

Fertility Pattern and Its Correlates in North East India

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KEYWORDS Socio-economic Status. Contraceptive. Fertility Differentials. Regression Lines

ABSTRACT In this paper, fertility differentials of married couples of North Eastern States were studied in relation to their different socio-demographic characteristics by using NFHS-2 data. Effects of socioeconomic factors that influence fertility viz. literacy, religion, occupation, socioeconomic status, child mortality and uses of contraceptives of spouses were analyzed. Mother's age, age at marriage and duration of breast feeding has also been studied to observe their influence on fertility. Finally regression analyses were done for the couples who had and had not experienced child loss separately to identify the significant influential factors on fertility. Explanatory variables were included in the regression model after investigating the presence of multicollinearity.

INTRODUCTION

In today's scenario, fertility control is the most important way to check high population growth. Fertility is directly influenced by a set of social and biological factors. The factors, such as woman's age, education level, age at marriage, economic status and religious attitudes etc., are often called intermediate fertility variables (Elamin and Bhuyan 1999; RGI- Fertility Survey 1971) because they are influenced in turn by various socio-cultural, economic and environmental factors. Among the factors responsible for fertility variation, maternal education, mother's age at marriage and use of contraceptives were found to play a significant role in fertility reduction. The fact that Women's education has a positive impact on fertility regulation has been established by many others (Bulanto et al. 1993; Dwivedi and Rajaram 2004; Khakhar and Gulati 2000; Nag Mani 1989; NFHS-2 (1998-99; Sharma et al. 1997; Shobha 1990). Several authors (Kamath and Sajjan 2003; Shobha 1990) reported that the religion plays an important role in determining the attitude of the people in limiting the fertility. In another study, several researchers (Rao and Somayajulu 1991; Regassa 2007; Singh et al. 2004) noted that the extent of acceptance of contraceptive methods still vary within and between societies and also among different castes and religious groups. Acceptance of contraception by a couple is governed by various socio-cultural factors, such as religion (NFHS 1998-99), education of husband and wife (Berelson 1976; Coale 1965), etc. The States with greater use of

contraceptive have generally achieved a more advanced state of socio-economic modernization. This achievement has generated higher levels of motivation. Religious disparities also play an important role in declining or increasing fertility, like high fertility rate is found in the Muslim population compared to the Hindu population (Mari Bhat and Zaviera 1999). Also contraceptive prevalence rate has been found to be lower among the Muslim and lower caste Hindu women (Bora et al. 1998; Gulati 1996). In North East India, the adoption of family planning method is very poor and it varies from state to state.

With the rising level of education and socio economic development, there has been a change in these intermediate variables and fertility indicators. In this paper an attempt has been made to analyze the effect of education, occupation, age, socio economic status, contraceptive used, etc. on fertility.

DATA SOURCE AND METHODOLOGY

The data for this study have been taken from the 1998-99 National Family & Health Survey (NFHS-2). The area of the study all North-East Indian states. Information of 4494 married couples were analyzed to interpret the fertility pattern in relation to education, age of mother, age of mother at marriage, number of child losses, method of contraceptive used and socio economic status. SPSS/PC software was used to analyze the data.

The information recorded include the number of ever born children (Y , alive + dead), current age of mother in completed years (X_1), mother's

educational level (X_2 , $X_2=0$ if no education, $X_2=1$ if completed primary education, $X_2=2$ if completed secondary education and $X_2=3$ if completed higher education), mother's age at marriage in completed years (X_3), father's educational level (X_4 , $X_4=0$ if no education; $X_4=1$ if completed primary education; $X_4=2$ if completed secondary education; $X_4=3$ if completed higher education), Socio-economic status (X_5 , $X_5=1$ if low; $X_5=2$ if medium; $X_5=3$ if high), Number of lost child (X_6) and number of family members (X_7).

Fertility differentials were studied in relation to their different socio-demographic characteristics. The influences of factors affecting the fertility of couples were studied by fitting two regression lines of y on x 's, one for data from couples who had no child loss experience and the other who had such experience. Explanatory variables were included in the regression model after investigating the presence of multicollinearity as suggested by Belsley et al. (1980).

RESULTS AND DISCUSSION

The data revealed that, the respondent couples had, on an average, more than three children (3.07 ± 2.04). Fifty percent of the couples had one or two children, 29.0 percent had three or four children, 13.7 percent had five or six children and 7.1 percent had seven or more children. The analysis also revealed that the maximum number of children among couple was 13.

Literacy and Fertility

Table 1 represents the mean number of children ever born to the couples by their educational level. The results showed that 35.9 percent of the women were illiterate and very few of them (7.0

percent) had higher education where as 24.1 percent of the husbands were illiterate and 14.4 percent of them had higher education. The figures also indicate that as the education of spouses (both male and female) increases, the fertility decreases. The number of children ever born to the illiterate mother was, on an average, 3.68 while a sharp decline in fertility was found in the highly educated mother, which was on an average 1.85. Similar downward tendency in fertility was noticed when education of father increases. The findings further indicated that illiterate couples (both husband and wife were illiterate) had, on an average, just less than four children (3.70 ± 2.2) and a gradual decline in fertility was seen with an increase in their educational level. It would be worth mentioning that highly educated couples (both husband and wife were highly educated) had, on an average, less than two ever born children (1.85 ± 1.04).

Out of 4494 couples of Northeast India, the proportion of Hindu, Muslim, Christian and Other couples are 38.5%, 12.6%, 37.0% and 11.9% respectively. The number of children ever born, on an average, in Northeast India amongst the Hindu, Muslim, Christian and other community women are 2.63, 3.34, 3.44 and 3.09 respectively. The table 2 shows that the highest fertility was amongst the Christian women, viz., 3.44 children ever born followed by Muslim women (3.34 children ever born) and the least fertility was noticed amongst the Hindu women (2.63 children ever born).

Occupation and Fertility

The results indicate that, for both husbands and wives, more involvement in agricultural activities resulted in upward movement in fertility. Highest fertility, viz. on an average 3.83 children,

Table1: Number of children ever born* by educational level of spouses

Education of mother	Education of father				All
	No education	Primary	Secondary	Higher	
$\bar{y}$ (s)	3.70 ± 2.2	3.93 ± 2.4	3.37 ± 2.2	3.07 ± 2.0	3.68 ± 2.3
No education N(%)	796 (73.4)	442 (44.7)	334 (18.8)	41 (6.3)	1613 (35.9)
$\bar{y}$ (s)	3.49 ± 2.1	3.39 ± 2.1	3.16 ± 2.1	2.52 ± 1.6	3.27 ± 2.1
Primary N(%)	198 (18.2)	368 (37.2)	468 (26.4)	46 (7.1)	1080 (24.0)
$\bar{y}$ (s)	3.00 ± 2.3	2.99 ± 1.9	2.44 ± 1.5	2.37 ± 1.5	2.52 ± 1.6
Secondary N(%)	91 (8.4)	173 (17.5)	896 (50.5)	326 (50.5)	1486 (33.1)
$\bar{y}$ (s)	-	3.20 ± 1.1	1.77 ± 0.9	1.85 ± 1.1	1.85 ± 1.04
Higher N(%)	0	5 (0.6)	77 (4.3)	233 (36.1)	315 (7.0)
$\bar{y}$ (s)	3.60 ± 2.2	3.56 ± 2.3	2.78 ± 1.8	2.24 ± 1.5	3.07 ± 2.04
All N(%)	1085 (24.1)	988 (22.0)	1775 (39.5)	646 (14.4)	4494 (100.0)

Values are $\bar{y}$ (s) = mean ($\bar{y}$) $\pm$ standard deviation (s).

Table 2: Number of children ever born by religion and state of domicile

State of domicile	Religion				All
	Hindu	Muslim	Christian	Others	
Assam	2.54 ± 1.6	3.18 ± 2.1	3.24 ± 1.9	2.60 ± 1.5	2.79 ± 1.9
N (%)	644(60.8)	394 (37.2)	17 (1.6)	5 (0.4)	1069 (23.8)
Meghalaya	3.33 ± 1.8	4.45 ± 2.0	3.96 ± 2.5	3.87 ± 2.6	3.92 ± 2.5
N (%)	46 (7.5)	33 (5.3)	443 (71.8)	95 (15.4)	617 (13.7)
Mizoram	3.47 ± 2.1	-	2.67 ± 1.5	3.64 ± 2.1	2.72 ± 1.5
N (%)	15 (3.0)	-	468 (94.7)	11 (2.2)	494 (11.0)
Manipur	2.55 ± 1.6	3.93 ± 2.5	3.68 ± 2.4	2.39 ± 1.4	3.11 ± 2.1
N (%)	277 (41.5)	43 (6.4)	285 (42.7)	62 (9.4)	667 (14.8)
Nagaland	3.18 ± 1.9	3.55 ± 2.2	3.74 ± 2.2	3.50 ± 2.1	3.66 ± 2.2
N (%)	56 (12.3)	40 (8.7)	357 (77.9)	5 (1.1)	458 (10.2)
Tripura	2.26 ± 1.5	3.37 ± 2.2	2.00 ± 1.7	2.80 ± 1.3	2.41 ± 1.6
N (%)	254 (83.6)	41 (13.5)	3 (1.0)	6 (1.9)	304 (6.8)
Arunachal Pradesh	2.82 ± 1.7	2.50 ± 1.0	3.22 ± 2.1	3.10 ± 2.0	3.01 ± 1.9
N (%)	158 (36.8)	4 (0.9)	60 (14.1)	206 (48.2)	429 (9.5)
Sikkim	2.86 ± 2.1	3.00 ± 1.9	2.52 ± 1.5	2.82 ± 1.9	2.84 ± 2.0
N (%)	274 (60.1)	9 (2.0)	23 (5.0)	150 (32.9)	456 (10.1)
All	2.63 ± 1.7	3.34 ± 2.2	3.44 ± 2.2	3.09 ± 2.1	3.07 ± 2.04
N (%)	1724 (38.5)	564 (12.6)	1656 (37.0)	534 (11.9)	4494 (100.0)

Values are mean ± standard deviation

was found among the women who were employed in agricultural works followed by 3.56, 2.96, 2.81, 2.79, 2.73 children ever born to the women engaged with sales, manual works, housewives, clerical and teaching & management respectively. The majority of the women (64.4 percent) were housewives and majority of their husbands (66.4 percent) were either agricultural workers or manual workers. Fathers' occupation also influenced fertility as shown in table 3. Maximum fertility, viz. 3.39 children, was found among the women whose husbands were agricultural workers followed by 3.03, 2.93, 2.76 and 2.56 children among the women whose husbands were engaged in manual works, clerical works, teaching

& management and sales respectively. Surprisingly, lowest fertility (on an average 2.28 children) was observed in the women whose husbands did not work.

Age of Mother and Fertility

Woman's age is always observed as directly related to fertility and early marriage increases her reproductive span, and the absence of appropriate family planning, can result in children explosion. Table 4 represents a distribution of couples by number of children ever born and age of mother. In the present study, the average age of women was found to be 26.6 years (26.6 ± 5.9);

Table 3: Children ever born* by occupation of spouses

Occupation of mother	Occupation of father						All
	Agri-employed	Manual workers	Clerical & others	Teaching & Manag.	Sales	Didn't work	
$\bar{y}$ (s)	3.06 ± 2.0	2.89 ± 1.9	2.75 ± 1.7	2.46 ± 1.7	2.54 ± 1.6	1.79 ± 1.1	2.81 ± 1.9
Housewife N (%)	935 (51.3)	884 (76.1)	392 (71.7)	273 (61.9)	330 (82.7)	78 (62.9)	2892 (64.4)
$\bar{y}$ (s)	3.84 ± 2.4	3.63 ± 2.2	3.83 ± 2.2	4.16 ± 2.5	3.50 ± 3.1	3.19 ± 2.2	3.83 ± 2.4
Agri- employed N (%)	748 (41.1)	81 (7.0)	80 (14.6)	75 (17.0)	12 (3.0)	21 (16.9)	1017 (22.6)
$\bar{y}$ (s)	2.56 ± 1.6	3.31 ± 2.1	2.63 ± 1.5	1.81 ± 0.8	2.64 ± 1.2	4.50 ± 0.7	2.96 ± 1.9
Manual worker N (%)	54 (3.0)	131 (11.3)	19 (3.5)	16 (3.6)	11 (2.8)	2 (1.6)	233 (5.2)
$\bar{y}$ (s)	4.10 ± 2.2	3.77 ± 2.4	3.91 ± 2.6	3.19 ± 1.5	2.59 ± 1.2	3.67 ± 2.2	3.56 ± 2.1
Sales N (%)	48 (2.6)	30 (2.6)	11 (2.0)	16 (3.6)	32 (8.0)	6 (4.8)	143 (3.2)
$\bar{y}$ (s)	2.93 ± 1.6	3.20 ± 2.0	2.71 ± 1.6	2.45 ± 1.5	2.63 ± 1.9	2.75 ± 1.3	2.73 ± 1.6
Teaching & Manag. N(%)	28 (1.5)	15 (1.3)	24 (4.4)	42 (9.5)	8 (2.0)	12 (9.7)	129 (2.9)
$\bar{y}$ (s)	2.0 ± 0.5	3.57 ± 2.8	2.86 ± 1.5	2.68 ± 1.3	1.50 ± 0.5	2.40 ± 0.9	2.79 ± 1.8
Clerical & others N(%)	8 (0.4)	21 (1.8)	21 (3.8)	19 (4.3)	6 (1.5)	5 (4.0)	80 (1.8)
$\bar{y}$ (s)	3.39 ± 2.2	3.03 ± 2.0	2.93 ± 1.8	2.76 ± 1.9	2.56 ± 1.7	2.28 ± 1.6	3.07 ± 2.04
All N (%)	1821(40.5)	1162(25.9)	547 (12.2)	441 (9.8)	399 (8.9)	124 (2.8)	4494(100.0)

the majority (62.6 percent) were in their peak child bearing age (20-29 years); 25.8 percent were in the child bearing age 30-39 years; 8.6 percent were below the age of 20 years and only 3.0 percent were in their very late child bearing age.

Table 4 reveals that as the reproductive age of mother increases, the number of children ever born also increases. The fertility figure indicates that the women of age 40+ have, on an average, more than seven ever born children (7.13 ± 2.9).

The age at marriage has been observed as an important factor associated with high fertility (Table 5). The married women who were aged below 14 years showed very high fertility with 3.96, on an average, children ever born and amongst them those who had no education had 4.24 children ever born. In this study, the average age at marriage was found to be around 19 years (18.95 ± 3.8) with minimum 12 and maximum 41 years. It is also noticed that the majority of the women (58.9 percent) got married at the age of 14-19 years and a very good proportion of them (31.2 percent) got married at the age of 20-25 years. The results also showed a sharp decline in fertility

with an increase in the age at marriage. The women married at the age of 32+ years had, on an average, 1.80 children ever born and that further declined to 1.42 children ever born who had higher education.

Breast Feeding and Fertility

Generally, the birth intervals and breast feeding is closely related and shorter breast feeding durations results in higher fertility levels. The findings indicate that 49.3 percent had breastfed their children for a year or more while 27.7 percent discontinued within six months. The average duration of breast feeding was found to be just more than 13 months (13.29 ± 9.03). Correlation table (Table 6) of 4494 mothers' indicates that fertility has the tendency to increase with an increase in the duration of breast feeding.

Socio-economic Status and Fertility

Socio economic status plays an important role in fertility. Our present study indicates that fertility

Table 4: Distribution of couples by number of children ever born and age of mother (in years)

Number of children ever born	Age of mother (in years)				Number (%)
	Below 20	20 - 29	30 - 39	40 +	
1	72.2	26.7	6.3	4.6	1110 (24.7)
2	23.5	32.2	11.6	3.1	1136 (25.3)
3	4.1	20.9	13.4	3.8	764 (17.0)
4	0.3	11.8	17.0	6.1	539 (12.0)
5	-	4.9	18.0	13.0	365 (8.1)
6	-	2.5	14.3	13.0	252 (5.6)
7	-	0.5	10.9	6.9	150 (3.3)
8	-	0.5	5.2	8.4	84 (1.9)
9	-	-	2.1	18.3	48 (1.1)
10	-	0.1	0.7	12.2	26 (0.6)
11+	-	-	0.5	10.7	20 (0.4)
N (%)	388 (8.6)	2815 (62.6)	1160 (25.8)	131 (3.0)	4494 (100.0)
All (s)	1.32 ± 0.6	2.48 ± 1.4	4.63 ± 2.1	7.13 ± 2.9	3.07 ± 2.04

Table 5: Number of children ever born by mother's age at marriage and her education

Mother's education	Mother's age at marriage (in years)					All
	Below 14	14 - 19	20 - 25	26 - 31	32+	
No education $\bar{y}(s)$	4.24 ± 2.4	3.76 ± 2.2	3.45 ± 2.3	2.80 ± 2.0	2.00 ± 1.0	3.68 ± 2.3
N (%)	106 (6.6)	1078 (66.8)	371 (23.0)	46 (2.9)	12 (0.7)	1613 (35.9)
Primary $\bar{y}(s)$	3.31 ± 1.8	3.37 ± 2.1	3.13 ± 2.1	2.26 ± 1.5	2.00 ± 0.9	3.27 ± 2.1
N (%)	48 (4.4)	708 (65.6)	293 (27.1)	23 (2.1)	8 (0.8)	1080 (24.0)
Secondary $\bar{y}(s)$	4.33 ± 1.7	2.54 ± 1.6	2.50 ± 1.6	2.34 ± 1.5	1.87 ± 1.4	2.53 ± 1.6
N (%)	12 (0.8)	822 (55.3)	568 (38.2)	76 (5.1)	8 (0.6)	1486 (33.1)
Higher $\bar{y}(s)$	2	1.92 ± 1.0	1.95 ± 1.2	1.70 ± 0.8	1.42 ± 0.7	1.85 ± 1.0
N (%)	1 (0.3)	39 (12.4)	172 (54.6)	91 (28.9)	12 (3.8)	315 (7.0)
All $\bar{y}(s)$	3.96 ± 2.2	3.25 ± 2.1	2.82 ± 1.9	2.18 ± 1.44	1.80 ± 1.0	3.07 ± 2.04
N (%)	167 (3.7)	2647 (58.9)	1404 (31.2)	236 (5.3)	40 (0.9)	4494 (100.)

Value are $\bar{y}(s)$ =Mean ($\bar{y}$) $\pm$ standard deviation (s)

Table 6: Correlation Table
(Breast feeding vs. fertility)

		Total children ever born	Months of breast feeding
Total children ever born	Pearson's correlation		
	Sig. (2-tailed)	1.000	0.027
Months of breast feeding	Pearson's correlation		
	Sig. (2-tailed)	0.027	1.000
		0.035	

* Correlation is significant at 0.01 level (2-tailed).

declines with an improvement in socio economic status. Table 7 reveals that maximum couples (52.0 percent) belonged to middle socio economic category and had, on an average, just less than three (2.93 ± 2.0) ever born children. A good proportion of the couples (33.0 percent) had more than the average number of children ever born; and very few of them (9.7 percent) who belonged to the high socio economic category had, on an average, around two children (2.33 ± 1.6). Among all these three groups, maximum fertility (3.45 ± 2.2) was observed to the couples of low socio economic status.

Child Mortality and Fertility

Child mortality moves directly with the fertility. In developing countries, parents tend to have more children than actual desired number of children, as infants' survival rate is low, expecting that some would survive into the adulthood.

Our study indicates that one-fifth (20.6 percent) of the couples had lost at least one child and 6.1 percent of them lost multiple children. Table 8 indicates that average number of children

born to the parents who did not have any child loss was $2.62 (2.62 \pm 1.7)$, which increased to $4.17 (4.17 \pm 2.1)$ to the parents who lost only one child, $5.55 (5.55 \pm 2.3)$ to the parents who lost two children and ultimately $7.50 (7.50 \pm 2.1)$ to the parents who lost three or more children.

Fertility and child loss experiences are also associated with educational level of father (husband) and mother (wife). Table 8 indicates that number of children ever born to the illiterate mothers with no child loss experience was 3.04 (3.04 ± 1.9) as compared to $4.56 (4.56 \pm 2.1)$ in case of those who lost one child, $6.01 (6.01 \pm 2.2)$ in case of those who lost two children, and $7.82 (7.82 \pm 2.1)$ in case of those who lost three or more children. The corresponding figures to the mothers with primary education were $2.83 (2.83 \pm 1.8)$, $4.13 (4.13 \pm 2.0)$, $5.88 (5.88 \pm 2.5)$, $7.23 (7.23 \pm 1.9)$ respectively; while for secondary educated mothers they were $2.31 (2.31 \pm 1.4)$, $3.61 (3.61 \pm 2.1)$, $4.36 (4.36 \pm 2.0)$ and $6.67 (6.67 \pm 1.9)$ respectively. So far fathers' education is concerned, the corresponding figures for illiterate fathers were 2.96, 4.49, 6.08 and 7.40 ever born children respectively; and in case of highly educated fathers, they were 2.09, 3.47 and 4.50 respectively. The cells of the table 9 indicate that as the education increases, the number of child loss experience decreases.

Fertility and Family Planning

Whenever fertility is considered, the role of family planning measures becomes an important part to be analyzed. It has been observed that the prevalence of contraceptives among the North-East Indian married couples is very poor. The data revealed that three-fourths of the married couples (74.4 percent) had never used any family planning method. Table 10 indicates that three-fourths (74.7 percent) of the women of peak child bearing ages (20-29 years) have never gone for any type of contraception. More than 70.3 percent of women did not adopt any type of contraceptive method

Table 7: Distribution of couples by number of children ever born and socio economic status

Number of children ever born	Socio economic status			N (%)
	Low	Medium	High	
1	19.7	26.6	34.3	1110 (24.7)
2	22.8	25.8	32.3	1136 (25.3)
3	15.2	18.2	17.6	764 (17.0)
4	15.2	10.5	7.6	539 (12.0)
5	9.7	7.7	4.1	365 (8.1)
6	7.6	4.9	1.4	252 (5.6)
7	4.5	2.9	1.1	150 (3.3)
8	2.4	1.7	0.7	84 (1.9)
9	1.3	1	0.5	48 (1.1)
10	0.9	0.4	-	26 (0.6)
11+	0.5	0.3	0.5	20 (0.4)
N (%)	1722 (38.3)	2335 (52.0)	437 (9.7)	4494 (100.0)
All $\bar{y}(s)$	3.45 ± 38.3	2.93 ± 2.0	2.33 ± 1.6	3.07 ± 2.04

Table 8: Distribution of couples by fertility and child loss experience

Number of children ever born	Number of child loss experience								N (%)
	Nil	1	2	3	4	5	6	7	
1	29.8	7.2	-	-	-	-	-	-	1110 (24.7)
2	28.2	18.6	6.4	-	-	-	-	-	1136 (25.3)
3	17.8	16.3	12.7	2.9	-	-	-	-	764 (17.0)
4	11.0	16.9	19.7	5.8	-	-	-	-	539 (12.0)
5	6.3	16.0	16.2	14.5	-	-	-	-	365 (8.1)
6	3.8	11.8	12.7	15.9	16.0	12.5	-	-	252 (5.6)
7	1.7	6.6	13.3	30.4	12.0	12.5	-	-	150 (3.3)
8	0.8	3.7	6.9	13.0	28.0	25.0	-	-	84 (1.9)
9	0.6	1.7	5.2	8.7	-	12.5	-	-	48 (1.1)
10	0.1	0.6	3.5	4.3	28.0	25.0	100.0	-	26 (0.6)
11+	0.02	0.8	3.5	4.3	16.0	12.5	-	-	20 (0.4)
N(%)	3566 (79.4)	652 (14.5)	173 (3.8)	69 (1.5)	25 (0.6)	8 (0.2)	1 (0.0)	0 (0.0)	4494 (100.0)
All (s)	2.62 ± 1.7	4.17 ± 2.1	5.55 ± 2.3	6.90 ± 1.9	8.68 ± 1.9	8.75 ± 1.9	10.0	-	3.07 ± 2.04

Table 9: Number of children ever born* by educational level of spouses and child loss experience

Education	Number of child loss experience				All
	Nil	1	2	3 and above	
A. Mother's Education					
No Education $\bar{y}(s)$	3.04 $\pm$ 1.9	4.56 $\pm$ 2.1	6.01 $\pm$ 2.2	7.82 $\pm$ 2.1	3.68 $\pm$ 2.3
N (%)	1155 (71.6)	301 (18.7)	97 (6.0)	60 (3.7)	1613 (35.9)
Primary $\bar{y}(s)$	2.83 $\pm$ 1.8	4.13 $\pm$ 2.0	5.88 $\pm$ 2.5	7.23 $\pm$ 1.9	3.27 $\pm$ 2.1
N (%)	829 (76.8)	187 (17.3)	33 (3.1)	31 (2.8)	1080 (24.0)
Secondary $\bar{y}(s)$	2.31 $\pm$ 1.4	3.61 $\pm$ 2.1	4.36 $\pm$ 2.0	6.67 $\pm$ 1.9	2.52 $\pm$ 1.6
N (%)	1290 (86.8)	145 (9.8)	39 (2.6)	12 (0.8)	1486 (33.1)
Higher $\bar{y}(s)$	1.78 $\pm$ 1.0	2.58 $\pm$ 1.5	3.50 $\pm$ 1.7	-	1.85 $\pm$ 1.04
N (%)	292 (92.7)	19 (6.0)	4 (1.3)	0 (0.0)	315 (7.0)
B. Father's Education					
No Education $\bar{y}(s)$	2.96 $\pm$ 1.8	4.49 $\pm$ 2.1	6.08 $\pm$ 2.1	7.40 $\pm$ 1.9	3.60 $\pm$ 2.2
N (%)	778 (71.7)	204 (18.8)	50 (4.6)	53 (4.9)	1085 (24.1)
Primary $\bar{y}(s)$	3.04 $\pm$ 1.9	4.27 $\pm$ 2.2	5.85 $\pm$ 2.5	7.77 $\pm$ 2.4	3.56 $\pm$ 2.3
N (%)	731 (74.0)	167 (16.9)	60 (6.1)	30 (3.0)	988 (22.0)
Secondary $\bar{y}(s)$	2.45 $\pm$ 1.6	3.97 $\pm$ 2.0	4.94 $\pm$ 2.2	7.40 $\pm$ 2.2	2.78 $\pm$ 1.8
N (%)	1472 (82.9)	232 (13.1)	51 (2.9)	20 (1.1)	1775 (39.5)
Higher $\bar{y}(s)$	2.09 $\pm$ 1.3	3.47 $\pm$ 1.9	4.50 $\pm$ 1.9	-	2.24 $\pm$ 1.5
N (%)	585 (90.6)	49 (7.6)	12 (1.8)	0 (0.0)	646 (14.4)
All $\bar{y}(s)$	2.62 $\pm$ 1.7	4.17 $\pm$ 2.1	5.55 $\pm$ 2.3	7.50 $\pm$ 2.1	3.07 $\pm$ 2.04
N (%)	3566 (79.4)	652 (14.5)	173 (3.8)	103 (2.3)	4494 (100.0)

Table 10: Children ever born* by age of mother and the method of contraceptive used.

Age of mother (in years)	Method of current contraceptive used								All
	No method	Pill	Female sterilization	Periodic abstinence	IUD	Withdrawal	Condom	Other method	
$\bar{y}(s)$	1.32 ± 0.6	1.39 ± 0.5	2	1.36 ± 0.7	1.00 ± 0.0	1.43 ± 0.5	1.00 ± 0.0	-	1.32 ± 0.6
Below 20 N(%)	315 (81.2)	33 (8.5)	1 (0.3)	22 (5.7)	6 (1.5)	7 (1.8)	4 (1.0)	-	388 (8.6)
$\bar{y}(s)$	2.51 ± 1.4	2.17 ± 1.2	3.18 ± 1.0	2.17 ± 1.3	2.44 ± 1.2	2.24 ± 1.2	1.98 ± 1.2	3.38 ± 3.0	2.48 ± 1.4
20-29 N(%)	2104 (74.7)	189 (6.7)	125 (4.4)	145 (5.2)	107 (3.8)	92 (3.3)	45 (1.6)	8 (0.3)	2815 (62.6)
$\bar{y}(s)$	4.85 ± 2.2	4.14 ± 2.3	4.14 ± 1.5	4.15 ± 2.1	3.68 ± 1.3	4.61 ± 1.9	3.33 ± 1.9	6.00 ± 2.4	4.63 ± 2.1
30-39 N(%)	815 (70.3)	63 (5.4)	130 (11.2)	59 (5.1)	40 (3.4)	33 (2.8)	15 (1.3)	5 (0.4)	1160 (25.8)
$\bar{y}(s)$	7.47 ± 2.8	6.00 ± 3.4	7.25 ± 2.8	4.83 ± 0.4	3.00 ± 2.8	1	2	-	7.13 ± 2.9
40+ N(%)	109 (83.2)	4 (3.1)	8 (6.1)	6 (4.6)	2 (1.5)	1 (0.8)	1 (0.8)	-	131 (2.9)
$\bar{y}(s)$	3.13 ± 2.1	2.56 ± 1.8	3.77 ± 1.6	2.67 ± 1.8	2.71 ± 1.4	2.77 ± 1.8	2.23 ± 1.5	4.38 ± 2.9	3.07 ± 2.04
All N(%)	3343 (74.4)	289 (6.4)	264 (5.9)	232 (5.2)	155 (3.4)	133 (3.0)	65 (1.4)	13 (0.4)	4494 (100.0)

at the age group 30-39 years, which is also considered as high reproductive period. Among the users of the family planning, maximum of the women (6.4 percent) were noted to have used Pills and 5.9 percent preferred sterilization.

As far as other methods of contraceptives are concerned, 5.2 percent adopted periodic abstinence; 3.4 percent used IUD; 3.0 percent withdrew; and only 1.4 percent was reported to have used condom. Table 9 indicates that the children ever born to the women, who did not go for any type of contraception, exceed the average number of children ever born taken as a whole. It is noteworthy that high fertility (on average 3.77 children) was found among the women who were sterilized. This might be due to sex preference of babies, because sometimes couples prefer for a boy or a girl child and wait up to three or four children to see their desire fulfilled.

Regression Analysis

Fertility was found to be influenced by the socio economic and biological factors. However, all factors were not equally influential in describing variations in fertility for the two groups of couples viz. couples with child loss and couples without child loss. Some socio economic variables are selected and their coefficients were calculated as shown in table 11. The ANOVA table 12 indicate that both the fitted regressions are

highly significant [$P(F_{(7, 920)} = 308.83) = 0.000$ with 7 and 920 d.f.] and [$P(F_{(7, 3558)} = 1283.18) = 0.000$ with 7 and 3558 d.f. respectively]. The analysis also indicates that for both the groups, mothers' age and age at marriage had significant reducing effects on fertility. Among couples without child loss experiences, maternal education and use of contraception were found to have significant effect on fertility reduction. For both the groups, fertility was found to vary indirectly with the changes in the household standard of living.

CONCLUSION

In a bid to reduce fertility, studies relating to its social inter-related factors have been of major importance to national planners. Among the social factors, education, occupation, age at marriage, socioeconomic status, child mortality, breast feeding and use of contraceptives were studied to analyze the effects on fertility. An attempt has been made to identify the socio-demographic factors which influence fertility of the women in North East India where the majority of the people are economically mediocre, the climatic conditions are cold and moderate, and the adoption of family planning measures is very poor.

In our study, the investigated couples were, by and large, literate. Majority of the women (64.4 percent) were housewives and 22.6 percent were engaged in agricultural activities. Fifty two

Table 11: Regression analysis of fertility on influential socio economic factors of couples with and without child loss experience

Variables	Couples with child loss			Couples without child loss		
	Coefficients	t-value	p-value	Coefficients	t-value	p-value
Constant	1.051	3.867	0.000	0.426	4.663	0.000
Mother's age	0.321	43.368	0.000	0.292	88.780	0.000
Mother's education	-0.0133	-0.839	0.402	-0.0131	-2.686	0.007
Mother's age at marriage	-0.302	-20.877	0.000	-0.269	-54.037	0.000
Mother's occupation	-0.0445	-1.009	0.313	0.01177	0.861	0.389
Father's education	0.0105	0.7660	0.444	0.00148	0.326	0.744
Father's occupation	-0.0147	-0.426	0.670	-0.0322	-2.864	0.004
Socio economic status	-0.107	-1.260	0.208	-0.0461	-1.634	0.102
Contraceptive used	-0.145	-1.297	0.072	-0.209	-3.782	0.022

Table 12: ANOVA table

Source	Couples with child loss					Couples with out child loss				
	Sum of squares	d.f.	Mean square	F	Sig. ^a	Sum of squares	d.f.	Mean squares	F	Sig. ^a
Regression	3740.209	7	534.316	308.833	0.000 ^a	7111.678	7	1015.954	1283.180	0.000 ^a
Residual	1591.705	920	1.730			2817.037	3558	0.792		
Total	5331.914	927				9928	3565			

a: predictors.

percent of the couples belonged to the middle socio economic group. The married couples had, on an average, about three (3.07 ± 2.04) ever born children and 50 percent of them had two or less ever born children. However 33 percent of the couples had, on an average, four or more children and that accounted for 60 percent of all ever born children.

A positive association has been observed between fertility and child mortality: couples who had lost three or more children had, on an average, seven or more ever born children, and even education failed to prevent higher fertility associated with child loss. Duration of breast feeding has also been found to be positively correlated with fertility.

Differential impact of the socio-demographic variables was observed from the two regression lines of fertility of women viz., women who had experienced child loss and those who had not. The study showed that mother's education and age at marriage had a significant effect on reducing fertility. Our study also indicates that, even without the use of family planning method, increasing level of education, age at marriage and providing opportunities for women to work outside the home can go a long way in reducing fertility. The message seems to be quite surprising, but it is important to note that variables related to status of women have a significant influence on fertility. The study clearly brought out that for accelerating the fertility decline in the North Eastern States, efforts can be made more effectively by giving attention to key structural variables. Thus the process of fertility change can clearly reinforced through variety of channels.

ACKNOWLEDGEMENT

The Authors wish to thank the referees for their helpful comments in revising the paper.

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