion are the key factors that affect the length of last birth interval. These findings suggest that, as a step towards reducing induced

abortion in the study area, it is desirable to improve the status of women in areas such as education, age at marriage, age at first birth and employment opportunity. Considering these factors with others we have analyzed timing of induced abortion in chapter three. Education, however, appears to be key factor through some causal mechanism as: (i) education delays marriage, and the maturity that comes with higher age may result in more effective contraception and hence influence the length of the birth interval, (ii) education increases the opportunity for paid employment in the modern sector and this competes with the demand for child at a suitable spacing, and (iii) through increasing employment opportunity out side the home and thus becoming an income-producing member in the family, a woman is more likely to acquire a role in decisions concerning all aspects of family life, including the number and adequate birth spacing of her children. Hence being educated through the above three processes women can reduce induced abortion and thereby improve the reproductive health.

Chapter Seven

Summary and Conclusions

7.1 Summary of Findings

The main focus of this study has been made to understand the socio-economic and demographic determinants of induced abortion. It has also undertaken an investigation to see that how induced abortion can space the birth of a women. Regulation of fertility seems to be the major solution that can significantly improve reproductive health and birth interval is an indicator of reproductive health.

Nowadays in many communities abortion has become a significant contributory factor for regulation of fertility where there is less practice of contraceptive or reckless use of contraception. However, the timing of abortion is one of the most complexities of abortion. So the period of gestation is the critical determinant of the sequel of induced abortion. Induced abortion in first trimester is comparatively safer period, because dangers of termination increase substantially with increase each week of gestation regardless of medical care. For these reasons we have investigated the correlates of timing of induced abortion.

The relationship between level of contraceptive use and the incidence of induced abortion is a sensitive issue. Some go for induced abortion when they have had unwanted pregnancy and it becomes the alternative of contraceptive. So we have been interested to see the influencing factors of contraceptive use.

Since birth interval is one of the most significant indicator of reproductive health, so it is very much important to investigate that which factors influence the length of birth intervals.

In order to provide insights into the mechanisms understanding the determinants of induced abortion, the background characteristics of the study population are examined. There are 1230 respondents in our study population. Among them, 2 respondents are aged <15 years and remaining 1228 respondents are aged between 15 years to 49 years. Of the total respondents 610 women are abortion seekers (exposure group) and 620 women are pregnant but not abortion seekers (control group). According to the current age of the respondents 0.2 percent is below 15 years, 10.7 percent are within 15-19 years, 62.7 percent are of 20-29 years and remaining 26.3 percent are 30+ years aged women. It is also seen that for exposure group the mean length of pregnancy duration is maximum (13.57 weeks) at the age group below 15 years and the minimum (11.04 weeks) mean length of pregnancy duration in between 40 and 44 years age. Considering both husband and wife, 16 percent of them are illiterate. It is also found that 41.3 percent wives and 34.6 percent husbands are educated up to secondary level and 8.1 percent wives and 20.9 percent husbands have higher level of education. In the study population about two-fifth of the couples have had secondary level of education. For exposure group maximum (13.09 weeks) and minimum (11.41 weeks) mean lengths of pregnancy duration are seen at the primary and higher secondary level of education of the respondents respectively.

Regarding the working status, 83.3 percent respondents are housewives, 11.4 percent are working women and 5.3 percent are students. The mean length of pregnancy duration of housewives is 12.74 weeks for exposure group. On the

basis of husband's occupation, 36.7 percent are farmer, 26.4 percent are businessmen, 18.3 percent are service holder, 12.6 percent are labor and there are also 3.7 percent students.

On the basis of construction of house with respect to wall and roof, 57.4 percent lives in katcha house, 17.6 percent in pucca house, 20.4 percent in half-pucca house and 4.6 percent lives in tin shade or other categories of house. According to religion, maximum (92.4 percent) numbers of respondents are Muslim and the rest 7.6 percent are non-Muslim. For exposure group the mean length of pregnancy duration of Muslim (12.62 weeks) women is greater than that of non-Muslim (11.37 weeks). Among the total respondents 96.9 percent are currently married, 2.8 percent are unmarried and each of divorced, separated and widowed is of 0.1 percent. Majority (77.0 percent) of the women are found to be living in rural areas, while 14.5 percent and 8.5 percent of the women come from urban and sub-urban areas respectively, whereas for exposure group maximum (12.78 weeks) mean length of pregnancy duration is seen for rural women and minimum (10.99 weeks) for that of sub-urban women. Among all the women 78.5 percent are found to be living in nuclear family and 21.5 percent women are found to be living in joint family. Considering children ever born (CEB) and number of living children, 20.5 percent respondents have not yet given any live birth and 20.6 percent have no living children. 30.0 percent of the respondents have given one live birth and 33.2 percent respondents have one living child. 29.3 and 26.4 percent respondents have given two live births and two living children respectively. It is also evident that for exposure group maximum (14.12 weeks) and minimum (10.00 weeks) mean lengths of pregnancy duration are of women having 4 and 8 ever born children respectively and the maximum (14.18 weeks) and minimum (11.43 weeks) mean lengths of pregnancy duration are of women having 4 and 6 living

children respectively. Majority (59.1 percent) of the respondents desired no more children, 30.5 percent desired one more child and 10.4 percent respondents desired more than one child. It is also evident that for exposure group maximum (12.69 weeks) and minimum (12.38 weeks) mean lengths of pregnancy duration are for the categories "desire no more children" and "desire more than one child" respectively. In our study population, 82.6 percent respondents currently use contraceptives and the remaining 17.4 percent do not use any family planning method. It is also found that pill is the leading family planning method followed by condom. It is also that maximum (14.93 weeks) and minimum (8.00 weeks) mean lengths of pregnancy duration are for injection users and the women whose husband did vasectomy categories in case of exposure group. The mean age at first marriage and first birth are 18.43 years and 20.14 years respectively. The majority (58.9 percent) of the respondents got married in the age group 15-19 years while 46.6 percent and 40.2 percent had their first child at the age group 15-19 and 20-24 years respectively. It is also evident from our study that for exposure group maximum (13.12 weeks) and minimum (12.29 weeks) mean lengths of pregnancy duration according to the age at first marriage group <15 years and 20-24 years respectively and maximum (13.00 weeks) and minimum (11.40 weeks) mean lengths of pregnancy duration according to the age at first birth group 15-19 years and 25+ years respectively. According to the socio-economic possession, based on semi-durable and durable goods of household, 24.1 percent belong to the lower class, 40.1 percent belong to the middle class and 35.8 percent belong to the upper class. The mean length of pregnancy duration is maximum (12.87 weeks) of socio-economically medium class women for exposure group.

In chapter four we have seen that the differentiation is clear within both the trimesters for current age, education, occupation, age at marriage, place of

residence, type of family, contraceptive use, number of living children, social status and reasons for abortion of the respondents. Also the differentiation has been found between the trimesters for education, occupation, place of residence, contraceptive use, the number of living children, higher social status and reasons for abortion of the respondents. The analysis of the determinants of the timing of induced abortion suggests that women with primary, secondary, higher secondary and higher education are 36 percent, 41 percent, 59 percent and 58 percent less likely to induce abortion in the second trimester than that of the women with no education. Similarly, the women in urban and sub-urban areas are 11 percent and 70 percent less likely to perform abortion in second trimester than the women in rural areas. Women belonging in the nuclear family are 60 percent more likely to perform abortion in second trimester than the women belonging in the joint family. Women who use contraceptive are 64 percent less likely to induce abortion in the second trimester than the women who did not use. Women with 3 or less living children are 50 percent more likely to perform abortion in the second trimester than women having more than 3 living children. From this analysis it has also seen that on the basis of the reasons for seeking abortion: conceived very soon after marriage, desire to take children later, desire no more children, illegal conception, social problem and husband's pressure group have 79 percent, 85 percent, 87 percent, 87 percent, 95 percent and 79 percent are less likely to induce abortion in the second trimester than those group of women who go for doctor's advice.

In chapter five we have studied the factors that influence the use of contraceptive. Here variations in the use of contraception, differentiation of use among various characteristics and influencing factors of contraceptive have been examined. The variation in the use of different contraceptive methods shows that pill is the most (69.8 percent) used method followed by condom

(18.6 percent) and then injection (9.4 percent). There are notable differences within both user and non-user group of respondents with respect to the variables current age, education of the respondents, education and occupation of the husband, tried for delaying pregnancy, number of living children and socio-economic status. Among the factors of contraceptive use, the current age of the respondents has significant effect. Women of 20-24, 25-29 and 30+ years age group are 3.202, 6.911 and 16.115 times more likely to use any family planning method than the age group <20 years. Similarly, education of the respondents has a positive significant effect on contraceptive practice. Women with primary, secondary, higher secondary and higher education are 1.958, 6.503, 7.992 and 7.174 times more likely to use any family planning method than that of the women with no education. Though occupation of the respondents has no significant effect on contraceptive practice, working women and students are 1.258 and 1.217 times more likely to practice contraception than that of the housewives. Husband's education and occupation also have significant effect on contraceptive practice. Primary, secondary, higher secondary and higher educated husbands are 1.279, 1.962, 2.815 and 3.593 times more likely to use contraceptive (themselves or their wives) than that of the illiterate husbands. Similarly, women with husbands as businessmen, service holder, labors, professionals and students are 2.956, 3.781, 0.740, 9.061 and 8.741 times more likely to practice contraceptive than women with the farmers as husbands. Place of residence has no significant effect on contraceptive practice, but women from urban and sub-urban areas are 1.207 and 1.192 times more likely to practice contraceptive than that of the women from rural areas. Women who tried for delaying pregnancy are 6.054 times more likely to practice contraceptive than that of who did not try. The respondents who desired for children are 0.26 times less likely to use contraceptive than that of who did not desire any more children. Women with two or less living children are 0.868

times less likely to use contraceptive than that of the women with more than two living children. Socio-economic status has significant effect on contraceptive practice. Women from medium and higher socio-economic group are 3.456 and 2.755 times more likely to practice contraceptive than that of whose status group are low.

In chapter six we have found the impact of the factors that influence birth intervals. Since both first birth and last birth interval is very much useful as the mediator of fertility and reproductive health study, in our study we have considered only these two variables. It is revealed that more than 90 percent of the respondents' first birth interval was 3 years or less and 50 percent respondents' last birth interval was 4 years or less. Further it is found for all respondents that the median first birth and last birth intervals are 20.88 months and 49.44 months respectively. It is also evident that women who married between the age 15 to 19 years have minimum (19.42 months) first birth interval and who married in the age group 20 to 25 years have minimum (42.60 months) last birth interval. Women with lower age at first birth have lower first birth interval. Women with age at first birth less than 15 years and 15 to 19 years have first birth intervals 16.14 months and 16.75 months respectively. Women with age at first birth between 20 to 24 years have minimum (41.40 months) last birth interval. Illiterate and up to secondary level educated respondents have 15.33 months and 19.56 months first birth intervals. According to working status of women house wives have minimum first birth interval (20.42 months) and last birth interval (45.00 months). Women with less educated husbands have lower first birth interval. Similarly, women whose husbands are labors and farmers have lower first birth interval. According to residence, the women from rural areas have minimum (20.19 months) first birth interval. Women belonging to nuclear family have lower first birth interval

(20.41 months) but larger last birth interval (49.80 months). On the basis of socio-economic status lower class have minimum first birth interval (18.78 months) and last birth interval (43.80 months). Comparatively control group have lower first birth interval (20.72 months) and last birth interval (49.26 months). To assess the impact of several factors simultaneously on birth interval we have used proportional hazard analysis which shows that age at marriage, age at first birth, respondent's education and exposure group have significant effect on first birth interval. Further age at marriage, age at first birth and exposure group have significant effect on last birth interval. It has been seen that the respondents whose age at marriage is between 15 to 19 years have 0.45 times smaller first birth interval and respondents with age at marriage between 20 to 24 years and 25+ years have 3.141 and 5.328 times longer first birth interval respectively than those of age at marriage less than 15 years. Further the respondents with age at first birth between 15 to 19 years, 20 to 24 years and 25+ years have 1.462, 2.790 and 6.190 times longer first birth interval than those whose age at first birth is less than 15 years. Respondents with primary, secondary, higher secondary and higher education have 1.412, 1.399, 2.184 and 1.687 times longer first birth interval respectively than those of women with no education. Exposure group of respondents have 1.289 times longer first birth interval than those of control group. Considering the significant effect of age at marriage on last birth interval women whose age at marriage are in the groups 15 to 19 years, 20 to 25 years and 25+ years have 1.166, 1.426 and 2.003 times respectively longer last birth interval than those whose age at marriage is less than 15 years. Also women whose age at first birth are in the ranges 15 to 19 years, 20 to 25 years and 25+ years have 2.105, 3.403 and 2.057 times respectively longer last birth interval than those whose age at first birth is less than 15 years. The study also reveals that only primary level of education of the respondents and their husbands with primary level of

education have significant effect on last birth interval. Exposure group has 1.187 times longer last birth interval than that of control group.

7.2 Conclusions

Several important results have emerged from our study. It has revealed that there is more or less equal tendency to terminate pregnancy at both first and second trimesters. If the women have enough consciousness about their health condition they must not go to a stage of unwanted pregnancy. Even if an unfortunate unwanted pregnancy occurs they would have terminated their pregnancy in an earlier stage i.e. in the first trimesters. Our study have shown that more awareness should be created regarding women's education, contraceptive practice, expected family size and health facilities in rural areas related with reproductive health. From logistic regression analysis it has been also shown that the significant determinants of timing of induced abortion are women's education, place of residence, type of family, contraceptive practice, number of living children and reasons for abortion. The variable reasons for seeking abortion have shown that the majority of the women go for induced abortion due to the decision of taking children in delayed time or they desired no more children.

From the results of chapter five it has been found that apparently contraceptive practice has significant positive impact on reproductive behavior. Among the various methods of contraception, pill is the most used method which is practiced by the female. So it is obvious that the use of male contraceptive methods should be equally increased which will ultimately create women empowerment in respect of contraceptive practice. The differentiation of contraceptive practice has been shown for the variables current age of the women, education of husbands and wives, family size and socio-economic

status. The logistic regression analysis to identify the determinants of contraceptive use has shown that women's current age, education of both husband and wife, occupation of the husband, tried for delaying pregnancy, number of living children and socio-economic status have significant effect on contraceptive practice.

It has been noted that the median first birth and last birth intervals are 20.88 months and 49.44 months respectively. The significant differentials in the first birth and last birth intervals are found in respect of education and occupation of both husband and wife, place of residence and social status. The proportional hazard regression analyses have shown that women's education, age at marriage, age at first birth and exposure group to induced abortion have significant effect on the length of first birth interval and education of both husbands and wives, age at marriage, age at first birth and exposure group to induced abortion have significant effect on the length of last birth interval.

7.3 Policy Implications

This study attempted to throw some light on induced abortion and related aspects for Rajshahi district of Bangladesh. The findings of this study may have some policy implications to identify the actual determinants of induced abortion. Based on the discussion of this study some comments and recommendations have been suggested that would help the Government to take initiative to understand better reproductive health through reducing induced abortion.

In this study, we have found that nuclear family and number of living children of the respondents have positive significant effect on timing of induced abortion. Emphasis should be given to regulate fertility through suitable and

effective family planning methods and social integrity should be maintained by joint family structure. On the other hand we have also found that women's education, place of residence, contraceptive use and reasons for induced abortion have negative significant effect on timing of induced abortion. Efforts should be made to enhance women's education, specially education on reproductive health in the rural areas of Bangladesh. Emphasis should be given to the activities of national reproductive health programs so that community, particularly uneducated women become aware of the need for continuous and effective family planning methods and the odd consequences of unwanted pregnancy.

Contraceptive practice has positive significant effect on reproductive health and contraceptive practice rate is reasonable, still there were unwanted pregnancies that led to induced abortions. So, emphasis should be given to study effective and continuous use of contraceptive, specially in relation to and cultural factors (e.g. religiosity, women's roles in decision making process, subordinate status of women, etc). Simultaneously education of the couples, working (income producing) facility of women and better job opportunity of the male and the more awareness to regulate fertility should be uplifted for contraceptive use behavior.

It is obvious that contraceptive practice can regulate fertility. There is another potential impact of contraceptive use that it prolongs birth spacing which in turn creates good maternal health. For these reasons emphasis should be given to promote age at marriage, age at first birth. Apart from formal education, functional education that provides specific knowledge about reproductive health should be imparted to women by arranging village meetings under the supervision of health workers, making more visits of the health workers to

them, through TV campaign and advertisement in other media and involving NGO's.

7.4 Further Works

There are various areas that need further research. This study highlights induced abortion at a particular region of Bangladesh. Similar works with uncontrolled data in different regions should be made before taking a policy measure nationwide. If the regional differences become obvious, then through understanding as to why there are differences in induced abortion and reproductive health between the regions should be addressed. This will assist the planners and policy makers to distribute the limited resources adequately.

Studies on maternal morbidity and mortality due to induced abortion can be done for updating our national population policy specially in respect of reproductive health. More over sex preference is strong in our society and sex selection techniques are becoming easily accessible. So studies can be made relating sex preference and induced abortion. Another important issue "pre-marital abortion" can be studied in different aspects so that proper sex education can be propagated to our adolescents, because legalizing abortion will not be a perfect solution of pre-marital abortion.

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