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Correlates of High-Risk and Low-Risk Childbearing Pattern in Bangladesh

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CORRELATES OF HIGH-RISK AND LOW-RISK CHILDBEARING PATTERN IN BANGLADESH

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By

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November 2004

DEDICATION

This dissertation is dedicated to my parents and parent-in-laws. To my parents, for advising me to maintaining patience, study, and willpower needed success in life.

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CERTIFICATE

It is a pleasure for me to certify that the dissertation entitled, **'Correlates of High-Risk and Low-Risk Childbearing Pattern in Bangladesh'**, is an original work done by **Md. Abdul Mazed Chowdhury** under my supervision. As far as I know, this has not been previously submitted for any degree or diploma under any University or Institute. I also certify that I have gone through the draft and final version of the dissertation carefully and found it satisfactory for submission to the Department of Statistics, Rajshahi University in partial fulfilment of the requirement for the degree of Doctor of Philosophy in Statistics.

24.11.04

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DECLARATION

I do hereby declare that the dissertation entitled, **"Correlates of High-Risk and Low-Risk Childbearing Pattern in Bangladesh",** submitted to the Department of Statistics, Rajshahi University for the degree of Doctor of Philosophy in Statistics, is an original research work of mine. This work is carried out by me under the supervision and guidance of **Professor Samad Abedin,** Department of Statistics of the Rajshahi University, Rajshahi, Bangladesh. The material embodied in this dissertation is original and no part of it in any form has been submitted to any other University or Institute for any degree or diploma. The sources incorporated in the dissertation have been duly referred and quoted for clarity.

Z-4-11-04

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I am solely responsible for errors and omissions that remain in thesis, if any.

Md. Abdul Mazed Chowdhury

ABSTRACT

Childbearing in human population can be classified as early, on-time and delayed in context of age of a woman or a group of women. While on-time childbearing involves less risk, both early and delayed childbearing involve high-risk also involves in having children in quick succession as well as in having children more than three or four. Thus, childbearing occurs early or late, in quick succession and at higher parity (more than 3 or 4) involves high-risk and beyond these have some low-risk. Admitting that every pregnancy expulsion involves risk - more or less. The present study is an attempt to analyse the childbearing pattern that are termed as high-risk and low-risk and try to isolate the factors that discriminate and affect significantly the high-risk and low-risk pattern in the context of age, parity and birth interval.

Methodology

The study uses 17 variables that include age of women, parity, birth interval, age at marriage, age at first birth, duration of conjugal life, surviving children, child loss experience, duration of breastfeeding, contraceptive use, spousal age difference, place of residence, religion of women, education of women, education of husband, women's working status and occupation of husband. Such data are available from the 1999-2000 Bangladesh Demographic and Health Survey (BOHS) implemented through a collaborative effect of the National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ORC Macro (USA). Multi-stage random sampling was used to obtain the data. Data were obtained from all the administrative geographical divisions of Bangladesh. A

total of 10,544 ever-married women aged 10-49 were interviewed to collect data concerning fertility levels, contraceptive, infant mortality levels to improve the lives of mothers and children.

Aside from rates and ratios used in the analysis of data, the study uses x^2-analysis to list the association between the attributes of risk of childbearing classified as high-risk and low-risk in terms of age, birth interval and parity and indicates socio-economic and demographic phenomena. The study further uses two sophisticated statistical techniques namely, discriminant and multivariate logistic regression analysis.

Findings

It is evident that childbearing performance varies greatly with differences in religion, education, residential status and so on. Majority of women (78 percent) are not currently working outside home. A considerable 70 percent of women live in rural area. About 43 percent of the study population has no formal education. The data shows that mean age at first marriage is 14.9 years while more than 50 percent were married before the age of 15 years and 80 percent of Bangladeshi women marry when they are still teenagers, which increases the likelihood of their having high-risk births in the absence of contraceptive use before the first birth. In most cases, the first birth occurs between ages 17 and 19, the median age at first birth is 17-18 for all women aged 20 and older. The results indicate that childbearing of adolescent mothers have on average, shorter birth interval (less than 24 months) than their adults counterparts. Nearly one in six children are born after a "too short" interval (less than 24 months). Although, the median birth interval is 39 months, younger women have shorter birth intervals than older women. The median birth interval for women age 15-19 is 27 months, compared with 48 months for women over age 40. The mean number of children ever born to currently married women is 3.13, while it is 2.58 for all women aged 15-49.

It was found that the variables viz., education of women, contraceptive use, women's working status, occupation of husband, duration of conjugal life, child loss experience, age at first marriage, age at first birth, duration of breastfeeding and surviving children are the most significantly associated corresponding to age, parity and birth interval.

The variables that significantly discriminate the high-risk childbearing from the low-risk childbearing are age at first marriage, duration of conjugal life, age at first birth, contraceptive use, child loss experience, surviving children, education of women, place of residence, women's working status, spousal age difference, occupation of husband and duration of breastfeeding.

It was also found that the most important significant variables that influence both the high-risk and the low-risk childbearing are age at marriage, place of residence, education of women, duration of conjugal life, child loss experience, age at first birth, working status of women, and duration of breastfeeding, contraceptive use and occupation of husband.

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INTRODUCTION

1.1 Introduction

Women who bear children too early or too late in life, women who bear too many children, and those who bear children too close together, put themselves and their children in danger (Eckholm and Newland, 1977). In other words, pregnancies of younger mothers (below 20 years) and older mothers (above 35 years), too many pregnancies (5 or more) and closer birth interval of below twenty-four months are likely to produce high-risks to mother and child life (Perkin, 1968) In practice, the combinations of these four types of high-risk pregnancy are more important than any one of the four considered separately. For example, in developing countries older women usually also have many children, so their pregnancies fall into two high-risk categories. Likewise, women with large families tend to have closely spaced births. Also, women who marry very young may have several closely spaced births before they reach age 20. These groups of women, who are doubly at risk, should be a special focus of primary health programs trying to reduce infant, child and maternal deaths. Among these pregnancies, there are greater risks of miscarriage, stillbirths, and death during infancy (Swenson, 1979; Chen et al., 1974 and Koenig et al., 1988).

When a woman is too young, pregnancy - wanted or unwanted - can be dangerous for both mother and infant (Senanayke and Ladjali, 1994; Population Reference Bureau, 1994; Stewart and Cuervo, 1994). Women ages 15 to 19 are twice as likely to die from childbearing as women in their 20s (Noble et al., 1996, Starrs, 1997). Women under age-17 face especially higher risk (Fraser et al., 1995; Miller, 1993). The health risks of childbearing increase before age 20 and after age 39 (Okie, 1998; Ross and Frankenberg, 1993). Among women ages 40-44, for example, the risk of death is five times higher than among women in their 20s (Royston and Lopez, 1987). Pregnancy before age 20 also

poses risk to the younger woman's infant (Sullivan et al., 1994). Young mothers, especially those under age 15, have higher rates of premature labor, spontaneous abortion, stillbirth, and low birth weight infants than those of older mothers (WHO, 1989; Population Council, 1991; Mishra and Dawn, 1986; Fraser et al., 1995 and Population Reference Bureau, 1994). For the infant who survives, the higher risk of death persists throughout early childhood (Bachmann, 1988; Blum, 1991; Daly et al., 1994; UN, 1989; United Nations Children's Fund and Indian Council of Medical Research, 1987). The risk of maternal mortally rises dramatically after a woman's four or more births (Garenne et al., 1997; Senanayke, 1995; Maine, 1991). These problems are also more likely among women with less than two years after a previous pregnancy (Babson, 1997; Hay and Barbason, 1972 and Hobcraft, 1987).

For young women just beginning their adult lives, the risks of childbearing do not end with delivery. Compared with a woman who delays childbearing until her 20s, the woman who has her first child before age 20 is more likely to obtain less education, have fewer job opportunities and lower income, be divorced or separated from her partner and live in poverty (Klepinger et al., 1995; Klitsch, 1993; Ramirez, 1992; Rahim and Ram, 1993; Singh and Wulf, 1990). Pregnancies that occur before age 20 or after age 40 increase the risks of a wide variety of health problems for the child. These problems include low birth weight, birth defects, malnutrition, infectious diseases, and slower physical growth and development. These problems are also more likely among women with more than four children or that follow less than two years after a previous pregnancy (Babson, 1997; Hay and Barbano, 1972 and Hobcraft, 1987).

The Bangladesh Health and Family Planning Program has made remarkable progress over the last two decades. The fertility transition is already well underway in the country and the success of the immunization program is most impressive. The contraceptive prevalence rate has already reached 53.8% level and the fertility rate has declined from 6.3 in 1971-1975 to 3.3 in 1999-

2000 (BFS, 1975; BOHS, 1999-2000). The under-five mortality rate has declined from 133 for the period 1989-90 to 94 for the period 1999-2000 (BOHS, 1999-2000). The infant mortality has also declined from 153 in 1975 to 57 in 1999-2000 (BFS, 1975; BBS, 2000).

Despite these, however, Bangladesh still remains one of the countries where female life expectancy at birth is lower than that of males (male 60.7 and female 60.5) (BBS, 2000). While the progress was satisfactory with respect to reduction in fertility and child mortality, progress was inadequate with respect to maternal mortality and morbidity. Maternal mortality is a serious concern in Bangladesh. With the current maternal mortality ratio of 3 per 1,000 live births (BBS, 1999), the estimated lifetime risk of dying from pregnancy and childbirth is about 100 times higher than in the developed countries. One of the most tragic outcomes of these deaths is that about three fourths of the babies born to these women also die within first year of life, and the survival of the other siblings is also at stake.

It is very important to note that 14 percent of pregnant women's deaths are associated with injury and violence. Also, the incidence of maternal mortality is decreasing, the incidence of violence against women in rising. In addition, most population based studies show that abortion complications are responsible for nearly a quarter of deaths of the mothers. The annual number of induced abortions would be 1,62, 130 (BAPSA, 1998). Also an estimated 8,00,000 pregnancies are terminated each year in Bangladesh 262,000 induced abortions plus 5,18,000 MRs), at a rate of approximately 28 per 1,000 pregnant women aged 15-44 (Akhter, 1988; Rochat et al., 1981). Although this rate is moderate compared to levels worldwide, there is no room for complacency because the extent of undocumented and unsafe abortion is very high which in most cases result in life-threatening consequences.

About 70 percent of women suffer from nutritional deficiency anemia. Less than 40 percent of the population has access to basic care, and 71 percent

of pregnant women do not receive antenatal care, while 78 percent over 35 years receive none (BDHS, 1996-97). The low level of antenatal care coverage in Bangladesh has improved only marginally during the last five years. Close to 54 percent do not have assistance from a trained attendant (Doctors, nurses, midwives and family welfare visitors). Almost all births (92 percent) in Bangladesh occur at home. Only 12 percent of births are assisted by medically trained personnel, doctors (7 percent), or nurses, mid-wives and family welfare visitors (5 percent) (BDHS, 1999-2000). Like maternal mortality, the situation of maternal morbidity in Bangladesh is the alarming. In Bangladesh, there are about 9 million women who have survived the rigors of pregnancy and child birth to suffer from lasting complications such as fistulae, uterine prolapse, inability to control urination and painful intercourse (BIRPERTH, 1998, 2000), with 37 percent during antepartum, 12 percent during intrapartum and 51 percent during postpartum. These reproductive morbidities diminish woman's fertility, productivity and quality of life, as well as the health and survival of the next generation. These also make them social outcasts in some cases, turned out of homes and rejected by their husbands and families.

In Bangladesh, still children are born after a "too short" interval (Less than 24 months). Nearly one in six children (about 16 percent) are born after a "too short" interval (Mitra et. al., 2000). In Bangladesh, younger women have shorter birth intervals than older women. It helps to ensure her infants health when a woman avoids pregnancy for 24 months after a previous birth. A baby born too soon is vulnerable because the mother has not yet recovered from vitamin depletion, blood loss and reproductive system damage from the previous birth (Zhu et al., 1999). In Bangladesh, birth intervals are still five months shorter among rural women than among urban women (Mitra et. al., 2000).]

In Bangladesh, although almost all babies are breastfed at some time, only 17 percent are put to the breast within one hour of births and less than two-thirds (63 percent) are put to the breast within the first day of life (Mitra et. al., 2001:134).

Although the median length of any breastfeeding in Bangladesh is 30.5 months or slightly more than two and half years, the median duration of breastfeeding has declined from 36 months in 1993-1994 to 33 months in 1996-1997 and to 31 months in 1999-2000 (Mitra et. al., 2001: 136; 1997: 132; 1994: 120).

The mortality risks for infants of young mothers are high. The 1996-97 BDHS reports a neonatal mortality of 70 percent for mothers less than 20 years and an infant mortality rate of 106 per 1,000 like births. This is considerably higher than women in the older age groups: infant mortality is 79 per 1,000 live births for mothers 20-29 years and 87 per 1,000 live births for those 30-49 years. The 1996-97 BDHS concludes that approximately 19 percent of births in Bangladesh are exposed to a higher risk of death because the mother is less than 18 years. Delays in marriage and childbearing could lead to improve child survival prospects (Mitra et al., 1997).

Maternal mortality rate is five times higher among women aged 10-14 years than that of women aged 20-24 years (Chen et al., 1974). In the same study, maternal mortality rate is almost twice among women age less than 20 years than that of older women aged 20-30.

Levels of education attainment still remain low in Bangladesh with a strong differential persisting between males and females. Generally, educational attainment is higher for males than for families, although this varies substantially by age. Twenty-eight percent of men and 38 percent of women age six years and above have not received any formal education. Substantial urban-rural gaps in educational attainment still persist. Thirty-one percent of rural men have never attended school, compared with less than one-fifth of urban men (18 percent). The differences are also striking for women 40 percent of rural women have never attended school, compared with only 29 percent of urban women (Mitra et al., 2001: 14).

1.2 Country Profile

Bangladesh, one of the South Asian countries, is the eighth most populous country in the world. Bangladesh is an irregular shaped and low-lying country with a total area of 56,977 square miles or 1,47,570 square kilometers of which 8,236 square kilometers is riverine and 1,971 square kilometers is under forest. It is situated latitudinally between 20°34' and26°38' north and longitudinally between 88°01' and 92°41' east. The country is bounded on the north and the west by India, on the east by India, and Myanmar and on the south by the Bay of Bengal. Today's Bangladesh, with a population of about 130.03 million, 65.8 million are males and the rest 63.7 million are females in 2001, is the most densely populated country in the world. The annual population growth rate is still high of 1.54 percent (Bangladesh Population Census, 2001). Bangladesh occupy only 1/13000th of total land area of the world but population density is about 839 per square kilometer (GOB, 1999; Bangladesh Population Census, 2001). The country demonstrates the typically broad-based population age pyramid of a under-developed country. Only 37.0 percent male and 33.4 percent female are educated in Bangladesh (Bangladesh Population Census, 2001). Ethnically, Bangladesh is homogeneous and 98.8% of the populations have Bengali as their mother tongue (BBS, 1977).

For administrative purpose, the country is divided into 7 divisions, 64 districts and 507 thanas. Muslims constitute almost 89.7 percent of the population of Bangladesh, Hindus constitute about 9.2 percent, Buddhist 0.7 percent, Christian 0.3 percent and others constitute 0.2 percent (Bangladesh Population Census, 2001).

Agriculture is the most important sector of the nation's economy. It accounts for 30 percent of the gross domestic product (GDP) and almost 64 percent of the population is directly engaged with it (BBS, 1997: 270, 159). The growth of industrial sectors is increasing with importance in national policies and as a result of foreign investment. The per capita income is only US $275 and half

of Bangladesh's population is below the poverty line (GOB, 1994: 2; World Bank, 1995: xvii). Because of high young age structure and lack of employment facilities, out of 56 million of total civilian labor force, 20.1 million youth labor force (15-29) were unemployed in 1996, which was 19.1 million in 1989 out of total civilian labor force 50.7 million (BBS, 1996a). Unemployment/under employment is a serious problem, and pressure on the land in rural areas has led to movement of people from rural to urban areas.

The relatively young age structure of the population indicates continued population growth in the future; about 26.6 percent of the population is under 10 years of age, 67.3 percent are between 10 and 59 years, and 6.1 percent are age 60 or over (Bangladesh Population Census, 2001). This young age structure constitutes a built-in "population momentum," which will continue to generate population increases well into the future, even in the face of rapid fertility decline. For example, in 1992, Bangladesh had about 22 million married women of reproductive age; by the year 2001, this number is projected to rise to 31 million (GOB, 1994: 8).

Bangladesh has undergone a remarkable demographic transition over the last two decades. The total fertility rate has declined from about 6.3 in the period 1971-1975 to 3.3 in 1994-2000 (BFS, 1975; BDHS 1999-2000). The crude death rate has also fallen dramatically, from about 19 per 1,000 populations in 1975 to 4.8 in 1998 (GOB, 1994: 4; BBS, 2000:14). The infant mortality rate was 150 deaths per 1,000 live births in 1975 and has fallen to 66 in the period 1999-2000 (GOB, 1994: 5; Mitra et al., 2001). Maternal mortality rate has declined from 6.2 per 1,000 live births in 1982 to 3.0 per 1,000 live births in 1999 (GOB, 1994: 5; BBS, 1999). Life expectancy at birth was 46 years for males and 47 years for females in 1974 (UN, 1981: 60). It increased to 60.7 years for males and 60.5 years for females (BBS, 2000: xx). In 1975, when married women were asked how many children they would ideally like to have, the response was an

average of 4.1 children (Huq and Cleland, 1990: 53, 54). By 1993-1994, the mean ideal family size had dropped to 2.5 (Mitra et al., 1994: 88). There has been a little improvement in the age at marriage. Marriage starts very early in Bangladesh, nearly about 12.5 years of age, progresses very fast and almost all women marry (Islam, 1996; Abedin, 1982). The median age at first marriage among women 20-49 is 14 years (BOHS, 1996-97). The mean age at first marriage for females and males are 19.0 years and 25.3 years, respectively (Bangladesh Population Census, 2001).

Childbearing begins early in Bangladesh, with large majority of women becoming mothers before they reach the age of 20. The median age at first birth is between 17 and 19. The median age at first birth has increased slightly from about 17 for older women to about 19 for women in their early twenties. For example, in 1975, the median age at first birth among women aged 20-24 was 16.8 in 1989, it had risen to 18.0 in 1993-1994 to 18.4 in 1996-1997 and by 1999-2000 to 18.7 (BFS, 1975; BFS, 1989; BOHS, 1996-97, 1999-2000).

More than half (55 percent) of women aged 15-19 who have been married have at least one child, although most of them have had only one. At ages 20-24, 51 percent of ever-married women have had two or more births and 10 percent have already had at least four, 55 percent of women in their early thirties have had five or more children (Mitra et al., 1990). The age specific fertility rate indicates a pattern of early childbearing with a peak of age group 20-24. Three quarters of childbearing occurs before age 30 (Mitra et al., 2001; Mitra et al., 1997; Kantner et al., 1996).

Nearly one in six children (16 percent) are born after a "too short" interval (less than 24 months). More than half (57 percent) of non-first births occur three or more years after the previous birth, while 27 percent of births take place 24-35 months after the previous birth. The median birth interval in Bangladesh is 39 months (Mitra et al. 2001: 39).

1.3 The Phenomena of Childbearing Pattern in Bangladesh

The most widely used measures of childbearing pattern are the total fertility rate (TFR) and its component age specific fertility rates (ASFRs). The TFR has declined dramatically from 6.3 children per woman in 1971-1975 to 3.3 in 1997-1999, a decline of 48 percent over a 25-year period (Figure 1.1) that represents the trends in TFR during 1971-2000 periods showed the pace of fertility decline. The pace of fertility decline in the most recent period compared to the exceptionally rapid decline during the late 1980s and early 1990s. The total fertility rate dropped almost imperceptibly from 3.4 for the period 1991-1993 to 3.3 in 1934-1996 and then remained constant in 1997-1999 (see table 1.1).

Table 1.1
ASFR and TFR among women age 15-49, selected sources, Bangladesh 1975 to 1999-2000

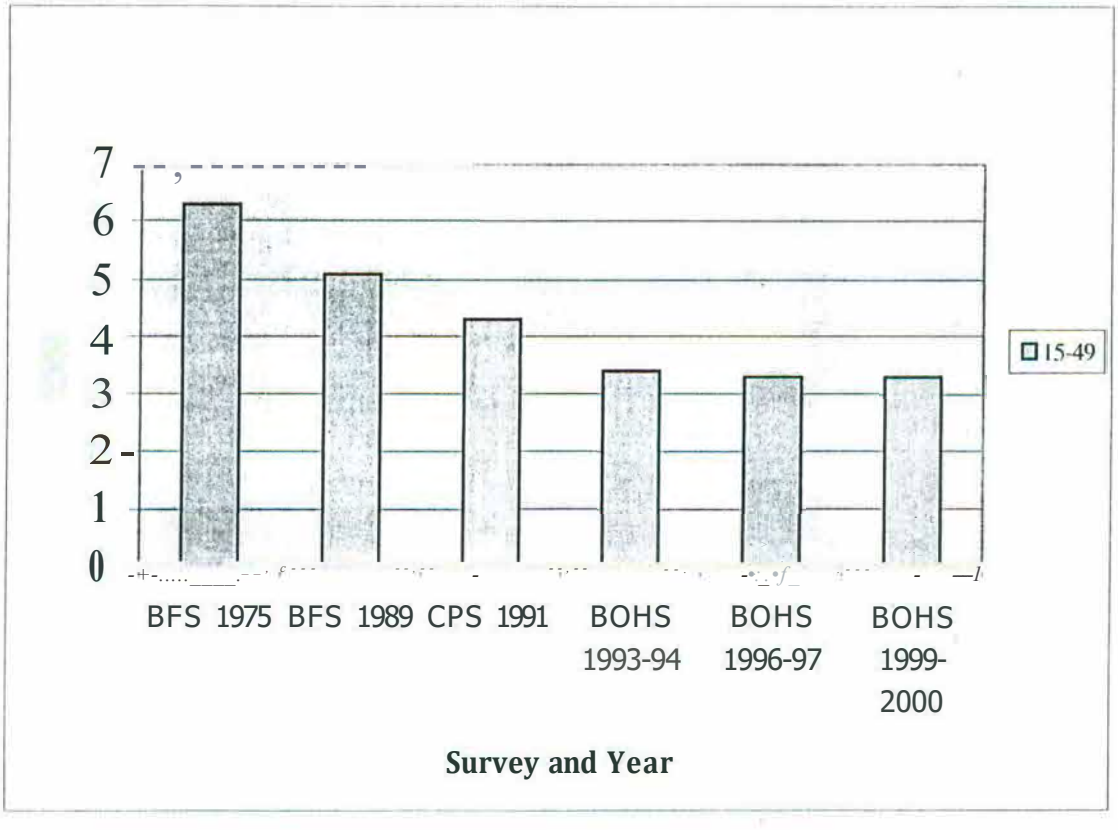
Age group	Survey and approximate time period					
	1975 BFS 1971-1975	1989 BFS 1984-1988	1991 BPS 1989-1991	1993-1994 BOHS 1991-1993	1996-1997 BOHS 1994-1996	1999-2000 BOHS 1997-1999
15-19	109	182	179	140	147	144
20-24	289	260	230	196	192	188
25-29	291	225	188	158	150	165
30-34	250	169	129	105	96	99
35-39	185	114	78	56	44	44
40-44	107	56	36	19	18	18
45-49	35	18	13	14	6	3
TFR (15-49)	6.3	5.1	4.3	3.4	3.3	3.3

Sources: *1975 BFS (MHP 1978:73); 1989 BFS (Huq and Clelancl 1990:103); 1991 CPS (Mitra et al./ 1993:34); 1993-94 BOHS (Mitra et al., 1994: 24); 1996-97 BOHS (Mitra et al., 1997: 37); 1999-2000 BOHS (Mitra et al., 2001: 34)*

The age specific fertility rates (ASFRs) covering the age range of 15 to 50 years in quinquonnial age group from the year 1971 to 1999 form the basis of the analysis of the characteristic features of fertility of Bangladeshi women. The graphical presentation of ASFRs showing the pattern as well as the level of

fertility for some selected years is shown in Figure 1.2. The graph shows that the childbearing pattern of Bangladeshi women remains more or less same with a little exception in one or two cases but the level of reproductive performance has slower down (reduced) to a mark extent. However, prolong reproductive span still persists. Age specific fertility rates and the total fertility rates show decreasing trend in the level of childbearing pattern over time with some distortions noticed in ASFRs at young and middle ages of reproduction, i.e., the decline since the mid-1980s has been fairly uniform over all age groups of women except those age 25-29 (Figure 1.2).

Figure 1.1
Trends in Total Fertility Rates (1971-1999)



The life course fertility is also measured by children ever born (CEB) by mothers who had at least one live birth. It is a measure of cumulative cohort fertility. While cumulative current fertility measured from the age specific fertility

rates reflects the current status of reproduction of women after certain age, the mean births per woman or the mean number of children ever born measured the cumulative cohort fertility. Such mean number of births is provided in Table 1.2 by age groups for the nine different time points from 1975 to 1999. The data show a decreasing tendency of mean births per woman over time at every age group with marked exception for teenagers where mean births per adolescent mother remain almost constant over the period under study. Between 1985 and 1989, the decline in mean number of children ever born was substantial in all but the youngest and oldest age groups. Although there was little change between 1989 and 1991, the rates against decline considerably between 1991 and 1993-1994, especially among women age 25 and above, and show further decline between 1993-1994 and 1999-2000 at all ages expect 15-19 (Table 1.2).

Table 1.2
Mean numbers of children ever born by age groups, selected sources, Bangladesh 1975-1999

Age group	1975 BFS	1981 CPS	1983 CPS	1985 CPS	1989 BFS	1991 BDHS	1996-94 BDHS	1996-97 BDHS	1999-2000 BDHS
15-19	0.6	0.5	0.6	0.4	0.4	0.4	0.3	0.4	0.4
20-24	2.3	2.0	2.2	2.0	1.7	1.7	1.6	1.5	1.4
25-29	4.2	3.7	3.8	3.6	3.1	3.2	2.9	2.8	2.6
30-34	5.7	5.4	5.5	5.1	4.7	4.5	4.1	3.9	3.6
35-39	6.7	6.4	6.5	6.5	5.9	5.7	5.2	4.8	4.3
40-44	7.1	7.3	7.4	7.4	6.6	6.7	6.4	5.6	5.1
45-49	6.7	7.6	7.5	7.2	7.3	7.4	6.9	6.4	6.1

Sources: *1975 BFS (MHP(1978:73)/ 1983 and 1985 CPSs (Kantner and Frankenberg/ 1988:21)/ 1991CPS (Mitra et at 1993:31)/ 1993-1994 BDHS (Mitra et al./ 1994: 33)/ 1996-1997 BDHS (Mitra et al., 1997:36)/ 1999-2000 BOHS (Mitra et al., 2001:39)/ all others (Cleland et al., 1994:11)*

Table 1.3
Percentage Distribution of subsequent births (non-first births) in the five years preceding the survey by number of months since previous birth, according to age of mothers, Bangladesh 1999-2000

Number of months since previous birth	Age of mother				Total
	15-19	20-29	30-39	40 +	
7-17	19.3	6.7	5.1	3.1	6.6
18-23	21.3	10.0	7.7	7.9	9.7
24-35	34.8	28.6	23.9	17.2	26.9
36-47	18.2	22.5	20.9	21.5	21.8
48 +	6.1	32.2	42.4	50.3	35.0
Total	100.0	100.0	100.0	100.0	100.0
Median number of months	26.9	37.8	42.7	48.1	

Sources: *BOHS 1999-2000 (Mitra et al., 2001: 39)*

Figure 1.2
Age-Specific Fertility Rates (1975-2000)

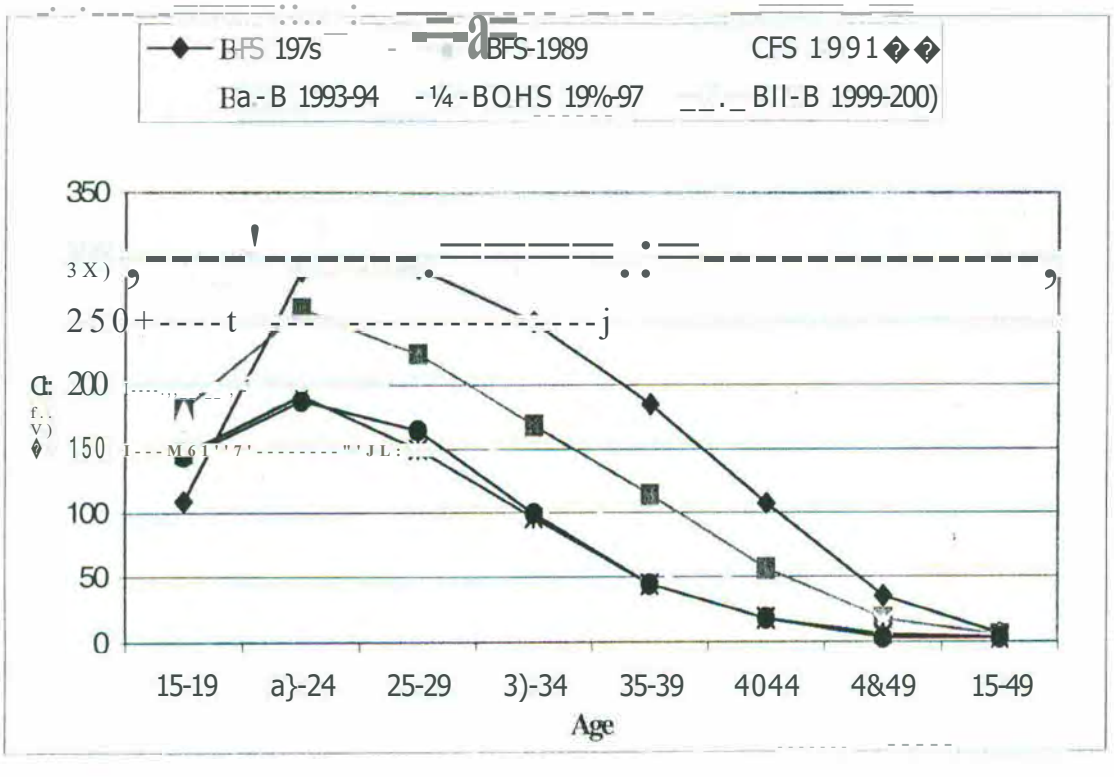


Table 1.3 shows the percent distribution of non-first births that occurred in the five years before the 1999-2000 BOHS by the number of months since the pervious birth. The results indicate that women aged below 20 years have, on average, shorter birth intervals than their adults' counterparts. Nearly, one in six children (16 percent) are born after a "too short" interval (less than 24 months). More than half (57 percent) of non-first births occur three or more years after the previous birth, while 27 percent of births take place 24-35 months after the previous birth. The median birth interval is 39 months. As expected, younger women have shorter birth intervals than older women, presumably because they are more fecund and want to build their families. The median birth interval for women age 15-19 is 27 months, compared with 48 months for women over age 40. The median birth interval is slightly shorter if the pervious child was a girl than if it was a boy. Birth intervals are much shorter if the previous child died (28 months) than if the previous child survived (40 months). In part, this reflects the shortening of postpartum amenorrhea that occurs when the preceding child dies in infancy and breastfeeding stops prematurely. Women are also less likely if the pervious child died and they want to replace the dead chidden. There is a tendency for birth intervals to increase with education. Mothers with some secondary education have a median birth internal that is six months longer than the interval for uneducated mothers.

Some characteristic features of the age pattern of fertility are attempted to capture by means of descriptive statistical measures of the fertility schedules. The measures are arithmetic mean, median, mode, first quartile (Q1) and third quartile (Q3) for central location of the age distribution of fertility and standard deviation, coefficient of variation, coefficient of skewness and kurtosis for looking at the pattern of spread or scatteredness or variations of fertility schedules. These measures are calculated in usual way for all temporal schedules of fertility distributions. The results are produced in 1.4.

Table 1.4
Some Descriptive Measures of Age Schedules of Fertility

Year	Mean	Median	Mode	Q l	Q3
]963	27.4	26.9	25.3	21.7	32.6
1964	26.9	26.2	25.4	21.2	31.9
1965	27.0	26.4	25.4	21.3	31.9
1963-65	27.2	26.5	25.5	21.4	32.2
] 966-68	26.5	26.6	22.4	20.7	31.8
1967-68	27.0	26.1	23.1	21.3	32.3
1971-75	29.8	29.0	25.3	23.6	35.3
1974-76	27.9	27.1	24.3	22.0	33.1
1984-88	27.6	27.0	24.2	23.0	34.7
1978	29.7	29.6	24.]	23.3	34.5
1980	28.7	28.0	24.4	22.6	34.0
1983	28.4	27.7	25.2	23.0	33.3
1984	28.4	27.7	24.4	22.7	33.6
1985	28.3	27.5	24.7	22.8	33.2
1986	28.3	27.4	24.5	22.8	33.0
1987	28.0	27.2	24.9	22.7	32.7
1988	28.3	27.3	24.9	22.9	32.9
1989	28.3	27.4	24.5	22.8	33.2
1990	28.2	27.4	24.8	22.9	33.1
1991	28.2	27.4	24.8	22.9	33.0
1992	28.2	27.4	25.0	22.9	32.9
1993	28.3	27.5	24.6	23.0	33.0
1994	28.1	27.3	25.1	23.0	32.7
1995	28.0	27.2	25.2	22.9	32.4
1996	28.0	27.2	25.2	23.0	32.4
1997	28.0	27.6	24.7	23.3	32.5
1998	28.0	27.6	24.7	23.3	32.5
1991-93	26.4	26.3	24.1	23.0	32.0
1994-96	25.8	25.7	24.5	22.9	32.2
1997-99	25.8	25.6	2A.5	22.7	32.3

Sources : *Abedin 2003*

Table 1.5
Measures of Variability (Dispersion) of ASFR

Year	Std Deviation	Coeff. of Variation	*Coeff.* of Skewness	Kurtosis
1963	7.10	25.89	0.40	2.49
1964	7.13	26.48	0.49	2.50
1965	7.14	26.44	0.51	2.67
1963-65	7.12	26.43	0.46	2.60
1966-68	7.09	26.75	0.45	2.32
1967-68	7.00	25.96	0.39	2.32
1971-75	7.67	25.75	0.32	2.34
1974-76	7.37	26.42	0.45	2.49
1984-88	7.66	27.80	0.40	2.52
1978	7.84	26.39	0.49	2.39
1980	.7.60	26.48	0.51	2.50
1983	6.85	24.09	0.46	2.59
1984	7.22	25.39	0.45	2.61
1985	6.96	24.58	0.39	2.71
1986	6.92	24.50	0.32	2.78
1987	6.74	24.07	0.45	2.76
1988	6.98	24.70	0.40	2.89
1989	7.00	24.75	0.49	2.74
1990	6.86	24.30	0.51	2.73
1991	6.86	24.29	0.46	2.73
1992	6.76	24.00	0.45	2.74
1993	6.58	23.28	0.39	2.65
1994	6.46	23.01	0.32	2.69
1995	6.44	23.01	0.45	2.66
1996	6.42	22.89	0.40	2.67
1997	6.47	23.08	0.49	2.66
1998	6.45	23.03	0.51	2.70
1991-93	7.26	27.45	0.46	3.11
1994-96	6.87	26.65	0.45	3.08
1997-99	6.66	25.81	0.39	2.91

Sources : *Abedin, 2003*

For statistical interest, we see from the Table 1.4 that the median age of each of fertility curve lies between the mean and the modal ages in which mean age is the highest and the median age is the lowest. That is, mean age> median age>modal age. This phenomenon is found for all fertility distributions by age over time. Since the mode is the greatest and the mean is the smallest and median lies between mean and mode, we can say that the fertility curve is elongated to the right i.e. positively skewed. The coefficient of skewness given in Table 1.5 which are all positive and vary within the vicinity of 0.32 to 0.51 bear the evidence of elongation of fertility curve to the right. The kurtosis of each of fertility curve is found to be less than 3.0 (but nearer to *3.0)* and varies within 2.31 (for age distribution of fertility of the year 1967-68) and 2.91 (for 1999 fertility curve) except two age distributions of fertility for which the kurtosis are 3.06 and 3.08 for the years 1997 and 1998 respectively. Then all temporal fertility schedules are more or less leptokumtic except the two mentioned above. These two are somewhat mesocurtic or in true sense platykurtic. Thus the statistical terminology, almost all age schedules of fertility are positively skewed and platykurtic (except the two). The relative variability in the fertility distributions, which can be measured by the coefficient of variations (defined by the ratio of the standard deviation and arithmetic mean multiplied by 100) of almost all the fertility schedules are not so wide but vary from one fertility schedule to another.

The coefficient of variation has found to vary within a minimum of 21.5 (for 1998-fertility distribution curve) and a maximum of 26.8 (for 1966-68). Thus the shape of the fertility curves related to specified years are almost the same and do not vary much from their central points i.e. mean.

Hence from statistical standpoint we can say, the age pattern of fertility of Bangladeshi women is positively skewed (elongated to the right), platykurtic and the relative variations are more or less small. From demographic point of view the descriptive measures given in Tables 1.4 and 1.5 are all with reference

to the age of mothers. The mean age of mothers has found to lie in the age range of 25 to 30. The exact values vary within 27 to 30 years. Some fluctuations are observed in the mean age before 1980 and after that it remains more or less constant at about 28 years. Similar characteristic is noticed in the median ages at different time points. Here by median age of mothers we mean the age at which 50 percent of all births by age groups of mothers are produced on or before that age. Such age is found to vary within the vicinity 27 to 28 years (except 1999) from 1980. This means that 50 percent of all births are produced by women on or before the age of 27 to 28 years, more precisely by 27.5 years after 1980; but before 1980 some variations in the median age of mothers are noticed. Looking at the modal age of mother with slight variations by time points such ages lie mostly within 24 to 25.5 years. Thus, maximum childbearing happened at an age of nearly 25 years. No marked variations are observed in the mean, median and modal ages of mothers after the year 1980. Looking at the quartiles (QI and Q3), we observed that Bangladeshi women produce 25 percent of all births by age 22 to 23.5 and 75 percent of all births by age 32 to 34. Fixing such an age at 23 and 33, we can say 50 percent of all births have occurred between 23 to 33 years of age of mothers.

Thus, in spite of downward trend in the level of TFR and ASFR from 1980 average age of motherhood remains almost equal. The impression is that though the level of TFR and ASFR has changed, the pattern of the age schedules of fertility has not yet changed significantly (not in statistical sense). In this context the figures related to the year 1997-1999 should explain with caution. The entire central points (mean, median and modal ages of mothers) as well as Q l and Q3 have found to be the lowest of all for this year. Implication is that the fertility levels have further decreased and the average age of mothers has slightly changed from some higher age to relatively lower age but still pattern of fertility persists.

The proportion of all women in different age cohorts who had a child by a given age during childbearing period indicates a high incidence of very early childbearing in Bangladesh (Table 1.6). In most cases, the first birth occurs between ages 15 and 17; the median age at first birth is 17-18 for all women aged 20 and older. There is an indication that the median age at first birth has increased slightly from about 17 for older women to about 19 for women in their early twenties. This slight change to later age at first birth is reflected in the smaller proportion of younger women whose first birth occurred before age 15; about 18 percent of women in their forties report having had their first birth before age 15, compared with only 7 percent of women age 15-19.

Table 1.6
Percentage of women in different age cohorts who had a child by Specified ages, Bangladesh 1999-2000

Current age	Had a child by age						Median age at first birth
	<15	15-17	18-19	20-21	22-24	25 +	
15-19	6.5	20.3	3.0	-	-	-	-
20-24	10.1	33.5	17.7	8.3	3.0	-	18.7
25-29	10.1	37.6	18.7	12.4	9.4	3.2	18.2
30-34	11.3	39.1	21.4	12.3	8.0	4.6	18.0
35-39	11.1	38.1	20.6	12.1	9.0	6.5	18.1
40-44	16.6	41.9	17.6	8.3	8.1	5.2	17.2
45-49	17.8	48.3	16.7	7.1	5.1	3.2	16.9

Sources: *1999-2000 BOHS (Mitra and others/ 2001: 41)*

Table 1.7 shows the percentage distribution of non-first births that occurred in the five years before the 1999-2000 BDHS by the number of months since the previous birth. The results indicate that adolescent mothers (less than 20) have, on average, shorter birth intervals than their adults' counterparts. Nearly one in six children (16- percent) are born after a "too short" interval (less than 24 months). More than half (57 percent) of non-first births occur three or more years after the previous birth, while 27 percent of births take place 24-35

months after the previous birth. The median birth interval is 39 months. This is slightly longer than the median birth interval of 35 months reported in the 1993-1994 BDHS survey and 37 months in the 1996-1997 BDHS survey (Mitra et al., 1993:34; Mitra et al., 1997:38). As expected, younger women have shorter birth intervals than older women presumably because they are more fecund and want to build their families. The median birth interval for women having parity 2-3 is 41 months compared with 35 months for women having 7 or more parity. Married adolescents may have higher fertility desire and a lower contraceptive use rate.

Table 1.7
Percentage Distribution of subsequent births (non-first births) in the five years preceding the survey by number of months since previous birth, according to parity of mothers, "Bangladesh 1999-2000"

Number of months since previous birth	Parity of Mother			Total
	2-3	4-6	7+	
7-17	6.6	6.8	6.1	6.6
18-23	9.4	9.3	12.7	9.7
24-35	24.7	29.2	33.4	26.9
36-47	21.1	22.6	23.3	21.8
48 +	38.1	32.2	24.5	35.0
Total	100.0	100.0	100.0	100.0
Median number of months	40.6	37.7	35.0	

Sources: *BOHS 1999-2000 (Mitra et al./ 2001: 39)*

Table 1.8 presents the percentage distribution of all women and currently married women aged 15-49 by number of children ever born. Among the currently married women, 18.0 percent had one child and 20.3 percent had two children. The corresponding figures for all women are 150 and 16.4 percent, respectively. The proportion decreases with the number of children ever born. The mean number of children ever born to currently married women is 3.13, while it is 2.58 for all women aged 15-49.

It has been observed that only 9 percent of the currently married women did not have any child at the time of survey. This may be due to the fact that most of them were newly married, and / or had short exposure to childbearing. Some of them were pregnant and some were using contraception. To some extent, women sub-fecundity, rather than infertility, may also be responsible for not having any child during adolescence. The percentage of women in their forties who have never had children provides an indicator of the level of primary infertility the proportion of women who are unable to bear children at all. Since voluntary childlessness is rare in Bangladesh, it is likely that married women with no births are unable to bear children.

Table 1.8
Percentage distribution of all Women and currently married Women ages 15-49 by number of Children Ever Born (CEB}- and mean number of Children Ever Born, Bangladesh 1999-2000

Children ever born	All women	Currently married women
0	25.2	9.1
1	15.0	18.0
2	16.4	20.3
3	13.4	16.6
4	9.6	11.6
5	7.2	8.7
6	5.1	6.2
7	3.5	4.2
8	2.1	2.5
9	1.3	1.5
10 +	1.1	1.3
Mean number of children ever born	2.58	3.13

Sources: *1999-2000 BDHS (Mitra et al./ 2001: 38)*

The BDHS results suggest that primary infertility is low, about 2 percent. It should be noted that this estimate of primary infertility does not include women who may have had one or more births but who are unable to have more (secondary infertility).

1.4 Importance of the Study

In the context of above discussion, it is felt necessary to undertake a study that highlight the pattern of high-risk and low-risk childbearing of Bangladeshi women in terms of their reproductive performance. Fertility of a woman may happen any time after marriage, if a woman is fecund. Being low age of marriage of Bangladeshi women and in compliance with cultural and social view a newly married woman gives birth as soon as possible after marriage and takes one or two births before the age of 20. These births may happen with too shorter birth interval. Reproduction continues till the end of reproduction. Examination of various fertility schedules gives the evidence of such a pattern. Thus, there is a need to investigate the age pattern of fertility in terms of high-risk and low-risk childbearing in the context of age of women, birth interval and parity and the covariates that influence significantly such pattern of childbearing of Bangladeshi women.

1.5 Objectives of the Study

Childbearing in human population is a complex phenomenon. Analysis of childbearing process is even more complex since a number of biological, behavioural and cultural factors are associated with it. Every childbearing woman faces some risks - high or low in her childbearing period. The aim of the study is to investigate the high-risk and the low-risk childbearing pattern of Bangladeshi women and identify the factors, which influence both high-risk and low-risk childbearing pattern.

The specific objectives of the study are as follows:

(i) To investigate the levels and trends in the childbearing pattern of Bangladeshi women

(ii) To isolate the factors that discriminate high-risk and low-risk childbearing pattern

(iii) To identify the influencing variables of high-risk and low-risk childbearing pattern

1.6 Organization of the Study

The present study has been organized into seven chapters, structured sequentially with an "Introduction" which contains the following aspects: background of the study, country profile, the phenomena of childbearing pattern in Bangladesh, current levels of childbearing patterns, importance of the study, objectives of the study and hypotheses of the study. The background of the study highlights the effects of high-risk pregnancies and biological behavior of fertility and complications of pregnancy and childbirth and critical issues in childbearing patterns. These aspects affect the childbearing performance of women directly and indirectly and hence the high-risk and low-risk childbearing pattern.

Chapter two deals with the review of literature giving more emphasis on the changes in childbearing pattern of Bangladeshi mothers. The reviews investigate the socio-economic, cultural and demographic phenomenon of rural poor women and high-risk pregnancies in the context of age, birth interval and parity. Chapter three outlines the data and methodology adopted in the present investigation. It includes the area of study, sampling procedure, sample size, tools of data collection, and analysis procedure. Chapter four deals with socio-economic and demographic characteristics of the study population such as, age at first marriage, education of mothers, women's working status, contraceptive use, religion, place of residence, child loss experience, breastfeeding practices, child loss experience, duration of conjugal life, number of surviving children and so on.

The fifth chapter devoted to the investigation of the distribution of number of women possessing socio-economic and demographic characteristics in relation to high-risk and low-risk childbearing pattern. It also includes the association of different socio-economic and demographic attributes possessed by the women under study with the categories of childbearing.

Chapter six provides the determinants of high-risk and low-risk childbearing pattern employing the multivariate techniques. Two statistical techniques have been used in the study. These are discriminant analysis and logistic regression analysis. The logistic regression analysis is used to identify the factors, which significantly influence both high-risk and low-risk childbearing pattern. Chapter seven provides the detail summary and conclusion of the findings of the study and discusses the results in terms of policy implications.

Chapter 2
REVIEW OF LITERATURE

Population in Bangladesh is characterized by young age structure (about 40 percent of total population still remain under 15 years of age), relatively high share of married women in the reproductive age span (15-49), low female age at marriage, relatively high rates of neonatal, infant, child and maternal mortality and increasing size of the aged population (population of age 60+). Today's Bangladesh, with a population of about 130.03 million, 65.8 million are males and the rest 63.7 million are females (in 2001), is the most densely populated country in the world. The annual population growth rate is still high of 1.54 percent (Bangladesh Population Census, 2001). Bangladesh has undergone a remarkable demographic transition over the last two decades. Fertility in Bangladesh is high ever by the standards of developing countries. Recent evidence suggests that the level of fertility has started to decline since mid-seventies in Bangladesh (Amin and others, 1993; Islam et al., 2001; Islam et al., 2003). The total fertility rate has declined from about 6.3 (per woman) in 1975 to 3.3 in 1999-2000 (BFS, 1975 and BOHS, 1999-2000). A number of demographers have argued that the mechanism of this steep fertility decline was achieved primarily due to a successful family planning (Amin and others, 1990; Cleland and others, 1994; Cleland, 1993; Cald et al., 1994; Islam et al., 1998), that succeeded in raising in contraceptive prevalence rate (CPR) from a low level of 8 percent in 1975 to as high as 53 percent in 1999-2000 (Mitra et al., 1999) However, from 1993-94 the level of fertility appears to be unchanged at a level of 3.3 (TFR), as indicated by the last two Bangladesh Demographic and Health Surveys (BDHSs) in Bangladesh in 1993-94 and 1999-2000. On the other hand, during the period from 1993-94 to 1999-2000, the contraceptive prevalence rate was increased substantially from 44.6 percent to 53.8 percent (Mitra et al., 2001). In Indonesia, research suggests that fertility decline resulted mainly from a high rate of increased use of contraception that was induced primarily through

economic development and an increasing rate of female education as well as greater work force participation (Gertler and Molyneaux, 1994). Development programmes have, no doubt, contributed to the fertility decline. However, several biological, behavioural and cultural factors are also involved. Bongaarts (1978) termed these factors the proximate determinants of fertility since they directly affect fertility. It is likely that rapid fertility decline occurred in Bangladesh as a result of a family planning program that was introduced at a time of increasing openness to and expansion of social development innovations in the country in general and rural areas in particular (Amin et al., 1995).

Islam et al. (2001) suggested that in the recent years contraception has emerged as the highest fertility reducing factors in Bangladesh. Until early 1990s, postpartum infecundability was the most important and strongest fertility reducing factors in Bangladesh, but by 1993-94 contraception had become most important determinant of fertility and its fertility inhibiting effect is steadily increasing. There has been a little improvement in the age at marriage. Marriage starts very early in Bangladesh nearly 12.5 years of age, progresses very fast and almost all women marry (Islam, 1996 and Abedin, 1982).

Teenage childbearing is very high in Bangladesh. According to the 1999-2000 Bangladesh and Demographic and Health Survey, more than 90 percent cases of marriage occurred at an age below 20 years. As long as marriage and children are universal goals, no society can reasonably expect to achieve replacement level of fertility (2.13) by only postponing union and spacing births. Permanent fertility reduction largely depends on desired completed family size at the end of the reproductive life span (Islam et al., 2001).

World Bank (1993) has conducted a study and concluded that the socio-economic development carried out since 1970 is in progress but at a very slow rate. Average economic growth reached 4.3 percent per annum during 1980-91. Decline in infant mortality (from 112 in 1986 to 66 to per thousand births in 1999) (Mitra et al., 1994; BOHS, 1999) indicate improvements in socio-economic

welfare in education attainment (BSA, 1993), which has led to increase in age at first marriage, reduced family size and reduced fertility. The total effect of female education on fertility is found to be negative (Islam et al., 1995). Education may provide better employment opportunities outside the home and providing education to females, especially at the secondary and higher levels can increase age at marriage.

Educational attainment of the women is generally considered to be a useful index of socio-economic status as well as of the level of overall social sophistication. Improved education and an increase in the age at first marriage are key elements for improving the status of women (Widayatum, 1991; Islam et al., 1995). Women who begin childbearing before age 20 complete less schooling than women who delay having children until they are in their 20s (Tam, 1993). While more women are delaying marriage, many continue to marry young and begin childbearing soon after marriage. In many developing countries most women marry before age 20 (McCauley and Salter, 1995) and many young women between ages 15 and 19 give birth (UN, 1994). The two most common reasons why young women do not complete secondary education are marriage and pregnancy (AGI, 1998). Most young women do not return to school after they become mothers (Lerman, 1992). Women who do not finish school have fewer job opportunities and less income than others and are more likely to live in poverty (UN, 1994). Education may make people more receptive to new ideas - such as, infant, child and maternal mortality from high-risk and low-risk childbearing. Hobcraft (1984), using the data from World Fertility Survey for 28 countries found that mother's education and husband's occupation have strong effect on lower infant and child mortality. Bhuiya and Streatfield (1991) using data on Demographic Surveillance System (DSS) from ICDDR,B found that the higher socio-economic status of husband, higher education of mother and health intervention area have a lower infant and child mortality. The mother and father's education, hygienic improvement of water, sanitation and environment

and modernization of the community decreased the infant and child mortality (Prakash, 1991). Caldwell (1979) suggested that general maternal education is a most effective means of infant and child mortality reduction.

An important indicator of women's status in society is their access to education. Education can have a profound impact on the position of women, particularly in strongly patriarchal societies where it allows girls to have a wider social network, new reference groups and greater exposure to the modern world than they might otherwise experience. In addition, exposure to schooling allows girls to be free from parental control for several hours a day and gives them experience in interacting with boys, strangers and authority figures other than their parents (Tan and Hainers, 1984). According to numerous studies, the level of education of the wife is more strongly correlated with a couple's fertility than the educational level of the husband. Female education helps to "prevent" early marriage and early motherhood. Education is also considered to be associated with an increase in women's domestic power and their participation in extra-domestic employment before marriage (Mason et al., 1984).

Childbearing of Bangladeshi women has significantly changed in the level but less markedly in the pattern though there are some indications of shifting of fertility from older age and teenage of reproduction to the young and middle ages of reproduction. The level of fertility can further be reduced by decreasing the level of fertility of the women belonging to these age categories (Abedin, 2003). Also, the combinations of age at marriage, contraceptive use and fertility desire influence the age pattern fertility directly in Bangladesh.

In rural Bangladesh it was found that age at first marriage, education of partner, religion, availability of electricity in the household, and occupation of partner have significant effects on fertility. It has also been found that fertility is the lowest in those women whose husbands are service holders and the highest for those engaged in agriculture (Khan et al., 1993).

Age at first marriage, coital frequency, contraceptive use, duration of breastfeeding, female education, religion, and household incomes have significant effects on fertility (Islam and others, 1993). The total effect of female education and age at marriage on fertility is found to be negative while those of religion and household income on fertility are found to be positive.

Khan and Raeside (1997) have rightly reported that mother's age, contraceptive use, child loss, woman's working status, religion, region of residence and female's freedom are the important factors for explaining recent fertility pattern in Bangladesh. Age at marriage is one of the important demographic determinants of fertility (Islam et al., 1995). It determines the survival status of children and very much under the influence of socio-cultural and socio-economic situation. Low age at marriage not only contributes to population growth but also adversely affects the health of women resulting in maternal mortality. It also provides long childbearing span and results in a higher fertility in the societies where birth spacing is low. Higher fertility is encouraged by such societies, which are characterised by low socio-economic status, fatalism, and high degree of religious and superstitious beliefs. Parents (mostly rural/slum areas) perform the marriage of their children particularly daughters soon alter their puberty or even earlier due to various reasons such as to satisfy the wishes of grand parents; dowry problem, availability of suitable match (bridegroom) and to dispose off the responsibility. But this may affect the health of women and also result in early pregnancy, abortion, and premature births, stillbirth, which will reflect on the health of the women. The early and frequent pregnancies not only destroy the health but also that of future generations as well (Kapoor, 1991). According to the United Nation International Children Emergency Fund (UNICEF) document (1994), girls are forced into early marriage, pregnancy risk, and higher rates of infection and death. Early marriage for females is customary in Bangladesh. In rural areas, majorities of girls marry before the age of 12 (BFS, 1978; Rahman, 1984). Although, the average age at marriage has increased during the last two decades, early marriages are still prevalent in rural Bangladesh (Shaikh, 1984; Rahman, 1984; Rob, 1987).

Maternal age, mother's work status and previous birth intervals have been found to affect the length of birth intervals (Mturi, 1996). Women who give birth at ages 34 or over, who are in polygamous marriage, and who work in the modern sector have been found to have longer birth intervals than other women. The process of family building consists of a series of stages where women move successively from marriage to most significant events in a women's life (Rindfuss and John, 1983) and it signals the beginning of intensive responsibilities and child-care tasks (Rao and Balakrishnam, 1988). Studies suggest that the timing of a first birth have a substantial influence on the childbearing pattern of women (Trussel and Menken, 1980; Yamaguchi and Ferguson, 1995). Furthermore, women with previous intervals of at least three years and those with intervals, which begin with a boy, have longer birth intervals than other women.

In Bangladesh, fertility is greatly influenced by among other socio-economic variables such as, working status of women and their levels of education (Abedin, 2003). She also showed that the influence of education is more than the influence of working status of women. Swenson and Thang (1993) have rightly reported that women's education is a prime determinant of fertility.

Foetal loss appears to have a significant direct positive effect on fertility in Bangladesh (Islam et al., 1995). In Bangladesh, mothers who have experienced fatal loss are found to have higher fertility. There is a tendency that mothers always try to replace their dead child as early as possible. Such behaviour is a result of social fear about the survival of children. Survival of preceding child is significant demographic covariate affecting the length of birth interval (Chandran, 1989; Gubhaju et al., 1991; Naquib et al., 1995; and Nur, 1982). These studies reported that child loss resulted in shorter birth intervals as well as higher fertility. Brittain (1992) for a Carribean population, Khalifa and Farhat (1993) for an Egyptian population and Ren (1995) for a Chinese population observed that the spacing of births was significantly affected by the infant death

of the index child. Nath et al. (2003) for the schedule caste population in the rural India observed a slower transition to the next birth an index child surviving more than a year. In a society where having children is related to the old-age security concerns of parents, a higher probability of death for children also is more likely to boost fertility levels to compensate for the risk. The influence of infant death is found to be the strongest of all correlates.

The strong preference for having at least one living son in Bangladesh is well known (Ahmed, 1981; Islam, 1991; Rahman and others, 1992). In a rural Bangladesh, parents typically highly valued a son as an economic asset and old-age insurance as well as the bearer of the family name; it is less likely that they will accept contraception or other methods of fertility control until they have had at least one son. Thus, the sex of the child could be regarded as a determinant of the birth interval (Islam et al., 1996).

In many developing countries about 50 percent of pregnancy terminations occur among the high-risk mothers (Rinehart and Kols, 1984), and the wide choice of family planning methods now available allow heath programmes to offer an appropriate technique to avoid each type of high-risk pregnancy and maternal, child and infant mortality. The high-risk childbearing was determined according to the demographic factors such as age, pregnancy and birth interval. Pregnancies of younger mothers (below 18 years) and older mothers (above 35 years), too many pregnancies (5 or more), and closer birth interval of below twenty-four months are likely to produce high-risks to mother and child life (Perkin, 1968).

Education may make people more receptive to new ideas - such as, age at marriage, high-risk and low-risk childbearing patterns, and family planning and more willing to take risks - such as moving to a new place or taking a job outside the home. It has also been established by the social scientists that many others factors - such as women's status may explain much of the association

(Nancy, 1997). In respect to socio-economic characteristics, women's education is strongly related to their domestic economic power and childbearing pattern. In almost every setting regardless of region, culture or level of development, well-educated women are observed to have fewer children than uneducated women. Yet, the parents in the relationship between women's education and their fertility are diverse, varying by region of the world, by level of development and over time (Cochrane, 1979; UN, 1987, 1995). More women and those with more schooling have a greater say in economic decisions than do youngest brides and those with little schooling (Mason, 1996). Female education helps to prevent childhood marriage and childbearing (Hossain, 2000). Education is also considered to be associated with an increase in women's participation in extra-domestic employment before marriage (Mason, 1984). Kabir et al. (1988) found that the average age at marriage was more than two years higher for women who have completed secondary school compared to those who did not complete secondary education. Improved education and an increase in the age at first marriage are the key elements for improving the status of women. There is a positive relation between education and age at first marriage (Hossain, 2000). The total effect on fertility is found to be negative (Islam et al., 1995; Chi and Hsin, 1996; Nair and Nair, 1996 and Yadava and Chadney, 1994). However, Hallas and Larsen (1992) found that birth intervals are uncorrected with the education of Nigerian women whose education levels were low. For Vietnamese birth intervals, Swenson and Thong (1993) observed that the education differentials were apparent only at higher levels of education.

Various studies indicate that birth spacing depends on a number of variables like religion, type of place of residence, caste, number of surviving child, sex of the last child born, spousal age difference, child loss, and so on (Nath et al., 2003; Mturi, 1996; Islam et al., 1996). Prolonging the intervals between births reduces the number of children a woman to have during her childbearing period. Short birth intervals raise infant and child mortality

(Hobcraft et al., 1983; Mturi and Curtis, 1985) and this, in turn, can raise the number of births for a woman since infant and child mortality is positively related to fertility in most societies (Preston, 1987).

The analysis of birth spacing (from birth to the next conception) has shown that breastfeeding is one of the major determinants of birth interval lengths in Tanzania (Mturi, 1996). The results further suggest that mothers having death child have shorter birth intervals than mothers having a live child do.

Adolescent childbearing and motherhood are highly valued in Bangladeshi society since 78 percent of the births to adolescents were wanted births (Islam, 1999). According to a recent study, the median age at first birth is between 17 and 18 years. Overall, 31 percent of female adolescents became mothers by age 19 years and another 4.6 percent became pregnant by that age. Rural and illiterate females are more likely to become mothers during adolescence. On average, each currently married female aged 15-19 has 0.78 births. The annual age specific fertility rate for adolescents aged 15-19 is 147 births per thousand females, which accounts for about 23 percent of the overall TFR (Islam, 1999).

Due to physiological and social factors, adolescent women are more vulnerable than older women to pregnancy-related complications are (WHO, 1996). Sexually active adolescent women experience higher levels of reproductive mortality and morbidity than women do in the 20's and early 30's (Senderowitz, 1995). Although most adolescent women are physiologically mature enough to become pregnant, their bodies are often not sufficiently developed to carry a pregnancy to tern safely. They are at a particular risk for pre-eclampsia and obstructed labour due to cephalopelvic disproportion. Skeletal growth in women is not complete until the age of 18 and the birth canal is not mature until approximately 20 to 21 years of age although their ages vary substantially with nutritional levels among individuals and between populations (Hobcraft, 1997).

Studies in Bangladesh, Bolivia, Ethiopia, Malawi, Thailand and elsewhere consistently have shown a higher risk for short interval births (Alam, 1995; Forste, 1994; Haaga, 1995; Rahman et al., 1996 and Shahidullah, 1994). Analysis of DHS data shows that, on average, the risk of death is twice as high for infants conceived less than two years after the mother's previous birth than for those conceived after a larger interval (Bicego and Ahmed, 1996 and Shane, 1997). When births are closely spaced, the next older sibling is endangered as well as the younger child. Even if infants survive the first year of life, they are almost 1.5 times more likely to die before age five than if pregnancies are spaced at least two years apart (Shane, 1997).

On average, women in developing countries have much shorter birth intervals than they would prefer (Bankole and Westoff, 1995). Birth intervals are growing longer, yet most are still short of the healthiest interval of 3 to 5 years. The median birth interval in developing countries is about 32 months, 4 months short of 3 years, based on Population Reports analysis of 55 countries with DHS data. While this statistic suggests that many women are close to reaching the healthiest birth interval, in fact, 57 percent of women in the countries included in the analysis space their births shorter than 3 years (Demographic and Health Surveys Study, 1992-1997).

The health of a woman's previous child often affects the timing of her next birth. If a child dies, particularly within the first year of life, couples tend to have their next child sooner than if the child survives. Similarly, if a new-born is unhealthy in infancy, couples are more likely to have another child without waiting as long as they otherwise would. Studies around the world, including Bhutan, Egypt, Kenya, Vietnams and Zimbabwe, show that parents are more likely to have their next child sooner if a newborn dies than if a newborn survives (Grummer-Strawn et al., 1998; Hoa et al., 1996; Prakasham et al., 1993). In all 55 countries surveyed by DHS between 1990 and 2001, women are more likely to have their next child within 3 years if the previous child dies. In

Bangladesh, 76 percent women aged 15 years or less have birth intervals less than three years and 28 percent women whose age are 40 years or more have intervals less than 3 years (BOHS, 1999-2000).

When a child dies, mother's subsequent birth intervals are 60 percent shorter, on overage, than when a child survives, according to data from 6 DHS (Grummer-Strawn et al., 1998). This study also found that the longer the previous child survives, the less it has the effect on the subsequent birth interval. After age two, a child's death appears not to influence the mother's subsequent birth interval at all.

Physical immaturity increases the risk of prolonged or obstructed labour, which can result in maternal death, as well as devastating complications such as obstetric fistulae. Studies in Africa and Asia indicate that adolescents are much more likely than older women to suffer obstetric fistulae are (WHO, 1996). In Nigeria, for example, 80 percent of fistula cases were women aged 15-19 (Senderowitz, 1995).

A study from Matlab in Bangladesh showed that the level of maternal mortality among adolescent women was nearly double that of women aged 20-34 (Hobcraft, 1997). Other studies suggest that the risk of dying during pregnancy or delivery is 20 to 200 percent greater for women aged 15-19 than it is for women aged 20-34 (Senderowitz, 1995).

Children born to mother's age less than 20 years often experience higher risks of death during the first five years of life. A recent comparative study using data from Demographic and Health Surveys in 20 countries showed that the risk of death by age five was 28 percent higher for children born to adolescent mothers than for those born to women age 20-30 (Bicego et al., 1996).

The education of women can make childbearing safer and improve the health of the entire family. In Zaire and Nigeria, for example, women with some formal education had a maternal mortality rate one fourth that of women with

no formal education (Harrison, 1980). Education levels strongly influence adolescent childbearing. More than two-thirds of women with no education in the Dominican Republic, Ecuador, Mexico and most African countries give birth before age 20 (Senderwitz, 1995). Women with some secondary schooling, however, are less likely to give birth during adolescence (Singh, 1997). Research in Nigeria showed that only 7 percent of women with seven years of schooling gave birth before age 20, compared to 43 percent of women with no education. Similarly, in Pakistan only 16 percent of women with seven years of education gave birth before age 20 compared to 54 percent of women with no education (Senderowitz, 1995).

Mothers in rural Senegal have their next birth within a median of 15 months if their infant dies in the first month of life. If an infant dies before age one, mothers wait a median of 22 months before their next child. If a child dies between ages one and two, mothers wait a median age of 29 months; and when a child survives for two years, mothers wait a median of 33 months to have their next child (Ronsmans, 1998). Some couples unintentionally have their next child quickly because a child's early death ends breastfeeding and women return to menses and resume ovulation sooner (Grummer-Strawn et al., 1998). In Ghana, The median duration of postpartum amenorrhoea dropped from 12 months to 4 months among women whose child died early (Nyarko et al., 1999). Data from the 46 OHS show that, on average, child survival increases the duration of postpartum amenorrhoea by 17.8 percent. When a child dies, the duration of postpartum sexual abstinence can fall by as much as 47 percent, according to data from the 46 OHS (Grummer-Strawn et al., 1998). Some studies have found, however, that resumption of sexual activity is less important than the early cessation of breastfeeding in explaining why the next child is born sooner when a previous child dies (Park et al., 1998 and Taylor et al., 1976).

Young girls in traditional societies are often bound by cultural norms that equate marriage and motherhood with female status and worth. Even the

youngest brides often face enormous pressure to prove their fecundity soon after marriage through the birth of a child (Sadik, 1997). In other cases, cultural traditions encourage young women to prove their fertility before marriage (Senderowitz, 1995).

Bangladesh has made substantial advances in social indicators including health and education that have contributed greatly in the reduction of fertility level. Fertility decline achieved by mid-nineties is remarkable. Childbearing starts early and progresses fast in Bangladesh. Children born to teenage mothers (below 20 years) and to mothers over the age of 35 have a reduced change of surviving (Perkin, 1968). More than half (55 percent) of women aged 15-19 who have married have at least one child, although most of them have had only one. At ages 20-24, 51 percent of ever-married women have had two or more births and 10 percent have already had at least four, 55 percent of women in their early thirties have had five or more children (Mitra et al., 1990). The age specific fertility rate indicates a pattern of early childbearing with a peak of age group 20-24. Three quarters of childbearing occurs before age 30 (Mitra et al., 2001; Mitra et al., 1997; Kantner et al., 1996). Fertility rates reported in BOHS reflect an extremely steep decline over the past 20 years when compared with previous estimates. The decline since mid 1980s has been generally uniform over all age groups of women except those 45-49, for whom there has been no change (BOHS, 1993-94: 27; BOHS; 1996-97). However, data from the 1996 Bangladesh Demographic and Health Survey show a very different age pattern of fertility, having much lowest rates for younger women and much higher rates for older women (BOHS, 1996-97: 30-31).

In Jamaica and Nigeria, it has been found that pregnant women under 15 are 4-8 times more likely to die during pregnancy and childbirth than those age 15-19 (Williams, 1973 and Harrison et al., 1985). In the United States of America in 1981, the maternal death rate among mothers under 15 was 2.5 times higher than the rate among mothers aged 20-24 (Royston and Armstron,

1989). Women in Algeria, Bangladesh, Ethiopia, Indonesia, and Nigeria, who became pregnant when aged 15-19 ran a greater risk-sometimes twice as high of dying from pregnancy related causes than pregnant women in their twenties and early thirties (Liskin et al., 1985).

Maternal mortality rates in the developing countries average about 450 per 1,00,000 live births, compared with 30 per 1,00,000 in the developed countries. Young women who have not reached full physical and physiological maturity are almost three times as likely to die from complications in childbirth as older women (20-34 years). Data from studies in several countries consistently show a higher risk of maternal death from teenage girls compared with women aged 20-34 years. The risk for very young teenagers (10-14 years) is much greater than for older teenagers (15-19 years) (Rayston and Armstrong, 1989; United Nations, 1989; WHO, 1989; and Abouzahr and Royston, 1991). Bangladesh has one of the highest maternal mortality rates in the world. It is five times higher than Sri Lanka and Vietnam and about ten times higher than Malaysia. Maternal mortality rate is recognised as a global indicator of the status of women in a country (Safe Motherhood Day, 1998). Since the 1940s, maternal deaths have become increasingly rare in developed countries. The same cannot be said, however, of developing areas, where the persistence of high levels of maternal mortality is symptomatic of a pervasive neglect of women's most fundamental human rights. Such neglect affects most acutely the poor, the disadvantaged and the powerless. For more than half a million women, death is the last episode in a long story of pain and suffering, millions more women are damaged and disabled, many of them for the rest of their lives. The suffering often goes beyond the purely physical and affects women's ability to undertake their social and economic responsibilities and to share in the development of their communities (WHO, 1999).

Infant mortality rates are over 10 times higher than those in developed countries 65 infant deaths per 1,000 live births compared with 6 per 1,000

(United Nations, 1999). But in Bangladesh, the infant mortality rate has declined in both rural and urban areas. Findings from the 1993-94 BDHS indicate that infant mortality in urban areas may have fallen more rapidly than in rural areas. The rate of decline in urban slum areas is especially impressive, fallen nearly 50 percent between 1985-1989 and 1990-1994 (from 137.6 to 76.4 infant deaths per 1,000 population). First births have the highest mortality risks and second to fourth births have the lowest. This pattern persists for both infant and under five-child mortality. Mortality risks are highest for short (24 months) preceding birth intervals and lowest for long (48+ months) intervals. Typically, births after a short interval have three times the mortality risk of a birth following long interval (BDHS, 1993-1994).

In Bangladesh, it was found that nulliparous women aged 10-24 and women of 35 or more with parity seven or more accounted for a disproportionate share of maternal deaths. Higher parity is associated with increased risk of maternal mortality only in the oldest age groups, where mothers may be less able to meet the physiological demands of repeated pregnancy (Koenig et al., 1986).

Spacing births helps protect children's health (National Research Council, 1989). A baby conceived more than two years after an older sibling is born is more likely to survive than a baby conceived sooner (Hoberaft, 1987; Miller et al., 1992; Montgomery and Lloyd, 1996; Sullivan et al., 1994). It helps ensure her infants health when a woman avoids pregnancy for 24 months after a previous birth. A baby born too soon is vulnerable because the mother has not yet recovered from vitamin depletion, blood loss and reproductive system damage from the previous birth {Zhu et al., 1999). Adequate child spacing is considered a positive factor on the health of mothers and their children (Miller et al., 1992). In a recent study of anaemia, its prevalence was 35.2 percent among mothers whose birth spacing was less than 12 months (Mahfouz et al., 1994). World wide, women differ widely in their birth spacing practices. A variety of

factors influence a woman's birth spacing, including the heath status of her previous child as well as her personal characteristics such as place of residence, education level, age, sex, and survival of the previous child (DHSS, 1990-2002).

In Bangladesh, still children are born in a "too short" interval (less than 24 months). Nearly one in six children (16 percent) are born in a "too short" interval (less than 24 months) (Mitra et al., 2000). Younger women have shorter birth intervals for women age 15-19 is 25 months, compared with 44 months for women over age 40. A shorter median interval also prevails for children whose preceding sibling has died, compared with those whose prior sibling is alive. This pattern presumably reflects a shortened breastfeeding period due to the death of the prior sibling, as well as minimal use of contraception (BOHS, 1996-97).

In Bangladesh, still birth-intervals are five months shorter among rural women than among urban women. The longest birth intervals are found among women in Khulna Division and the shortest are among women is Sylhet Division. There is a tendency for birth intervals to increase with education. Mothers with some secondary education have a median birth interval that is six months longer than the interval for uneducated mothers. (Mitra et al., 2000).

The survival status of the child, the death of the child during infancy and early childhood, age of mother at the birth of the child, education of mother, sex of the child, residence and parity have strong effects on birth spacing (Islam et al., 1996). Rodriguez and others (1984) compared the 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.

In a study based on 54 developing countries, Abadian (1996) reported that fertility was strongly related to spousal age difference. Young wives may find it difficult to interact frequently with much older husbands. Without contraception, a decrease in the age difference between the spouses may therefore lead to an increase in fertility through free and easy sexual

intercourse. Therefore, spousal age difference is found to have a significant direct effect on fertility (Nath et al., 2003).

Duration of breastfeeding is found to have a significant direct negative effect on fertility (Islam et al., 1995). Encouraging women to breastfeed their children for a relatively longer duration may also contribute to a reduction in fertility. Mturi (1996) demonstrated that any policy aimed at lengthening birth intervals in Tanzania should encourage breastfeeding. Prolonging the intervals between births reduces the number of children a woman can have during her childbearing period. The fertility-inhibiting effect of breastfeeding is significant even after controlling for postpartum amenorrhoea and abstinence. The duration of breastfeeding varies significantly with the mother's occupation (Tu, 1990). Breastfeeding serves as an effective means of birth spacing in traditional Chinese society where the reproductive potential is enormous owing to early and universal marriage (Tu, 1989a).

Analysing World Fertility Survey (WFS) data from Indonesia, Malaysia, and the Philippines, Trussell and others (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 behaviour, contraceptive use, coital frequency and induced abortion.

Chen and others (1974) found positive association between breastfeeding and the length of post-partum amenorrhoea. A study of child spacing in Asia by Rindfuss and others (1984) revealed that ethnicity, age at birth and urban experience have a substantial effect on birth spacing. Using the 1989 Bangladesh Contraceptive Prevalence Survey (CPS) data, Islam et al. (1996) found that mother's age at the birth of the index child, place of residence, parity, survival status of index child, mother's education and sex of the index child are the socio-economic and demographic characteristics of the birth intervals.

In developing countries older women usually have many children, so their pregnancies fall into two high-risk categories. Likewise women with large families tend to have closely spaced births. Women who marry very young may have several closely spaced births before they reach age 20. These groups of women, who are doubly at risk, should be a special focus of primary health programmes trying to reduce infant, child and maternal mortality. Among these pregnancies, there are greater risks of miscarriage, stillbirths, and death during infancy (Swenson, 1979; Chen et al., 1974; Koenig et al., 1988).

AI-Naheadh (1999), using the data from house-to-house survey of 332 women in AI-Oyaynah village, Saudi Arabia, found that age of the mother, age at marriage, education, income, parity, type of infant feeding and birth order are significantly associated with the length of the birth interval. The current age of mother and her parity were found to be significant predictor variables of birth interval. Variables such as age at marriage, present age of mother, woman's occupation, sex composition of the children already born, duration of breast feeding, family income and place of residence have profound effects on the variation of the length of the first birth interval (Nath et al., 1993).

Mturi (1996) found that women who gave birth when they are aged 30 years or more, who reside in urban areas, those in polygamous marriages, those who had a preceding birth interval of at least three years, those working in the modern sector and those whose index child is a boy have longer birth intervals than other women.

Variables such as age at marriage, current age of mother, women's occupation, sex composition of the children/already born, duration of breastfeeding, family income and place of residence have profound effects on variation of the length of the birth interval (Park et. al., 1994).

While it is difficult to separate education from other aspects of socio-economic status, it is clear that women with education are more likely to marry later, delay childbearing, use family planning, and seek prenatal care (Harrison, 1980; London et al., 1985; Monteith et al., 1987 and Potter, 1985). Educated women also are more likely to use obstetric services and avoid harmful traditional practices regarding pregnancy and childbearing.

Helping women remain in school by avoiding unintended pregnancies could substantially improve child survival and health (Cayemittes et al., 1995; Muhur, 1995). Mother's level of education has "a very powerful and pervasive" relationship to child survival and health, according to a UN report based on Demographic and Health survey data from 25 countries (UN, 1994).

Early childbearing is linked to the age at which women are married, their education levels and cultural norms related to women's social status and roles. The highest levels of adolescent childbearing world-wide occur in sub-Sahara Africa, where most of them aged 20-24 have given birth before age 20 and in Latin America and the Caribbean, where about one third of them have given birth before age 20 (Hobcraft, 1997). Although not all childbearing occurs within marriage, age at marriage is closely linked to first birth due to cultural norms and expectations and due to the fact that contraception is less commonly used to delay first births than it is to delay later births (McDevitt et al., 1996). Where women marry later, they have more time to complete their education, learn about reproduction and contraceptive methods and develop marketable skills. Moreover, delayed marriage and first birth means fewer years spent in childbearing and are often linked to lower fertility.

From the above discussion it can be concluded that childbearing of women might be classified as those occur before the age of 20 years (early

childbearing), plus after the age of 35 years (delayed childbearing) and during 20 to 35 years of age (on-time childbering) what can be termed as high-risk and low-risk childbearing. Not only that, in terms of birth interval childbearing with less than 24 months and childbearing after parity 3 can also be termed as high-risk childbearing and beyond those is the low-risk childbearing. The review further indicates that so many factors affect such high-risk and low-risk childbearing in its own way. Some of such factors are education, religion, place of residence, women working status, age at marriage, age at first birth, duration of conjugal life, child loss experience and so on.

The present study is an attempt to look the pattern of childbearing classified as high-risk and low-risk in terms of age of women, birth interval and parity and try to identify the most significant factors that affect such pattern of childbearing of Bangladeshi women.

Chapter 3
DATA AND METHODOLOGY

3.1 Introduction

The main purpose of the present study is to investigate the pattern of high-risk and low-risk childbearing of Bangladeshi women. No doubt, every pregnancy and its outcome involve some risk - high or low. And every mother at any level of age, parity and birth interval faces such risk. Therefore, in order to see the aspects of high-risk and low-risk childbearing first we need to examine the fertility schedules to shed some light on the age pattern of high-risk and low-risk and low-risk childbearing. Here, by childbearing we mean reproductive performance of women through the childbearing ages. Having some knowledge on such aforesaid aspect of age pattern of childbearing, we have to investigate the pattern of high-risk and low-risk childbearing by age, parity and birth interval on individual level having such data for every woman. It is well recognized that in many developing countries about 50 percent of pregnancy terminations occur among the high-risk mothers (Rinehart and Kais, 1984). The high-risk mothers were determined according to the demographic factors such as age, parity and birth interval. Pregnancies of younger mothers (below 18 years) and older mothers (above 35 years), too many pregnancies (50 or more), and closer birth interval of below twenty four months are likely to produce high-risks to mother and child life (Perkin, 1968). The demographic characteristics of low-risk mothers included subjects between 20-34 years of age having less than 4 pregnancy terminations, and the birth interval being over 24 months. It is internationally recognized that the maternal, child and infant mortality are substantially higher in families with high-risk mothers than in low-risk mothers (Pebley, 1948).

In this chapter, we have discussed about nature and type of data needed to fulfil our objectives cited earlier and sources of data we have taken to undertake such research.

3.2 Data Source and Variables

The goal of the study is to investigate the high-risk and the low-risk childbearing patterns of Bangladeshi women currently prevail in the country and explore the covariates of high-risk and low-risk childbearing. Since high-risk and low-risk childbearing are primarily age, birth interval and parity related, we need data not only on the age pattern of fertility i.e., age specific fertility rates (ASFRs) but also on interval (in terms of time) between two consecutive live births and the number of children ever born (or parity) to women at the time of enumeration. Also, data are needed on various socio-economic and demographic characteristics to isolate the covariates of high-risk and low-risk childbearing at the individual level. The 1999-2000 BOHS (Bangladesh Demographic and Health Survey) provides such data and the present study is undertaken using these data.

The 1999-2000 Bangladesh Demographic and Health Survey (BOHS) is a nationally representative survey that was implemented by Mitra and Associates under the authority of National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare, Government of Bangladesh, from November 1999 to March 2000.

Bangladesh is divided into 6 administrative divisions, 64 districts (zillas), and 490 thanas. In rural areas, thanas are divided into unions and then mauzas, a land administrative unit. Urban areas are divided into wards and then mahallas. The 1999-2000 BOHS survey employed a nationally representative, two-stage sample that was selected from the master sample maintained by the Bangladesh Bureau of Statistics for the implementation of surveys. The master sample consists of 500 primary sampling units (PSUs) with enough PSUs in each stratum. In rural areas, the primary sampling unit was the mauza, while in urban areas, it was the mahalla. A total of 341 primary sampling units were used for the BOHS survey (99 in urban areas and 242 in rural areas). Mitra and Associates conducted a household listing in all the sample points from September to December 1999. A systematic sample of 10,268 households was

then selected from these lists. A total of 10,268 households were selected for the sample, of which 9,854 were successfully interviewed. Of the 9,922 households occupied, 99 percent were successfully interviewed. In these households, 10,885 women were identified as eligible for the individual interview (i.e., ever-married women age 10-49) and interviews were completed for 10,544 or 97 percent of them.

In the 1999-2000 BDHS, a number of socio-economic, demographic and cultural variables are available. Among them, seventeen variables have been taken for the present study. Table 3.1 gives description of the variables considered for the analysis.

Table 3.1
Variables considered for Analysis

Variable name	Variable number as indicated in BDHS, 1999-2000	Questions no. as indicated in BDHS, 1999-2000
Age of women (X1)	V012	Q106
Children ever born (X_2)	V201	Q201
Birth-interval (X_3)	B3$01, B3$02	Q212
Age at marriage (X_4)	V511	Q106A
Age at first birth (X_5)	V212	Q212
Duration of conjugal life (X_6)	V512	Q307
Surviving children (X_7)	V218	Q204, Q205
Child loss experience (X_8)	V201, V218	Q207
Duration of Breastfeeding (X_9)	M4$1	Q439
Contraceptive use (X_{10})	V302	Q304
Spousal age difference (X_{11})	V730, V012	Q012, Q804
Place of residence (X_{12})	V102	Q104
Religion of mother (X_{13})	V130	Q115
Education of women (X14)	V106	Q108
Education of Husband (X15)	V701	Q804
Working status (X_{16})	V714	Q807
Occupation of Husband ($X1_7$)	V704	Q806

In all 17 variables are taken. Of these 17 variables, three variables, such as, age of women (virtually ASFR), parity and birth interval i.e., x1, x2, x3 are of main interest on which high-risk and low-risk childbearing patterns are based. Remaining 14 variables are taken as the variables (covariates) influencing the high-risk and low-risk childbearing.

3.3 Women of High-Risk and Low-Risk Childbearing

In the present study by "High-Risk (HR)" and "Low-Risk (LR)" childbearing, we mean -

"High-Risk (HR)" - "pregnancies of younger mothers (below 18 ears) and older mothers (above 35 years), too many pregnancies (50 or more), and closer birth interval of below twenty four months are likely to produce high-risks to mother and child life (Perkin, 1968)".

"Low-Risk (LR)" - "the demographic characteristics of low-risk mothers included subjects between 20-34 years of age having less than 4 pregnancy terminations, and the birth interval being over 24 months".

Table 3.2 depicts the distribution of women with high-risk and low-risk childbearing according to concerned characteristics viz., age, birth interval and parity. This table shows that 4947 women at are high-risk childbearing and the rest 5597 are of low-risk childbearing in the context of age of women. 2503 women according to the birth interval are high-risk and the rest 4847 at are low-risk childbearing. According to the parity, childbearing of 3674 women is of high-risk and majority of women (6870) is of low-risk.

Table 3.2
Number of Women of High-Risk (HR) and Low-Risk (LR) Childbearing

Characteristics	Childbearing		Total
	High-risk	Low-risk	
Age	4947	5597	10544
Birth Interval	2503	4847	7350
Parity	3674	6870	10544

Table 3.3
Number of Women of HR and LR Childbearing classified by Age, Birth Interval (BI) and Parity

(i) HR and LR by Age and Birth Interval

Age	Birth Interval		Total
	High-risk	Low-risk	
High-risk	1130	2147	3277
Low-risk	1373	2700	4073
Total	2503	4847	7350

(ii) Age and Parity

Age	Parity		Total
	High-risk	Low-risk	
High-risk	2359	2588	4947
Low-risk	1315	4282	5597
Total	3674	6870	10544

(iii) Birth Interval and Parity

Birth Interval	Parity		Total
	High-risk	Low-risk	
High-risk	1360	1143	2503
Low-risk	2256	2591	4847
Total	3616	3734	7350

Table 3.3 (i) presents the distribution of women with high-risk (HR) and low-risk (LR) childbearing classified by age and birth interval (BI). Out of a total of 2503 women, childbearing of 1130 women is of high-risk and the rest 1373 women are of low-risk by age. Out of a total of 3277 women, 1130 is of high-risk childbearing by birth interval and the rest 2147 is of low-risk childbearing.

The distribution of women by age and parity is shown in table 3.3 (ii). The table shows that 4947 women are of high-risk and the rest 5597 are of low-risk childbearing according to age. Among women, a high proportion (65.0 percent) is observed for low-risk childbearing by parity. Women having high-risk childbearing by parity constitute 35.0 percent of the total cases.

The distribution of women by birth interval and parity is shown in table 3.3 (iii). It shows that childbearing of 1360 women has been found to be of high-risk and the rest 1143 of low-risk by birth interval. Among women, a high proportion (50.8 percent) is observed for low-risk childbearing by parity. Women having high-risk childbearing by parity constitute 49.2 percent of the total cases.

3.4 Methods of Analysis

The analysis of data is based on

(i) Percent Distribution

(ii) Contingency and association analysis

(iii) Discriminant Analysis

(iv) Logistic Regression Analysis

Percent distribution of women is provided in Table 3.1according to high-risk (HR) and low-risk (LR) childbearing in relation to various socio-economic and demographic variables by their hierarchy. Several 2x2 contingency tables are prepared considering the childbearing of women as an attribute with two levels

viz., HR and LR and other 16 variables (mentioned in Table 3.1) treating every variable as the other attribute each with two levels. The purpose of contingency and association analysis is to look at the independency criterion of childbearing pattern classified as HR and LR childbearing in respect of various socio-economic and demographic attributes. For example, we want to examine whether HR and LR childbearing that occur in terms of age, birth interval and parity are significantly associated or not (in statistical sense) with education, working status, rural-urban residence and so on. These phenomena are tested statistically by means of x^2 - statistic. If associated how much the magnitude of association is again examined by the coefficient of association as well as the coefficient of contingency.

Two more statistical techniques have been used in the study. These are discriminant analysis and logistic regression analysis. Examination of each independent variable individually can only provide a preliminary idea about how it behaves in the population exposed to the risk of HR and LR childbearing. Association of each of attributes (variables) presented in Table 3.1 with childbearing pattern categorized as HR and LR childbearing impart knowledge only about the independency or association of the childbearing with the stated variable but does not tell us about the contribution of each variable that differentiate HR and LR childbearing. In order to find out the variables that mostly distinguish between two groups' viz., HR and LR, discriminant analysis is performed.

3.4.1 Discriminant Analysis

Discriminant analysis is a statistical technique used to distinguish between two or more groups or cases. In our analysis, we have considered two groups, viz., high-risk and low-risk childbearing. Let us say few words about discriminant analysis.

"Discriminant analysis" is a broad term that refers to several closely related statistical activities. A researcher is engaged in interpretation when studying the ways in which groups differ, that is, is one able to "discriminate" between the groups on the basis of some set of characteristics, how well do they discriminate, and which characteristics are the most powerful discriminators? The characteristics used to distinguish among the groups are called "discriminating variables". These variables must be measured at the interval or ratio level of measurement, so that means and variances can be calculated and so that they can be legitimately employed in mathematical equations. In general, there is no limit on the number of discriminating variables as long as the total number of cases exceeds the number of variables by more than two. There are, however some limits on the statistical properties, which the discriminating variables are allowed to have. For one thing, no variable may be a linear combination of other discriminating variables. Another is two variables which are perfectly correlated cannot be used at the same time. Under this method, we conclude that one or more variables may be poor discriminators, because the group means are not different on those variables. In our analysis, we have considered 17 discriminating variables defined above. It may happen that some of them have no significant contribution to select high-risk and low-risk childbearing. A forward stepwise procedure has been considered to select the individual variable, which provides the greatest univariate discrimination between high-risk and low-risk childbearing.

3.4.2 Logistic Regression Analysis

To examine the relative importance of all the variables simultaneously, we need some multivariate techniques. Multiple regression analysis is one of such technique. However, this technique poses difficulty when dependent variable can have two or more values - e.g., high-risk and low-risk childbearing. To

overcome these problems, the linear logistic regression is used. This model required far fewer assumptions than discriminant analysis be satisfied; logistic regression still performs well (Hosmer et al., 1989).

The logistic; regression model can be used not only to identify risk factors but also predict the probability of success. The general logistic model expresses a qualitative and quantitative. Before beginning a study of logistic regression qualitative dependent variable as a function of several independent variables, both, it is important to understand that the goal of an analysis using this method is the same as that of any model building the technique used in Statistics.

The logistic regression analysis gives us the values of coefficient, significant values and odds ratio of the regression coefficients of the independent variables on the basis of which we can say, some factors influence the high-risk childbearing and some factors influence the low-risk childbearing.

Mathematical exposition of above two techniques - viz., discriminant and logistic regression analyses are provided in relevant chapter.

Chapter 4
SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

4.1 Introduction

Before proceeding towards detail analysis of the phenomena of high-risk and low-risk childbearing patterns and their associated factors, it is felt necessary to investigate the background characteristics of the women under study. BOHS 1999-2000 collected information on various aspects of socio-economic and demographic characteristics of the women. It is well known that women with different socio-economic and demographic status have different childbearing pattern. A few of them are education of women and of their husbands, women's working status, occupation of husbands, religion, place of residence, contraceptive use, age at first marriage, age at first birth, duration of conjugal life, child loss experience, spousal age difference, duration of breastfeeding, and surviving children. From numerous studies it is quite evident that childbearing performance varies greatly with differences in religion (such as, Muslim and non-Muslim), residential status (such as, rural and urban), working status (such as, working and not working), etc. It is well known that all these aforesaid characteristics affect the childbearing performance of women directly and indirectly and hence the high-risk and low-risk childbearing patterns.

4.2 Socio-economic Characteristics of Women

It is stated earlier that we have considered 17 variables on which our present analysis is based. Classifications of each variable are made in the following way:

Table 4.1
Classification of Variables

Variable	Category	
Education of Women	No education	Primary or more
Women's Working Status	Never working	Ever working
Education of Husband	No education	Primary or more
Contraceptive Use	Never use	Ever use
Religion of Women	Muslim	Non-Muslim
Occupation of Women	Non-manual	Manual
Type of place of residence	Urban	Rural
Age at marriage	Less than 15 years	15 or more
Age at first birth	Less than 18 years	18 or more
Duration of conjugal life	Less than 15 years	15 or more
Spousal age difference	Less than 6 years	6 or more
Child loss experience	Never loss	Ever loss
Duration of breastfeeding	Less than 12 months	12 or more months
Age of women	Less than 20 years and 35 or more years	20-34 years
Birth interval	Less than 24 months	24 or more months
Parity	Less than 4	4 or more

Percent distribution of women according to the variables under study with their classifications is shown in Table 4.2. It is well recognized that women with different socio-economic status have different childbearing patterns. It is observed from the table that childbearing performance varies greatly by the following socio-economic variables:

4.2.1 Education of Women

Education is one of the key determinants of the life style for improving the status of women (Widayatum 1991; DHS, 1996–97). In almost all countries, women's education is strongly related to their domestic economic power. Older women and those with more schooling have a greater say in economic decisions than do youngest brides and those with little schooling (Mason, 1996). Table 4.2 shows that 43 percent of women have no education and the rest 57 percent had primary or higher education. In our study, it is clear that most of the women have only primary education. About fifty percent of the women are illiterate, i.e., they have no an education. Ahmed and Ruzicka (1994) found that women having primary education had a lower contraceptive prevalence rate than women with no education. As a result, this characteristic affects the childbearing performance of women directly and indirectly and hence the high-risk and low-risk childbearing.

4.2.2 Type of Place of Residence

Data of urban-rural residences for Bangladesh are presented in Table 4.2. It is observed that only 30.0 percent of the respondents live in urban areas against 70.0 percent of women in rural areas. In our study, it is observed that majority of the women live in rural areas. It is clear that this characteristic affects the childbearing performance of women directly and indirectly and hence the high-risk and low-risk childbearing.

4.2.3 Religious Status

From the religious status, it appears that 87 percent of the respondents are Muslim and only 13 percent are non-Muslim. A vast majority of the respondents are Muslim. Rob (1988) found that Islam is opposed to birth control and that Muslim religious leaders are against family planning. There are many reasons behind childbearing performances. Religion is one of the determinants of childbearing performances and affects the high-risk and low-risk childbearing.

4.2.4 Working Status of Mothers

In the Bangladesh Demographic and Health Survey 1999-2000, the types of work for the women have been classified broadly as agriculture, service, business, agricultural labours, non-agricultural labours, housewife and domestic. For the sake of the present analysis, the categories cited in the survey are classified into two major groups' viz., working and not working.From the table (4.2), it appears that majority of women (78 percent) are currently not working. Only 22 percent of women are working out side of home.

4.2.5 Ever use any Contraception

Family planning can effectively reduce maternal and infant mortality rates by decreasing the number of high-risk pregnancies. Social and economic development as well as more widely diffused family planning services will contribute to a higher level of contraceptive use. It is observed that only 25 percent of women are currently not using family planning methods. A considerable 75 percent are currently using contraception.

4.2.6 Education of Husband

Table 4.2 provides data relating to education of husbands of rural women. From the table, it appears that about 38 percent of husbands have no education, about 21 percent had primary education and about 25 percent had secondary education. About 14 percent of husbands had higher education.

4.2.7 Husbands' Occupation

In developing countries like Bangladesh, the husband's occupation is closely related to the social status of the women. It is expected that wives whose husbands have professional, administrative and technical jobs would have higher age at marriage and age at first birth (Shahidullah, 1980). The occupation of husbands included in BOHS 1999-2000 are as follows: professional, technical,

clerical, service, sales, trades, administrative, executive, agriculture (own land), landless agricultural labourers, unemployed, farm managers, production and related workers and others. The various occupational categories included in the survey slightly differ from one another. For the sake of present analysis, the categories cited in the survey are classified into two major groups, viz., manual and non-manual categories. Most of the husbands are engaged in manual occupation, i.e., agriculture, landless, agricultural labours, housewife, unemployed, farm, production and others.

From the table (4.2), it is observed that 31 percent of husbands are engaged in the non-manual occupation and majority of the women is engaged in the (69 percent) manual occupation.

Table 4.2
Percent distribution of Women possessing different background Characteristics of the Study Population, 1999-2000 BOHS

Background Characteristics	N	%
Education of women		
No education	4575	43.4
Primary+	5969	56.6
Total	10,544	100.0
Women's working status		
Never working	8259	78.3
Ever working	2282	21.7
Total	10,544	100.0
Education of husband		
No education	3920	37.9
Primary+	6624	62.1
Total	10,544	100.0
Contraceptive use		
Never use	2648	25.1
Ever use	7896	74.9
Total	10,544	100.0
Religion of women		
Muslim	9135	86.6
Others	1409	13.4
Total	10,544	100.0
Occupation of husband		
Non-manual	3229	30.6
Manual	7315	69.4
Total	10,544	100.0

Table 4.2 continued

Background Characteristics	N	%
Type of place of residence		
Urban	3150	29.9
Rural	7394	70.1
Total	10.544	100.0
Age at marriage (in years)		
< 15	5553	52.7
15 +	4991	47.3
Total	10,544	100.0
Mean age at marriage	14.99	
Age at first birth (in years)		
< 18	5434	58
18 +	3937	42
Total	9,371	100.0
Mean age at first birth	17.6	
Duration of conjugal life (in years)		
< 15	5792	54.9
15 +	4752	45.1
Total	10,544	100.0
Mean duration of conjugal life	14.4	
Spousal age difference (in years)		
< 6	2125	20.2
6 +	8419	79.8
Total	10,544	100.0
Child loss experience		
Never loss	7360	69.8
Ever loss	3184	30.2
Total	10544	100.0
Duration of breastfeeding		
< 12 months	1572	30.3
12 + months	3622	69.7
Total	5194	100.0
Age of women (in years)		
< 20 and 35 +	4947	46.92
20-34	5597	53.08
Total	10,544	100.0
Birth interval (in months)		
< 24	2503	34.1
24 +	4847	65.9
Total	7,350	100.0
Parity		
< 4	6870	65.16
4 +	3674	34.84
Total	10,544	100.0

N: Number of women

4.3 Demographic Characteristics

It is well known that women with different demographic status have different childbearing patterns. From numerous studies, it is quite evident that childbearing performance varies greatly with differences in age at marriage (such as, less than 15 years and 15 or more years), duration of conjugal life (less than 15 years and 15 or more) and duration of breastfeeding (ever breastfeeding and never breastfeeding) and so on.

4.3.1 Age at First Marriage

It is a common belief that age at first marriage is inversely related to fertility. While early marriage of women has been conducive to high fertility (Osborn, 1958), late marriage is argued to have a fertility-reducing effect (Coale, 1975). Delayed marriage (other things being equal) shortens the period between generations and hence puts an independent brake on long range population growth (Davies and Blake, 1956). In Mysore, it has been shown that a rise in the age at marriage of women from under 15 years to 16-18 years has produced an appreciable decline in fertility (UN, 1961). Agarwala (1967) estimated that an increase in average age at marriage from the existing 15.6 years to 19 or 20 would lead to a decline of birth rate by 29% in India. The potential impact of age at first marriage is especially high in countries where there is little voluntary control of fertility (Yaukey and Thorsen, 1972).

Table 4.2 provides data relating to age at first marriage. About 53 percent of women are married when they were of age 15 or below and the rest 47 percent of women are married when they were aged 15 or more years. The mean age at marriage was 14.9 years and the median age at marriage was 14 years.

4.3.2 Age at First Birth

Table 4.2 provides data relating age at first birth. About 58 percent of married women gave first birth age 18 or below and only 42 percent gave first child after age 18. The mean age at first birth was 17.6.

4.3.3 Spousal Age Difference

The spousal age difference is one of the important factors affecting fertility as well as high-risk mothers in developing countries (Sembajwe, 1981; Levin et al., 1997). The difference in age between spouses (present age of husband minus present age of wife) in Bangladesh generally is as high as men usually like to marry younger (higher reproductive value) women. About 22 percent of women have age difference below six years and 78 percent have six or more.

4.3.4 Duration of Conjugal Life

Table 4.2 also provides that about 55 percent of married women have duration of marriage below 15 years and 45 percent having 15 or more. Thus, though majority of women has duration of women less than 15 years but overwhelming majority of them has age difference of 6 or more years the impact of which might have fallen on high-risk fertility of women.

4.3.5 Child Loss Experience

Infant mortality rates are expected to correlate positively with rates of fertility. Survival of preceding child is significant demographic covariate affecting the length of birth interval as well as fertility (Chandran, 1989; Gubhaju et al., 1991; Naquib et al., 1995; Nur, 1982). Child loss appears to have a significant direct positive effect on fertility in Bangladesh, which means that mothers who have experienced child loss are found to have higher fertility (Islam, 1995). Mothers always try to replace their dead children as early as possible. Such behavior is a result of social fear about the survival of children. Table 4.2 shows that 70.0 percent of women have no child loss experience, whereas, 30.0 percent of women have one or more child loss experience.

4.3.6 Duration of Breastfeeding in Last Closed Birth Interval

Duration of breastfeeding is found to be significant direct negative effect on fertility (Islam, 1995). A considerable 70 percent of women are breastfeeding 12 or more months and only 30 percent of women are breastfeeding 11 or below months.

4.4 Conclusion

From the results presented in this chapter, a few remarkable points are summarized below:

It is evident that childbearing performance varies greatly with differences in religion (such as, Muslim and non-Muslim), education (such as, no education and primary or higher), residential status (such as, rural and urban) and so on. Majority of women (78 percent) are not currently working outside home. A considerable 70 percent of women live in rural area. About 43 percent of women have no education. Since most of the illiterate women do not work outside of home and have a long duration (15 or more years) of conjugal life, there is a tendency to bear many children having less than 24 months. Another important point that has been observed that majority of the risk population in the younger ages (less than 20 years) and in the older ages (35 or more) dominating the total sample women. More than fifty percent of women (53%) are getting married before age 15 and more than fifty percent of women (58%) are getting child before age 18. All these aforesaid characteristics affect the childbearing performance of women directly and indirectly and hence the high-risk and low-risk childbearing.

In the next chapter, the high-risk and low-risk childbearing (concerned with age, parity and birth interval) have been highlighted.

Chapter 5
HIGH-RISK AND LOW-RISK CHILDBEARING AND THEIR ASSOCIATION WITH VARIOUS BACKGROUND CHARACTERISTICS

5.1 Introduction

In this section, socio-economic and demographic characteristics of the respondents are investigated to understand whether who had the demographic characteristics, such as, ages being below 20 years and after 35 years, birth interval being below 24 months and parity having 4 or more are high-risk (HR) childbearing. On the other hand, the demographic characteristics as aged 20-34 years; birth interval 24 or more (months) and parity having 3 or less are low-risk (LR) childbearing (Perkin, 1968). This chapter is devoted to the investigation of the distribution of number of women possessing various socio-economic and demographic characteristics in relation to high-risk and low-risk childbearing patterns. Attempt is also made to assess the association of different socio-economic attributes possessed by the women under study with the categories (high-risk and low-risk) of childbearing.

5.2 Women of High-Risk and Low-Risk Childbearing

Table 5.4 depicts the percent distribution of women with high-risk and low-risk childbearing according to concerned characteristics. This table shows that 47 percent of women are high-risk and the rest 53 percent are low-risk childbearing in the context of age of women. Thirty four percent of women according to the birth interval are high-risk and the rest 66 percent low-risk childbearing. According to the parity of women, 35 percent of women are high-risk and majority of women (65 percent) is low-risk childbearing.

Table 5.1
Percent Distribution of Women with High-Risk and Low-Risk Childbearing According to Concerned Characteristics

Characteristics	Childbearing		Total
	High-risk	Low-risk	
Age	46.9	53.1	100.0
Birth Interval	34.1	65.9	100.0
Parity	34.8	65.2	100.0

Sources: *Based on Table 3.2*

Table 5.2
Percent distribution of women with HR and LR childbearing Classified by Age, Birth Interval (BI) and Parity

(i) Age and Birth Interval

Age	Birth Interval		Total
	High-risk	Low-risk	
High-risk	15.4	29.2	44.6
Low-risk	18.7	36.7	55.4
Total	34.1	65.9	100.0
Pearson X^2	223.483		

Sources : *Based on Table 3.3 (i)*

Table 5.2 (i) presents the distribution of women with high-risk (HR) and low-risk (LR) childbearing classified by age and birth interval (BI). Out of a total of 55.4 percent of women is low-risk by age, 18.7 percent of women are high-risk and 36.7 percent of women are low-risk by birth interval. Out a total of 44.6 percent of women of high-risk childbearing by age, only 15.4 percent of women are high-risk and 29.2 percent of women are low-risk by birth interval. Further investigation shows that the agreement is better for women having high-risk and low-risk childbearing by birth interval have rates of agreement 54.9 percent and 55.7 percent, respectively. Another investigation shows that age of women having high-risk childbearing by birth interval have a relatively lower rate of agreement (34.5 percent). Like the negative association between age and birth

interval, a statistically significant association ($p < 0.01$) between age and birth interval of the same event is evident from Table 5.2(i).

(ii) Age and Parity

Age	Parity		Total
	Hiqh-risk	Low-risk	
High-risk	22.4	24.5	46.9
Low-risk	12.5	40.6	53.1
Total	34.8	65.2	100.0
Pearson X^2	676.869		

Sources : *Based on Table 3.3 (ii)*

The distribution of women by age and parity is shown in table 5.2 (ii). In this analysis, 46.9 percent has been found high-risk and the rest 53.1 percent low-risk according to age. Among women, a high proportion (65.0 percent) is observed for low-risk childbearing by parity. Women having high-risk childbearing by parity constitute 35.0 percent of the total cases.

A further investigation shows that the agreement between age of women having high-risk and parity having both high-risk and low-risk childbearing have 48.0 percent and 52.0 percent, respectively. Another investigation shows that the agreements between age having low-risk and parity having high-risk and low-risk have 23.5 percent and 76.5 percent, respectively.

Further investigation shows that age of women having high-risk childbearing by parity have 48.0 percent and low-risk childbearing by parity has 53.0 percent. Another investigation shows that age of women having high-risk childbearing by parity have 64.0 percent for high-risk and 36.0 for low-risk, respectively. An investigation shows that age of women having low-risk childbearing by parity have 38.0 percent (for high-risk by age) and 62.0 percent (for low-risk by age), respectively. Like the positive association between age and parity, a statistically significant association ($p < 0.01$) between age and parity of the same event is evident from Table 5.2 (ii).

(iii) Birth Interval and Parity

Birth Interval	Parity		Total
	Hiqh-risk	Low-risk	
High-risk	18.5	15.6	34.1
Low-risk	30.7	35.3	65.9
Total	49.2	50.8	100.0
Pearson X^2	40.08		

Sources : *Based on Table 3.3 (iii)*

The distribution of women by birth interval and parity is shown in table 5.2 (iii). It shows that 34.1 percent has been found at high-risk and the rest 65.9 percent low-risk by birth interval. Among women, a high proportion (50.8 percent) is observed for low-risk childbearing by parity. Women having high-risk childbearing by parity constitute 49.2 percent of the total cases. A further investigation shows that the agreement between birth interval of women having high-risk and parity having high-risk and low-risk have 54.3 percent and 45.7 percent, respectively. Another investigation shows that the agreements between birth interval having low-risk and parity having high-risk and low-risk childbearing has 46.5 percent and 53.5 percent, respectively. Further investigation shows that the agreements between parity having high-risk and birth interval having high-risk and low-risk childbearing have 37.6 percent and 62.4 percent, respectively. Like the negative association between birth interval and parity, a statistically significant association ($p < 0.01$) between birth interval and parity of the same event is evident from Table 5.2 (iii).

5.3 Association of High-Risk and Low-Risk Childbearing with Background Characteristics

In Table 5.3 that shows percent distribution of women is provided according to high-risk and low-risk childbearing in relation to various socio-

economic and demographic variables. Fifty-three percent of women having low-risk childbearing concerned age, 65% concerned with birth interval and 65% concerned with parity reported being Muslim, in contrast, 47% of women having high-risk childbearing concerned with age, 35% concerned with birth interval and 35% concerned with parity, respectively. On the other hand, a significantly greater proportion of women having low-risk childbearing than of women having high-risk childbearing reported being non- Muslim concerned with birth interval (70% vs. 30%) and concerned with parity (65% vs. 35%).

Data of urban-rural residences for Bangladesh are presented in Table 5.3. A greater proportion of women having low-risk childbearing than of women having high-risk childbearing are reported being living in rural area concerned with age (52% vs. 48%), birth interval (65% vs. 35%) and parity (65% vs. 35%). On the other hand, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing are reported being living in urban area concerned with age (56% vs. 44%), birth interval (67% vs. 33%) and parity (66% vs. 34%).

A total of 55% of women having low-risk childbearing concerned with age were primary or higher educated than 45% of women having high-risk childbearing. Fifty-percent of women having high-risk and the rest fifty-percent having low-risk childbearing concerned with age was not educated. The most striking differences occurred in women having low-risk childbearing and women having high-risk childbearing who were primary or higher educated concerned with birth interval (67% vs. 33%) and parity (65% vs. 35%).

Table 5.3

Percentage distribution of Women having High-risk (HR) and Low-risk (LR) Childbearing Patterns concerned with Age, Birth Interval and Parity, Bangladesh 1999-2000

Background **Characteristics**	High-risk and Low-risk childbearing concerned with					
	Age		Birth Interval		Parity	
	HR	LR	HR	LR	HR	LR
Religion						
Muslim	46.9 (4293)	53,1 (4842)	34.7 (2198)	65.3 (4142)	34.8 (3183)	65,2 (5952)
Others	46.4 (654)	53,6 (755)	30.2 (305)	69.8 (705)	34.8 (491)	65.2 (918)
Place of residence						
Rural	48.1 (3554)	51.9 (3840)	34.6 (1818)	65.4 (3430)	35.0 (1068)	65.0 (2082)
Urban	44.2 (1393)	55.8 (1757)	32.6 (685)	67.4 (1417)	33.9 (2606)	66.1 (4788)
Education						
No education	50.0 (2286)	50.0 (2289)	35.2 (1287)	64.7 (2367)	35.9 (1642)	64.1 (2933)
Primary or more	44.6 (2661)	55.4 (3308)	32,9 (1216)	67.1 (2480)	35.0 (2032)	37,3 (3937)
Working status						
Never working	47,3 (3907)	52,7 (4352)	34.5 (1957)	65.5 (3709)	35.0 (2894)	65.0 (5365)
Ever working	45.5 (1040)	54.5 (1245)	32.4 (546)	67.6 (1138)	34.1 (780)	65.9 (1505)
Education of husband						
No education						
Primary or higher	48.4 (1899)	51.6 (2021)	36.2 (1059)	63.8 (1865)	41.0 (1609)	59.0 (2311)
	46.0 (3048)	54.0 (3576)	32.6 (1444)	67.4 (2982)	31.2 (2065)	68.8 (4559)
Husband's occupation						
Manual	48.1 (3522)	1.9 (3793)	34.4 (1758)	65.6 (3354)	35.9 (2623)	64.1 (4692)
Non-manual	44.1 (1425)	55.9 (1804)	33.3 (745)	66.7 (1493)	32.5 (1051)	67.5 (2178)
Contraceptive use						
Never use	57.7 (1527)	42.3 (1121)	37.1 (518)	62.9 (879)	29.2 (774)	70.8 (1874)
Ever use	43.3 (3420)	56,7 (4476)	33,3 (1985)	66.7 (3968)	36,7 (2900)	63.3 (4996)
Age at first marriage						
< 15 years	53.4 (2968)	46.6 (2585)	33.7 (1425)	66,3 (2808)	41.3 (2867)	58.7 (4075)
15 + years	39.7 (1979)	60.3 (3012)	34.6 (1078)	65.4 (2039)	22.4 (807)	77.6 (2795)
Spousal age difference						
< 6 years	44.3 (941)	55.7 (1184)	32.3 (465)	67.7 (985)	32.3 (687)	67.7 (1438)
6 + years	47.6 (4006)	52.4 (4413)	34,5 (2038)	65,5 (3862)	35.5 (2987)	64.5 (5432)
Duration of conjugal life						
< 15 years	53.0 (1704)	47.0 (1509)	35.7 (1055)	64.3 (1898)	9.4 (542)	90.6 (5250)
15 + years	44.2 (3243)	55.8 (4088)	32.9 (1498)	67.1 (2949)	65.9 (3132)	34.1 (1620)
Age at first birth						
< 18 years	49.0 (2665)	51.0 (2769)	33.7 (1515)	66.3 (2981)	45.8 (2491)	54.2 (2943)
18 + years	38.1 (1499)	61.9 (2438)	34.6 (988)	65.4 (1866)	30.0 (1183)	70.0 (2754)
Surviving children						
<3	51.2 (1782)	48.8 (1697)	32.4 (878)	67.6 (1829)	4.0 (202)	96.0 (5637)
3+	44.8 (3165)	55.2 (3900)	34.9 (1625)	65.1 (3018)	73.8 (3472)	26.2 (1233)

Table 5.3 continued

Background Characteristics	High-risk and Low-risk childbearing concerned with					
	Age		Birth Interval		Parity	
	HR	LR	HR	LR	HR	LR
Child loss experience						
Never loss	41.7 (3072)	58.3 (4288)	29.4 (1276)	70.6 (3068)	18.2 (1342)	81.8 (6018)
Ever loss	58.1 (1817)	41.9 (1309)	40.8 (1227)	59.2 (1779)	73.2 (2332)	26.8 (852)
Breastfeeding						
< 12 months	32.3 (507)	67.7 (1065)	31.3 (343)	68.7 (754)	26.1 (410)	73.9 (1162)
12 + months	26.4 (958)	73.6 (2664)	30.6 (799)	69.4 (1815)	30.4 (1100)	69.6 (2522)

Table 5.3 provides women's working status concerned with age, birth interval and parity. Fifty-three percent of women having low-risk childbearing concerned with age, 66% birth interval and 65% parity are not currently working, in contrast, 47% of women having high-risk childbearing concerned with age, birth interval (35%) and Parity (35%). On the other hand, 55% of women having low-risk childbearing concerned with age, birth interval (68%) and parity (66%) are working out side home, in contrast, 46% of women having high-risk childbearing concerned with age, 32% concerned with birth interval and 34% concerned with parity.

A greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to husband's occupation having manual are found concerned with age (52% vs. 48%), birth interval (66% vs. 34%) and parity (64% vs. 36%). On the other hand, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to husband's occupation having non-manual are found concerned with age (56% vs. 44%), birth interval (67% vs. 34%) and parity (64% vs. 36%), respectively.

Contraceptive use can effectively reduce maternal and infant mortality rates by decreasing the member of high-risk pregnancies. In reality, risk of childbearing is high before the age 20 and rise gradually after age 35. Fifty-percent of women having high-risk childbearing concerned with age, 37% concerned with birth interval 29% concerned with parity never use any contraception, in contrast, 42% of women having low-risk childbearing

concerned with age, 63% concerned with birth interval and 71% concerned with parity. On the other hand, 43% of women having high-risk childbearing concerned with age, 33% concerned with birth interval and 37% concerned with parity are currently using contraception, in contrast, 57% of women having low-risk childbearing concerned with age, 67% concerned with birth interval and 63% concerned with parity.

A greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to age at first marriage having less than 15 years are found concerned with birth interval (66% vs. 34%) and parity (59% vs. 41%). On the other hand, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to age at first marriage having 15 or more (years) are found concerned with age (60% vs. 40%), birth interval (65% vs. 35%) and parity (78% vs. 22%).

Furthermore, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to spousal age differences having less than 6 years are found concerned with age (56% vs. 44%), birth interval (68% vs. 32%) and parity (68% vs. 32%). On the other hand, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to spousal age differences having 6 or more (years) are found concerned with age (52% vs. 48%), birth interval (67% vs. 33%) and parity (65% vs. 35%).

A greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to duration of conjugal life having less than 15 years are found concerned with birth interval (64% vs. 36%). But a significantly greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to duration of conjugal life having less than 15 years are found concerned with parity (91% vs. 9%).

The differences occurred in women having both low-risk and high-risk childbearing in relation to surviving children having less than 3 are concerned with age (49% vs. 51%) and having 3 or more children (55% vs. 45%), respectively. Furthermore, The differences occurred in women having both low-risk and high-risk childbearing in relation to surviving children having less than 3 are concerned with birth interval (68% vs. 32%) and having 3 or more children (65% vs. 35%), respectively. The most striking differences occurred in women having both low-risk and high-risk childbearing in relation to surviving children having less than 3 are concerned with parity (96% vs. 4%) and having 3 or more children (26% vs. 74%), respectively.

Table 5.3 also provides women's child loss experience concerned with age, birth interval and parity. Fifty-eight percent of women having low-risk childbearing have no child loss experience concerned with age, 66% concerned with birth interval and 65% concerned with parity compared with women having high-risk childbearing concerned with age 42%, concerned with birth interval 29% and concerned with parity 18%. On the other hand, 58% of women having high-risk childbearing concerned with age, birth interval (41 %) and parity (73%) have child loss experience, in contrast, 42% of women having low-risk childbearing concerned with age, 59% concerned with birth interval and 27% concerned with parity.

A greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to duration of breastfeeding having less than 12 months are found concerned with age (68% vs. 32%), birth interval (69% vs. 31 %) and parity (74% vs. 26%). On the other hand, a greater proportion of women having low-risk childbearing than of women having high-risk childbearing in relation to breastfeeding practices having 12 or more months are found concerned with age (74% vs. 26%), birth interval (69% vs. 31 %) and parity (70% vs. 30%), respectively.

Table 5.4
Values of x^2, the Coefficient of Contingency C concerned with Age, Birth Interval and Parity

Background Characteristics	Age		Birth Interval		Parity	
	x2	C	x2	C	x2	C
Religion	6.164**	0.024	7.754*	0.030	15.226*	0.038
Place of residence	2.123	0.014	2.819***	0.020	86.768*	0.090
Education	30.177*	0,053	4.409**	0.025	591.744*	0.231
Working status	2.377	0.015	2.590	0.019	0.646	0.008
Education of husband	5.836**	0.024	10.117*	0.040	105.7*	0.100
Husband's occupation	29.000*	0.052	0.840	0.011	10.8*	0.032
Contraceptive use	164.030*	0.125	49.103*	0.081	49.103*	0.068
Age at first marriage	200.910*	0.138	103.677*	0.118	346.44*	0.178
Spousal age difference	7.421*	0.027	3.171 ***	0.021	7.415*	0.027
Duration of conjugal life	1579.92*	0.361	2017*	0.500	3677.1*	0.508
Age at first birth	111.239*	0.108	219.66*	0.178	238.89*	0.158
Surviving children	203.650*	0.1380	57.008*	0.087	5677.3*	0.592
Child loss experience	262.446*	0.156	103.616*	0.120	2962.2*	0.468
Breastfeeding practices	18.226*	0.059	21.178*	0.054	9.778*	0.043

* 1% level of significance
** 5% level of significance
*** 10% level of significance

5.4 Conclusion

The reproductive performance of Bangladeshi women is characterized by early initiation of childbearing; prolong childbearing span and quick progress to arrive at its maximum. The proportion of all women in different age cohorts who had a child by a given age during childbearing period indicates a high incidence of very early childbearing in Bangladesh. In most cases, the first birth occurs between ages 15 and 17. Also younger mothers (less than 20 years) have, on average, shorter birth intervals (less than 24 months) than their adults'

counterparts. Even more than half (57 %) of non-first births occur three or more years after the previous birth. Yet the mean number of children ever born to currently married women is 3.13, while it is 2.58 ,:narried women aged 15 to 49.

Among the women under study, a considerable number of women have high-risk and low-risk childbearing concerned with age (47 % vs. 53 %), parity (37 % vs. 63 %) and birth interval (44 % vs. 56 %). It was found that education of women and of their husbands, women's working status, occupation of husbands, religion, place of residence, contraceptive use, age at first marriage, age at first birth, duration of marriage, spousal age difference, child loss experience, surviving children, and duration of breastfeeding influence the reproductive performance of women directly and indirectly and hence the high-risk and low-risk childbearing patterns. It was also found that there is association of these aforesaid characteristics possessed by the women under study with the high-risk and the low-risk childbearing.

To isolate the factors that discriminate the high-risk and the low-risk childbearing, discriminant analysis has been employed in the next chapter. To identify the covariates that affect the high-risk and the low-risk childbearing significantly, a well-known logistic regression analytical model is also used in the next chapter.

Chapter 6
DETERMINANTS OF HIGH-RISK AND LOW-RISK CHILDBEARING PATTERN: DISCRIMINANT AND LOGISTIC REGRESSION ANALYSES

6.1 Introduction

The high-risk and the low-risk childbearing patterns are observed to vary with varying levels of socio-economic and demographic variables as can be found from chapter five. Now, can we assess the high-risk and the low-risk childbearing performance? Also can we isolate the factors that significantly affect the high-risk and the low-risk childbearing? To identify the association between the selected variables and high-risk and low-risk childbearing concerned with age, parity and birth interval, chi-square test was performed. However, in such analysis, it is difficult to identify the relative impact of the explanatory variables on the dependent variable. Hence, in this chapter, the multivariate technique is employed to isolate the impact of selected socio-economic and demographic variables that affect high-risk and low-risk childbearing. For this purpose, discriminant analytical method is used to discriminate the high-risk and the low-risk childbearing patterns in the context of age, birth interval and parity.

In order to identify the factors that influence both the high-risk and the low-risk childbearing, a well-known logistic regression analytical method has been employed in this chapter.

6.2 Variables Included in the Analyses

In the 1999-2000 BDHS, a number of socio-economic, demographic and cultural variables are available. Among them, seventeen variables are taken into consideration to compute discrimination between high-risk and low-risk

childbearing of variables considered the socio-economic variables are respondent's education, religion, place of residence, work status, ever use of any contraception, husband's education and husband's occupation, while the demographic variables regarded in this study are age at first marriage, age at first birth, age of mother, parity, number of surviving children, birth interval, child loss experience, duration of conjugal life, spousal age difference and duration of breastfeeding. Table 6.1 gives a detailed description of the variables.

Table 6.1
Variables considered for Analysis

Characteristics	Variable Level	Codes & Categories
Age of women	X1	1 =(< 20 and 35 +) years 0 = 20-34 years
Children ever born	X2	1 = 4 or more 0 = Less than 4
Birth-interval	X3	1 = Below 24 months 0 = 24 + months
Age at marriage	X4	1 = Below 15 years O = 15 + years
Age at first birth	Xs	1 = Below 18 years 0 = 18 + years
Duration of conjugal	X5	1 = 15 + years 0 = Below 15 years
Surviving children	X7	1 = Below 3 0 = 3 +
Child loss experience	Xa	1 = Ever loss O = Never loss
Duration of Breastfeeding	Xg	1 = < 12 months 0 = 12 or more months
Contraceptive use	X10	1 = Never use 0 = Ever use
Spousal age difference	X11	1 = Five years or less O = Six years or more
Place of residence	X12	1 = Rural 0 = Urban
Religion of mother	X13	1 = Muslim O = Non-Muslim
Education of women	X14	1 = No education 0 = Primary or more
Education of Husband	Xis	1 = No education 0 = Primary or higher
Women's working status	X16	1 = Never work 0 = Ever work
Occupation of Husband	X17	1 = Manual 0 = Non-manual

6.3 Expected Relationship of High-Risk and Low-Risk Childbearing with the Variables

(i) Religion of women: The religious composition of a society is considered to be of immense importance because religions tend to be institutional embodiments of values and values often influence demographic processes (Shahidullah, 1980). In this section, the investigation into the religious differentials in age, birth interval and parity of women is made in two broad groups, viz., Muslim and non-Muslim. We may expect that women who are Muslim have high-risk childbearing. Here, the category "non-Muslim" is treated as reference group.

(ii) Type of place of residence: In demography, residence means the type of community ranging from the rural to the urban, in which people live (Kammeyer, 1971). Differences exist in the ways of life in rural and urban places, which have important implications for almost every aspect of human behaviour including demographic behaviour. In the present section, place of residence is categorised as, (i) rural, and (ii) urban. We may expect that women who live in first category have high-risk childbearing. Here, the category "urban" is treated as reference group.

(iii) Women's working status: In the Bangladesh Demographic and Health Survey 1999-2000, the types of work for the women have been classified broadly as agriculture, service, business, agricultural labours, non-agricultural labours, housewife and domestic. For the sake of the present analysis, the categories cited in the survey are classified into two major groups' viz., (i) working and (ii) not working. We may expect that women belong to the second category have high-risk childbearing.

(iv) Husbands' occupation: In developing countries like Bangladesh, the husband's occupation is closely related to the social status of the women. It is expected that wives whose husbands have professional, administrative and technical jobs would have higher age at marriage and age at first birth

(Shahidullah, 1980). The occupation of husbands included in BDHS 1999-2000 are as follows: professional, technical, clerical, service, sales, trades, administrative, executive, agriculture (own land), landless agricultural labourers, unemployed, farm managers, production and related workers and others. The various occupational categories included in the survey slightly differ from one another. For the sake of present analysis, the categories cited in the survey are classified into two major groups, viz., manual and non-manual categories. Most of the husbands are engaged in manual occupation, i.e., agriculture, landless, agricultural labours, housewife, unemployed, farm, production and others. We may expect that women whose husbands are engaged in the manual occupation have high-risk childbearing.

(v) Education of mother: According to Dandeker (1967), education provides opportunities for personal advancement, awareness of social mobility and higher non-familial aspiration. It also provides a new outlook, freedom from tradition, willingness to analyze institutions, values and patterns of behavior and greater rationalism. It also serves as a measure of social status in Bangladesh as in most other Asian countries (Welty, 1963; Yusuf, 1966). Education is measured as the complete level of formal schooling. Females are categorized according to level of education as: (i) those who had no education, (ii) those who had primary or more education. We may expect that women who belong to the first category have high-risk childbearing.

(vi) Use of contraception: Family planning is an effective way to prevent maternal and infant mortality because family planning can help couples avoid high-risk pregnancies. Evidence from around the world shows that the risk of maternal or infant illness and death is highest both in pregnancies before age 20 and pregnancies after age 35. In other words, pregnancies can be considered high-risk if they are "too young, too old" (Population Reports, 1984). In this analysis, ever use of family planning methods was categorized as follows: (i) not

use, and (ii) use. We may expect that mothers belong to first category are high-risk mothers.

(vii) Number of children ever born: One important determinant of fertility depending, in turn, on the age of mother and the parity (House and Ibrahim, 1999). Children born to teenage mothers and to mothers over the ages of 35 have a reduced chance of surviving. Older mothers who have already had a number of children are also likely to b e at greater risk, together with their newborn. The risk of childbearing is strongly influenced by a woman's age and the number of children she has already had. Of course, a mother's age is associated with the number of births she has had. Women having their first child usually are young. Studies that have examined age and number of children at the same time have found that each factor has an independent effect in making pregnancy hazardous (Tomkinson et al., 1979 and Yerushalmy et al., 1940). Older women with many children face greater risk than those in only one of the high-risk categories. In Bangladesh, some of the highest death rates are found in women under age 20 with three or more children (Chen et al., 1974 and Chi et al., 1981). In this analysis, mothers were classified according to their number of children ever born as (i) less than 4 parity and (ii) 4 and more parity. We may expect that women belonging to the second category have high-risk childbearing.

(viii) Number of surviving children: In a country like Bangladesh, parents desire more surviving children and especially sons as their old stage security (Chowdhury et al., 1990). If one does not have children, his possession of property is meaningless (Mahmud, 1999). In rural Hindu society, there is a preference for sons over daughters because of the Hindu belief that only a son can perform some of the religious rites upon death of his parents, and sins also are considered heirs of their father's property (Kapadia, 1966; Patwardhan, 1968). Our field experience led us to conclude that having at least 2 children was especially import to females. Thus, mothers having less than two surviving children may be expected to be high-risk.

(ix) Duration of conjugal life: The duration of conjugal life is also another important factor affecting fertility in developing countries (Kabir, 2000). The duration of conjugal life was classified as, (i) less than 15 years, (ii) 15 years or more. We may expect that mothers belonging to the 2nd category have high-risk childbearing.

(x) Birth interval: Spacing births helps protect children's health (National Research Council, 1989). Birth interval by maternal age is highly sensitive to current fertility levels (Srinivasan et al., 1994). Studies in Bangladesh have shown a higher risk for short-interval births (Alam, 1995). Thus, mothers are classified according to their birth spacing as: (i) less than 24 months and (ii) 24 and above. We may expect that a mother belonging to the first category have high-risk childbearing.

(xi) Age at first marriage: Low age at marriage not only contributes population growth but also adversely affects the health of mothers. To investigate the effect of age at marriage on age, birth interval and parity, mothers were categorised as, (i) below 15 years, (ii) 15 years or more. We may expect that mothers belonging to the first category have high-risk childbearing.

(xii) Child loss experience: Evidence from around the world shows that the risk of infant illness and death is highest in pregnancies before age 20 and after ages 35 (Population Reports, 1984). Child loss experience was classified as, (i) never loss and (ii) ever loss. We may expect that women belonging to the 2nd category have high-risk childbearing.

(xiii) Age at first birth: The majority of young women in the developing world still have their first child within marriage. Therefore, median age at first birth still closely follows median age at marriage (Westoff et al., 1994). Age at first birth was categorised as, (i) below 18 years and (ii) 18 years or more. We may expect that mothers belonging to the first category have high-risk childbearing.

(xiv) Age difference between spouses: Age difference at marriage is another accepted norm in Bangladesh. A bridegroom shall have to be several years older than his bride. This age difference ranges usually from 1-15 years. And, to assume virginity, most rural parents tend to give their daughters in marriage between 13-16 years of age. As the girl's age exceeds 16-18 years, her marriage prospects begin to diminish. Though such a culture pattern reduces the chance of pre-marital sex, it provides a long marital life span resulting in high marital fertility (Mabud, 1983). Several authors (Halen, 1981: Dixon, 1971) have suggested that the age difference between spouses is a clear indicator of the status of women, especially when it is common for women to marry men who are fairly older gives them a considerable edge in status, experience and power. In Germany and a few other industrialised countries, a woman tends to marry a man either almost equal in age or slightly younger or older (Halen, 1981; p. 93). Generally, they do not think of marrying one who is 10-15 years older than they as in Bangladesh. Spousal age difference was classified as (i) below 6 years and (ii) 6 years or more. It is hypothesised that mothers belonging to the 2nd category have high-risk childbearing.

(xv) Education of husband: The husband's education is also categorised as, (i) no education and (ii) primary or more education. We may expect that mothers belonging to the first category have high-risk childbearing.

6.4 Description of the Methods

6.4.1 The Methods of Discriminant Analysis

Discriminant analysis is a statistical technique used to distinguish between two or more groups or cases. There are two major objectives in separation of groups: (1) Description of group separation, in which linear functions (Discriminant functions) of the variables are used to describe or elucidate the differences between two or more groups. The goals of discriminant analysis include identifying the relative contribution of variables to separation of the

groups and finding the optimal plane on which the points can be projected to best illustrate the configuration of the groups. (2) Prediction or allocation, in which linear or quadratic functions (classification functions) of the variables are employed to assign an individual sampling unit to one of the groups.

The characteristics used to distinguish the high-risk and low-risk childbearing are called "discriminating variables". These variables must be measured at the interval or ratio level of measurement, so that means and variances can be legitimately employed in mathematical equations. In general, there is no limit on the number of discriminating variables as long as the total number of cases exceeds the number of variables by more than two. There are, however, some limits on the statistical properties, which the discriminating variables are allowed to have. For one thing, no variable may be a linear combination of other discriminating variables. Another is two variables which are perfectly correlated cannot be used at the same time in the analysis.

To distinguish between the high-risk and the low-risk childbearing, the following mathematical form is used:

$$f_{km} = u_0 + u_1X_{1km} + u_2X_{2km} + u_3X_{3km} + \ldots\ldots\ldots\ldots + u_pX_{pkm} \text{ ---------- [1]}$$

Where, f_{km} = the value (score) on the canonical discriminant function for case m in the group k;

$X_{ik}m$ = the value on discriminating variable X_i for case m in group k; and

$X_{ik}.$ = mean value of variable i for those cases in group k

$X_{i}..$ = mean value of variable i for all cases (grand or total mean)

u_i = coefficients which produce the desired characteristics in the function

Using Pooled within group's correlation matrix, correlation between independents is not perfected correlated. It is obvious, one or more of the variables

may be poor discriminators, because the group means are not very different on those variables. It may happen that some of the variables have no significant contribution between high-risk and low-risk childbearing. A forward stepwise procedure has been considered to select the individual variable, which provides the greatest univariate discrimination between high-risk and low-risk childbearing.

Stepwise procedures must employ some measures o discrimination as the criterion for selection. In this analysis, we used Maximize-minimum Mahalanobis (1963) distance (D Square) between the pairs of groups' centroids. Minimum tolerance value has been considered 0.001. Maximum significance of F to enter has been considered 0.05 to continue stepwise procedure of Mahalanobis distance D-square. F to remove is also a partial multivariate F statistic, but it tests the significance of the decrease in discrimination when that variable is removed from the list of variables already selected. Minimum significance of F to remove has been considered as 0.10 in stepwise method. Maximum significance of Wilk's Lambda has been considered as 1.00 and prior probability of each group is 0.5. Finally, to test the significance of high-risk and low-risk childbearing, we used the Statistical Package for Social Science (SPSS).

Another way to judge the substantive of a discriminate function is by examining the canonical correlation. This correlation is a measure of association which summaries the degree of relatedness between high-risk and low-risk childbearing and the discriminate function. A value of zero denotes no relationship between at all, but larger numbers (always-positive) represent increasing degrees of association with 1 being the maximum. The value of overall x^2 indicates that ultimately discriminatory variables of high-risk and low-risk childbearing are significant. Using stepwise procedure coefficients of Fisher's linear discriminating variables for high-risk and low-risk childbearing are found. When Fisher's approach is used, it turns out that it may be possible to determine several linear combinations for high-risk and low-risk childbearing.

6.4.2 The Method of Logistic Regression Analysis

The linear discriminate analysis classifies an individual into one of two populations. Risk factors can be identified as independent variables that provide maximal discriminatory power. However, this technique is based on the assumption that the independent variables are normally distributed with equal variances. In most practical situation, some of the variables are qualitative or measured in nominal or ordinal scales and often the assumption of normality is violated. A practical method that does not require any assumption is Cox's (1970) linear logistic regression analytical method. This method required far fewer assumptions than discriminate analytical method and is more flexible since the distribution of the predictor variables do not have to be normally distributed, linearly related or of equal variance within each group. Logistic regression analysis especially useful when the distribution of the responses on the dependent variable is expected to be non-linear with one or more of the independent variables.

Suppose that there in individual, some of them are called "success" and others are "failure". Let Yi denote the dependent variable for i-th observation and Y_i = 1 if the i-th individual as a success and Yi = O if i-th individual is a failure. Consider a collection of p independent variables which will be denoted by the vector X' = (x1, x2, x_3, ••• X_p) and the vector of the coefficients of X is f3' = B1, B2, p_3, • • • p_p)- These variables are either qualitative, such as religious, service, family type, and residence or quantitative, such as age, income, age at marriage etc. For the moment we will assume that each of these variables is at least interval scaled. Let the conditional probability that the outcome is present be denoted by Pr (Yi = 1/xi1, xi2, .. Xip) = P_1. Then the logit of the multiple logistic regression models is given by the equation

$$g(X) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_p X_p \text{ - - - - - - - - - (1)}$$

In which case

$$P_i = \frac{e^{g(x)}}{1+e^{g(x)}} \text{ - - - - - - - - - - - - - - - - (2)}$$

And $1 - pi = Pr(Y_1 = 0 / Xi!, X\&2, "' X_{ip}) = \frac{e^{\alpha>}}{1+e^{x(x)}}$ - - - - - - - - - - - - - (3)

Equations (2) and (3) look complicated, however, the logarithm of the ratio of P_i and $1 - P_i$ is a simple linear function of X_{ij}.

$$\text{Let } A_i = \log_e \frac{n(Y)}{1-n(Y)} = f3'x \text{ - - - - - - - - - - - - - - - - (4)}$$

Which express the log odds of occurrence on an event (i.e. independent variable) as a linear function of the independent variables. The logit is thus the logarithm of the odds of success, that is, the logarithm of the ratio of the probability of success to the probability of failure. It is also called the logit transformation of P_i and equation (4) is a linear logistic model. It has several nice properties; P_i is bounded only between 0 and 1. If $n_{(Y)} < 0.5$, logit P_1 is negative; while if $P_i > 0.5$, logit P_i is positive.

In logistic regression, the parameters of the modes are estimated by maximum likelihood method. That is, the coefficient that makes our observed results most "likely" is selected. The contribution of individual variables in logistic regression dependent on the other individual variables and the interpretation is difficult when are highly correlated. In logistic regression, just as linear regression, the codes for the independent variables must be meaningful. We must decode the values of the independent variables by creating a new set of variables that correspond, in some way, the original categories.

When we have a variance with more than two categories, we must create a new variable to represent the categories. The number of new variables required to represent a categorical variable is one less than the number of categories. For example, if instead of the actual values for education of the respondents, we had values of 0, 1 depending on whether the value was 'no education', and 'some education'. The value "no education" would be represented by codes of O and it is called reference category. If we use indicator variable for coding, the coefficient for the new variables represent the effect of each category compared to a reference category. The coefficient for 'some education' is the change in log odds when the lower primary compared to no education. The coefficients for no education is necessarily zero, since it does not differ from itself. The logistic regression procedure will automatically create new variables for categorical variables.

6.5 Results and Discussion

6.5.1 Results of Discriminant Analysis

The result of discriminant analysis is shown in Table 6.2. Out of sixteen variables thirteen are discriminating high-risk from low-risk childbearing corresponding to maternal age. The third and fifth columns show the Wilk's lambda and minimum Mahalanobis distance D Square of the table 6.5. For example, the most significant discriminating variable is duration of conjugal life, as it discriminates high-risk childbearing from low-risk childbearing with maximum significance of Wilk's lambda (0.9367) and minimum Mahalanobis distance (0.2702). The next significant discriminating factor is surviving children, as it discriminates the high-risk childbearing from low-risk childbearing with maximum significance of Wilk's lambda (0.9238) and minimum Mahalanobis distance (0.3300). The other significant variables which discriminate high-risk childbearing pattern from low-risk childbearing pattern are contraceptive use, age at first marriage, religion, child loss experience, age at first birth, women work status, education of women, type of place of residence and husbands' occupation.

Table 6.2
Significant Discriminate Variables between High-Risk and Low-Risk Childbearing Patterns according to Maternal Age

Step	Name of variables	Wilk's Lamda	Sig.	Minimum D sauare	Sig.	Between Groups
1	Duration of conjugal life	.93679	.0000	.27022	.0000	High-risk and Low-risk
2	Surviving children	.92386	.0000	.33002	.0000	High-risk and Low-risk
3	Age at first birth	.91569	.0000	.36870	.0000	High-risk and Low-risk
4	Mother's education	.91238	.0000	.38457	.0000	High-risk and Low-risk
5	Age at marriage	.90941	.0000	.39889	.0000	High-risk and Low-risk
6	Ever use of contraceptive	.89650	.0000	.41423	.0000	High-risk and Low-risk
7	Child loss experience	.85220	.0000	.43410	.0000	High-risk and Low-risk
8	Religion	.84150	.0000	.44125	.0000	High-risk and Low-risk
9	Place of residence	.83431	.0000	.45378	.0000	High-risk and Low-risk
10	Mother's work status	.83021	.0000	.46129	.0000	High-risk and Low-risk
11	Religion	.81963	.0000	.53821	.0000	High-risk and Low-risk
12	Occupation of husband	.78309	.0000	.54012	.0000	High-risk and Low-risk

The size of eigenvalue (0.650) is related to the discriminating power of the function. This value shows that discrimination of two groups of variables is present. Another way to judge the substantive utility of a discriminate function is by examining the canonical correlation coefficient (0.7). This correlation is a measure of association, which summarises the degree of relatedness between high-risk and low-risk mothers and the discriminate function. A value of zero

denotes no discrimination at all, but large numbers (always-positive) represent increasing degrees of association with 1 being the maximum. The value of overall $x^2(11)$ is 4030.66, which indicates those ultimately discriminatory variables of high-risk and low-risk childbearing is significant.

Eigenvalue	Canonical correlation	Wilk's Lamda	Chi-square	D.F.	Significance
0.650	0.7	0.9599	4030.66	12	0.0000

Using stepwise procedure coefficients of Fisher's linear discriminating variables are shown in Table 6.3.

Table 6.3
Coefficients of (Fisher's linear) Discriminating Variables of High-Risk & Low-Risk Childbearing according to Age of Mother

Variable	Coefficients of low-risk mothers (0)	Coefficients of high-risk mothers (1)
Xn	7.743	7.462
X15	0.473	0.280
X10	6.395	6.009
X3	1.726	1.954
X5	10.806	14.066
Xs	2.244	2.026
X12	3.958	3.764
X2	2.054	2.788
X14	0.571	0.962
X1	7.873	8.068
X11	0.761	0.994
Xa	-0.531	-0.299
Constant	-43.181	-47.150

When Fisher's approach is used, it turns out that it may be possible to determine several linear combinations for low-risk and high-risk mothers. Mathematical form of two groups are given below:

$$Z_0 = -43.181 + 2.054X2 + 1.726X3 + 2.244X5 + 10.806X6 + 7.873X7 - 0.531Xs + 6.395X10 + 0.761X11 + 3.958X12 + 7.743X13 + 0.571X14 + 0.473X16$$

$$Z_1 = -47.150 + 2.788X2 + 1.954X3 + 2.026Xs + 14.066X6 + 8.068X1 - 0.299Xs + 6.009X10 + 0.994X11 + 3.764X12 + 7.462X13 + 0.962X14 + 0.280X16$$

Table 6.4
Significant Discriminate Variables between High-Risk and Low-Risk Childbearing Patterns according to Birth Interval

Step	Name of variables	Wilk's Lambda	Sig.	Minimum D square	Sig.	Between Groups
1	Duration of conjugal life	0.9◆13	.0000	0.1365	.0000	High-risk and Low-risk
2	Child loss experience	0.9436	.0000	0.1961	.0000	High-risk and Low-risk
3	Ever use of method	0.9367	.0000	0.2101	.0000	High-risk and Low-risk
4	Children ever born	0.9200	.0000	0.2299	.0000	High-risk and Low-risk
5	Age at first marriage	0.9158	.0000	0.2356	.0000	High-risk and Low-risk
6	Number of living children	0.9100	.0000	0.2503	.0000	High-risk and Low-risk
7	Age at first birth	0.9035	.0000	0.3009	.0000	High-risk and Low-risk
8	Breastfeeding	0.9099	.0000	0.3212	.0000	High-risk and Low-risk
9	Mother's work status	0.8910	.0000	0.3561	.0000	High-risk and Low-risk
10	Education of women	0.8856	.0000	0.3599	.0000	High-risk and Low-risk
11	Husbands' occupation	0.8799	.0000	0.4018	.0000	High-risk and Low-risk
12	Place of residence	0.8670	.0000	0.4539	.0000	High-risk and Low-risk

Table 6.4 shows the result of logistic regression analysis corresponding to birth interval. Out of sixteen variables, twelve variables are discriminating high-risk childbearing from low-risk childbearing patterns. The third and fifth columns show the Wilk's lambda and minimum Mahalanobis distance D Square of the table 6.7. For example, the most significant discriminating variable is duration of conjugal life, as it discriminates high-risk childbearing from low-risk childbearing with maximum significance of Wilk's lambda (0.9513) and minimum Mahalanobis distance (0.1365). The next significant discriminating factor is child loss experience, as it discriminates the high-risk childbearing from low-risk childbearing maximum significance of Wilk's lambda (0.9436) and minimum Mahalanobis distance (0.1961). The other significant variables which discriminate high-risk childbearing from low-risk childbearing are contraceptive use, parity, age at first marriage, living children, breastfeeding, age at first birth, women work status, education of women, type of place of residence and husbands'occupatlon.

The size of eigenvalue (0.52) is related to the discriminating power of the function. This value shows that discrimination of two groups of variables is present. Another way to judge the substantive utility of a discriminate function is by examining the canonical correlation coefficient (0.65). This correlation is a measure of association, which. summarises the degree of relatedness between high-risk and low-risk mothers and the discriminant function. A value of zero denotes no relationship at all, but large numbers (always-positive) represent increasing degrees of association with 1 being the maximum. The value of overall x^2 is 403, which indicates those ultimately discriminatory variables of high-risk and low-risk mother, are significant.

Eigenvalue	Canonical correlation	Wilk's Lamda	Chi-square	D.F.	Sig.
0.52	0.65	0.9699	403.66	11	0.000

Using stepwise procedure coefficients of Fisher's linear discriminating variables is shown in Table 6.5.

Table 6.5
Coefficients of (Fisher's linear) Discriminating Variables of High-Risk and Low-Risk Childbearing Patterns according to Birth Interval

Variables	Coefficients of high-risk mother (0)	Coefficients of high-risk mother (1)
X16	0.0056	0.0053
X1	0.1224	0.1356
X10	0.0052	0.0036
X3	0.51651	0.6320
x6	0.1405	0.1597
Xs	0.5427	0.5629
X12	3.2349	3.6940
X2	4.0034	4.5789
X14	0.6987	0.7823
X7	0.3023	0.3782
X4	7.0039	8.2003
Xa	2.0023	2.2314
Constant	-16.5519	-17.5711

When Fisher approach is used, it turns out that it may be possible to determine several linear combinations for low-risk and high-risk childbearing. Mathematical form of two groups are given below:

$Z_0 = -16.5519 + 0.1224X_1 + 4.0034X_2 + 0.51651X3 + 7.0039X4 + 0.5427Xs + 0.1405X_5 + 0.3023X_7 + 2.0023Xs + 0.0052X_10 + 3.2349X_{12} + 0.6987X14 + 0.0056X_16$

$Z_1 = -17.5711 + 0.1356X_1 + 4.5789X_2 + 0.6320X3 + 8.2003X4 + 0.5629Xs + 0.1597X_5 + 0.3782X_7 + 2.2314Xs + 0.0036X_10 + 3.6940X_12 + 0.7823X14 + 0.0053X_16$

The result of discriminate analysis is shown in Table 6.5 corresponding to parity of women. Out of sixteen variables twelve are discriminating high-risk from low-risk childbearing pattern. The third and fifth columns show the Wilk's lambda and minimum Mahalanobis distance D Square of the table 6.9. For example, the most significant discriminating variable is age at first marriage, as it discriminates high-risk childbearing from low-risk childbearing with maximum significance of Wilk's lambda (0.9575) and minimum Mahalanobis distance (0.1592). The next significant discriminating factor is child loss experience, as it discriminates the high-risk childbearing from low-risk childbearing with maximum significance of Wilk's lambda (.9501) and minimum Mahalanobis distance (0.1601). The other significant variables which discriminate high-risk childbearing from low-risk childbearing are contraceptive use, birth interval, education of husband, religion, age at first birth, women work status, education of women, type of place of residence and husbands' occupation.

Table 6.6
Significant Discriminate Variables between High-Risk and Low-Risk Childbearing Patterns according to Parity

Step	Variables	Wilk's Lamda	Sig.	Minimum D Square	Sig.	Between Groups
1.	Age at first marriage	0.9575	.0000	0.1592	.0000	High-risk and low-risk
2.	Child loss experience	0.9501	.0000	0.1601	.0000	High-risk and low-risk
3.	Duration of conjugal life	0.9478	.0000	0.1698	.0000	High-risk and low-risk
4.	Work status	0.9359	.0000	0.1756	.0000	High-risk and low-risk
5.	Education of women	0.9300	.0000	0.1823	.0000	High-risk and low-risk
6.	Contraceptive use	0.9288	.0000	0.1975	.0000	High-risk and low-risk
7.	Surviving children	0.9112	.0000	0.2122	.0000	High-risk and low-risk
8.	Birth interval	0.9044	.0000	0.3000	.0000	High-risk and low-risk
9.	Type of place of residence	0.8988	.0000	0.3099	.0000	High-risk and low-risk
10	Husbands' occupation	0.8875	.0000	0.3429	.0000	High-risk and low-risk
11	Spousal Age difference	0.8592	.0000	0.3556	.0000	High-risk and low-risk
12	Education of husband	0.8301	0.0000	0.3689	0.0000	High-risk and low-risk

The size of eigenvalue (0.690) is related to the discriminating power of the function. This value shows that discrimination of two groups of variables is present. Another way to judge the substantive utility of a discriminate function is by examining the canonical correlation coefficient (0.639). This correlation is a measure of association, which summarises the degree of relatedness between high-risk and low-risk mothers and the discriminate function. A value of zero denotes no relationship at all, but large numbers (always-positive) represent increasing degrees of association with 1 being the maximum. The value of overall $X^2_{(u)}$ is 3882.667, which indicates those ultimately discriminatory variables of high-risk and low-risk mothers are significant.

Eigenvalue	Canonical Correlation	Wilk's Lamda	Chi-square	D.F.	Sig.
0.690	0.639	0.592	3882.667	10	0.0000

Using stepwise procedure, coefficients of Fish·er's linear discriminating variables are shown in Table 6.7.

Table 6.7
Coefficients of (Fisher's linear) Discriminating Variables ofHigh-Risk and Low-Risk Childbearing Patterns

Variables	Coefficients low-risk mothers (0)	Coefficients of high-risk mothers (1)
Education of women (X14)	-0.5656	-0.5355
Age at marriage (X4)	-0.3214	-0.3896
Working Status (X15)	-0.9652	-0.8636
Religion (X13)	1.1351	1.5930
Contraceptive use (X10)	7.1534	7.7243
Duration of conjugal life (X6)	11.3523	12.5412
Child loss (Xa)	6.0053	5.0094
Surviving children (X7)	1.9493	1.8683
Place of residence (X12)	3.1810	3.6451
Spousal age difference (X11)	5.0039	6.1263
Birth interval (X3)	-4.0034	-4.5789
Education of husband (Xis)	0.7430	0.6532
Occupation of husband (X17)	1.4521	2.2398
Constant	-43.2196	-44.5711

When Fisher's approach is used, it turns out that it may be possible to determine several linear combinations for low-risk and high-risk childbearing patterns. Mathematical forms of the two groups are given below:

$Z_0 = -43.2196 - 4.0034X3 - 0.3214X4 + 11.3523X5 + 1.9493X7 + 6.0053xa + 7.1534X_{10} + 5.0039X11 + 3.1810X12 - 0.5656X1-1 + 0.7430X1s - 0.9652X16 + 1.4521X17$

$Z_1 = -44.5711 - 4.57894x3 - 0.3896x-1 + 12.5412xr, + 1.8683X7 + 5.0094x_8 + 7.7243x_{10} + 6.1263x11 + 3.6451x1;, - 0.5355x1,1 + 0.6532X1s - 0.8636X15 + 2.2398X17$

6.5.2 Results of Logistic Regression Analysis

The result of logistic regression analysis is shown in Table 6.8. The regression coefficients in the model are also shown in the table. For example, the regression coefficient of Xn (religion of women) is significant at 1% level of significance while the regression coefficient of X_{12} (place of residence) is significant at 5% level of significance. The third column of the table 7.2 shows the odds ratios. For example, the odds ratio of duration of conjugal life (X6) is 7.187 indicates that the risk of childbearing will be 7.187 times higher for those mothers who have duration of conjugal life 15 or more years than those mothers who have duration of conjugal life below 15 years. Also, the odds ratio of surviving children (X7) is 5.719 indicates that the risk of childbearing will be 5.719 times higher for those mothers who have surviving children 1-2 than those mothers who have surviving children 3 or more. Therefore, the most important significant variables that influence high-risk childbearing mothers are duration of conjugal life, place of residence, religion of women, surviving children, contraceptive use, age at first marriage, women work status, and occupation of husband. On the other hand, the variables that influenc_e low-risk childbearing mothers are education of women (odds ratio 1.17), breastfeeding practices (odds ratio 1.4) and child loss experience (odds ratio 1.3). The most highly significant variable is duration of conjugal life (7.187) and the next significant variable is surviving children and so on.

The logistic regression equations for low-risk and high-risk childbearing are given below:

$$11_0 = 2.237 - 0.121x_4 - 0.844x_5 - 1.963x6 - l.743x1 + 0.263xs + 0.366xg - 0.489x10 - 0.159X12 - 0.l86X_13 + 0.159xl'1 - 0.309X16 - 0.253X_17$$

$$11_1 = - 4.095 + 0.127x_4 + 0.877x_5 + l.972x6 + l.744X7 - 0.262xs - 0.371Xg + 0.479X10 + 0.156X12 + 0.178X13 - 0.148X14 + 0.165X16 + 0.235X17$$

Table 6.8
Results of Logistic Regression Analysis for High-Risk and Low-Risk Childbearing Patterns corresponding to Age of Mothers

Characteristic	High-risk childbearing			Low-risk childbearing		
	Coeff.	Sig.	Odds ratio	Coeff.	Sig.	Odds ratio
Place of residence						
Rural	0.156**	0.032	1.169	-0.159	0.030	0.853
Urban			-			-
Education of women						
No education	-0.148*	0.044	0.863	0.159	0.029	1.173
Any education			-			-
Religion						
Muslim	0.178*	0.085	1.195	-0.186	0.072	0.830
others			-			-
Age at first birth						
Below 18 years	0.877*	0.000	2.404	-0.844	0.000	0.430
18 + years			-			-
Contraceptive use						
Never use	0.479*	0.000	1.614	-0.489	0.000	0.613
Ever use			-			-
Duration of breastfeeding						
Never breastfeed	-0.371 **	0.309	0.690	0.366	0.317	1.441
Ever breastfeed			-			-
Age at first marriage						
Below 15 years	0.127*	0.087	1.135	-.121	0.102	0.886
15 + years			-			-
Duration of conjugal life						
15 + years	1.972*	0.000	7.187	-1.963	0.000	0.140
Below 15 years			-			-
Child loss experience						
Ever loss	-0.262**	0.000	0.769	0.263	0.000	1.300
Never loss			-			-
Occupation of husband						
Manual	0.235*	0.362	2.096	-0.253	0.083	0.674
Non-manual			-			-
Women's working status						
Never work	0.165*	0.050	1.390	-0.309	0.286	0.764
Ever work			-			-
Surviving children						
1 - 2	1.744*	0.000	5.719	-1.743	0.000	0.175
3 +			-			-
Constant	-4.095	0.000	-	2.237	0.000	-

* $p < 0.01$
** $p < 0.05$

Table 6.9
Results of Logistic Regression Analysis for High-Risk and Low-Risk Childbearing Patterns corresponding to Birth Interval

Characteristic	High-risk childbearing			Low-risk childbearing		
	Coeff.	Sig.	Odds ratio	Coeff.	Sig.	Odds ratio
Place of residence						
Rural	0.149**	0.019	1.160	- 0.153	0.015	0.858
Urban			-			-
Education of women						
No education	0.006*	0.933	1.006	0.018	0.782	1.108
Any education			-			-
Religion						
Muslim	0.165**	0.056	1.179	-0.187	0.030	0.829
Others			-			-
Parity						
4+	0.189*	0.072	1.208	-0.200	0.056	1.221
<4			-			-
Age at first birth						
Below 18 years	-0.103*	0.131	0.902	0.101	0.135	1.107
18 + years			-			-
Contraceptive use						
Never use	0,966*	0.000	2.628	-0.990	0.000	0.372
Ever use			-			-
Duration of breastfeeding						
Never breastfeed	0.248**	0.412	1.282	-0.266	0.379	0.766
Ever breastfeed			-			-
Age at first marriage						
Below 15 years	-0.013*	0.851	0.987	0.025	0.714	1.025
15 + years			-			-
Duration of conjugal life						
15 + years	0.494*	0.000	4.524	-0.509	0.000	0.224
Below 15 years			-			-
Child loss experience						
Ever loss	0.033**	0.000	1.034	-0.029	0.000	0.971
Never loss			-			-
Occupation of husband						
Manual	0.575*	0.016	1.778	0.714	0.001	0.619
Non-manual			-			-
Women's working status						
Never work	0.353*	0.050	1.423	0.313	0.040	0.763
Ever work			-			-
Surviving children						
1 - 2	-0.316*	0.000	0.729	0.317	0.000	1.373
3 +			-			-
Constant	-4.095	0.000	-	2.237	0.000	-

r < 0.0 I

p < 0.05

The result of logistic regression analysis is shown in Table 6.9. The regression coefficients in the model are also shown in the table. For example, the regression coefficient of X_{10} (contraceptive use) is significant at 1% level of significance while the regression coefficient of X_{13} (religion of women) is significant at 5% level of significance. The third column of the table 7.4 shows the odds ratios. For example, the odds ratio of contraceptive use (X10) is 2.628 indicates that the risk of childbearing will be 2.628 times higher for those mothers who never used any contraception than those mothers who are using contraceptive. Also, the odds ratio of women's working status (X7) is 1.423 indicates that the risk of childbearing will be 1.423 times higher for those mothers who never work outside home than those mothers who are currently working outside home. Therefore, the most important significant variables that influence the high-risk childbearing mothers are duration of conjugal life, education of women, place of residence, religion of women, contraceptive use, breastfeeding practices, women work status, parity, education of husband, occupation of husband and child loss experience (Table 7.4). On the other hand, the variables that influence the low-risk childbearing mothers are education of women (odds ratio 1.018), parity (odds ratio 1.221), surviving children (odds ratio 1.373), age at first marriage (odds ratio 1.025), and age at first birth (odds ratio 1.107) (Table 6.9).

The highly most significant variable is duration of conjugal life (odds ratio 4.524) and the next factor, which influences the high-risk childbearing mothers, is contraceptive use (odds ratio 2.628) by birth interval. Here, duration of conjugal life has positive significant effect on birth interval. Another important positive significant factor is breastfeeding practices (odds ratio 1.282) by birth interval. Practicing breastfeeding more and using family planning methods

prolong birth spacing between the successive births and reduce the nee-natal, infant, child and maternal mortality in Bangladesh.

The logistic regression equations for low-risk and high-risk childbearing pattern are-

$$Ao = 2.237 - 0.200 X_2 - + 0.025X4 + 0.101xs - 0.509x6 + 0.317X7 - 0.029xs - 0.266x_9 - 0.990x10 - 0.153x1_2 - 0.187xn + 0.0l8x14 + 0.313x16 + 0.714x17$$

$$A1 = - 4.095 + 0.189 X2 - 0.013x4 - 0.103xs + 0.494x6 - 0.316X7 + 0.033xa + 0.966X10 + 0.248Xg + 0.149X_12 + 0.165X_{13} + 0.006X14 + 0.353X15 + 0.575X17$$

Table 6.10
Results of Logistic Regression Analysis for High-Risk and Low-Risk Childbearing Patterns corresponding to Parity of Women

Characteristic	High-risk childbearing			Low-risk childbearing		
	Coeff.	Sig.	Odds ratio	Coeff.	Sig.	Odds ratio
Place of residence Rural Urban	0.396**	0.002	1.485 -	-0.393	0.002	0.675 -
Education of women No education Any education	0.653*	0.000	1.922 -	-0.635	0.000	0.530 -
Religion Muslim Others	0.198**	0.257	1.219 -	-0.215	0.214	0.807 -
Age at first birth Below 18 years 18 + years	0.323*	0.000	1.381 -	-0.273	0.027	0.761 -
Contraceptive use Never use Ever use	-0.132*	0.368	0.876 -	0.084	0.566	1.087 -
Duration of breastfeeding Never breastfeed Ever breastfeed	0.096**	0.880	1.100 -	-0.023	0.971	0.977 -
Age at first marriage Below 15 years 15 + years	-0.197*	0.116	0.821 -	0.223	0.073	1.250 -
Duration of conjugal life 15 + years Below 15 years	1.875*	0.000	6.523 -	-2.034	0.000	0.131 -
Child loss experience Ever loss Never loss	9.930**	0.000	16.977 -	-9.911	0.000	0.000 -
Occupation of husband Manual Non-manual	0.306*	0.594	1.358 -	0.714	0.001	0.619 -
Women's working status Never work Ever work	0.302*	0.000	1.353 -	0.313	0.040	0.763 -
Education of husband No education Any education	0.040	0.740	1.041 -	-0.010	0.933	0.990 -
Spousal age difference < 6 years 6 + years	0.040	0.974	1.004 -	-0.031	0.808	0.969 -
Constant	-1.390	0.000	-	0.216	0.747	-

- $p < 0.01$
- $p < 0.05$

The result of logistic regression analysis is shown in Table 6.10. The regression coefficients in model shown in Table 6.10 are statistically significant at different level. For example, the regression coefficient of X8 (child loss experience) is significant at 1% level of significance while the regression coefficient of X_9 (duration of breastfeeding) is significant at 5% level of significance. The third column of the Table 6.10 shows the odds ratio. For example, the odds ratio of education of women is 1.922 indicates that the risk of childbearing will be 1.922 times higher for those mothers who have no education than those mothers who have some education. Similarly, the odds ratio of child !ass experience is 16.977 indicates that the risk of childbearing will be 16.977 times higher for those mothers who have child loss than those mothers who have no child loss.

Therefore, the most important significant variables that influence high-risk childbearing are place of residence, religion, age at first birth, education of women, breastfeeding practices, duration of conjugal life, women work status, child loss experience, and occupation of husband, education of partner, and spousal age difference. On the other hand, the variables that influence the low-risk childbearing mothers are surviving children, contraceptive use, and age at first marriage. Table 6.10 suggests that the highly most significant variable is child loss experience (odds ratio 16.977) and the next significant variable is duration of conjugal life (odds ratio 6.523). The analysis further indicates that child loss experience will affect childbearing pattern. Age at first birth is also an important correlate of high-risk childbearing pattern. The higher is the infant and child mortality in a community; the lower is the age at marriage. Thus, improved child survival may help to motivate mothers to prolong birth spacing by practices of breasfeeding and contraceptive use. Education of women is also an important determinant of high-risk childbearing. Duration of breastfeeding is found to have a significant direct negative effect on fertility. Encouraging women to breastfeed their children for a relatively longer duration may also contribute to a reduction

in fertility. The total effect of female education on fertility is found to be negative. Education may provide better employment opportunities outside home and providing education to females, especially at the secondary and higher levels can rise age at first marriage and age at first birth. Another important factor of high-risk childbearing is women work status. Most women in Bangladesh work at home as housewives, for example, cooking, maintaining home, taking care of children and so on.

The logistic regression equations for low-risk and high-risk childbearing patterns are given below-

$$).0 = 0.216 + O.223x_4 - O.273x_{5-} 2.O34x_6 - 9.911xa - O.O23xg + O.O84x_10 - O.O31x1_1 - O.393X12 - O.215X13 - O.635X14 - O.O1OX1s + O.313X16 + O.714X17 \text{ and}$$

$$A_1 = - 1.390 - O.197x4 + O.323xs + 1.875x_6 + 9.93Oxa + O.O96xg - 0.132X10 + 0.040X11 + 0.396X12 + 0.198X13 + 0.653X14 + 0.040X15 + 0.302X16 + 0.306X17$$

6.6 Conclusion

The discriminant analysis extracted thirteen variables concerned with age. The most important significant variables that discriminate the high-risk childbearing from the low-risk childbearing are duration of conjugal life, child loss experience, age at first marriage, contraceptive use, surviving children, education of women, place of residence, women's working status, occupation of husband, spousal age difference and age at first birth.

The variables that significantly discrimi_nate the high-risk childbearing from the low-risk childbearing corresponding to birth interval are age at first marriage, duration of conjugal life, child loss experience, surviving children, education of women, place of residence, women's working status, and occupation of husband.

Similarly, the most important significant discriminating variables concerned with parity are age at first marriage, child loss experience, women's working status, duration of breastfeeding, contraceptive use, duration of conjugal life, surviving children, education of women, place of residence, and occupation of husband.

The most important significant variables that influence the high-risk childbearing corresponding to age are place of residence, education of women, religion of women, age at first birth, age at first marriage, duration of conjugal life, women's working status, duration of breastfeeding, contraceptive use, surviving children, and occupation of husband. On the other hand, the variables that influence the low-risk childbearing are duration of breastfeeding and child loss experience.

The variables that influence the high-risk childbearing concerned with birth interval are place of residence, education of women, religion of women, contraceptive use, duration of breastfeeding, duration of conjugal life, child loss experience, women's working status, and occupation of husband. On the other hand, the variables that influence the low-risk childbearing are age at first birth, age at first marriage, surviving children and education of women.

The highly most significant variables that influence the high-risk childbearing corresponding to parity are place of residence, education of women, religion of women, age at first birth, duration of breastfeeding, duration of conjugal life, child loss experience, women's working status and spousal age difference. On the other hand, the variables that influence the low-risk childbearing are age at first marriage and contraceptive use.

Chapter 7
SUMMARY AND CONCLUSION

7.1 Summary of Findings

1. The present study under the title "Correlates of High-risk and Low-risk Childbearing Pattern in Bangladesh" is undertaken with an aim to investigate the reproductive behavior of the women in Bangladesh classified as high-risk and low-risk childbearing. Of course high-risk and low-risk childbearing are age, birth interval and parity dependent and there are so many demographic and socio-economic as well as biological factors that affect the high-risk and low-risk childbearing. In fact, high-risk and low-risk childbearing in a sense are respectively the early plus delayed fertility and the on-time fertility while age is concerned. However, the study is undertaken with respect to age, birth interval and parity of women. The objectives of the study have been (i) to investigate the levels and trends in the childbearing pattern of Bangladeshi women, (ii) to isolate the factors that discriminate high-risk and low-risk childbearing pattern, and (iii) To identify the influencing variables of high-risk and low-risk childbearing pattern

2. The study uses BOHS 1999-2000 data and also data obtained from several other sources. To look at the high-risk and low-risk childbearing with respect to age at an aggregate level several fertility schedules are used. At the individual level relevant data are made available from BOHS 1999-2000. Apart from age, birth interval of per:iultimate child and parity, the demographic and socio-economic variables that are considered in the analysis are age at marriage of women, age at first birth, duration of conjugal life, number of surviving children, child loss experience, spousal age difference, place of residence, education of women, education of

husbands, working status of women and occupation of husbands. In all, the analysis considered seventeen variables. For all 17 variables, data are taken from 10,544 women as recorded in BDHS 1999-2000. With regar9 to quality of data used in the analysis no screening procedure is adopted admitting the fact that BDHS data are assumed to be of good quality, and are widely used and well accepted worldwide. So the analyses are performed using data as they are recorded in BDHS. For the sake of analysis, some classifications/hierarchy are made whenever necessary.

3. In our study, 4947 women are at high-risk childbearing and the rest 5597 are of low-risk childbearing in the context of age of women. About 2503 women according to the birth interval are in childbearing of high-risk and the rest 4847 are of low-risk childbearing. According to the parity, childbearing of 3674 women is of high-risk and majority of women (6870) is of low-risk childbearing.

4. Apart from percent distribution of women possessing various background characteristics, the study uses x^2-analysis to investigate the significance of association between high-risk and low-risk childbearing with the demographic and the socio-economic traits. Recourse of discriminate and multiple logistic techniques are made to isolate the significant factor (s) that discriminate the high-risk and low-risk childbearing groups as well as to evaluate the factors that significantly affect the high-risk and the low-risk childbearing groups as well as to evaluate the factors that significantly affect the high-risk and the low-risk childbearing.

5. Childbearing begins early in Bangladesh with large majority of women becoming mothers before they reach age of 20. It indicates a high incidence of very early childbearing in Bangladesh. In most cases, the first birth occurs between ages 15 and 17; the median age at first birth is 17-18 for all women aged 20 and older. The median birth interval for women age 15-19 is 27 months compared with 48 months for women over age 40. Married adolescents aged 15-19 may have higher fertility desire and lower

contraceptive use. Only one-third women aged 15-19 uses contraceptive methods compared with 47 percent among adult women aged 20-24. Among the currently married women aged 15-49, 18 percent had one child and 20 percent had two children. Tne mean number of children ever born to currently married women is 3.1, while it is 2.58 for at women aged 15-49. Being low age at marriage of Bangladeshi women and in compliance with cultural and social view, a newly married woman gives birth as soon as possible after marriage and takes one or two births before the age of 20. These births may happen with too shorter birth interval.

6. About 43 percent of the women are illiterate and the rest 57 percent had primary or higher education. It is observed that only 30 percent of women live in urban areas against 70 percent in rural areas. From the religious status, it appears that majority of the women (87%) are Muslim. It also appears that majority of women (78%) are currently not working. A considerable (75 percent) are currently using contraception. Most of the husbands (69%) are engaged in manual occupation, i.e., agriculture, landless, agricultural labors, housewife, unemployed, farm, production and others. About 78 percent of women have age difference of six years or more. A considerable 70 percent of women are breastfeeding 12 months or more. And about 45 percent of married women have duration of marriage of 15 years or more.

7. The variables education of women, contraceptive use, working status of women, occupation of husband, duration of conjugal life, child loss experience, age at first marriage, are of first birth, duration of breastfeeding and surviving children are significantly associated with not only age but also with parity and birth interval.

8. Also some demographic and socio economic variables are studied to isolate those that discriminate high-risk from low-risk childbearing in the context of age, birth interval and parity. Out of 17 variables, age at first marriage, duration of conjugal life, age at first birth, contraceptive use, child loss experience, surviving children, education of women, place of residence,

working status of women, spousal age difference, occupation of husband, and duration of breastfeeding are the factors that significantly discriminating high-risk childbearing from low-risk childbearing.

9. From logistic regression analysis, it is revealed that the most significant variables that influence both the high-risk and the low-risk childbearing are age at marriage, place of residence, education of women, duration of conjugal life, child low experience, age at first birth, working status of women, duration of breastfeeding, contraceptive use and occupation of husband.

10. Findings from the study show that 75 percent of women use contraception. Among them 59 percent of women who use contraception have higher birth interval (above 24 months) and 47 percent of women who use contraception have lower fertility (3 or less). Our data also show that 70 percent of women have no child loss experience. About 18 percent of women having age below 20 years and above 35 years are found to have child loss experience. The analysis suggests that child loss experience has a significant positive effect on the childbearing performance. For the present survey population, we too observe a slower transition to the next birth with child loss experience more than a year. The analysis also suggests that duration of conjugal life has a significant positive effect on the childbearing performance. About 17 percent women who are in high-risk by birth interval and 25 percent of women who are in high-risk childbearing by age have completed some education (primary or higher). About 19 percent of women who are in high-risk childbearing and 37 percent of women who are in low-risk childbearing by parity have completed at least primary education. Our data show that there is negative relation between education and fertility. Finding from the study shows about 43 percent of respondents have no education, one in five women has primary education, and less than a percent women has secondary education and above. Improved education and an increase in the age at first marriage are key elements for improving the status of women. Hossain (2000) found that there is a positive relation between education and age at first marriage. Our data supports this relationship.

7.2 Implications of the Study

Childbearing in Bangladesh is characterized by early start of motherhood, quick progress till the peak age of reproduction and slow progress till the end of childbearing period. Also it is a matter of fact that women have less capability to decide how many children they want, when to have them and whether they use contraception or not to avoid or terminate pregnancy. Motherhood is often forced by depriving young women of adequate birth spacing and contraceptive information. Due to traditional customs and norms and societal pressure an adolescent girl is forced to marry early and take birth in quick succession. Early sexual experience combined with a lack of information and services related to reproduction increases the risk of unwanted or unintended and too early pregnancy. At some older ages of reproduction Bangladeshi women are found to be reluctant to stop taking more births than they already have creating some hazards to reproductive performance. Now, the question is-can we bring the women belonging to the high-risk category to the low-risk category.

No doubt that a considerable number of women give birth with high-risk and they belong to both lower age (<20) and upper age (35+) spectrum of reproduction. These women have low age of marriage (53.4% have age of marriage of < 15 years), low age of first birth (49% have first birth at age < 18 years), low duration of breastfeeding (32.3% have breastfeeding duration of < 12 months), no or low level of education (almost all) and no work experience (47.3%). On the other hand, women with low-risk childbearing, more than 60% have age of marriage of 15 years or more, about 62% have given birth at age 18 years and above, nearly 74% have breastfed their children at a duration of 12 months and more greater than 55% have education at level primary and more and about 55% are working. Also there is wide difference in the use of contraception by the women with high-risk and low-risk childbearing (43% against 57%). Now, in order to avoid high-risk childbearing increase in the age of marriage is desirable. Though the stipulated age of Bangladeshi women is 18 years but the average age of marriage is currently around 16 years. Government

should increase the stipulated age of marriage from 18 years to 20 years. Since, in our country no birth occurs beyond marriage, increasing age of marriage will result avoiding high-risk childbearing in the context of age. Also such increase in age of marriage reduces the length of childbearing span. Another way of avoiding high-risk childbearing to women of lower age spectrum is not to take first birth before the age of 20. This is possible by increasing the age of marriage to 20 years as well as using contraception at least by those who get marry before the age of 20. Increase in the level of education as well as creating job opportunities for the adolescents may help increase in the age of marriage. After marriage (before the age of 20) use of contraception is the only way to avoid childbirth before the age of 20. Regarding childbearing after the age of 35 that involves high-risk could be avoided by bringing the women into family planning programmes. For them, permanent FP method is necessary. Menstrual regulation (MR) could be an option (since abortion is not legally permitted).

Regarding high-risk childbearing according to birth interval, every one out of three births is of high-risk. This is true for all characteristics, either socio-economic or demographic, possessed by the women. Avoidance of such childbearing can be done by lengthening the birth interval through lengthening the duration of breastfeeding, using contraception and terminating unwanted or unintended pregnancies. In fact, termination of unwanted or unintended pregnancies are difficult to attain due to some reasons or other, at least for adolescent mothers and for those who are given birth for the first or the second times. Therefore, women of high-risk childbearing should be encouraged for longer period of breastfeeding and to use contraception. This study shows that nearly one out of three women with high-risk childbearing breastfed at a duration of less than 12 month and only 33 percent of women with high-risk childbearing use contraception. There is opportunity to reduce such number if appropriate measures could be taken.

A considerable number of women are in the category of high-risk childbearing according to parity. Percentages of such high-risk category of women

vary according to varying demographic and socio-economic characteristics of women. One of the ways to reduce the number of such women is to make them aware about the boon of taking marry children. Extended use of contraception by them could be a measure to keep their parity below 3. Uptil now we have stressed and try to give some policy implications for women who are in hi_gh-risk childbearing category. No doubt age and parity are the most important attributes that clearly differentiate high-risk and low-risk categories while birth interval is not. Women of high-risk childbearing category may have children having successive birth interval of more than 2 or 3 years or even more. Contrary to that, women belonging to low-risk childbearing category might have children having successive births at interval of less than 24 months. Again, a low parity woman may have more births with longer birth interval vis-a-vis a high parity women may have birth with shorter birth interval. Thus, measures should be taken not only to bring high-risk childbearing women into low-risk childbearing category but also bring all women irrespective of age, parity and birth interval to keep the limit of birth at some replacement level (TFR = 2.13) and space births in planned way to reach the limit. The limit may be 2 or 3 births.

7.3 Recommendations

The following recommendations are made for consideration:

1. Increase the age of marriage of females from 18 years to 20 years. This might be possible by increasing the level of education of adolescent girls providing jobs to those adolescent girls who will not marry before the age of 20.

2. Efforts must be paid to raise the level of use of contraception. Provision should be made to abort pregnancy for safe motherhood. Menstrual regulation (MR) should be encouraged to high parity women.

3. Mothers should encourage to breastfeed their children for a longer period, at last not less than two years.

4. In the case of formidable socio-cultural and economic constraints improve progress has been made in some demographic areas particularly in the areas of early marriage and early childbearing of population of Bangladesh. Significant studies have been made in the areas of population policies and programs including the family planning activities. It is suggested that greater participation of women in development activities might create conditions favorable to the pursuit of population goals. To avoid high-risk pregnancies, emphasis should be given to create job opportunities and improve the status of women through education while formulating population policies and programs.

5. Higher socio-economic status of women will contribute to change the pattern of childbearing. Education of women and employment opportunities, particularly in rural areas will contribute to depress the level of childbearing performance.

6. Education may provide better employment opportunities outside home and providing education to females, especially at the secondary and higher levels can increase age at marriage and age at first birth. Delaying the start of childbearing at young ages would save many women's lives.

7.4 Conclusion

1. High-risk pregnancy is a critical issue in safe motherhood. To ensure safe motherhood, mothers should avoid high-risk p[illegible]egnancy. That is, a woman can participate in childbearing after age of 20 years up to age 35 years. Delaying the start of childbearing at young ages would save many women's lives. Women aged less than 20 years face a higher risk of dying from pregnancy and childbirth than women aged 20-34 years about twice as high as women in their twenties.

2. To ensure save motherhood, the 1994 International Conference on Population and Development encourages high-risk women to have access to safe, effective, affordable and acceptable methods of family planning of their choice, ... and the right of access to appropriate health care services that will enable women to go safely through pregnancy and childbirth (ICPD, 1994).

3. Family planning can be an effective way to avoid high-risk pregnancies. While healthy needs vary in different areas, family planning is one service that is appropriate and beneficial in almost all settings. At the Alma Ata conference family planning was listed as one of the basic components of primary health care (WHO, 1978). In 1984, the United Nations Children's Emergency Fund (UNICEF) endorsed family planning as on of high-priority techniques for improving child health, along with breastfeeding, immunization, female education and growth monitoring. The government of Bangladesh has undertaken an extensive family planning program to reduce population growth in the country. Improvement of health and nutritional status of children as well as creation of job opportunities particularly for women and increasing the education level of women may have decrease high-risk childbearing and changing the pattern of childbearing. To achieve these, integrated poverty alleviation programs need to be strengthened.

4. Bangladesh is tried hard to accelerate its momentum towards achieving the Mid-Decade and World Summit for Children Goals and Millennium Development Goals regarding Health of both mothers and children. Already much has been accomplished and is on target to achieve the goals, with the exception of the one for malnutrition.

5. The present study is a modest attempt to categorize the variables into two ways and to analyze the high-risk and low-risk childbearing pattern in context of prevailing socio-economic conditions. There is no doubt about the contributions of childbearing pattern in regulating population growth of the country. Reasonably and hopefully it is believed that in the light of findings of the study, policy makers and planners will show a congenial and judicious path for the development of Bangladesh.

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