

## **SOCIO-CULTURAL DYNAMICS OF BIRTH INTERVALS IN NEPAL**

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Event histories such as birth, pregnancy, and marriage have been used by social scientists to study fertility behaviour of women. Birth history analysis undoubtedly provides useful information regarding reproduction and family formation. Fertility depends not only on the decisions of couples but also on many socioeconomic, demographic, health-related as well as tradition-related and emotional factors. The factors affecting fertility may have varying effects on child spacing. Thus, birth intervals experienced by women may reveal some insights about their reproduction patterns. Moreover, a detailed analysis of the sequence of steps in the childbearing process could provide a more comprehensive picture of the dynamics of fertility transitions (Hirschman and Rindfuss, 1980). The purpose of this paper is to analyze three consecutive birth intervals to gain a better understanding of the fertility behaviour of Nepalese women.

Bongaart (1978) found that the level of fertility in a group of women depends mainly on four intermediate variables: the proportion that is married, postpartum infecundability, contraception, and induced abortion. In other words, differences in exposure to the risk of pregnancy and differences in the length of time between births when women are exposed may contribute to differentials in childbearing levels (Trussell et al., 1985). Whatever the cause, the length of birth intervals may vary from one population of women to another.

Social scientists believe that differences in birth-interval lengths are explained by varying breastfeeding patterns, contraceptive use, frequency of intercourse, incidence of abortion, and fecundity (Trussell et al., 1985). Differences in other factors such as women's roles and status and the value of children may also influence the birth intervals. There is no doubt that the

socioeconomic, demographic, health and cultural background of a country, consequently that of women, affects the above factors. In addition, factors affecting family size were found to vary by birth parity (West, 1987).

### **Factors Affecting Birth Intervals**

Women's education and age at marriage are the most widely analyzed determinants of birth intervals. The former is found to have a substantial effect on birth-interval length (Hirschman and Rindfuss, 1980; Rindfuss et al., 1983). However, in a study done in a village of Kerala State in India, Nair (1996) did not find any significant effects in terms of the education of women either on the first or the second or the third birth intervals. In addition, female education was found to be an insignificant determinant of the risk of pregnancy in Malaysia, the Philippines, and Indonesia (Trussell et al., 1985). Nevertheless, male education and occupation were found to be significant determinants of fertility in Indonesia and the Philippines.

Age at marriage is considered to be an important variable in the fertility process. If couples marry at a very young age, decisions on number of children, use of contraceptives, and the like may be formed at a less mature age, consequently affecting the birth interval (Bumpass et al., 1978). Furthermore, since the effect of age at marriage possibly operates through biological and maturational factors rather than with respect to coital frequency (Kallan and Udry, 1986), age at marriage may have a varied effect on different birth intervals. Age at marriage correlates to age at first birth. For young women, West (1987) found that the first birth is an important determinant at the transition from parity one to parity two. For older women, he found its importance at the transition from parity two to parity three. Interestingly, his findings also showed that the younger a woman is at first birth, the higher the transition probability. In another study, Abdel-Aziz (1983) concluded that the later a Jordanian girl marries, the swifter she will bear her first child. A similar result was found in Nepal. The women of Tamang ethnicity, who married at age 19 or older, had higher chances of childbirth than those marrying at younger age (Fricke and Teachman, 1993).

A couple's decision on the timing of the first baby or the second or the third may depend on traditional norms and cultural practices as well. Ethnicity was found to be an important determinant of pregnancy in Malaysia (Rindfuss et al., 1983). Nair's (1996) analysis of birth intervals suggested that a significant differential existed between Hindus and Muslims in Kerala for the

first and the second birth intervals, but not for the third birth interval. Confucian women were found to have their first birth at least 2.5 to 3 years later than Muslim and Hindu women (Rindfuss et al., 1983). This suggests that religion is an important factor in the fertility behaviour of women in Asia.

Place of residence may be another important factor influencing birth intervals. According to the place of residence, people's customs and lifestyles may differ. Rural women may breastfeed for a longer duration than urban women, urban women may use contraceptives more often than rural women, and the socioeconomic status of urban women may be higher than that of rural women, resulting in better health and knowledge of and easier access to contraception for the former.

There have been a few empirical studies done in Nepal on birth intervals. However, the diversified cultural and religious practices, preference for sons, varied lifestyles in different regions of the country, different types of marriages (such as arranged, cross-cousin, capture, elopement, polygynous, fraternal polyandry, and self-spouse selection) in different ethnic groups, illegality of abortion, and social environments make research on this area not only interesting but also rewarding to gain insight into the fertility behaviour of Nepalese women.

This article intends to explore several questions regarding the socioeconomic, demographic, and cultural differentials on birth intervals. Do the levels of education and different occupations of women or their spouses affect the timing of births? Does age has to do anything with the birth intervals? Do the cultural and religious differences of women affect the duration of births? Or is it the sex of the first/second child/children that determines the waiting period between the later births? What factors influence birth intervals the most for the women in the past and the young women today?

### **Data and Methods**

The data source for this study is the Nepal Fertility, Family Planning and Health Survey, 1991, which was conducted under the Demographic Health Survey (DHS), Macro International Inc., Maryland, U.S.A. The sample size was 25,384, of which 5.3 percent were urban and 94.7 percent were rural women. The sample unit is women in the age group 15-49 who were living with their husbands at the time of the survey.

Time-constant Cox regression is used for the statistical analysis of the data. The model, also known as the Cox proportional hazards model, is given by:

$$h(t) = [h_0(t)]e^{B_1X_1 + B_2X_2 + \dots + B_nX_n}$$

where,  $X_1, X_2, \dots, X_n$  are the covariates (i.e. independent variables)

$B_1, B_2, \dots, B_n$  are the respective coefficients of each covariate that are also known as relative risks in the Cox regression.

$h_0(t)$  is the common baseline (reference group) hazard or duration-dependent risk. The duration dependent risk is the "chance of being pregnant" in this case.

$h(t)$ , the hazard function (birth interval or duration variable in this case), is the dependent variable. This is the product of the duration-dependent risk  $h_0(t)$  and the effect of  $X_1, X_2, \dots, X_n$  for any given set of values of these variables.

The hazard function enables one to estimate the relative risks of other groups in relation to the baseline group (Balkrishnan et al., 1987). Cox regression is useful for analyzing events with duration-specific risks. Furthermore, the Cox regression model can be used to analyze data that contain censored observations (Norusis, 1994). Multiple linear regressions cannot be used for analysis of time-to-event data because it cannot handle censored observations. Censoring is caused by the incomplete experience of the events studied (Halli and Rao, 1992). Only event history analysis can make use of the information on censored (incomplete) observations.

For the current study, the "events" are the first union with a husband, the first birth, the second birth and the third birth. Censoring in this case is "no birth" or non-occurrence of birth in a particular "event" of birth. Thus, the cases in which women do not have any children until the day of the survey are "censored" cases for the first birth interval. Those women who already have one child but have not given birth to a second child until the day of the survey are "censored" for the second birth interval. Similarly, women with only two children on the survey day are "censored" cases for the third birth interval.

The dependent variables are the first birth interval (duration of marriage to the first birth), the second birth interval (duration between the first and the second births), and the third birth interval (period between the second and the third births). Each dependent variable is analyzed separately by Cox regression. The independent variables selected are respondent's place of residence, religion, ethnicity, current age, age at first union (with the

husband), cash earning, education, occupation, education of husband, occupation of husband, and sex of previous child/children.

### Measurement

Among the independent variables, "age of respondent" and "age at first union" are measured by the actual age in years. Residence is recoded as urban 1 and rural 0, cash earning as earning 1 and not earning 0, sex as male 1 and female 0 for both the second and the third births. In all the cases, '0' denotes the reference category. Ethnicity, religion, education, and occupation are categorical variables, recoded as 1 to 4 or 1 to 5 (Table 1).

**Table 1 : Measurement of Categorical Variables**

Variable	Categories	Value <sup>1</sup>
Ethnicity <sup>2</sup>	Brahmin+ Chhetri	1
	Newar	2
	Mongoloid groups	3
	Other	4
Religion	Hindu	1
	Buddhist	2
	Muslim	3
	Other	4
Education Level	Never attended school to Primary Level (0 to grade 5)	1
	Middle school level (grade 6 to 9)	2
	School Leaving Certificate. (SLC or grade 10) <sup>3</sup>	3
	Post secondary level	4
Occupation	Agriculture	1
	Business + Cottage industry Service (administrators, technicians, professionals, etc.)	2
	Daily wages	4
	Other (students, unemployed, etc.)	5

### Limitations

In spite of useful information regarding fertility behaviour and family formation, birth history analysis has several limitations. Recall lapse by the

older women is one of the most reported errors (Bogue and Bogue, 1970; Brass, 1980; Singh et al., 1988). In other studies, misreporting of age, and omission of the first births were found (Kallan and Udry, 1986; Islam, 1988). Age heaping, recall lapse, and misreporting of the date of events are some of the common errors found in the surveys done in Nepal (Nepal Fertility, Family Planning and Health Survey, 1993; Central Bureau of Statistics, 1995; Nepal Family Health Survey, 1997). World Fertility Surveys in several countries have found that earliest births reported by older women tend to be "moved forward" toward the present. This resulted in longer first birth intervals for older women than for younger ones (Kallan and Udry, 1986). Such misreporting may be common in Nepal because rural populations may consider early or immediate conception following marriage as shameful. Moreover, women who had given birth in previous marriages may not want to report those births. Other birth omissions may be those of dead children. In the analysis section, although breastfeeding, contraceptive use, and induced abortion are considered to be important intermediate factors that influence birth intervals and through which socioeconomic and demographic factors affect births, they had to be excluded for several reasons. The analysis of breastfeeding variable was not possible because of a large proportion of missing cases (about 90 %) in the data set. Since breastfeeding is universal in Nepal, it probably would have similar impact on all birth intervals across different cultural groups and regional populations. However, because Nepalese women tend to breastfeed the first born for a longer period than the subsequent children, the study of duration of breastfeeding on different birth intervals would have been useful and interesting, had the data allowed.

Birth spacing is not a popular practice in Nepal as most couples who use contraceptives are interested in sterilization once they have the desired number of children. Among the 24.1 percent women who were using any modern family planning method in 1991 Nepal Fertility, Family Planning, and Health Survey, only 4.5 percent were using birth spacing methods, the rest 19.6 percent had been sterilized (either wives sterilized or the husbands). Even though the spacers increased slowly from 0.9 percent in 1976 to 2.1 percent in 1986 to 4.5 percent in 1991, because this study involves three consecutive birth intervals, the spacers in the old cohort (in the past) may be very small for analysis purpose. Thus, this variable had to be dropped from the current analysis.

Also, because of the lack of official data on induced abortion, it is not possible to study the effect of this factor on birth intervals. Finally, the interpretation of the findings for "ethnicity" categorical variable should be done with cautious because ethnicity is divided into four categories by combining a number of groups, and thus the different cultural and social practices within these categories may influence on the results, producing confused conclusions. For example, although categorized as "Mongoloid", the Sherpas practice polyandry while the Gurungs prefer cross-cousin marriage, and the category "other" includes more than 40 ethnic groups. One additional limitation worth mentioning is that as the average birth intervals (Table 2) are computed from complete as well as incomplete (censored as well as truncated) intervals, the results may be biased to some extent.

### Results

When we look at the average birth intervals (Table 2) the first birth interval is the longest of all the three intervals. Couples, on average, waited for almost four years before they had their first baby. The average second and third birth intervals do not differ much. Couples seem to wait almost three years, on average, for their second and the third child.

**Table 2 : Average Birth Intervals in Nepal, 1991.**

Birth Intervals	Average Period (in years)
First	3.9
Second	2.8
Third	2.9

There may be several reasons why couples have longer first birth interval than the other two intervals. First, because of the usual young age at marriage of Nepalese women, they may not yet be biologically ready to become pregnant. Second, since most of the marriages are arranged, couples may need time to establish an intimate relationship. Third, women in some cultures may spend more time in their natal home than their husband's home before they have their first child. And finally, Nepalese women are by nature shy and modest about sex.

Table 3 presents the Cox regression results for each of the three birth intervals when the variables were entered one at a time. Each result shows the individual effect of a particular variable on different birth intervals. Table 4, on the other hand, gives the result of Cox regression for each independent variable when the effects of the remaining variables are controlled. A positive value of B indicates a higher hazard (chance) of pregnancy and, consequently, a shorter birth interval that may result in higher fertility.

The summary of the results from Table 3 is presented below in a tabular form. The positive or the negative sign of the hazard coefficient B depicts the shorter or longer birth interval in the three equations.

**Table 3 : Cox Regression Results for the First, the Second, and the Third Birth Intervals when Socio-economic and Demographic Variables are Considered One at a Time, Nepal, 1991.**

Variable	B (First birth interval)	B (Second birth interval)	B (Third birth interval)
Residence (urban)	.2669*	.1201*	-.1820*
Age of respondent	-.0257*	-.0021*	.0047*
Age at first union	.0852*	-.0089*	-.0154*
Ethnicity (Brahmin + Chhetri)			
Newar	.3614*	.0342	-.1938*
Mongoloid	.1791*	-.0262	-.0021
Other	.0052	.0052	.0367
Religion (Hindu)			
Buddhist	.1296*	-.0992*	-.0416
Muslim	-.2021*	.0293	.1625*
Other	.1871*	-.0046	-.0091
Education of women (0 - grade 5)			
Middle school (grade 6 - 9)	.2133*	.0880	-.0998
School Leaving Certificate (SLC or Gr. 10)	.3150*	.0343	-.4032*
Post secondary	.3004*	-.1526	-1.2857*



Variable	B (First birth interval)	B (Second birth interval)	B (Third birth interval)
Education of husband (0 - grade 5)			
Middle school (grade 6 - 9)	.0398	.0107	-.0733*
School Leaving Certificate (SLC or Gr. 10)	.1418*	-.0082	-.1387*
Post secondary	.1649*	-.0092	-.2904*
Occupation of women (agriculture)			
Business + cottage industry	.2034*	.1282*	-.0708
Service	.4383*	-.0979	-.5657*
Daily wages	-.0835*	.0052	.0105
Other	.0838*	.0233	-.0489*
Occupation of husband (agriculture)			
Business + cottage industry	.1357*	.0920*	-.0818*
Service	.0978*	-.0817*	-.2428*
Daily wages	-.0227	-.0171	-.0076
Other	-.0276	-.1779*	-.0580
Cash earning by women (yes)	-.0136	.0116	-.0315
Sex of first child (male)	-	-.0552*	-.1016*
Sex of second child (male)	-	-	-.1149*
Compared to rural, urban women have	Shorter	Shorter	Longer
Higher the age of women	Longer	Longer	Shorter
Higher the age at first union with husband	Shorter	Longer	Longer
Compared to Brahmins and Chhetris, (see Table 1 for def.)			
Newar women have	Shorter	-	Longer
Mongoloid women have	Shorter	-	
Compared to Hindus,			
Buddhist women have	Shorter	Longer	-
Muslim women have	Longer	-	Shorter
Women in 'other' have	Shorter	-	-

Variable	B (First birth interval)	B (Second birth interval)	B (Third birth interval)
Compared to women with Elementary or no education, women with middle sch have women with gr. 10 edu. Have women with post-sec edu.	Shorter Shorter Shorter	- - -	- Longer Longer
Compared to women whose husbands have ele. or no sch, husband's middle sch have husband's grade 10 edu. Have husband's post secondary have	- Shorter Shorter	- - -	Longer Longer Longer
Compared to women in agri., women in busi & cott. ind. women in service have (see Table 1 for definition) Women in daily wages have Women in 'other' occu. Have	Shorter  Shorter Longer Shorter	Shorter  - - -	-  Longer - Longer
Compared to women whose Husbands are in agriculture, Husbands in bus. & cottage Industry have Husbands in service have Husbands in 'other' have	Shorter Shorter -	Shorter Longer Longer	Longer Longer -
If sex of 1st child is male,	-	Longer	Longer
If sex of 2nd child is male	-	-	Longer

\*significant at  $P \leq .05$ .

When all the variables were entered together (Table 4), the Cox regression results show a different picture. Most of the effects that were significant in the earlier equations disappeared once the effect of each variable was isolated, controlling for effects of the remaining variables.

Table 4 shows that even when all the other effects are controlled, place of residence, age of respondent, age at first union, ethnicity, and education of women still have significant influences on the first birth interval. In other words, urban women still have shorter first birth intervals than rural ones ( $B=0.272$ ). As the age of the responding women increases, their first child is born later still holds true ( $B=-0.022$ ). The higher the age of women at first union with their husbands, the quicker they conceive the first child ( $B=0.099$ ). Mongoloid women have shorter first birth intervals than their Brahmin and Chettri peers ( $B=0.313$ ), and those women who have middle school education have a higher chance of being pregnant than those with elementary or no education ( $B=0.144$ ).

Interestingly, after the effects of all other factors are controlled, the influence of occupation of women (in "business or a cottage industry" versus "agriculture" category) on the timing of the first-born changes its direction. That is, women who are involved in a business or cottage industry wait longer to have their first child compared to those women whose occupation is agriculture ( $B=-0.262$ ). This result suggests that there were effects from other variables, which led women involved in business and cottage industry to have their first child sooner than their peers in agricultural occupations (Table 3). So, once all other effects were held constant, the only effect of women's involvement in business and cottage industry shows a longer first birth interval. Also, equally interesting is the finding that those women whose husbands have "other" occupations (including students, the unemployed, seasonal migrants, etc.) conceive later than those whose husbands are involved in agriculture once the effect of this variable was isolated from effects of other variables ( $B=-0.331$ ).

In the case of the second birth interval, all the significant effects shown in Table 3 disappear when the effects of other variables are controlled except for the influence of husband's occupation on the second birth. The result suggests that those women whose husbands are involved in a "business or cottage industry" wait longer for their second child than those whose husbands are involved in agriculture ( $B=0.193$ ).

Most of the effects on the third birth interval also disappear once other factors are considered suggesting that the disappearing effects were not acting

alone. Only the "age of respondent," "education of women," and "preference for sons" have significant effects on the third birth interval in this case. The finding that as the age of respondents increases, they tend to conceive early for the third time still holds true ( $B = 0.020$ ). When the effect of women's education alone is analyzed, the result still shows that women with post-secondary education wait longer than those with elementary or no education ( $B = -1.140$ ). Similarly, the finding that if the first or second born was a boy, women delay the pregnancy for their third child ( $B = -0.281$  and  $B = -0.332$  respectively) still gains support.

**Table 4 : Cox Regression Results for the First, the Second, and the Third Birth Intervals when all the Socio-economic and Demographic Variables are Considered, Nepal, 1991.**

Variable	B (First birth interval)	B (Second birth interval)	B (Third birth interval)
Residence (urban)	.2716*	.0058	.0557
Age of respondent	-.0224*	-.0024	.0200*
Age at first union	.0995*	-.0120	-.0225
Ethnicity (Brahmin + Chhetri)			
Newar	.1180	-.0892	-.2053
Mongoloid	.3132*	-.1092	-.1374
Other	.1439	-.0853	-.0154
Religion (Hindu)			
Buddhist	-.1744	-.0959	.0986
Muslim	-.2562	.2336	.5201
Other	-.0333	.0180	.2479
Education of women (0 - grade 5)			
Middle school (grade 6 - 9)	.1441*	.0520	-.0403
School Leaving Certificate (SLC or Gr. 10)	.1061	.1666	.0284
Post secondary	-.1219	.0357	-1.1401*

Variable	B (First birth interval)	B (Second birth interval)	B (Third birth interval)
Education of husband (0 - grade 5)			
Middle school (grade 6 - 9)	-.0163	-.0433	-.1905
School Leaving Certificate (SLC or Gr. 10)	.1469	.1796	-.1081
Post secondary	.0094	.1396	-.0286
Occupation of women (agriculture)			
business + cottage industry	-.2617*	.0184	-.1833
service	-.1344	-.3416	-.3613
daily wages	-.0735	-.1680	-.2288
other	-.5499	-.6474	-.2092
Occupation of husband (agriculture)			
business + cottage industry	.1697	-.0373	.0701
service	-.0156	-.1927*	-.1232
daily wages	.3303	.2304	-.3320
other	-.3308*	-.1471	.2143
Cash earning by women (yes)	.0635	.0258	.0834
Sex of first child (male)	-	.0342	-.2807*
Sex of second child (male)	-	-	-.3323*

\* significant at  $P \leq .05$ .

Analysis is also done by age group: for younger women aged 15-34 and for older women aged 35-49 (Table 5). When we look carefully at Table 5, it is clear that for the younger women, more factors have significant influences on the birth intervals than for the older group. For the younger group, when age increases, pregnancy is delayed for the first child ( $B = -0.024$ ) and speeded up for the second ( $B = 0.019$ ) and the third child ( $B = 0.036$ ). As age at first union with husband increases for these women, the first pregnancy is quicker ( $B = 0.131$ ). Mogoloid women in this age group conceive earlier than Brahmin and Chhetri women for the first baby ( $B = 0.268$ ).

Younger women with post-secondary level education wait longer for the third child than those with elementary or no education. One interesting finding that emerges for this group is that women in the "other" category of

occupation (which includes students, the unemployed, housemaids, etc.) wait longer before having their first baby than the women in agricultural occupations ( $B = -1.124$ ). And younger women whose husbands are involved in a business or cottage industry conceive their first child earlier than those whose husbands are in agriculture ( $B = 0.251$ ). But the women whose husbands are service holders wait longer for the second child than their peers whose husbands are in agricultural work ( $B = -0.245$ ). Younger women also delay their pregnancy for the third child if their first or second child is a male ( $B = -0.373$ ,  $B = -0.348$  respectively).

For the older group of women (age 35-49), only two factors have significant effects on the first birth interval. For these women, as age at first union with their husbands increases, they tend to have their first child sooner ( $B = 0.060$ ). And if their husbands are service holders, the first pregnancy comes later ( $B = -0.398$ ). None of the factors have significant influence either on the second or the third birth intervals.

**Table 5 : Cox Regression Results for the First, the Second, and the Third Birth Intervals by Women's Age Groups 15-34 and 35-49, Nepal, 1991.**

Variables	Age 15-34			Age 35-49		
	B(1st birth)	B(2nd birth)	B(3rd birth)	B(4th birth)	B(5th birth)	B(6th birth)
Residence (urban)	.2264	.296	.0888	.2757	-.1061	.0506
Age of respondent	-.0236*	.0193*	.0366*	-.0228	-.0136	-.0069
Age at first union with husband	.1306*	-.0192	-.0346	.0601*	-.0133	.0047
Ethnicity (Brahmin+Cheetri)						
Newar	.031	-.0884	-.3209	.3282	.0640	-.3567
Mongoloid	.2681*	-.0791	-.1301	.2681	-.0972	-.3710
Other	.1788	-.2148	.1470	-.0576	.2573	-.2662
Religion (Hindi)						
Buddhist	-.0220	-.0706	.1498	-.3466	-.2008	-.0082
Muslim	-.2337	.2797	.4252	-	-	-
Other	-.0773	-.0970	.4870	.0450	.08878	-.1310

Variables	Age 15-34			Age 35-49		
	B(1st birth)	B(2nd birth)	B(3rd birth)	B(4th birth)	B(5th birth)	B(6th birth)
Education of women (0 - grd 5)						
Grade 6-9	.1259	.0613	-.0282	.2352	.1997	-.0171
SLC or grade 10	.0631	.2108	.1512	.2851	-.0592	.1402
Post secondary	-.3976	.0445	-1.7049*	.5301	.0156	-.8837
Education of husbands (0 - grd 5)						
Grade 6 - 9	-.0582	-.0639	-.1694	.1501	.2397	-.0447
SLC or grade 10	.0804	.2259	-.2093	.3105	.3143	.0999
Post secondary	.0026	.0761	-.1002	.0923	.3093	.2281
Occupation of women (agriculture)						
business + cottage industry	-.1959	-.0226	-.2289	-.1472	.1985	-.1062
service	-.1885	-.2431	-.4226	.0931	-.1770	-.5778
daily wages	-.1702	-.0536	-.3313	.2789	-1.0710	1.0334
other	-.2808	-.3335	.3413	-.7584	.7557	-.0251
Cash earning by women (yes)	.1201	.0797	.0621	-.1456	-.1451	.3203
Sex of first child (male)	-	.0203	-.3729*	-	-.0326	-.0464
Sex of second child (male)	-	-	-.3484*	-		-.2077

\* significant at  $P \leq .05$ .

### Discussion

The selected factors show various effects on different birth intervals; however, the first and the third births are the most affected ones. All the factors except for "cash earning by women" influence the timing of the first and the third births by shaping the length of birth intervals. But the second birth interval is affected neither by the ethnicity nor the education of women nor the education of husband nor cash earning by women (Table 3).

Among other things, this study of birth intervals indicates possible fertility decline among women with different characteristic background. In the first

scenario, when analysis was done for each independent variable, urban women having long third birth interval; higher age of women at first union with husband showing long second and third birth intervals; Newar women having a long third birth interval; Buddhist women showing a long second birth interval; grade 10 and post-secondary level educated women waiting long for the third birth; women with husbands' middle and post-secondary schooling waiting long for the third child; service holders and in 'other' occupation women having a long third birth interval; women with husbands involved in business and cottage industry waiting long for the third child, in service waiting long for the second and the third child, and in 'other' occupations waiting long for the second births, indicate that these women, probably, want less number of children. Thus their fertility may be expected to decrease eventually .

And the findings from the other scenario, the main equation, when the effect of each factor was analyzed by controlling for other effects (Table 4), show that place of residence, current age of women, age at first union, ethnicity, education, occupation, and occupation of husband are very strong factors in determining the length of the first birth interval. Similarly, the current age of women, education, sex of first child, and sex of the second child turned out to be the most influential factors in shaping the length of the third birth interval. However, occupation of husband is the only strong factor influencing the second birth interval.

Urban, Mongoloid women, and women with middle school education have higher chances of being pregnant for the first time. Also, the higher the age at first union the greater is the risk of being pregnant for the first time (Table 4).

Urban women may be more modern and outgoing. They may prefer modern marriages (the so-called "love marriages" or self spouse selection) rather than traditional arranged marriages . This may indicate that rural women are more modest about their sex lives than their urban sisters. Furthermore, sleeping arrangements in rural areas may affect their fertility behaviour. In some rural areas, mostly in the mountains, the sleeping room is a common big room for the whole family (Furer-Haimendorf, 1964). In other cases, mostly in the rural areas of South Nepal, rooms are divided by walls with open doors (no doors attached to lock the room). Thus, privacy for new couples is rare. Also, marriages are found to be more stable in urban areas compared to Nepal as a whole (Acharya, 1993). For all these reasons, the finding that urban women conceive earlier is not surprising.



Mongoloid women are by nature very frank, free and modern and prefer late marriages. Moreover, traditionally, they are not confined to arranged marriages, usually select spouses on their own (Furer-Haimendorf, 1964; Hitchcock, 1966; Johns and Johns, 1976; Messerschmidt, 1976). Compared to traditionally arranged marriages, romantically arranged ones are found to have greater coital frequency (Rindfuss and Morgan, 1983). Also, since most of the groups' cultures prefer cross-cousin marriages, they already know their future spouses and may have experienced close relationships. The findings of a study on the first birth interval among the Tamang women of Nepal suggested that the transition to family building within marriage pivots on the familiarity between couples and on a woman's comfort in the marital environment (Fricke and Teachman, 1993). In addition, premarital sex is acceptable in these groups (Furer-Haimendorf, 1964; Hitchcock, 1966; Johns and Johns, 1976; Messerschmidt, 1976; Macfarlane, 1976; Fricke, 1986; Fricke and Teachman, 1993). These facts may have enhanced their chance of becoming pregnant for the first child, compared to their Brahmin and Chhetri peers. The strong effect of ethnicity on the first birth interval is in line with the previous finding from Malaysia (Rindfuss et al., 1983).

Those women who have middle school education may be more modern, open and mature in age than those who have lower levels of schooling. Thus, the former may have a higher chance of getting pregnant than the latter. The delaying of first births by women involved in a business or cottage industry compared to those in agriculture may be explained by the fact that the former women need to spend more time in their work. Unlike women in agricultural work, they earn money in this occupation. But their husbands' occupations show different effects on the first birth. The category "other" under the husband's occupation includes students and the unemployed, as well as those associated with foreign military service, seasonal migration, and political work, which could have delayed the first births as they have to devote time for school, look for jobs or work away from home more often and for longer durations.

The higher risk of being pregnant for the first child as the age at first union with husband goes higher could be because women who are married at an older age may be more mature about and aware of their sexual relationships than those married at a younger age. Furthermore, since childbearing becomes more complicated as the age of women increases, and in particular for the first birth, older women may prefer to have their first baby as soon as possible. This finding supports the earlier research done in Jordan (Abdel-Aziz, 1983) and in Nepal (Fricke and Teachman, 1993).

On the other hand, women in the past (women in the older age group) tend to delay their first births. In general, when we look at the chance of being pregnant for women in the past and in recent years, chances for younger women may be higher than that for older women for several reasons. First, marriage patterns are changing slowly from traditional arranged to self (spouse) selected ones. Even in most of the arranged marriages these days, particularly in urban areas, couples have chances to know each other before they are married. Moreover, the media and women's development programmes (e.g. programmes related to health, nutrition, family planning and reproductive life, etc.) conducted by the national and international non-governmental organizations (NGOs and INGOs) may have helped younger women to better understand sex life. Obviously, such programmes were rare in the past. The reason for the greater fecundity of women today is also attributed to an improvement in health conditions and nutritional levels (Abdel-Aziz, 1983). This explains the delay of first births by women in the past.

The second birth is hardly affected by these factors. In Nepal, people seem to care less about when the second baby comes once they had the first one. The findings suggest that the second birth is not given much importance vis-a-vis the first.

When it comes to the third child, the decision seems to depend mainly on the sex of the previous two children. The finding that Nepalese women delay their second and third births if the previous child/children was/were male suggest that women do not wait long to have another baby if the previous child/children was/were female. Another important finding is that post-secondary educated women seem to delay third births, most probably to wait until the previous children are grown up. Moreover, these women may be exposed to family planning programmes through sources such as peers, courses in college/university, and the media. It is noteworthy that this factor has the strongest influence on birth interval. The finding also indicates that in the past, women preferred to have the third birth earlier than women today. One of the reasons for this may be that contraceptives were neither popular nor easily available in the past and that women had little control over their own reproductive lives.

When we look at the effect of ethnicity across the three intervals (Table 4), although Newar, Mongoloid, and 'other' women waited longer duration for the second and the third child/children compared to their Brahmin and Chhetri peers, these results were not significant suggesting ethnicity mediating

through other social factors. Similarly, religion alone and husband's education alone do not make any difference in shorter or longer first, second, or third birth intervals. Unlike in other Asian countries, religion does not seem to play an important role in determining the length of birth intervals in Nepal.

The effects of women's education and husbands' education on birth intervals shown by the current research contradict some of the findings from the earlier studies done in other parts of Asia (Trussell et al., 1985; Nait, 1996) but support others (Hirschman and Rindfuss, 1980; Rindfuss et al., 1983). The findings imply that encouraging women to join post-secondary schools, to take up business and cottage industry as their occupations may in the long run bring their fertility level down. Similarly, opening up more jobs in 'service' or 'other' occupations rather than in agriculture, business, and daily wages for men (husbands) may be expected to bring down fertility of their wives at some point.

On the contrary to the expectation, the overall results indicate that cash earning (by women) is not an important determinant in shaping the birth intervals in Nepal. However, women in salaried jobs (service), daily wages, business and 'other' occupations seem to delay either the first or the second or the third births (Tables 3 and 4). This contradicting result may have to do something with the measurement of variables and the definitions for the survey. A further work is needed to investigate this finding.

### **Conclusion**

We have found that fertility behaviour of Nepalese women depends on many socio-economic, demographic, and culture-related factors. From the birth history presented here, it is clear that different births are given varied importance in Nepalese society. First births are given much more importance than the subsequent births. Generally speaking, after the first birth, women seem to be eager to complete their reproductive cycle by bearing the second and the third child early, possibly to get involved in other work. However, the analysis of effects of individual factors on different birth intervals shows that women do not always conceive their second and third child/children sooner (with shorter duration of intervals) compared to the first ones and that many factors affect the delaying or the speeding up of the first, the second and the third births.

Although some of the findings contradict the results of previous studies from other developing countries, many support. One of the most significant

findings is that highly educated women seem to have control over their reproductive lives. It is found that fertility decisions also depend on women's place of residence, on their own and their husbands' occupations, and on the age when they first started to have sexual relationship with their spouses. In addition, cultural disparities among different ethnic groups have remarkable influence on birth intervals. Compared to younger ones, older women had longer first and shorter third birth intervals. This may be interpreted as younger women not waiting long for the first baby but delaying the third birth.

The birth intervals affect total fertility rate in that, women who delay child bearing may consequently have low fertility. The findings from this study indicate that as more women achieve higher education in the coming years, fertility of Nepalese women may be expected to decline. Encouraging women for higher education may be the most influential way of slowing down the fertility of Nepalese women.

The findings also suggest that by giving opportunity to women in employments such as business and cottage industries rather than in agriculture-related occupations, Nepal could have higher chance in bringing down its fertility level. Similarly, the steady increase in the number of family planning acceptors also indicates people wanting lesser number of children than in the past. This trend indeed suggests possible further fertility decline of Nepalese women in coming years. Furthermore, the findings that urban women and those women who are young in age delay their third births also suggest that these women's knowledge of family planning on the one hand and the availability and accessibility of contraceptives on the other (a clear indication of an advantage of being in urban areas and having interactions with different media and people as young women) have significant impact on birth intervals. And women with lower age at first union were found to delay their first births. This is an important finding as well. Because if first births are delayed, subsequent births will naturally come later than in the case when first births come earlier. This will certainly affect the total fertility of women.

On the other hand, although it appears that the first-born is considered to be the most important, be it a boy or a girl, a preference for sons is still found to be a strong cultural norm. A pronatalist norm such as this one may enhance fertility of Nepalese women because women may want to continue child bearing until they give birth to a male child. The reasons behind such attitude should be carefully studied and analyzed to find a way to change the attitude without hurting cultural beliefs and practices of different ethnic groups. The

policy planners of the country need to give serious thoughts on the findings such as discussed in this paper before they plan the population policy and development of Nepal.

### Notes

1. Value "1" represents the reference group.
2. "Brahmins and Chhetris" are the so-called high caste groups in the Hindu hierarchy. The Newars are the aboriginals of the Kathmandu Valley. "Mongoloid group" consists of the Gurungs, the Magars, the Rais, the Tamangs, and the Sherpas, originally the hills and mountain dwellers.
3. SLC is the School Leaving Certificate level, equivalent to grade 10. Most of the high schools have grade 10 levels in Nepal.

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