

Fertility: The dynamic of birth interval in Bangladesh

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Abstract:

The study attempts to investigate birth interval patterns and its determinants in Bangladesh, using the data of Bangladesh Demographic and Health survey 1993-94. The finding shows that most of the women try to have their first child as soon as possible after their first marriage. The estimated median months and cumulative proportion at specified months by residence, education, and regions were obtained by using life table methods. Hazard Model was used to estimate the effects of mothers` education, age at first marriage, urban-rural residence, sex of the previous sibling, and status of the previous child (whether the previous child died) on birth interval. The results of this study support that mothers` education, age at first marriage and urban-rural residence have significant effects on first birth interval. For second and third birth intervals mother`s education and status of previous child have highly significant effect. The finding also shows that the second and third birth intervals are shorter in Chittagong division compare to other divisions in Bangladesh. Education, marriage patterns, breast-feeding and use of contraception are affecting to limits births that are amenable to policy.

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CHAPTER ONE: INTRODUCTION

1.1 Background of study

Bangladesh is a highly populous country in the world. According to 1991 census, the population density is over 800 people per square kilometer. The Total Fertility Rate (TFR) in Bangladesh dropped from 5.5 births per woman in 1985 to 4.2 in 1991. In Bangladesh the family planning program was introduced during the 1960s. At the initial stage, family planning program was to promote

abstinence, and the fertility rate does not come down to a reasonable level till now, after more than 30 years. It has been established that the shorter the birth interval, the higher the fertility rate. There is a lot of contributing factors that influence the birth interval. But here we are trying to focus on the effects of mothers' education, urban rural residence, age at first marriage, and regional variation on birth interval in Bangladesh.

A woman's birth interval patterns not only determine her pace of childbearing but also reflects the likelihood that she will progress to a higher parity, which, in turn, determine her completed family size.

From birth interval pattern we can infer the fertility behaviour and level of contraceptive use in Bangladesh. Until recently, little research has addressed these questions, which have important research and family planning policy implications for Bangladeshi population.

Therefore, an examination of the relationship between the order specific birth interval length and various social and demographic variables at the individual level may shed some light on the relative importance of various factors that contribute to fertility decline as well as on the factors that create obstacles to further fertility reduction.

An understanding of these relationships can also help policy makers and family planning workers to identify groups that are more likely to progress to a higher parity and to make informed decisions on the priorities and strategies of the family planning program. The understanding of the effects of the above-mentioned variables on birth interval is necessary to the success of family planning program. The result of this study may be used by family planning policy makers and managers, public health specialists, and population researchers in Bangladesh and outside of the country to formulate the appropriate policy and program in family planning.

1.2 Study objectives:

The purpose of this study is to describe the birth interval pattern for Bangladeshi women. More precisely:

- (a) To observe the patterns of birth interval and its determinants;
- (b) To provide information necessary for the promotion of family planning, and health programs.

CHAPTER TWO : LITERATURE REVIEW

2.1 Birth interval, breast-feeding and infant and child mortality in Bangladesh

A study (Muhuri PK, Menken JA, 1993: 34) focused on the birth conception interval (BCI) and gender of the index child from ages 1-4 years and the next younger sibling. The result of this analysis showed that short-term effects on mortality were associated with the presence of 0-3 month old younger sibling. The effects at age 1 may be due to weaning or the burden of pregnancy and caring for a young child; the impact was minimal (2%). The effect at ages 2 and 3 were greater for girls and independent of the effects of one or more older sister, which also increased the mortality of girls. Closely spaced subsequent pregnancies may mean earlier weaning for girls or less medical care. The long-term effects were due to the presence of a young toddler (.5 to 1.5 years old) for children at ages 2, 3 and 4. Longer BCIs increase survival risk: family planning programs should stress longer birth intervals.

Another study (Majumder AK, 1991) analysed the data to learn the impact of breast feeding birth intervals and the impact of both breast feeding and birth intervals on early mortality. Indeed they indicated that preceding birth interval, timing of next conception, and breast feeding each separately influence mortality at an early age. The child mortality risk at ages 1-4 months was lower for the group with an alive preceding sibling than those from the group with a dead preceding sibling.

Yet there was no difference in the risk of dying at 5-8 months between these 2 groups. Furthermore, the group with a preceding sibling alive had a higher risk of dying at 9-59 months, than the group with no preceding

sibling alive. Therefore, competition is the more plausible mechanism of the influence of the survival status of the preceding child on mortality in childhood or late infancy.

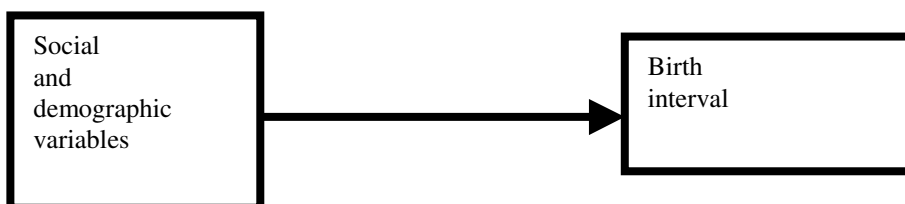
2.2 Birth interval, breast-feeding, and infant and child mortality in other countries

A study (Tu, 1991) of Shaanxi, China shows that most women try to have their first birth as soon as possible after their first marriage, and that the length of the interval between marriage and first birth is strongly correlated with the women's age at first marriage. The length of the second and third birth intervals and likelihood of going on to have a second or third birth are strongly influenced by the sex composition of children already born, the survival time of the child initiating the interval, the duration of breast feeding, and the women's occupation. There is significant regional variation in the length of birth intervals and in the prevalence of second and third births in Shaanxi. The findings indicate that China's child policy is far from being universally implemented in Shaanxi, including its urban areas. The persistence of many social, economic, institutional, and cultural factors promoting high fertility poses many obstacles to further fertility decline.

A study shows that in Nepal breast-feeding almost completely explains the effects of following birth interval on childhood mortality during the first 18 months of age and partially explains the effect of following birth interval on childhood mortality between 18 and 60 months of age. Breast-feeding does not explain the effect of preceding birth interval on childhood mortality. Studies conducted in the United States (Wray 1971) and Great Britain (Federick and Adelstein 1973) showed higher mortality among children conceived shortly following a birth. Surveys carried out in Punjabi Villages in India, in East and West Africa, and in some countries in Latin America (Colombia, Ecuador) not only confirmed this relation, but also pointed to some mechanisms through which birth intervals operate (Wyon and Gordon 1962; Wolfers and Scrimshaw 1975; Wray and Aguirre 1969). Across-sectional study of 26 developing countries showed that, although variable in their magnitude, the positive effects of long intervals between births on infant survival were almost always statistically significant (Hobcraft et al. 1983). All of these studies have sought to measure the magnitude of the relation between birth intervals and infant mortality itself rather than sorting out the birth interval pattern. Despite the number of studies that have been conducted in the past, there still is no consensus about the effect of socio-economic and demographic impact on birth interval in Bangladesh. The present study examines the impact of socioeconomic and demographic characteristics on birth interval based on the 1993-94 Bangladesh Demographic and Health Survey.

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CHAPTER THREE. CONCEPTUAL FRAMEWORK AND HYPOTHESIS



It is expected that social and demographic variables influence birth-interval. In the conceptual framework of this study, demographic and social characteristics of the women are independent variables. The dependent variable is women's birth interval.

3.1 Definition and measurement of variables

In this framework, variables will be grouped and analyzed as follows:

- a. Dependent variable: Birth Intervals
- b. Independent variables: Demographic and social

Social variables:

- level of mother's education;
- rural urban residence; and
- region.

Demographic variables:

- the sex composition of the children already born; -maternal age;
- previous sibling mortality; and
- parity.

3.2 Hypothesis

There are many socio-economic and demographic characteristics that may influence the birth interval. Five of these characteristics may strongly influence birth interval: age at first marriage, mother's education, urban-rural residence, sex of the previous child, and whether the previous child alive or dead. When all the characteristics are analysed, we may find:

With regard to educational attainment we hypothesized that: higher the educational level of mothers, longer the birth interval, and ultimately lower the fertility.

If a woman gets married at the early age, her birth interval will be longer.

Rural women give subsequent births within a shorter period of previous birth than the urban women.

If the previous child is a girl the women give subsequent birth within a shorter period of previous birth.

If the previous child is dead the women give subsequent birth within a shorter period of previous birth.

CHAPTER FOUR: DATA AND METHODS

4.1 SOURCE OF DATA AND METHOD OF DATA COLLECTION

The data from the 1993-94 Demographic and Health Survey in Bangladesh are used. The survey was conducted under the authority of the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. Mitra and Associates implemented the survey. Macro International Inc. of Calverton, Maryland provided technical assistance to the project as part of the international Demographic and Health Surveys program. The u.s. Agency for International Development (USAID), Dhaka Bangladesh provided financial assistance.

The Bangladesh Demographic and Health Survey (BDHS) was conducted from 17 November 1993 through 12 March 1994. Four types of questionnaires were used for the BDHS: a Household Questionnaire, a Woman's Questionnaire, a Husband's questionnaire and a Service Availability Questionnaire. The contents of these questionnaires were based on the DHS Model Questionnaire, designed for use in countries with relatively high levels of contraceptive use.

Here we only discuss about women's questionnaire because women are our interest of study. The Women's Questionnaire was used to collect information from ever- married women age 10-49.

These women were asked questions on the following topics:

- Background characteristics (age, education, religion, etc.),
- Reproductive history
- Knowledge and use of family planning methods,

- Prenatal and delivery care,
- Breast-feeding and weaning practices,
- Vaccinations and health of children under age three,
- Marriage,
- Fertility preferences, and
- Husband's background and respondent's occupation.

Bangladesh is divided into five administrative divisions, 64 districts, and 489 thanas. In rural areas thanas are divided into unions and then mauzas, an administrative land unit. Urban areas are divided into wards and then mahallas. The 1993-94 BDHS employed a national -representative, two-stage sample. It was selected from the integrated Multi-Purpose Master Sample (IMPS), newly created by the Bangladesh Bureau of Statistics. The IMPS is based on 1991 census data. Each of the five divisions was stratified into three groups: (1) statistical metropolitan areas (SMAs), (2) municipalities (other urban areas), and (3) rural areas. The primary sampling unit was the mauza in rural areas, and the mahalla in urban areas. A total of 304 primary sampling units were selected for the BDHS (30 in SMAs, 40 in municipalities, and 234 in rural areas), out of the 372 in the IMPS. It was expected that the sample would yield interviews with approximately 10,000 ever-married women age 10-49 and 4,200 of their husbands.

4.2 Structure to identify and to compare determinants

This study is to observe the patterns of birth intervals in Bangladesh by mother's age, parity, education, previous sibling mortality and rural-urban residence.

4.3 Description of variables to be used in the analysis by type

Variable	Operational definition	Type
Dependent:		
	Birth interval	previous birth interval groups
		Categorical
Independent:		
A. Bio-demographic:	previous sibling mortality	Dummy
	parity	Categorical
B. Background characteristics:	mother's age	Categorical
	mother's education	Categorical
	sex of the child	Dummy
	residence	Dummy
	region	Categorical

4.4 Definition and classification of key variables:

1. BIRTH INTERVAL: women, who married between 1984 and 1993, are used to analyze the distribution of the length of the interval between marriage and first birth (referred to hereafter as the first birth interval). Women who had their first birth are used to analyze the distribution of the length of the interval from first to second birth (referred to hereafter as second birth interval), women who had their second birth are used to analyze the distribution of the length of the interval from second to third birth (referred to hereafter as the third birth interval) and women who had their third birth during the same period are used to analyze the distribution of the length of the interval from third to fourth birth (referred to hereafter as the fourth birth interval). These four groups of women are referred to as women of parity 0, parity 1, parity 2, and parity 3 throughout this report.

2. MOTHER'S AGE: Age in complete years (within reproductive age). Reproductive years is defined in the questionnaire as the age 15-49 years, because very few women given birth to a child in less than 15 years of age. To simplify the analysis, age will be classified into 3 age groups, e.g. 15-24, 25-34 and 35-49 years.

3. RELIGION: The classified groups of religion are Muslim (-the vast majority), Hindu, and others.
4. MARITAL STATUS: Whether the respondent is married, unmarried, divorced, widowed and separated.
5. AGE AT FIRST MARRIAGE: Age at the first marriage of the respondents.
6. EDUCATIONAL STATUS: Women's level of education in this study are classified as: no schooling, primary, secondary, and college/university.
7. NUMBER OF LIVE BIRTHS: # of live births the respondent has experienced since her first marriage
8. NUMBER OF LIVING CHILDREN: # of living children of the respondent at the time of survey. Possible classified into : 0, 1-2, 3-4, 5-6 and 7+ children.
9. AGE OF THE YOUNGEST CHILDREN: The respondent's last child age.
10. DESIRED # OF CHILDREN: # of the children as desired by the respondent. Will be classified into: 0, 1-2, 3-4 children.
11. REGION: 1=Barisal, 2=Chittagong, 3=Dhaka, 4=Khulna and 5=Rajshahi.

4.4 PLANNING OF DATA ANALYSIS

The analysis of this study was at the individual level, using each married woman who was interviewed in IMPS as the unit of analysis. Descriptive analysis and frequency distributions were done to observe characteristics of the-variables. A chi-square test was employed to test significance of the relationships between dependent and independent variables. For the analysis of data with censored observations, survival analysis techniques are appropriate.

The life table method is used to estimate the cumulative proportion of women of parity 0, 1, 2, and 3 who went on to have a first or subsequent birth at various intervals, and Cox's hazard regression model is used to estimate the relative effects of various covariates on the hazard for a woman to go on to have a first or subsequent birth at parity 0, 1, 2, and 3. The statistical package SPSS is used in this analysis.

The independent variables used in the hazard models were selected based on a preliminary exploratory analysis of the data, with reference to the results of some past studies (Arnold and Liu, 1986; Freedman et al, 1988; Wang, 1989; Tu, 1991). These variables are classified into two categories: demographic variables include the survival time of the child initiating the interval (referred to hereafter as the index child), the sex composition of the children already born, Mother's age at first marriage. The socio-economic variables consist of level of mother's education, rural-urban residence, and regional variation. Since our interest is to estimate the overall effects of various socio-economic and demographic variables on birth interval, we do not include contraceptive use in our model, because doing so would lead to a seriously biased estimate of the effects on the length of the birth intervals of many other independent variables that influence the length through their impact on contraceptive use. And due to lack of sufficient information on breast feeding and women occupation we do not include these two variables in our model, either.

CHAPTER FIVE: BACKGROUND CHARACTERISTICS OF RESPONDENTS

In this section we try to show the characteristics of the respondents in terms of age, age at first marriage, age at first birth, marital status, residence, education and region.

Table 5 – 1: Percentage distribution of ever-married women and currently married by selected background characteristics, Bangladesh 1993-94

Characteristics	Ever-married women (percent)	Currently married women (percent)
Age group (years):		
<15	1.5	1.6
15 – 19	13.2	13.6
20 – 24	21.1	21.9
25 – 29	20.9	21.3
30 – 34	15.1	15.1
35 – 39	12.4	12.0
40 – 44	9.0	8.5
45 – 49	6.8	6.0
Marital status		
Married	93.2	100.0
Widowed	4.0	0.00
Divorced/separated	2.8	0.00
Residence		
Urban	11.5	11.3
Rural	88.5	88.7
Education		
No schooling	58.1	56.7
primary	27.0	27.8
Secondary/higher	14.9	15.5
Religion		
Islam	87.8	87.7
Hinduism	11.6	11.7
Christianity	0.4	0.4
Buddhism	0.1	0.1
Total	100.0	100.0
Source: BDHS 1993-94		

5.1 Background Characteristics of the Respondents

Table 5-1 shows the distribution of the respondents by selected characteristics. The majority (57 percent) of ever-married women was under 30 years of age, and only 16 percent were in the age group of 40-49 years. The distribution of currently married women was similar to that of ever-married women. Among the ever-married women, more than nine in ten are currently married (93 percent). Only 4 percent have been widowed, and 3 percent are divorced or separated.

The majority of ever-married women (58 percent) and currently married women (57 percent) has never been attended school. Only 25 percent have completed primary school and 15 percent have secondary and higher level of education. About 89 percent of ever-married and currently married women live in rural areas and only 11 percent live in urban areas.

Most of the ever-married and currently married women were interviewed from Dhaka (31 percent) division, followed by Chittagong (26 percent), Rajshahi (24 percent), Khulna (13 percent) and Barisal (6 percent) division.

Almost nine out of ten ever-married and currently married women are Muslims (88 percent) and the rest are Hindus.

Table 5–2: Percentage Distribution of EMW by Age at First Marriage and Selected Characteristics, Bangladesh 1993-94

Characteristics	Age at first marriage						Number of cases
	<15	15 - 19	20 - 24	25 - 29	30 - 34	Total	
Bangladesh	63.0	31.7	4.9	0.4	0.0	100.0	9182
Current age (years)							
15 – 24	56.9	39.1	4.0	0.0	0.0	100.0	3182
25 – 34	58.8	33.3	7.0	0.8	0.1	100.0	3282
35 – 49	73.9	22.3	3.1	0.5	0.1	100.0	2573
Place of residence							
Urban	55.2	34.9	8.9	1.0	0.1	100.0	1377
Rural	64.4	31.2	4.1	0.3	0.0	100.0	7805
Respondent's education							
No schooling	69.8	26.4	3.4	0.4	0.0	100.0	5161
Primary	64.4	32.2	3.2	0.2	0.0	100.0	2598
Secondary	39.4	51.3	8.5	0.6	0.1	100.0	1241
College/university	10.4	42.3	42.3	4.4	0.5	100.0	182
Region							
Barisal	62.0	33.0	4.7	0.3	0.0	100.0	973
Chittagong	54.1	38.3	6.8	0.8	0.1	100.0	1931
Dhaka	63.6	31.1	4.7	0.5	0.1	100.0	2633
Khulna	63.8	32.1	3.8	0.3	0.0	100.0	1196
Rajshahi	69.5	26.4	4.7	0.2	0.0	100.0	2448

($p < 0.01$) based on Chi-square test for the mentioned variables.

Note: 145 women were below 15 years of age when interview were conducted.

5.2 Age at First Marriage/Union

Although menarche can probably be considered as a lower age limit to a woman's fecund life, the start of actual childbearing depends on subsequent exposure to sexual intercourse. Age at first marriage could probably identify the start of exposure to the risk of conception for majority-of women as long as premarital sex and conception are not rampant in the country.

Furthermore, the operational definition of marriage adopted in the 1993-94 BDHS was loose enough to include all women living together with their partners, whether or not a formal wedding ceremony had been performed.

The results in table 5-2 show that the majority (63 percent) of the women married below the age of 15 and about 95 percent of women married below age of 20. The percentage married of younger cohorts was less than the older cohorts. About 57 percent of younger cohorts and 74 percent of older cohorts married before age of 15. It indicates that early marriage is decreasing over the years. 9 percent higher rural women married before age of 15 (55 percent for urban women and 64 percent for rural women). 70 percent of women with no schooling, 64 percent of women with primary level, 39 percent of women with secondary level and only 10 percent of women with college/university level women married before age of 15.

Table 5–3: Percentage Distribution of EMW by Age at First Birth and Selected Characteristics, Bangladesh 1993-94

Characteristics	Age at first birth							Number of cases
	<15	15 - 19	20 - 24	25 - 29	30 - 34	35+	Total	
Bangladesh	13.2	67.6	16.9	1.9	0.3	0.0	100.0	8542

Current age (years)								
15 - 24	13.1	74.7	12.1	0.0	0.0	0.0	100.0	2519
25 - 34	11.4	63.5	21.1	3.0	0.3	0.0	100.0	3347
35 - 49	15.4	66.1	15.4	2.4	0.6	0.1	100.0	2667
Place of residence								
Urban	12.5	62.2	20.6	3.6	0.5	0.2	100.0	1306
Rural	13.4	68.5	16.3	1.6	0.3	0.0	100.0	7236
Respondent's education								
No schooling	15.2	67.7	15.1	1.7	0.3	0.0	100.0	4913
Primary	12.8	71.3	14.4	1.4	0.1	0.0	100.0	2359
Secondary	6.9	64.8	24.4	2.5	0.7	0.2	100.0	1100
College/university	2.9	28.2	54.7	12.4	1.8	0.0	100.0	170
Region								
Barisal	9.2	69.8	19.1	1.8	0.1	0.0	100.0	1108
Chittagong	10.7	66.9	19.1	2.5	0.7	0.0	100.0	1778
Dhaka	14.0	66.6	17.3	1.7	0.3	0.1	100.0	2463
Khulna	13.9	67.7	15.8	2.4	0.2	0.0	100.0	2287
Rajshahi	15.7	68.2	14.5	1.4	0.2	0.0	100.0	906

(p<0.01) based on Chi-square test for the mentioned variables.

Note: 9 women gave their first birth before age 15.

5.3 Age at First Birth

Table 5-3 shows the distribution of age at first birth by selected characteristics. More than 80 percent of women gave their first birth before age of 20 in Bangladesh. 13 percent of younger cohorts (15-24 years) gave their first birth before age of 15, on the other hand 15 percent of older cohorts. 75 percent of urban and 82 percent of rural women gave their first birth before age of 20. The percentage of first births among the women before age of 15 and 20 declines with the increase in educational level. Afterward, the percentage of first birth among the women after age 20 increases with the increase in educational level. The percentage of first birth before age of 15 of Barisal and Chittagong division was lower compare to other divisions. Because in Bangladesh, the educational level of Barisal and Chittagong division is higher than other parts of Bangladesh.

Table 5-4: Median age at first marriage, first and subsequent births (in years) and selected characteristics, Bangladesh 1993-94

Characteristics	Age at first marriage, first and subsequent birth						
	1st marriage	1st birth	2nd birth	3rd birth	4th birth	5th birth	6th birth
Bangladesh	14.49	17.43	20.23	23.72	26.93	30.22	33.54
Current age (years)							
15 - 24	14.76	17.52	20.94	na	na	na	na
25 - 34	14.85	17.70	20.75	23.97	27.38	30.99	na
35 - 49	13.78	17.00	19.96	22.97	25.97	29.09	32.34
p-value*	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Place of residence							
Urban	15.24	18.24	21.43	24.44	27.76	31.11	34.37
Rural	14.36	16.98	20.06	23.23	26.43	29.71	33.00
p-value*	0.0000	0.0000	0.0000	0.6947	0.1700	0.0043	0.2390
Respondent's education							
No schooling	13.85	16.75	19.58	22.47	25.33	28.29	31.29
Primary	14.35	17.05	19.91	22.84	25.83	28.82	31.82
Secondary	15.87	18.25	21.36	24.74	28.22	32.09	35.93
College/university	19.61	21.66	25.66	32.25	40.80	na	na

p-value*	0.0000	0.0000	0.0000	0.0000	0.0006	0.5125	0.6280
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* significance based on the Wilcoxon (Gehan) test.

na = not applicable

In Bangladesh, marriage of girls is almost universal and mostly takes place at the early ages. Table 5-5 shows that median age at first marriage of Bangladeshi women was around 15 years. With a significant difference the age at first marriage of younger age group women was slightly longer than older age group women. Urban women married about a year later (15.24 years) than rural women (14.36 years), and the difference was statistically significant.

As expected, age at first marriage was positively related with education, with women in the highest educational category marrying over five years later than those in the lowest educational category. Age at first marriage of college/university level women was 6 years older than no schooling and primary level women. The difference of age at first marriage was highly significant. The average age at first birth was 17.37 years.

Within three years of marriage all women gave their first birth except college/university level women. They gave first birth within two years of marriage. Education of the mother was inversely related with age at first birth. Those who had no education gave birth to their first child 5 years earlier, on average, than those who reached college. All women gave their second and subsequent birth every two years except the women who were college/university educated gave second birth about four years later from their first birth.

CHAPTER SIX: BIRTH INTERVAL PATTERNS

6.1 Birth interval patterns by residence

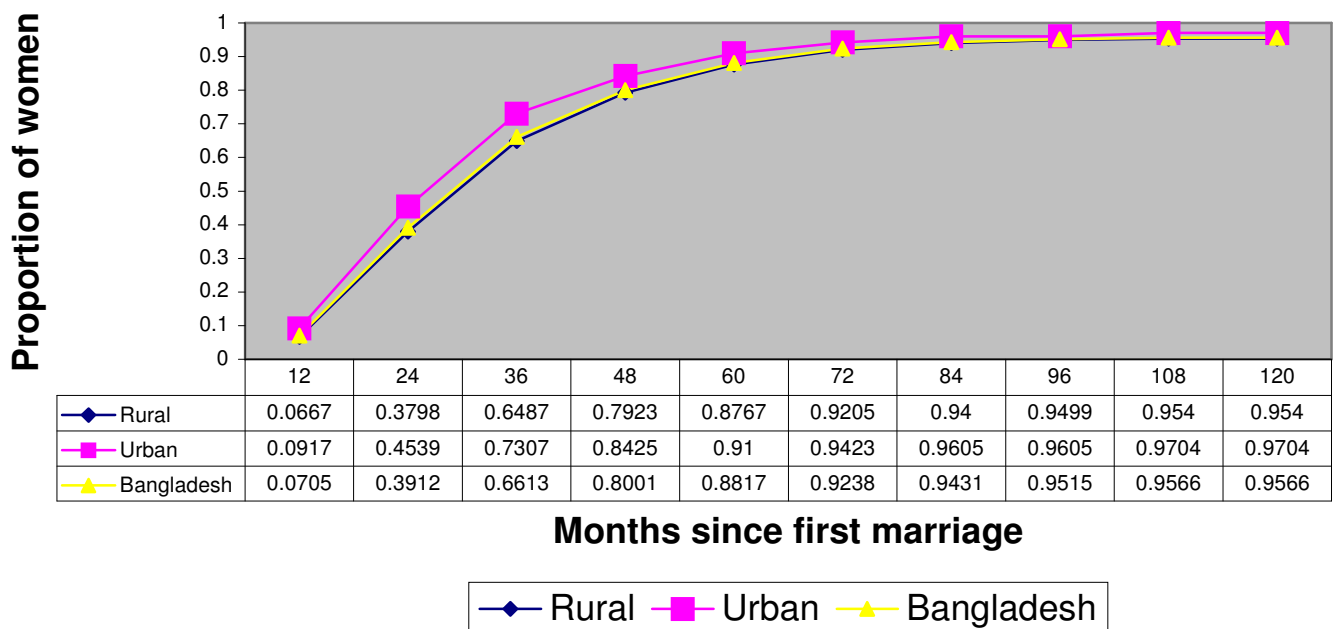
In this section we try to show the cumulative proportion of women who married in 1984-93 and who had their first and subsequent births corresponding estimated length of birth intervals by residence.

Table 6-1. The cumulative proportion of women who had a first birth and the corresponding median length of birth intervals, by residence, Bangladesh 1993-94

Months (since first marriage)	Rural	Urban	Bangladesh
12	0.0667	0.0917	0.0705
24	0.3798	0.4539	0.3912
36	0.6487	0.7307	0.6613
48	0.7923	0.8425	0.8001
60	0.8767	0.91	0.8817
72	0.9205	0.9423	0.9238
84	0.94	0.9605	0.9431
96	0.9499	0.9605	0.9515
108	0.954	0.9704	0.9566
120	0.954	0.9704	0.9566
Median	28.60	25.43	28.04
N	2831	513	3344

Note: the difference in the length of first birth interval between rural and urban is statistically significant (p<0.001), based on the Wilcoxon (Gehan) test.

Figure 1: Proportion of women married in 1984 -93, who had their first birth, by residence, Bangladesh



The estimated median length of first birth interval was 28.04 months. 38 percent of rural women and 45 percent of urban women gave their first birth within two years of marriage, with a significant difference in the median length between rural and urban women (28.60 & 25.43 months respectively).

Table 6-2. The cumulative proportion of women who had a second birth and the corresponding median length of birth intervals, by residence, Bangladesh 1993-94

Months (since first birth)	Rural	Urban	Bangladesh
12	0.0109	0.0051	0.006
24	0.1883	0.2039	0.1909
36	0.4449	0.366	0.4318
48	0.6337	0.5516	0.62
60	0.7611	0.6805	0.7471
72	0.8302	0.7894	0.8237
84	0.871	0.8005	0.8575
96	0.9005	0.8448	0.8898
108	0.9005	0.8448	0.8898
120	0.9005	0.8448	0.8898
Median	39.10	44.26	40.35
N	2056	383	2439

Note: the difference in the length of second birth interval between rural and urban is not statistically significant ($p=0.1768$), based on the Wilcoxon (Gehan) test.

Figure 2: Proportion of women who went on to have a second birth by residence, Bangladesh 1993-94

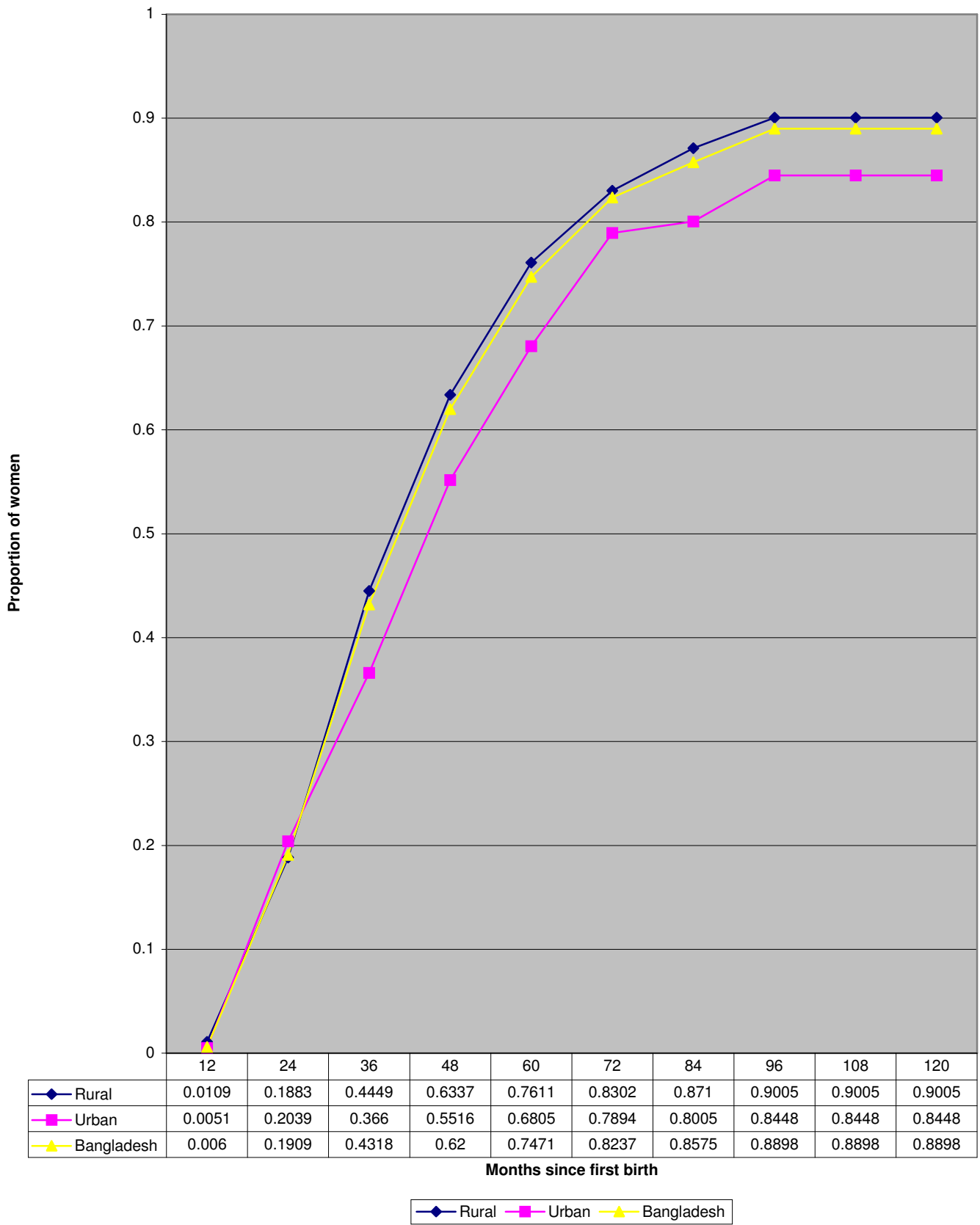


Table 6-2 and figure 2 show the distribution of second birth interval. The cumulative proportion of women who went on to have a second birth increased slowly with the number of months since their first birth, and the rural-urban differential in the length of second birth interval was greater than that of first birth. In the case of first birth interval the estimated median length for rural women was 3 months greater than urban women. But for the second birth interval the estimated median length for urban women is five months longer than the rural women. I believe, in the rural area, women got married very early age in life (Bee table 5-4), even sometimes, when they were not fecund yet. For this reason, first birth interval of rural women is longer than the urban women.

The estimated median length of second birth interval was 40 months (44 months for urban women and 39 months for rural women). Breast feeding and use of contraception lead to delayed pregnancy and as a result the

second birth interval in all areas is longer than the first birth interval.76 percent of rural women and 68 percent of urban women gave second birth within five years of first birth.

Table 6-3. The cumulative proportion of women who had a third birth and the corresponding median length of birth intervals, by residence, Bangladesh 1993-94

Months (since second births)	Rural	Urban	Bangladesh
12	0.0074	0	0.0062
24	0.1504	0.1111	0.1444
36	0.3847	0.2584	0.3657
48	0.5689	0.388	0.5411
60	0.7126	0.463	0.6749
72	0.7997	0.576	0.7667
84	0.8283	0.576	0.7926
96	0.8283	0.576	0.7926
108	0.8283	0.576	0.7926
120	0.8283	0.576	0.7926
Median	42.84	63.55	45.19
N	1024	195	1219

Note: the difference in the length of third birth interval between rural and urban is statistically significant ($p < 0.01$), based on the Wilcoxon (Gehan) test.

Figure 3: Proportion of women who went to have a third birth by residence, Bangladesh 1993-94

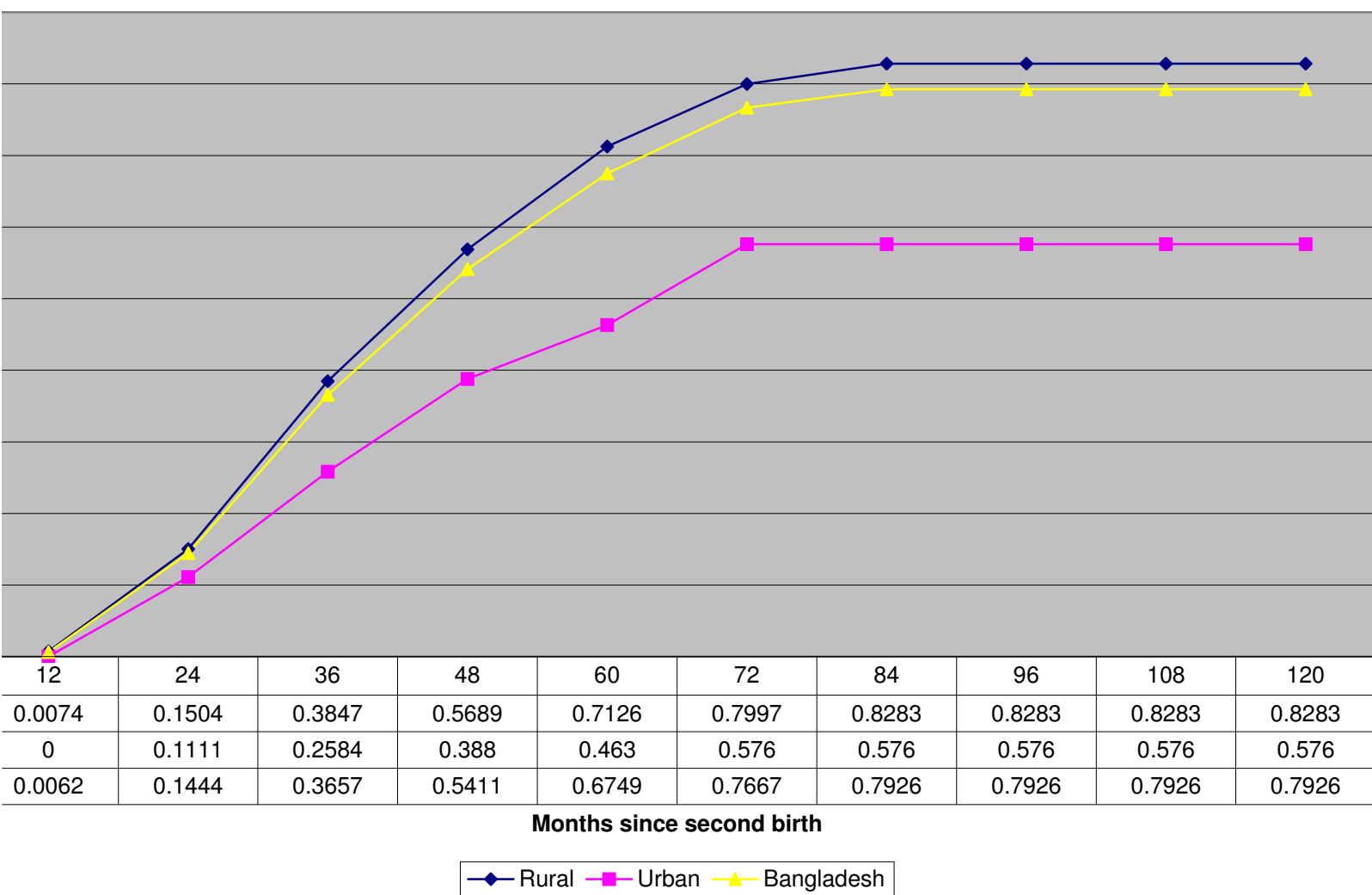


Table 6-4. The cumulative proportion of women who had a fourth birth and the corresponding median length of birth intervals, by residence, Bangladesh 1993-94

Months (since third birth)	Rural	Urban	Bangladesh
24	0.1295	0.2	0.137
36	0.412	0.3655	0.4057
48	0.6717	0.4713	0.6461
60	0.732	0.4713	0.6939
72	0.732	0.4713	0.7955
84	0.732	0.4713	0.7955
Median	39.09	na	40.71
N	354	43	397

Note: the difference in the length of fourth birth interval between rural and urban is not statistically significant ($p=0.7684$), based on the Wilcoxon (Gehan) test.

Figure 4: Proportion of women who went to have a fourth birth by residence, Bangladesh

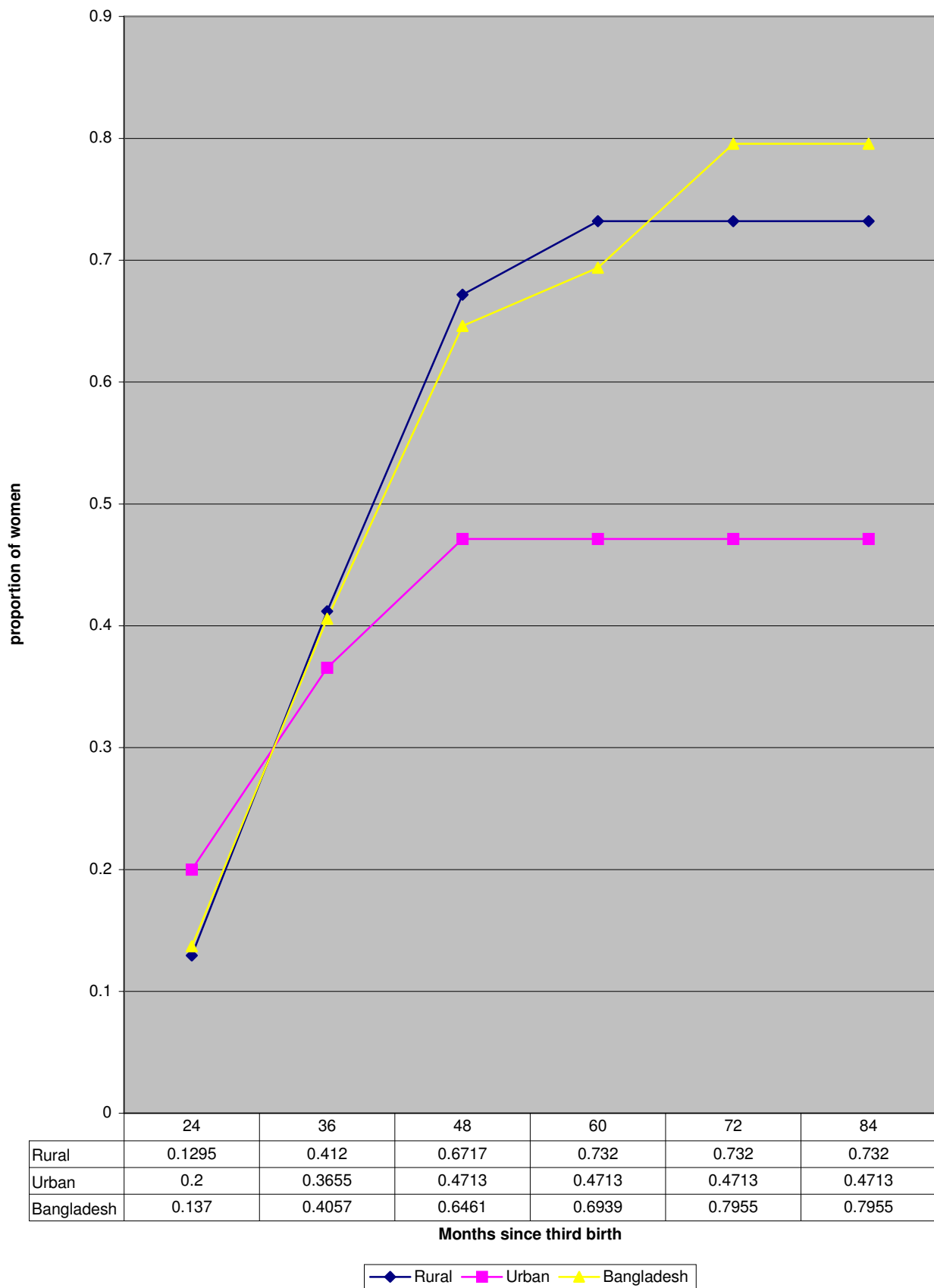


Table 6-5. The cumulative proportion of women who had a first birth interval and the corresponding median length of birth intervals, by education, Bangladesh 1993-94

Months (since first marriage)	No schooling	Primary	Secondary	College & university
12	0.062	0.0614	0.0889	0.1132
24	0.3546	0.3935	0.457	0.4866
36	0.6281	0.6808	0.6997	0.7259

48	0.7694	0.8227	0.8334	0.8406
60	0.8563	0.8926	0.9174	0.9522
72	0.9046	0.9356	0.9443	0.9841
84	0.9224	0.958	0.9657	0.9841
96	0.933	0.9624	0.9743	0.9841
108	0.9403	0.9708	0.9743	0.9841
120	0.9403	0.9708	0.9743	0.9841
Median	30.38	28.45	26.13	24.67
N	1533	1015	655	141

Note: The difference in the length of first birth interval by education is statistically significant ($p < 0.001$), based on the Wilcoxon (Gehan) test.

Figure 5: Proportion of women married in 1984-93 who had a first birth by education, Bangladesh

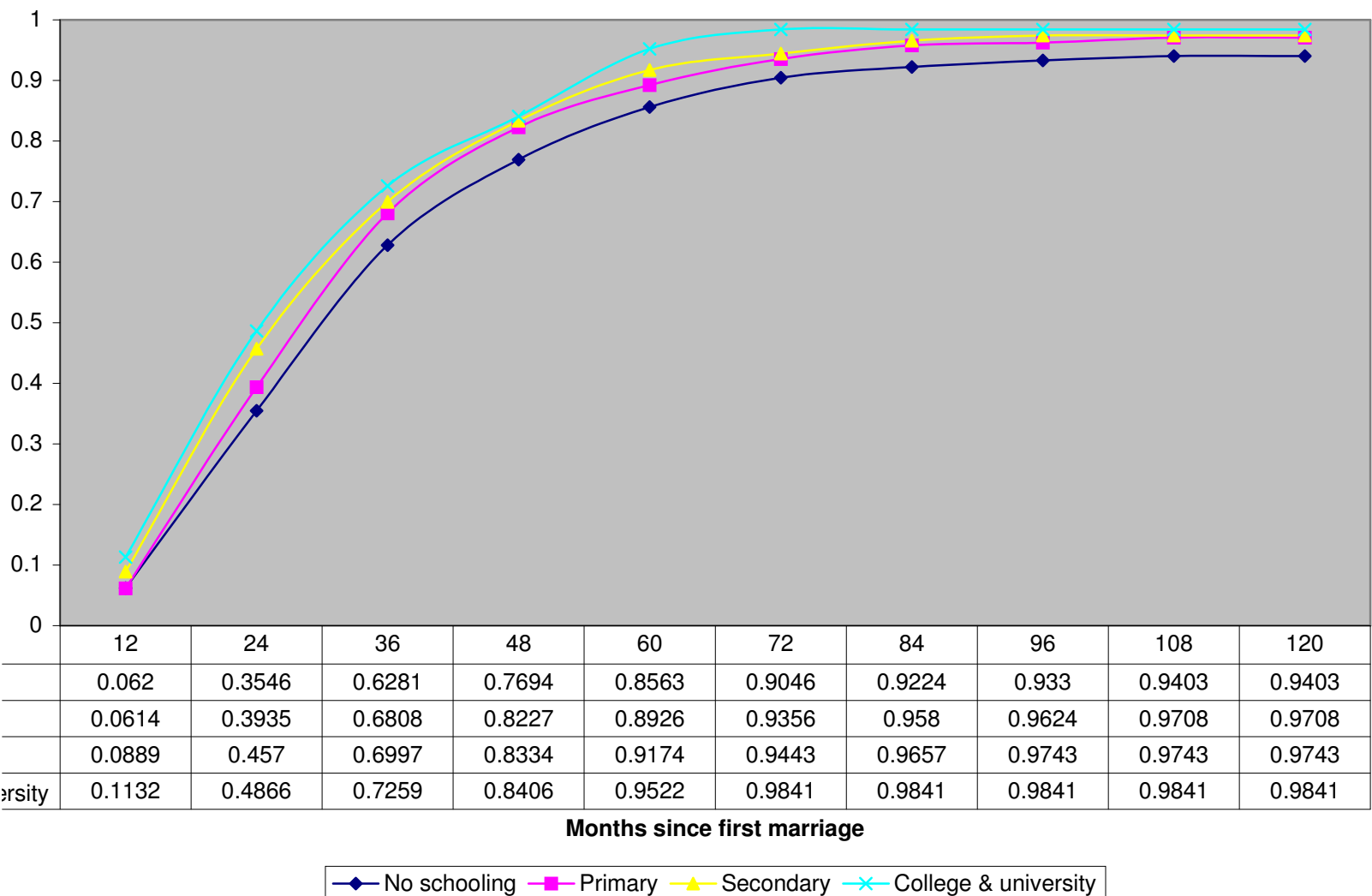


Table 6-5 and figure 5 show that women who married during 1984-93 and who were college/university educated women had a shorter first birth interval than no schooling and primary level women. College/university level women got married later and they tried to get first child within short period of marriage.

About 50 percent college/university level women gave birth within two years of marriage. On the contrary, 35 percent of women with no schooling and 39 percent of women with primary level gave their first birth within two years of marriage. With a statistically significant difference, the median length of first birth interval for no schooling, primary, secondary and college or university level women were 30.38, 28.45, 26.13 and 24.67 months respectively.

Table 6-6. The cumulative proportion of women who had a second birth and the corresponding median length of birth intervals, by education, Bangladesh 1993-94.

Months (since first birth)	No schooling	Primary	Secondary	College & university
12	0.0065	0.0015	0.0091	0.0093
24	0.2015	0.1949	0.1863	0.1149
36	0.4821	0.4353	0.3554	0.2682
48	0.6737	0.6288	0.5343	0.4599
60	0.7667	0.7842	0.7243	0.5538
72	0.8329	0.8472	0.8289	0.7254
84	0.9103	0.9049	0.8289	0.7254
96	0.9103	0.9049	0.8289	0.7254
108	0.9103	0.9049	0.8289	0.7254
120	0.9103	0.9049	0.8289	0.7254
Median	37.12	40.01	45.7	53.12
N	1132	738	470	99

Note: The difference in the length of second birth interval by education is statistically significant ($p < 0.001$), based on the Wilcoxon (Gehan) test.

Figure 6: Proportion of women who went to have a second birth by education, Bangladesh

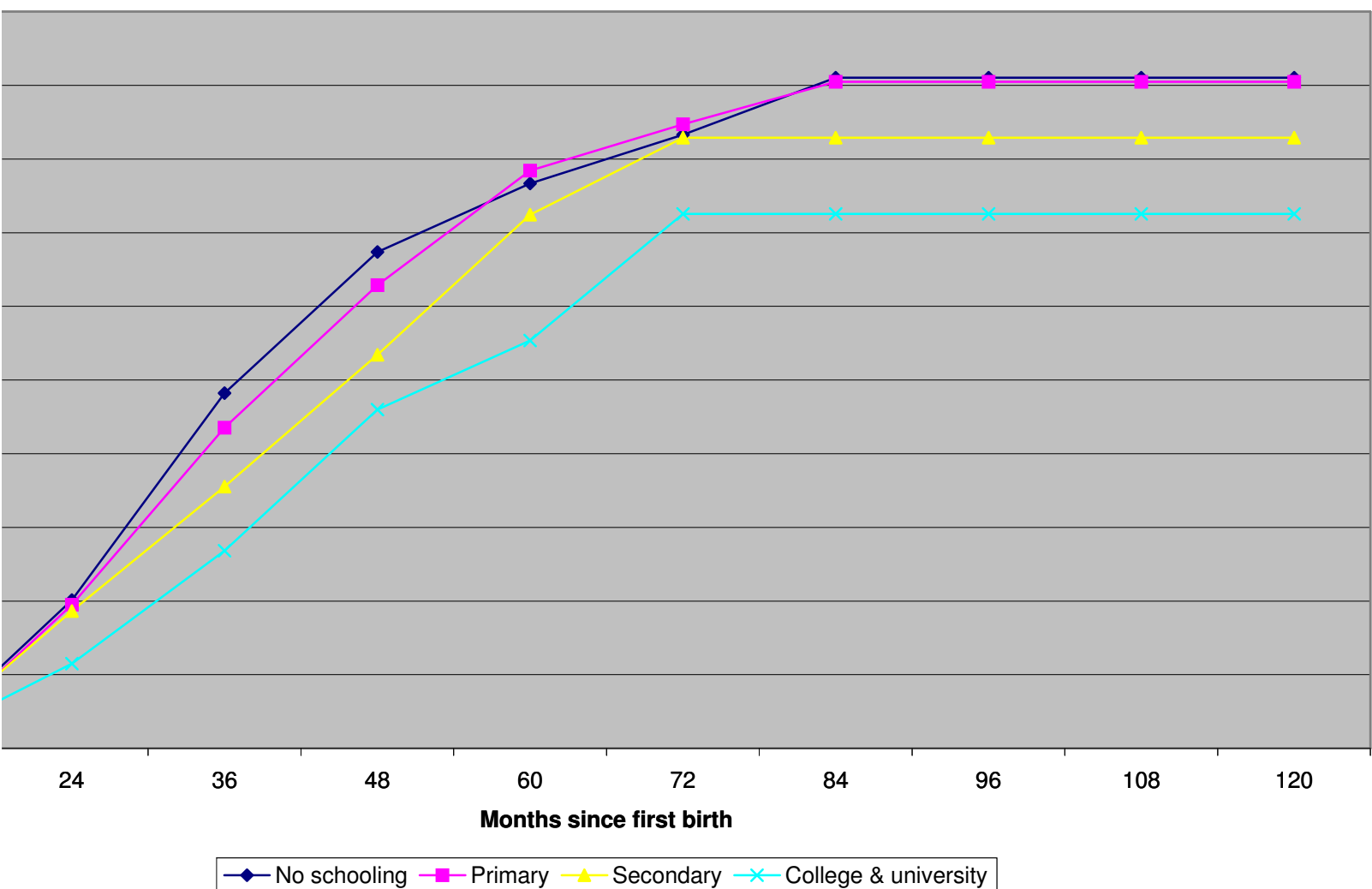


Table 6-6 and figure 6 show the distribution of second birth interval by education. The cumulative proportion of women who went on to have a second birth increased slowly with the number of months since their first birth. The distribution of the length of, the second birth interval was quite different from that of first birth. And by different educational level, the length of second birth interval was greater than that of first birth. Primary level women gave second birth 3 months later than those who had no education; secondary level women gave second birth five months- later than those who who were at the primary level; and college/university level women gave their second birth eight months later than those who were at the secondary level. 48 percent women with no schooling and 44 percent of primary level women gave their second birth within three years of their first birth- while 36 percent women with secondary and 27 percent women with college/university level women.

Table 6-7. The cumulative proportion of women who had a third birth and the corresponding median length of birth intervals, by education, Bangladesh 1993-94.

Months (since second birth)	No schooling	Primary	Secondary	College & university
12	0.0177	0.0155	0.0295	0
24	0.1534	0.1567	0.1159	0.1053
36	0.4291	0.3364	0.2864	0.1536
48	0.625	0.5351	0.352	0.3008
60	0.7608	0.6739	0.479	0.3008
72	0.8426	0.7981	0.5369	0.3008
84	0.8426	0.8654	0.5369	0.3008
96	0.8426	0.8654	0.5369	0.3008
108	0.8426	0.8654	0.5369	0.3008
Median	40.34	45.88	64.34	na
N	619	363	196	41

Note: The difference in the length of third birth interval by education is not statistically significant (p=0.1797), based on the Wilcoxon (Gehan) test.

na= not available

Figure 7: Proportion of women who went on to have a third birth by education

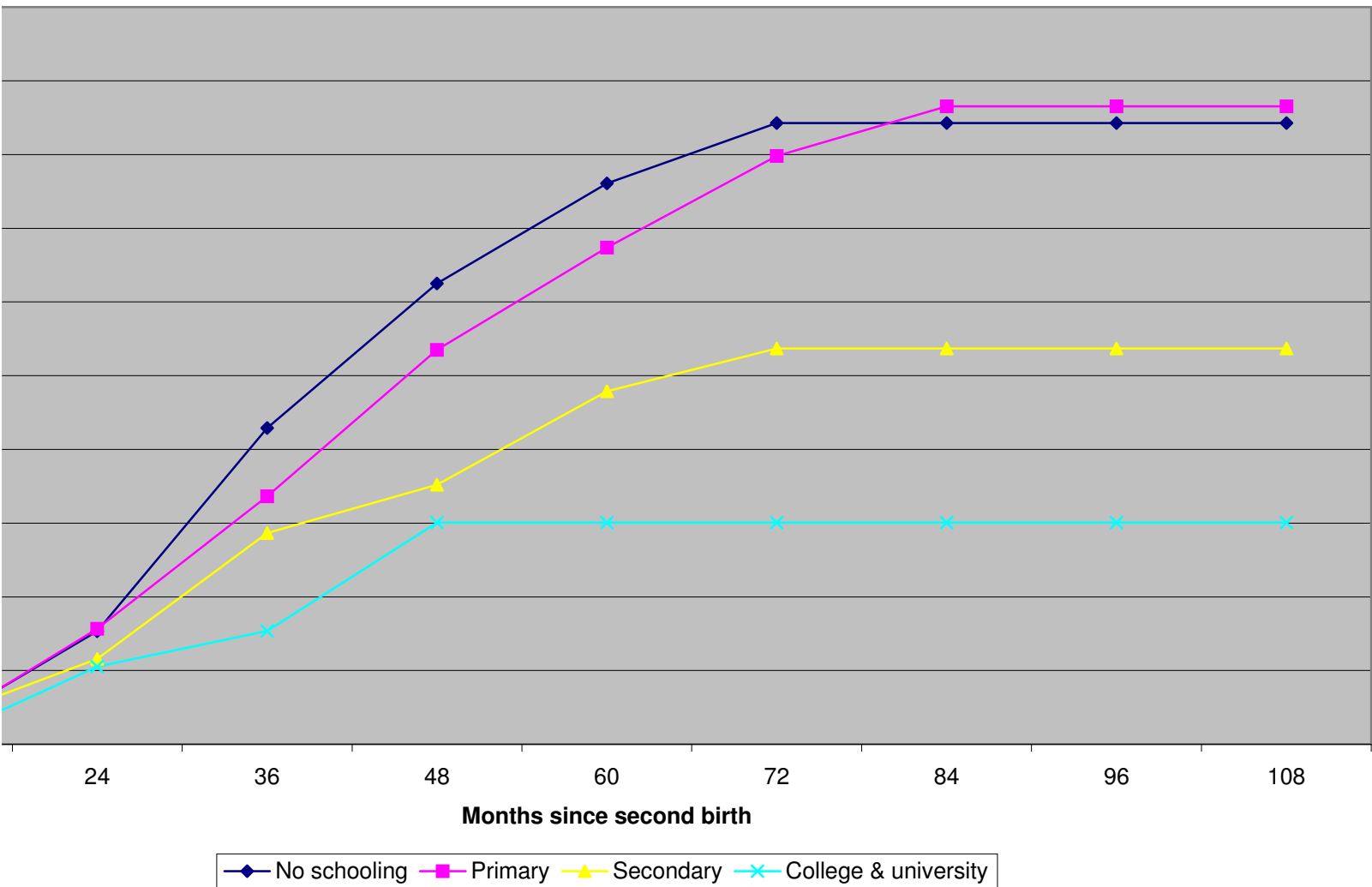


Table 6-8. The cumulative proportion of women who had a fourth birth and the corresponding median length of birth intervals, by education, Bangladesh 1993-94.

Months (since third birth)	No schooling	Primary	Secondary	College & university
24	0.4616	0.3207	0.4857	0
36	0.6742	0.7089	0.6914	0
48	0.7828	0.7089	0.6914	0
60	0.74828	0.7089	0.6914	0
72	0.7828	0.7089	0.6914	0
84	0.7828	0.7089	0.6914	0
Median	37.98	41.54	36.83	
N	241	110	40	

Note: The difference in the length of fourth birth interval by education is not statistically significant ($p=0.0733$), based on the Wilcoxon (Gehan) test.

Figure 8: Proportion of women who went to have a fourth birth by education

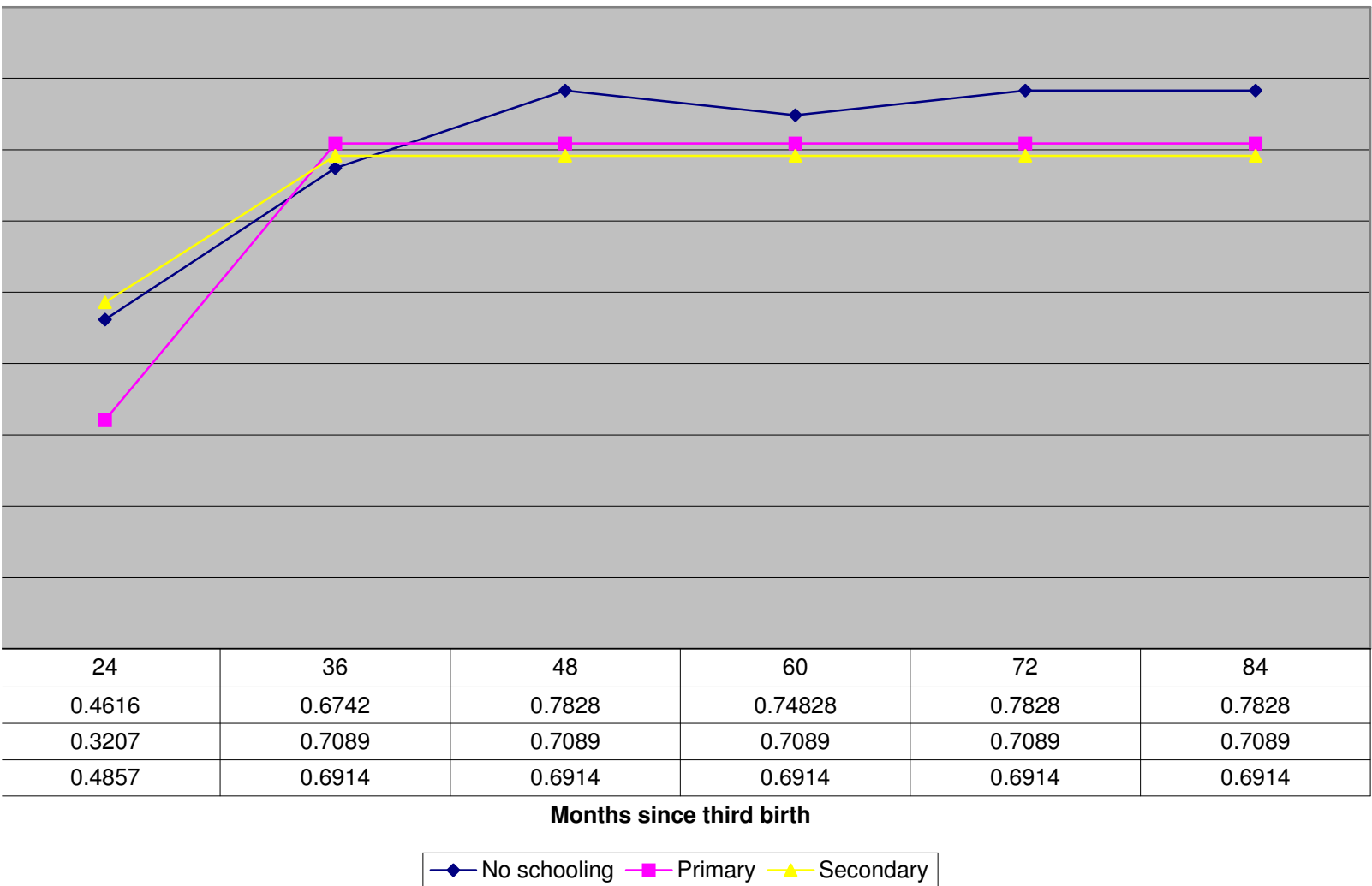


Table 6-8 and figure 8 show that estimated median length of fourth birth interval is less than the median length of third birth interval. The estimated median length of fourth birth interval was 38 months for no schooling women, 42 months for primary level and 37 months for secondary level women respectively.

Table 6-9. The cumulative proportion of women who had a first birth and the corresponding median length of birth intervals, by region, Bangladesh 1993-94.

Months (since first marriage)	Barisal	Chittagong	Dhaka	Khulna	Rajshahi
12	0.0556	0.0815	0.0755	0.0605	0.0605
24	0.3692	0.4283	0.4182	0.3386	0.3694
36	0.6223	0.6826	0.6812	0.618	0.6545
48	0.7966	0.7987	0.8029	0.7984	0.7914
60	0.8859	0.8729	0.8905	0.8694	0.8685
72	0.9476	0.8963	0.9307	0.9279	0.9116
84	0.9556	0.9358	0.9467	0.9339	0.929
96	0.9556	0.9429	0.9505	0.9516	0.9439
108	0.9734	0.9543	0.9505	0.9516	0.949
120	0.9734	0.9543	0.9505	0.9516	0.949
Median	30.2	27.38	27.73	30.93	29.5
N	343	612	1010	456	923

Note: The difference in the length of first birth interval by region is statistically significant ($p < 0.05$), based on the Wilcoxon (Gehan) test.

Table 6-10. The cumulative proportion of women who had a second birth and the corresponding median length of birth intervals, by region, Bangladesh 1993-94.

Months (since first birth)	Barisal	Chittagong	Dhaka	Khulna	Rajshahi
12	0.0085	0.0815	0.0755	0.0605	0.0605
24	0.1973	0.4283	0.4182	0.3386	0.3694
36	0.3763	0.6826	0.6812	0.618	0.6545
48	0.5666	0.7987	0.8029	0.7984	0.7914
60	0.7927	0.8729	0.8905	0.8694	0.8685
72	0.8816	0.8963	0.9307	0.9279	0.9116
84	0.921	0.9358	0.9467	0.9339	0.929
96	0.9605	0.9429	0.9505	0.9516	0.9439
108	0.9605	0.9543	0.9505	0.9516	0.949
120	0.9605	0.9543	0.9505	0.9516	0.949
Median	43.8	34.47	39.61	45.24	42.13
N	251	443	754	327	664

Note: The difference in the length of second birth interval by region is statistically significant ($p < 0.05$), based on the Wilcoxon (Gehan) test.

Table 6-11. The cumulative proportion of women who had a third birth and the corresponding median length of birth intervals, by region, Bangladesh 1993-94.

Months (since second birth)	Barisal	Chittagong	Dhaka	Khulna	Rajshahi
12	0.0339	0.0276	0.0029	0.0232	0.0147
24	0.1333	0.1584	0.161	0.1162	0.1292
36	0.3663	0.4707	0.3708	0.2991	0.309
48	0.5337	0.6471	0.5241	0.5371	0.5172
60	0.6319	0.7647	0.6728	0.5812	0.6138
72	0.7955	0.832	0.7601	0.7335	0.7241
84	0.7955	0.832	0.7601	0.7335	0.7241
96	0.7955	0.832	0.7601	0.7335	0.7241
108	0.7955	0.832	0.7601	0.7335	0.7241
120	0.7955	0.832	0.7601	0.7335	0.7241
Median	45.58	38	46.11	46.13	47.01
N	138	243	380	152	306

Note: The difference in the length of third birth interval by region is not statistically significant ($p = 0.1375$), based on the Wilcoxon (Gehan) test.

Table 6-12. The cumulative proportion of women who had a fourth birth and the corresponding median length of birth intervals, by region, Bangladesh 1993-94.

Months (since third birth)	Barisal	Chittagong	Dhaka	Khulna	Rajshahi
24	0.1364	0.1261	0.1961	0.1026	0.086
36	0.2589	0.4969	0.4775	0.2821	0.1935
48	0.7174	0.7713	0.715	0.5214	0.4868
60	0.7174	0.7713	0.8575	0.5214	0.4868
72	0.7174	0.7713	0.8575	0.5214	0.4868
84	0.7174	0.7713	0.8575	0.5214	0.4868
96	0.7174	0.7713	0.8575	0.5214	0.4868
108	0.7174	0.7713	0.8575	0.5214	0.4868
120	0.7174	0.7713	0.8575	0.5214	0.4868
Median	35.12	36.14	46.11	46.93	
N	42	91	135	38	91

Note: The difference in the length of fourth birth interval by region is statistically significant ($p=0.1423$), based on the Wilcoxon (Gehan) test.

Table 6-10 and figure 10 show the distribution of second birth interval by region. The cumulative proportion of women who went on to have a second birth increased slowly with the number of months since their first birth. The length of the second birth interval was longer than that of first birth. Women from Barisal gave second birth 13 months difference from their first birth, women from Chittagong gave second birth 7 months difference from their first birth, women from Dhaka gave second birth 12 months difference from their first birth, women from Khulna gave their second birth 15 months difference from their first birth and women from Rajshahi gave their second birth 13 months difference from their first birth. 37 percent, 54 percent, 45 percent, 36 percent and 41 percent of women from Barisal, Chittagong, Dhaka, Khulna and Rajshahi respectively gave their second birth within three years of first birth.

Table 6-12 and figure 12 show that estimated median length of fourth birth interval is shorter than the median length of third birth interval. The estimated median length of fourth birth interval was 35 months for Barisal, 36 months for Chittagong, 37 months for Dhaka, and 47 months for Khulna division respectively. 53 percent women from Barisal, 50 percent women from Chittagong, 48 percent women from Dhaka, and 28 percent women from Khulna division gave their fourth birth within three years of their third birth.

Now question may arise why fourth birth interval is shorter than third birth interval. I think, they are the higher parity of women and they want more children.

CHAPTER SEVEN: HAZARD ANALYSIS FOR DETERMINATION OF BIRTH INTERVALS

In this section, we try to find the effects of education, age at first marriage, residence, sex of previous child, whether the previous child died, and regional variation on birth interval.

Table 7-1: Estimated relative hazards of having first or subsequent birth by women's parity, Bangladesh 1993-94

Variables	Parity0	Parity1	Parity2	Parity3
	exp (β)	exp (β)	exp (β)	exp (β)
Mother's education:				
No schooling	0.8732**	1.1475*	1.3798*	15.7701
Primary	0.8322**	1.1402*	1.2243	11.5720
Secondary	1.1384	1.0058	0.8627	15.8777
College/university	-	-	-	-
Age at first marriage:				
<15 years	0.6126**	4.8164	10.8315	0.9872
15-19 years	0.7381*	4.7245	12.5192	0.7881
20-24 years	0.6746	3.682	9.1862	na
25-29 years	0.5579	2.2671	na	na
30+ years	-	-	-	-
Residence:				
Urban	0.8824*	1.0741	1.4134	1.0052
Rural	-	-	-	-
Previous sibling died:				
Yes	na	2.2689***	2.8181***	0.9063
No	-	-	-	-
Sex of previous child:				
Boy	na	1.0949	1.111	0.6989
Girl	-	-	-	-
Region:				
Barisal	0.9706	1.0111	0.9681	1.0652
Chittagong	1.0562	1.3465***	1.4060**	1.0619
Dhaka	1.0701	0.9902	0.9825	0.919
Khulna	0.9351	0.8492*	0.8656	1.8576
Rajshahi	-	-	-	-
Number of cases	3223	2075	969	264
*P<0.05 **P<0.01 ***P<0.001				
Note: The dash (-) indicates the reference group and na = not applicable.				

Since most couples in Bangladesh do not practice contraception before they have had one child, it is expected that the length of first birth interval depend mainly on fecundity and coital frequency. The results of the hazard analysis showed in Table 7-1. The couples' social characteristics measured by their level of education, urban-rural residence, and age at first marriage and region. Women's education has highly significant effect on

the length of their first birth interval. Women with no education or primary education had longer first birth interval than the women with secondary and college or university education. But from second birth the result shows that the primary and secondary level women's birth interval was shorter than the college or university level women. According to the residence, urban women gave their first birth later, and the difference was statistically significant. But there is no significant urban-rural difference in the length of second and subsequent birth intervals. A women's age at first marriage had a highly significant effect on the length of the first birth interval. Women who married late had a shorter first birth interval than those who married early. Here women who got married less than 15 years and between 15-19 years had significantly longer first birth intervals. There was no significant regional difference on the length of first birth interval in Bangladesh.

For second and subsequent birth intervals the sex of the index child and whether the previous sibling died included in the model. If the previous child was girl, the length of second and subsequent birth interval was shorter but not statistically significant. If the previous sibling died, the length of second and third birth interval was shorter and highly significant. Women from Chittagong division had a shorter second and third birth interval than other division of Bangladesh and the difference was statistically significant. Probably women from Chittagong division are very conservative and don't like to practice contraception.

CHAPTER EIGHT: DISCUSSION AND POLICY RECOMMENDATIONS.

Over the year's fertility declined slowly in Bangladesh. But it is still high, TFR per women is 4.2 according to the 1991 census. Further decline in fertility is subject to policy implication, out look of the clients, social, cultural, education and demographic factors, and the effects of these factors on fertility should no longer be ignored.

This study shows that the first birth intervals are very short in Bangladesh, where women try to have their first child as soon as possible after marriage. The length of the first birth interval is mainly determined by fecundity, which is closely correlated with a women's age.

Analysis of BDHS data reveals the timing of entry into motherhood, subsequent birth interval patterns, and average completed family size and average family size. In Bangladesh most men give their first birth within 17 years of age, second and subsequent births about every three years (see table 5-4).

The median values of first, second, third and fourth birth intervals were obtained by life table methods. As the data suggested, the first birth interval an average of about 28 months see table 6-1). And from second to fourth birth intervals were n between 40 and 45 months (see table 6-2, 6-3, and 6-4).

With several minor exceptions, the median time between live births increases with parity. The length of the subsequent intervals is affected by whether the older child has survived. If it has not, then the mother will have cease lactation earlier, and ovulation will have returned earlier, so a shorter birth interval is likely to eventuate. The length of the subsequent birth interval will be shorter if the previous child is girl.

My results highlight the importance of mother's education and mother's age at first marriage on birth interval in an impoverished environment. Higher educated women gave first birth within two years of marriage, because they got married later than those who were at the primary and secondary level. For second birth they gave four years later. More research is needed to isolate further the duration of breast-feeding and practice of contraception on birth interval and to determine the factors that support birth interval patterns.

Since interventions to improve levels of female education are desirable on several other grounds (e.g., to improve women's status and, quite likely, help to lower fertility), the nearly findings on association with birth interval reinforce the importance of improving educational system. Much more needs to be discovered about the pathways through which maternal education contributes to longer birth interval. Moreover, there is a need to study whether and how far the key benefits for birth spacing can be conveyed to those women with fewer years of schooling, inside or outside the formal education sector.

The study strongly reinforces the proposition that family planning program can indeed help to prolong birth intervals (through delayed child bearing to at least age 18 and possibly to age 20, and more especially through achieving birth intervals of at least 36 months). Family planning program can contribute to reduce high fertility, and this effect can be reinforced by improving the information, education and communication (IEC) aspects of programs concerning the timing of births and by establishing supplies of methods which are relevant to spacing births.

Contraceptive use in Chittagong division is consistently below those of the other four divisions. Government and Non-government organization should pay more attention to Chittagong division to find out-what are the

reasons for the relatively low contraceptive use in Chittagong division, and what are the best ways that can be taken to improve contraceptive use.

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