Journal of Modern Mathematics and Statistics 7 (2): 14-20, 2013
ISSN: 1994-5388

A Logistic Regression Analysis on the Indicators of Tribal Fertility and its 3rd Birth Transition in Manipur

[1]N. Sharat Singh, [2]W. Tomba Singh, [3]N. Sanajaoba Singh and [1]S. Brajabidhu Singh
[1]Department of Statistics, Thoubal College under Manipur University, Imphal, India
[2]CMJ University, Shillong, India
[3]Directorate of Census Operations, Imphal, India

Abstract: A cross sectional as well as community based study of 1376 ever-married women was conducted in tribal dominated rural areas of four valley districts of Manipur under cluster sampling scheme. The survey was performed during February, 2011 to September, 2012. Using logistic regression analysis, the present study is to investigate the indicators of tribal fertility and the determinants of 3rd birth transition. With significantly varied fertility indicators, the average fertility of tribal women (3.1) is significantly higher than that of non-tribal (2.6). Low education ($p<0.01$), sex of 2nd birth ($p<0.05$) and couple's desire number of son ($p<0.01$) are found to be major causes of 3rd birth transition in the population.

Key words: Tribal, odds ratio, third birth, education, sex

INTRODUCTION

After Cairo's International Conference on Population and Development (ICPD-1994) in its expansion of Programme of Action (PoA) from a sole concern with fertility reduction, India's National Population Policy (NPP) in 2000 had formulated the short, medium and long term objectives. While the medium-term objective is to bring the total fertility rate to replacement level (2.1) by 2010, its long-term objective is to achieve a stable population by 2045 at a level consistent with the requirements of sustainable economic growth, social development and environmental protection. The policy also gives special attention to the tribal and backward communities and recommends special provisions for health services and the treatment of infertility among them in view of the fact that many tribal communities are dwindling in numbers. With >8% of the countries population Indian tribes are broadly divided into three main groups, namely; Negrito, Proto-Australoid and Mongoloid. Netgrito group are mainly found in Andaman and Nicobar Islands and in the isolated pockets of Nilgiri District in South India. The Proto-Australoid tribes are mostly distributed in the mid Indian belt comprising parts of the states of Madhya Pradesh, Chhatisgarh, Jharkhand and parts of Orissa, Maharashtra, Gujarat and Andra Pradesh. In North East, there is very high concentration of tribal population belonging to Mongoloid race but it comprises only 12% of the total tribal population of the country. The tribes of Northeast are socio economically better off than their counterparts in the mid-Indian Region. Khasis, Jaintias, Nagas and Mizos are the major tribes inhabit this region. There are 33 schedule tribes with about 30% of the total population in Manipur. Past findings highlighted that the fertility level of tribal community could not be reduced to national level. It is associated with the factors like low socio-economic status, disadvantages of communication, infrastructures, etc. (Bhagat and Chattopadhyay, 2004; Nanda, 2005; Saha and Verma, 2006). In view of the causal identification mechanism to achieve the national socio-demographic goals for replacement fertility, it aims to investigate the fertility indicators and causal factors of 3rd birth transition of tribal dominated areas of rural Manipur valley where the natural fertility is assumed to be existed.

Tribal fertility and 3rd birth: After 6 decades of having national population policy in the country, fertility rates are higher for women in disadvantage groups say for instance 3.1 children per women among schedule tribes, 2.9 among scheduled castes and 2.8 among other backward classes, compared with women who are not any of these groups (2.4 children) while its all India figure of 2.7 (IIPS, 2007). The 2001 census in India classified >8% population of the country or 84.32 million people as scheduled tribes which is more than the population of Germany or the combined population of France and Australia. This motivated us to research whether fertility in this large socio-economically deprived group is consistent with mainstream of Indian society or which is experiencing a rapid, decline in fertility.

Corresponding Author: N. Sharat Singh, Department of Statistics, Thoubal College under Manipur University, Imphal, India

Thus past studies indicate that strengthening the Reproductive and Child Health (RCH) services in tribal areas specifically targeting young tribal mothers is need of the hour. Promotion of larger inter-birth intervals by generating demand for family planning services particularly the uses of spacing methods and reduction of the gender preference for children by intervention of IEC in tribal areas are also required.

In the meantime, the 3rd birth transition is a serious demographic phenomenon to population growth. Lack of education and son preference may be sole responsible to it. The past studies conducted in India have identified three major factors for son preference. They are economic, socio-cultural and religious utilities. Sons are more likely than daughters to provide family labour on the farm or in family business and support their parents of old age, although there is some recognition that sons are no longer a dependable source of old age support (Bardhan, 1988; Mason, 1992; Dharmalingam, 1996; Nath and Deka, 2004). A son brings upon marriage a daughter-in-law into his family and she provides additional help around the house as well as an economic reward in the form of dowry payments. In the context of India's patriarchal family system, having one son is imperative for continuation of the family line and many sons provide additional status to the family. The utility of having sons also arises from the important religious functions that only sons can provide (Nath and Leonetti, 2001). According to Hindu tradition, sons are needed to kindle the funeral pyre of their deceased parents and to help in the salvation of their souls. Most of the Indian couples have thus a strong preference for sons over daughters. In an effort to have sons, many couples continue to have children after achieving their desire family size. In case of intention, about 20% of Indian couples want more sons than daughters but only 2-3% of them want more daughters than sons (IIPS and Macro International, 2007). In Manipur, 31.2% of ever married women who want more sons than daughters according to NFHS-3:2005-06 which is declining from that of 36.5% in NFHS-2:1998-99 and 43.4% in NFHS-1:1992-93(IIPS, 2007).

MATERIALS AND METHODS

A cross sectional as well as community based study of 1376 eligible mothers was conducted through a cluster sampling scheme in four valley districts of Manipur-Bishnupur, Imphal East, Imphal West and Thoubal during the period from February, 2011 to September, 2012. The study population is one of the North Eastern states of India inhabited mainly by the Mongoloid race. Under cluster sampling, the primary data was collected by using a pre-tested and semi-structural interview schedule as a tool for survey. The cluster with rural-urban differential is defined according to population of Manipur.

In addition to the classical t-test, binary logistic regression model is applied in the present analysis. The logistic regression was used to examine the impacts of socio-demographic factors on the phenomenon of 3rd birth transition. In this study, the 3rd birth transition is taken as dependent variable. The binary logistic regression model is based on the fact that the dependent variable is dichotomous which is defined to be 1 if the woman has at least 3rd live birth and 0, the women has atmost 2 live birth. Ten independent variables considered are social class-tribal/non-tribal (tribal = 1, non-tribal = 0), educational levels of husband, educational levels of wife, family income, age at marriage of husband, age at marriage of wife, mother's age at 2nd delivery, couple's desire number of son, sex of 2nd live birth (male = 1, female = 0) and status of sterilization (wife is sterilized = 1, otherwise = 0). Among the variables, age, income and sex preference defined to be the desire number of son have their quantitative values and hence at present, no difficulties of measurement. For categorical variables-social class, sex and status of sterilization, binary dummy variable (0, 1) is utilized. As the education has no quantitative value leading to some difficulties of measurement so that it has been quantified by the number of completed years in schooling viz., illiterate = 0, literate but under matriculate = 5, matriculate but below ten plus two standard = 10, ten plus two standard but undergraduate = 15, graduate and above 20.

The logistic or logit function is used to transform an S-shaped curve into an approximately straight line and to change the range of the proportion from 0-1 into $-\infty$ to $+\infty$. The logit function is defined as the natural logarithm (ln) of the odds of death (Kirkwood and Sterne, 2003). That is:

$$\text{Logit}(P) = [P/(1-P)] = \alpha + \beta x \qquad (1)$$

Where:

- P = The probability of death that is the probability that a woman has at least 3rd birth in this investigation
- 1-P = The complement of death that is the probability of a woman gives at most 2 live births
- α = The constant
- β = Standing for the regression coefficient, x's being odds the independent covariates and the ratio
- [P/(1-P)] = The odds that a woman gives at least 3rd live birth

Equation 1 can be expressed as:

$$\frac{P}{1-P} = e^{(\alpha+\beta x)}$$

or;

$$P = \frac{e^{(\alpha+\beta x)}}{1+e^{(\alpha+\beta x)}}$$

When the explanatory variable increases by one unit from x to x + 1 (0-1 for binary dummy variable), the odds that a woman gives at least 3rd live birth change from $e^{\alpha}e^{\beta x}$ to $e^{\alpha}e^{\beta(x+1)} = e^{\alpha}e^{\beta x}e^{\beta}$. The Odds Ratio (OR) that is the amount of risk for a woman having at least 3rd live birth to that of woman having at most two live births is therefore:

$$e^{\alpha}e^{\beta x}e^{\beta}/e^{\alpha}e^{\beta x} = e^{\beta}$$

Wald χ^2 statistics are used to test the significance of individual coefficients in the model and it is calculated as:

$$\left(\frac{\text{Coefficient}}{\text{SE Coefficient}}\right)^2$$

Each Wald statistic is compared with a χ^2 distribution with 1 degree of freedom.

RESULTS

Fertility indicators: The current fertility of tribal women (3.1±1.4 children with 95% CI: 3.01-3.22) is found significantly higher ($p<0.01$) than that of non-tribal women (2.6±1.5 children with 95% CI: 2.48-2.70) while the overall mean fertility of (2.9±1.5 children with 95% CI: 2.77-2.93) in the population. As the starting event of reproductive span, the age at menarche varies significantly ($p<0.01$) within the two communities of tribal (12.9) and non-tribal (13.1) shown in Table 1. The current fertility differential is linked with significantly lower ($p<0.05$) age at marriage of tribal women (24.3) from non-tribal (24.0) and couple's desire number of son in their life time as a parameter of family setups (tribal: 1.9>non-tribal: 1.7; $p<0.05$). In this sample data, number of pregnancy is also observed to be higher in non-tribal women (3.46) than tribal women (3.32) which inversely associated with the average fertility of non-tribal women (2.59) which is lower than tribal women (3.11). It may perhaps be associated with the number of fetal death and abortion. The child mortality rate is also visibly higher in tribal community (son: 0.10 and daughter: 0.06) than that of non-tribal (son: 0.07 and daughter: 0.05).

Table 1: Differential of fertility indicators according to tribal/non-tribal class

Indicators	Social class	N	Mean	SD	95% CI for mean Lower	95% CI for mean Upper	p-value for t-test
Current fertility	Non-tribal	688	2.59	1.50	2.48	2.70	<0.01
	Tribal	688	3.11	1.40	3.01	3.22	
	Total	1376	2.85	1.47	2.77	2.93	
Age at menarche	Non-tribal	688	13.13	1.31	13.03	13.23	<0.01
	Tribal	688	12.90	1.08	12.82	12.98	
	Total	1376	13.01	1.21	12.95	13.08	
Age at marriage of wife	Non-tribal	688	24.96	4.76	24.61	25.32	<0.05
	Tribal	688	24.25	4.78	23.89	24.61	
	Total	1376	24.61	4.78	24.35	24.86	
Couple's desire no. of son	Non-tribal	688	1.73	0.48	1.69	1.76	<0.01
	Tribal	688	1.92	0.37	1.89	1.95	
	Total	1376	1.82	0.44	1.80	1.85	
No. of deceased son	Non-tribal	688	0.07	0.29	0.04	0.09	>0.05
	Tribal	688	0.10	0.37	0.07	0.13	
	Total	1376	0.08	0.33	0.06	0.10	
No. of deceased daughter	Non-tribal	688	0.05	0.28	0.03	0.07	>0.05
	Tribal	688	0.06	0.27	0.04	0.08	
	Total	1376	0.06	0.27	0.04	0.07	
No. of still birth	Non-tribal	688	0.10	0.79	0.04	0.16	<0.01
	Tribal	688	0.01	0.12	0.01	0.02	
	Total	1376	0.06	0.56	0.03	0.09	
No. of miscarriage	Non-tribal	688	0.14	0.41	0.11	0.17	>0.05
	Tribal	688	0.12	0.34	0.10	0.15	
	Total	1376	0.13	0.38	0.11	0.15	
No. of abortion	Non-tribal	688	0.60	0.84	0.54	0.67	<0.01
	Tribal	688	0.14	0.40	0.11	0.17	
	Total	1376	0.37	0.70	0.33	0.41	
Total no. of pregnancies	Non-tribal	688	3.46	1.88	3.32	3.60	>0.05
	Tribal	688	3.32	1.42	3.22	3.43	
	Total	1376	3.39	1.67	3.30	3.48	
Age at first delivery	Non-tribal	656	25.19	4.29	24.86	25.51	<0.05
	Tribal	674	25.79	4.44	25.46	26.13	

Table 1: Continue

Indicators	Social class	N	Mean	SD	95% CI for mean Lower	Upper	p-value for t-test
	Total	1330	25.49	4.37	25.26	25.73	
Duration (month) of PPA for 1st birth	Non-tribal	656	6.17	4.63	5.81	6.52	<0.01
	Tribal	674	3.77	2.82	3.56	3.99	
	Total	1330	4.96	4.00	4.74	5.17	
Duration (month) of PPA for last birth	Non-tribal	656	6.23	3.96	5.93	6.53	<0.01
	Tribal	674	4.41	2.61	4.22	4.61	
	Total	1330	5.32	3.47	5.13	5.50	
Age at last delivery	Non-tribal	656	30.34	5.47	29.92	30.76	<0.01
	Tribal	674	32.85	4.57	32.50	33.19	
	Total	1330	31.60	5.19	31.32	31.88	
Age at menopause	Non-tribal	20	48.51	1.74	47.70	49.32	<0.05
	Tribal	18	46.39	3.55	44.62	48.15	
	Total	38	47.51	2.91	46.55	48.46	

Out of total number of pregnancies, a woman has about 11% abortion in the population. But, tribal women share only 4.2% while non-tribal women takes 17.3%. It is estimated from the average number of abortion is 0.37±0.70 corresponding to the number of pregnancy, 3.39±1.67. While the average number of abortion per tribal woman is observed to be 0.14, the corresponding figure of non-tribal woman is 0.60. Thus, number of abortion for tribal women is significantly lower than that of non-tribal ($p<0.01$). While the duration of PPA for first birth is 4.96±4.00 months, tribal women have significantly shorter duration of 3.77 months than that of non-tribal (6.17). Irrespective of parity, the PPA for last birth in tribal women (4.41) have also shorter ($p<0.01$) than non-tribal women (6.23). As the last event of women's reproductive span, the age at menopause is observed to be 47.51 years, it is significantly earlier ($p<0.05$) in tribal women (46.39 years) than non-tribal women (48.51years). In view of these indicators, tribal couples may be observed to be far lagging behind the prevalence of birth control practices used by non-tribal couples in the population.

3rd birth transition: Out of 1376 eligible women, about 50% that is 685 women are found to have their 3rd birth in the population. A binary logistic regression analysis on the transition of 3rd birth (1 if at least 3rd birth occurred, 0 otherwise) is carried out to identify the determinants thereof. Firstly, simple binary logistic regressions on 3rd birth transition that each model with only one independent variable are fitted. Out of the ten variables, seven ones are found to have their significant impact on the 3rd birth transition. They are social class-tribal/non-tribal ($p<0.01$), educational levels of husband ($p<0.01$), educational levels of wife ($p<0.01$), age at marriage of husband ($p<0.01$), age at marriage of wife ($p<0.01$), mother's age at 2nd delivery ($p<0.01$) and couple's desire number of son ($p<0.01$) shown in Table 2. Without considering the effects of other variables, tribal women have highly significant chance of having 3rd birth transition in the population. The finding indicates that the tribal women have 79% more chance of having 3rd birth transition than that of non-tribal women as evidenced by its OR value, 1.79 (95% CI: 1.21-2.64). To each advancement of one level (from 0-5, 10, 15, 20), wife's education (OR = 0.92) can prevent 8% ($p<0.01$) chance from the 3rd birth transition which is more effective than of husband (6%). In the similar way, the chance of 3rd birth transition is reduced by 14% (OR = 0.86) to 1 year increment in the age at marriage of wife which is 7% in case of husband (OR = 0.93). Though, these interpretations have been made irrespective of joint effects of other variables under study.

Table 2: Odds ratios of variables on 3rd births transition in simple logistic regressions

Variables	B	Wald	p-value	OR	95%CI for OR Lower	Upper
Social class (tribal/non-tribal)	0.58	8.58	0.003	1.790	1.212	2.642
Constant	-0.01	0.01	0.933	0.986		
Education of husband	-0.06	18.41	0.000	0.943	0.918	0.969
Constant	0.80	37.41	0.000	2.234		
Education of wife	-0.08	27.34	0.000	0.921	0.900	0.953
Constant	0.79	44.27	0.000	2.207		
Family income	0.01	0.77	0.381	1.011	0.987	1.035
Constant	0.27	2.55	0.110	1.315		
Age at marriage of husband	-0.07	19.58	0.000	0.929	0.899	0.960
Constant	2.48	26.59	0.000	11.960		
Age at marriage of wife	-0.15	45.31	0.000	0.864	0.828	0.901
Constant	4.03	53.48	0.000	56.413		
Age at 2nd delivery	-0.13	22.09	0.000	0.874	0.827	0.928
Constant	4.66	28.19	0.000	105.101		
Desire number of son	1.99	54.91	0.000	7.361	4.342	12.481
Constant	-3.28	40.98	0.000	0.038		
Sex of 2nd live birth	-0.22	0.96	0.326	0.802	0.517	1.245
Constant	1.16	50.91	0.000	3.180		
Status of sterilization	-0.71	1.68	0.126	0.492	0.168	1.439
Constant	0.42	21.51	0.000	1.525		

In the multiple logistic regression models, only three out of the ten independent variables can be detected to have their significant impacts on the 3rd birth transition in the population. The adjusted OR levels of the variables with their 95% CI are manifested in Table 3. The significant factors found in the model are age at 2nd delivery of wife ($p<0.01$, OR = 0.83), couples' desire number of son ($p<0.01$, OR = 3.95) and sex of 2nd live birth ($p<0.05$, OR = 0.55). Age at 2nd delivery of wife and sex (male) of 2nd live birth are negatively as well as significantly associated with 3rd birth transition. But, the behavioural factor-couples' desire number of son is positively and highly significantly related with the serious phenomenon of 3rd birth. The level of significance of each contributed variable is observed after adjusted or keeping constant the joint effects of other nine background variables under study.

Applying stepwise method in the logistic regression, specifically Forward Wald-Method, the determinants of 3rd birth transition is found to be five factors. In other words, only five independent variables have been identified to be elements of the best set of 3rd birth transition. They are couple's desire number of son, age at 2nd delivery, education of husband, sex of 2nd live birth and status of sterilization shown in Table 4. In the last fifth model, the logistic regression is fitted with the five variables. It is to say that the logistic regression model is significant with these five independent variables. After adjusted the joint effects of combination of four other variables in the last model, education of husband, age at second delivery, sex of second baby and status of sterilization of wife are found to be negatively associated with the 3rd birth transition. Among the five determinants, only one factor, the couples' desire number of son has positive impact on the phenomenon.

In the last fitted model, keeping constant the effects of four other variables, the risk of having 3rd birth can significantly be reduced ($p<0.01$) by 6% as advancement of one level in husband's education as its OR value (0.94). A total of 1 year advance in age at 2nd delivery, the women can be free of 12% from the risk of 3rd birth in the sense that at an average a woman has 12% more risk of being 3rd birth with respect to 1 year earlier of her age at delivery of second live birth ($p<0.01$, OR = 0.82). One of the most important findings in this logistic regression analysis is that very high significant risk of 3.7 times of the chance of 3rd birth transition is observed to each increment in the couple's desire number of son as supported by its test values ($p<0.01$, OR = 3.74) when the joint effect of other four factors in the last model is typically controlled. The ill habit of son preference effect is again reemphasized that high risk of 3rd birth phenomenon ($p<0.01$) can be quantified to be 45% in the previous 2nd child is female than that of male (OR = 0.55). While adjusted the effects of four variables say couple's desire number of son, age at 2nd delivery, education of

Table 3: Odds ratios of variables on 3rd births transition in multiple logistic regression

Variables	B	Wald	p-value	OR	95% CI for OR Lower	Upper
Social class (tribal/non-tribal)	0.12	0.08	0.778	1.103	0.558	2.182
Education of husband	-0.04	3.05	0.081	0.957	0.912	1.005
Education of wife	-0.02	0.99	0.320	0.976	0.930	1.024
Family income	0.01	0.02	0.888	1.003	0.966	1.040
Age at marriage of husband	0.02	0.30	0.586	1.016	0.960	1.074
Age at marriage of wife	0.07	1.19	0.276	1.069	0.948	1.205
Age at 2nd delivery	-0.18	9.41	0.002	0.832	0.740	0.936
Desire number of son	1.37	13.77	0.000	3.949	1.912	8.157
Sex of 2nd live birth	-0.60	4.62	0.032	0.549	0.318	0.949
Status of sterilization	-1.48	2.70	0.101	0.229	0.039	1.331
Constant	2.17	2.85	0.091	8.783	-	-

Table 4: Odds ratios of variables on 3rd birth transition in stepwise logistic regression

Steps	Variables	B	Wald	p-value	OR	95% CI for OR Lower	Upper
1	Desire number of son	1.61	22.76	0.000	4.995	2.580	9.674
	Constant	-2.34	13.53	0.000	0.096		
2	Age at 2nd delivery	-0.11	15.12	0.000	0.892	0.842	0.945
	Desire number of son	1.42	16.55	0.000	4.143	2.089	8.219
	Constant	1.43	1.56	0.212	4.181		
3	Education of husband	-0.05	8.27	0.004	0.947	0.913	0.983
	Age at 2nd delivery	-0.11	13.36	0.000	0.897	0.847	0.951
	Desire number of son	1.43	16.59	0.000	4.197	2.105	8.369
	Constant	1.59	1.89	0.169	4.915		
4	Education of husband	-0.06	9.12	0.003	0.943	0.909	0.980
	Age at 2nd delivery	-0.12	15.21	0.000	0.889	0.838	0.943
	Sex of 2nd live birth	-0.65	5.76	0.016	0.522	0.307	0.888
	Desire number of son	1.47	16.56	0.000	4.328	2.137	8.765
	Constant	2.16	3.27	0.071	8.696		
5	Education of husband	-0.06	8.16	0.004	0.946	0.911	0.983
	Age at 2nd delivery	-0.12	16.19	0.000	0.884	0.833	0.939
	Sex of 2nd live birth	-0.60	4.85	0.028	0.547	0.320	0.936
	Desire number of son	1.41	14.75	0.000	3.740	1.989	7.343
	Status of sterilization	-1.68	3.63	0.057	0.187	0.033	1.050
	Constant	2.44	4.04	0.045	11.492		

husband and sex of 2nd live birth, the chance of having 3rd birth transition can be reduced by 89% ($p<0.01$) if the mother has been sterilized (OR = 0.19).

DISCUSSION

In the simple logistic regressions, seven factors have been observed to have their significant contribution on the 3rd birth transition in the population without couple's desire number of son, each at $p<0.01$. Only three factors; family income, sex of second live birth and status of sterilization are found statistically insignificant ($p>0.05$) on the phenomenon of 3rd birth. Only three independent variables are found significant on the transition of 3rd birth in the multiple logistic regression models. It reveals that each age at second delivery ($B = -0.18$, $p<0.01$), couples' desire number of son ($B = 1.37$, $p<0.01$) and sex of second live birth ($B = -0.60$, $p<0.05$) has its significant impact on the 3rd birth transition when the joint effects of other nine factors are controlled. As an achievement of stepwise method, five factors can be detected to be determinants of 3rd birth transition in the population. The factors are couple's desire number of son ($B = 1.41$, $p<0.01$), age at 2nd delivery ($B = -0.12$, $p<0.01$), education of husband ($B = -0.06$, $p<0.01$), sex of 2nd live birth ($B = -0.60$, $p<0.05$) and status of sterilization ($B = -1.68$, $p>0.05$). In the last model, each of five explanatory variables may be interpreted their effects corresponding to the statistics of regression coefficient -B, p-value and OR with 95% CI when adjusted the joint effects of four other variables.

The last fitted logistic regression model of the 3rd live birth transition consists of five independent factors namely; couple's desire number of son, age at 2nd delivery, education of husband, sex of 2nd live birth and status of sterilization. These five variables may be treated as the determinants of 3rd birth transition in the population under study. In many Indian societies as the couples are educated, eagerness to restrict the family size increases. The present findings also observe the similar view. But, comparing the effects of education of husband with the wife counterpart, it is evident that the education of husband ($p<0.01$) plays more significant role in preventing 3rd birth transition. It emphasized that husband's education has more consisted with decision taking of reproduction stopping particularly, of 3rd birth transition under the condition that the effects of four significant factors couple's desire number of son, age at 2nd delivery, sex of 2nd live birth and status of sterilization are typically controlled.

The effects may include delaying age at 2nd delivery, reduction in the desired number of son, increase opportunities for personal advancement, awareness of social mobility and freedom from close familiarities of women outside the home and greater exposure to knowledge and favourable attitude towards family limitations. Thus, enhancement of education is supposed to result in non-familial aspiration and a greater understanding of the process and ways of controlling high fertility. This view is supported by the findings of Yadava and Sharma (2004). Again from the event-history analysis of 2000 'Egyptian Demographic and Health Survey', Vignoli (2006) stresses that the difficult change in the fertility of women with high educational status seems to be responsible for the stalling fertility decline during recent years.

However, the sex of the previous/index child is demographic factor which can not be managed by human hand. The value of the OR say 0.55 means that the risk of 3rd birth transition is reduced about double times when the previous child is male than that of female counterpart. While adjusted the joint effects of other four variables in the last model, couple's desire number of son is also observed to be high influential factor ($p<0.01$) leading to 3rd birth. It is advocated by OR value of 3.74 which indicates that the risk of 3rd birth is increased by nearly 4 times corresponding to desire of one more son. It is thought to be caused by the fact that influence of son preference is high in the study population. This view is supported by Singh *et al.* (2007, 2011). They found that the duration of waiting time to conception is significantly short as the desire number of son increases.

CONCLUSION

The finding is in agreement with some other past findings too. In many developing countries, reproductive intentions and behaviours are strongly influenced by sex of surviving children (IIPS and Macro International, 2007; Hussain *et al.*, 2000; Youssef, 2005; Khawaja and Randall, 2006). This ill behave may have retarded India's fertility decline and therefore the present fertility level is far behind the national socio-demographic goals for replacement fertility 2.1 children.

ACKNOWLEDGEMENT

The 1st researcher is indebted to the University Grants Commission (UGC), India for financial support for the present data under Major Research Project vide Project No. F. 39-63/2010(SR) dated 27.12.2010.

REFERENCES

Bardhan, P.K., 1988. Sex Diaparity in Child Survival in Rural India. In: Rural Poverty in South India, Srinivasan, T.N. and P.K. Bardhan (Eds.). Oxford University Press, UK, pp: 472-482.

Bhagat, R.B. and A. Chattopadhyay, 2004. Characteristics and correlates of tribal fertility: A comparative study of selected tribes. Demography India, 33: 295-310.

Dharmalingam, A., 1996. The social context of family size preferences and fertility behabiour in a South Indian village. Genus, 52: 83-103.

Hussain, R., F.F. Fikree and H.W. Berendes, 2000. The role of son preference in reproductive behavior in Pakistan. Bull. World Health Organ., 78: 379-388.

IIPS and Macro International, 2007. National Family Health Survey (NFHS-3), 2005-06 India. International Institute for Population Sciences, Mumbai, India.

IIPS, 2007. National Family Health Survey (NFHS-3), 2005-06. IIPS, Mumbai, pp: 46. http://www.measuredhs.com/pubs/pdf/FRIND3/FRIND3-VOL2.pdf.

Khawaja, M. and S. Randall, 2006. Intifada Palestinian fertility and women's education. Genus, 62: 21-51.

Kirkwood, B.R. and J.A. Sterne, 2003. Essential Medical Statistics. Blackwell Science Ltd., Oxford, UK.

Mason, K.O., 1992. Family change and support of elderly in Asia: What do we know? Asia Pac. Popul. J., 7: 13-32.

Nanda, S., 2005. Cultural determinants of human fertility: A study of tribal population in Orissa. Anthropologist, 7: 221-227.

Nath, D.C. and A.K. Deka, 2004. The importance of son in a traditional society: How elderly parents see it? Demography India, 33: 33-46.

Nath, D.C. and D.L. Leonetti, 2001. Correlates of coital bpatterns in a traditional Indian society. In: Dynamics of Population Change (Emerging issues of 21st Century), Yadava, R.C., K.N.S. Yadava and K.K. Singh (Eds.). Shipra Publication, Delhi, pp: 57-67.

Saha, K.B. and A. Verma, 2006. High fertility among scheduled tribes of Madhya Pradesh. Indian J. Med. Res., 123: 89-90.

Singh, N.S., R.K. Narendra and L. Hemochandra, 2007. Determinants of waiting time to conception in Manipuri women. Kuwait Med. J., 39: 39-43.

Singh, N.S., N.S. Singh and R.K. Narendra, 2011. Survival analysis of duration of waiting time to conception. Electron. J. Applied Stat. Anal., 4: 144-154.

Vignoli, D., 2006. Fertility change in Egypt: From second to 3rd birth. Demographic Res., 15: 499-516.

Yadava, R.C. and S.S. Sharma, 2004. Closed birth interval versus most recent closed birth intervals. Demography India, 33: 249-263.

Youssef, R.M., 2005. Duration and determinants of interbirth interval: community-based survey of women in southern Jordan. Eastern Mediterranean Health J., 11: 559-572.