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A study of factors affecting fertility among Dhangars of Madhubani District, Bihar

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ABSTRACT

The present study investigates the association between various bio-social factors that affect fertility among Dhangar tribe of Madhubani district, Bihar. The data were collected from 300 households on ever married women in the age group 15-49 years. Both bivariate and multivariate analysis has been performed to describe the fertility differentials. In Dhangars, the number of children ever born is high. The mean number of live births among married Dhangar women of reproductive age was 4 children. There are considerable differentials in the average number of live births according to women's demographic, biological, socio-economic, and cultural settings. Regression analysis revealed that age of woman, maternal age at first conception, income level, ideal number of children desired, ideal number of son desired and experience of child death were the most significant variables that explained the variance in fertility. Women who considered a higher number of children as ideal, who had a desire for son, and those who had a child death experience were more likely to have a higher number of mean live births than their counterparts. On the other hand, those who married and had their first conception at a later age, were literate, those who has a household income of more than 10000 per person and who breastfeed their children for more than 2 years had a lower number of mean live births as compared to their counterparts.

Key words: Fertility, Dhangar tribe, Bio-social factor, One-way ANOVA, Regression analysis

BACKGROUND

Burgeoning growth of human population is one of the most problematic issues in the world today. It is estimated that unless there is reduction in fertility rate, the current world population of 7.3 billion is expected to reach 8.5 billion by 2030 (United Nation, 2015). The problem of population growth is more acute in the case of developing and underdeveloped countries in comparison to the developed countries. The 2 most populous countries of the world are China and India. India's population is 1.221 billion (Census of India, 2011) and is now the second country in the world after China who has crossed the one billion mark. The accelerated growth of population has been a matter of great concern for India. There exists a wide regional disparity in the achievement of pattern of growth. Fertility varies widely among states. It is below the national average in the Southern and Western states of India, like Kerala, Tamil Nadu, Puducherry and Goa, while it is higher than national average in states like Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan. The total fertility rate (TFR) has decreased worldwide **(**Population Reference Bureau, 2009) just as it has in India. In India, although fertility has declined significantly from 4.6 births per women (Census of India, 1981) in 1981 to 2.53 births per women in 2011 (Census of India, 2011), but still fertility is deep rooted.

In the present day world it is fertility, which is drawing a lot of attention, because the mortality rates have fallen considerably while fertility rates have not. When replacement is quicker and more in number than depletion, obviously there is rapid growth. Therefore only bringing down fertility can bring down population growth. While the measure to bring down mortality has met with success, it has not been so in case of fertility. This is because later is much more a socially controlled process influenced by a number of interrelated biological as well as socio-cultural factors such as age at menarche, age at marriage, education, desired family size, socio-economic status, use and acceptance of contraception and so on.

To understand the underlying cause of high fertility in India, it is essential to identify the risk factors associated with high fertility. To develop effective strategies for fertility control, it is important to understand the factors affecting fertility. Thus, the present study is an attempt to identify significant predictors affecting fertility among Dhangar tribe of Madhubani district, Bihar.

MATERIAL AND METHODS

Ethical statement

The topic of research was presented before the ethics committee of Department of Anthropology, University of Delhi and only after its consent, research work was carried out. Informed written consent from the participants was obtained prior to the actual commencement of the study. The privacy, confidentiality and anonymity of the respondents were duly maintained.

The people under study

The Dhangars are one of the scheduled tribe of Bihar. In some states e.g. Jharkhand and Chattisgarh, they are called Oraons. Dhangars belong to Hindu religion. They worship gods like Deenabhadri, Dularbeer, Bhuiyyan, Hansraj basraj and Kali. In Madhubani, they speak Maithili language which belongs to the Indo-European language family (Grierson, 1980). Dhangars are socially and economically underprivileged group. Traditionally they earn their livelihood from cultivation and manual labor in farms. Men and women both work together in fields. However because of unemployment Dhangar men are migrating to big cities like Delhi, Mumbai, Kolkata etc. to work as laborers. Alcohol consumption was high among Dhangar men.

Sampling frame and Sample selection

The present study was conducted among Dhangars of Madhubani district of the state of Bihar. Dhangars of Madhubani district, are concentrated in the rural areas. Data for the present investigation were collected by undertaking an intensive fieldwork extending for about eleven months. The present cross-sectional study was conducted between January 2013 and February 2015 in 3 different phases to collect data pertaining to fertility and related aspects. In the first phase, a pilot study was carried out during the months of February and March 2013 for period of 30 days. At the second and third phase fieldwork was carried out in the month of April-September 2014 and November-February 2015 for period of 10 months. Sample collection was based on two-stage sampling method. At first stage, three Dhangar predominated villages namely Sagarpur, Belam and Kamlawari were selected on the basis of PPS sampling (Probability proportional to the size of the population). At the second stage 90-110 households from each of the village were selected using systematic random sampling. Since the information relevant with specific objective of the present study was incomplete in many households, a sample size of 300 households of Dhangars could be retained for final analysis of the data. As the unit of data

collection was ever-married women in 15-49 years. In all, 300 ever-married women were interviewed from 300 households using interview schedule. Case study was also taken to verify many of the information gained through interviews. The sample size of the present study was tested at 5% level of significance, with a power of 80%.

Methods of analysis

The analysis was confined to women who were ever married and was in reproductive age group 15-49 (N = 300). Initially descriptive analysis was used to describe the number of respondents and percentages according to demographic, biological, socio-economic and cultural characteristics. Both bivariate and multivariate analyses were carried out to show the fertility differentials. Further, one-way ANOVA test was applied between dependent variable (mean number of live births) and independent variables that are displayed in table 4, in order to find out statistically significant association between them. Furthermore, correlation analysis was performed to find out the existence, degree and direction of the relationship between dependent variable and each pair of independent variable. Wherever association was found to be significant, multivariate stepwise linear regression analysis was performed to assess collective impact of various socio-economic, cultural and demographic independent variables on number of live births.

RESULTS

The age and sex composition of the present study is presented in Table 1. It shows that 48.20% of the total population of Dhangar tribe belongs to age group of 0-14 years whereas 49.10 are in the age group of 15-59 years. However, only 1.99 % of Dhangar population fall in (60+ years) age group. The higher percentage of population under 15 years than the population above 60 years shows young age composition of Dhangar tribe. It is also observed that females in the age groups 15-59 exceed than to those of males for the corresponding age groups. However, proportion of males is more than females in the age group 0-14 years and 60+ years.

Table 1: Age and sex composition of Dhangar tribe of Madhubani district, Bihar

Age	Male			Female			Total	
Cohort	No.	% of total population	% of male population	No.	% of total population	% of female population	No.	% of total population
0-14	411	24.76	49.64	401	24.16	48.20	812	48.91
15-59	399	24.04	48.19	416	25.06	50	815	49.10
60+	18	1.08	2.17	15	.90	1.80	33	1.99
Total	828	49.88	100	832	50.12	100	1660	100

Background characteristics of the sample

The total combined sample consisted of 340 women, although we had complete survey data for 300 women. The rest had incomplete data, and thus did not qualify for inclusion in the study. The average age of the women studied was 30 years. A majority of the ever married women (60.67%) were aged 25-39. Furthermore, about 18.33% were youth aged (15-24) and slightly more than a fifth (21%) were aged 40-49. Relatively higher proportions of the women (51%) were married before the age of 16 years. More than half of the women (54%) had their first child before the age of 20 years.

The educational levels of the women were studied: only 3.67 % of women had completed secondary school or had some years of education. The rest 96.33% had no education. It is to be noted that out of 300 women only 5 women were matriculate. The levels of some years of primary school or higher education for their husbands were 14% while the rest 86% had no education.

The majority of women (84.33%) were engaged in some kind of occupation, most of them work as agricultural laborers. Furthermore, 30% of people annual income was less than 10000.

The study found that only 32% of Dhangar women had 2 mean numbers of live births. The rest 68% had more than 2 mean numbers of live births. More than quarter of the women (26.33%) were having more than 4 children. Surprisingly more than a quarter of the women (27.33%) had experienced child death. 21.33% of the women reported occurrence of Infant death. 8.67% of under-5 child death was reported from Dhangar women. The percentage of spontaneous abortions and stillbirths were 12% and 5.67%. Only 12% of the respondents wanted balanced sex composition and balanced number of the children with one son and one daughter. On the other hand most of the women (89.67%) have preference for sons as against daughters. Majority 59.67% of Dhangar women reported a longer (more than 2 years) duration of total breast feeding. Duration of post partum amenorrhea for more than 1 year was found to be only among 19.33% of Dhangar women while most of the women (80.67%) had post partum amenorrhea for less than 1 year. It is notable that only 35% of the women had ever used any family planning method while a majority of women (65%) never tried contraception by any means (Table 2).

Table 2: Demographic, biological, socioeconomic and cultural characteristics

Characteristics		Number	%
Age group of women	15-24	55	18.33
	25-39	182	60.67
	40-49	63	21
Age at first marriage of women	Less than 16 years	153	51
	16 or more years	147	49
Age at first conception	Less than 20	162	54
	20 or more years	138	46
Literacy status of women	Illiterate	289	96.33
	Literate	11	3.67
Literacy status of husband	Illiterate	258	86
	Literate	42	14
Occupational status	Not working	47	15.67
	Working	253	84.33
Income level (per person annually)	Less than 10000	90	30
	More than 10000	210	70
Number of live births	Up to 2 children	96	32
	3-4 children	125	41.67
	More than 4 children	79	26.33
Child death experience	No	218	72.67
	Yes	82	27.33
Infant death experience	No	236	78.67
	Yes	64	21.33
Under-5 child death experience	No	274	91.30
	Yes	26	8.67
Spontaneous abortions	Yes	36	12
	No	264	88
Still births	Yes	17	5.67
	No	283	94.33
Perceived ideal number of children by women	Up to 2 children	36	12
	3	182	60.67
	More than 3 children	82	27.33
Perceived ideal number of son by women	1 son	31	10.33
	2 son	190	63.33
	More than 2 son	79	26.34
Total duration of breast feeding	Up to 2 years	121	40.33
	More than 2 years	179	59.67
Duration of post partum amenorrhea	Less than 1 year	242	80.67
	More than 1 year	58	19.33
Ever use of family planning method by women	Yes	105	35
	No	195	65

Demographic, socio-economic, and cultural correlates of children ever born

The crude birth rate in the present study is estimated to be 32 per 1000 population. However the total fertility rate in the present study is 4. On average the women in the sample were about 30 ± 6.74 years old and the mean age at marriage were 15 ± 2.45. The mean number of conceptions, live births and living children among married Dhangar women of reproductive age (15 to 49 years) were 4.3, 4 and 3.5 children respectively (Table 3).

Table - 3 Fertility measures and mean values for Dhangars

	Dhangars
Crude birth rate	32
Total fertility rate	4
Mean age of women	30 ± 6.74
Mean age at marriage	15 ± 2.45
Mean number of conceptions	4.3 ± 1.97
Mean number of live births	4 ± 1.96
Mean number of living children	3.5 ± 1.60

Several demographic, biological, socio-economic, and cultural variables were correlated with mean number of live births. Regarding age group of women, the mean number of live births for women in different age groups (i.e. between age groups [15-24], [25-39], and [40-49]) are 1.71±.78, 3.55± 1.55 and 5.27±2.23. The differences in means for all the categories are statistically significant. The results evidently show that mean number of live births are higher for higher age groups thereby placing the age group (40-49 years) at the top followed by age group (25-39 years) and then by (15-29 years). The mean number of live births to women whose age at marriage was less than 16 years, whose maternal age at first conception was less than 20 years and whose family income level per person is less than Rs. 10000, were significantly higher than their counterparts.

Regarding literacy status, literate women have only half mean number of live births (2 vs. 4) than illiterate women. Similarly women whose husbands are literate have significantly lower number of live births (3.70 vs. 2.86) than women with illiterate husbands. Furthermore, women who had a child death experience especially infant death had significantly higher number of live births than those who did not have such an experience. Notably, mean number of live births is highly significant for those women who have a desire for more than 3 children (5.10 ± 2.03) as

compared to those who have a desire for 3 (3.16 ± 1.62) or less than 3 children (2.25 ± 1.34). In fact women who have a desire for more than 3 children have more than double live births than women who have a desire for less than 3 children. Thus the fertility outcome is strongly influenced by the number of children desired. Similarly mean number of live births is significantly higher for those women who expressed for a desire for more than 2 son (4.99 ± 2.19) as compared to desire for 2 (3.25 ± 1.60) or 1 son (1.93 ± .99). Furthermore, women who had breastfeed their child for more than 2 years and whose duration of post-partum amenorrhea is more than 1 year had significantly higher number of mean live births than their other counterparts. In contrast women who used family planning methods had more mean number of live births (3.79 ± 2.17) than those who had never used them (3.49 ± 1.83). However, the difference between the means is not statistically significant (Table 4).

Table - 4 Mean numbers of children ever born to ever married women aged 15-49 by demographic, biological, socioeconomic, and cultural characteristics

Characteristics		Mean number of live births	SD	F-value
Age group	15-24	1.71	.78	71.22***
	25-39	3.55	1.55	
	40-49	5.27	2.23	
Age at first marriage	Less than 16 years	3.84	2.04	2.39*
	16 or more years	3.30	1.83	
Maternal age at first conception	Less than 20	3.80	2.05	2.15*
	20 or more years	3.31	1.81	
Literacy status of respondent	Illiterate	4.01	1.96	2.58**
	Literate	2.09	1.04	
Literacy status of husband	Illiterate	3.70	1.95	2.66**
	Literate	2.86	1.86	
Income level	Less than 10000	4.48	1.74	5.48***
	More than 10000	3.18	1.92	
Infant death experience	No	4.98	1.79	7.00***
	Yes	3.19	1.83	
Child death experience	No	4.97	2.01	7.73***
	Yes	3.04	1.66	
Ideal number of children desired	Less than 3 children	2.25	1.34	47.53***
	3	3.16	1.62	
	More than 3 children	5.10	2.03	
Ideal number of	1 son	1.93	.99	43.55***

son desired	2 son	3.25	1.60	
	More than 2 son	4.99	2.19	
Total duration of breast feeding	Up to 2 years	3.27	1.44	3.88**
	More than 2 years	4.09	2.07	
Total duration of Post partum amenorrhea	1 Year	3.40	1.82	3.04**
	More than 1 year	4.40	2.29	
Ever use of family planning method	Yes	3.79	2.17	1.26
	No	3.49	1.83	
Total mean				

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$

Correlation

Table 5 presents the results of bivariate correlation for Dhangar women. Correlation result with respect to number of live births appears to be significantly associated with age group of women, age at first marriage, age at first conception, Respondent literacy status, husband's literacy status, income level, infant death experience, child death experience, ideal number of children desired, ideal number of son desired, total duration of breast feeding and duration of post partum amenorrhea.

Table – 5 Association of fertility with factors affecting it: correlation analysis

Variables	Total number of Live Births	
	Values of correlation	Sig (2-tailed)
Age group	.569	.000
Age at first marriage	-.137	.017
Maternal age at first conception	-.123	.033
Literacy status of respondent	-.148	.010
Literacy status of husband	-.145	.010
Income level	-.239	.000
Infant death experience	-.375	.000
Child death experience	-.439	.000
Ideal number of children desired	.478	.000
Ideal number of son desired	.474	.000
Total duration of breast feeding	.213	.000
Total duration of post partum amenorrhea	.199	.001
Ever use of family planning method	-.073	.207

Multivariate analysis

Multivariate analyses for women aged 15-49 were performed. It deals with assessment of influence of independent variables on dependent variables i.e. number of live births. The multivariate analysis found that current age of women, ideal number of son desired, child death experience, economic status and ideal number of children desired by mothers to be significant predicators of fertility in Dhangar women. The results show that when the independent variables are entered in the regression model for number of live births among Dhangars, 'current age of woman' itself explains 32.2% of the variance. The coefficient (β = 0.419 for all women) of current age of woman showed a significant positive effect on fertility. To be more precise, increase in woman's age tended to decrease the number of live births. A significant increase of 0.115 (11.5%) is obtained in adjusted R square when 'ideal number of son desired by woman' is included in the regression equation. To be more specific, 'ideal number of son desired' showed a significant positive effect on fertility (β = 0.153 for all women). Women who desired for more son were indeed likely to have higher number of live births than those who perceived for lower number of children as ideal. Inclusion of 'child death experience' in the regression equation, accounts for another 0.075 (7.5%) variance. An increase of another 0.057 (5.7%) in adjusted R square value is noted when these variables are entered in the regression equation along with 'income level'. This analysis showed that the women whose family income level is more than 10000 per person, were likely to have fewer children (β = -0.231 for all women) than their counterparts. A further increase of 0.016 (1.6%) is noted when 'age at first conception' is added. Results shows that age at first conception of women has significantly and negatively affected the number of mean number of live births at <0.001 significant levels. A further increase of 0.007 (.7%) is noted when 'ideal number of children desired' is added. The coefficient (β = 0.160 for all women) of ideal number of children desired showed a significant ($p < 0.001$) positive effect on fertility. Finally all these variables results in an adjusted R square value of 0.592. This value tells us that the final model (6) accounts for 59.2% ($p < 0.001$) variance in number of live births among Dhangars. Thus a significant model has emerged.

Table – 6 Association of fertility with factors affecting it: Stepwise Linear regression analysis

Model	R	Adjusted R Square	B-coefficients	t-values
1	.569	.322	.419	10.55***
2	.664	.437	.153	2.44***
3	.719	.512	.287	7.47***
4	.785	.569	-.231	-6.11***
5	.769	.585	-.136	-3.66***
6	.775	.592	.160	2.51***

Model 1: Predictors- Current age of women
Model 2: Predictors- Current age of women, Ideal number of son desired by women
Model 3: Predictors- Current age of women, Ideal number of son desired by women, Child death experience
Model 4: Predictors- Current age of women, Ideal number of son desired by women, Child death experience, Economic status
Model 5: Predictors- Current age of women, Ideal number of son desired by women, Child death experience, Economic status, Age at first conception
Model 6: Predictors- Current age of women, Ideal number of son desired, Child death experience, Economic status, Age at first conception, Ideal number of children desired

DISCUSSION

The study found that on an average married Dhangar women of reproductive age give birth four times which is higher than the total fertility rate of India which is 2.53 births per woman (Census, 2011) and also higher than the total fertility rate of Scheduled tribe which is 3.12 births per woman (NFHS-3, 2007). Considerable differences in number of live births according to women's age, age at first conception, perceived ideal number of children, perceived ideal number of son, wealth status, and child-death experience by mothers were found in the study. Our study found that mean number of children ever born to women of age group (in years) 15-24, 25-39 and 40-49 are 1.71, 3.55 and 5.27 respectively. Statistical test (one-way ANOVA) shows that fertility is significantly higher among women aged 40-49 years. Thus fertility showed an increase with current age of the woman. Age at marriage has been found to exhibit an inverse relationship with the fertility of the women in a number of studies (Freedam, 1963; Bushfield, 1972; Nag, 1980; Audinarayana and Senthilnayaki, 1990; Islam and Khan 1995; Gulati and Sharma, 2002).

Those women who married early were likely to have a higher number of children than their counterparts. An increase in the age at first marriage has an adverse effect on high fertility. In the present study the mean age at marriage for women is found to be 15 ± 2.45 years, which is relatively much lower than the nationally recommended legal age at marriage. The present finding also conforms to the other related studies, although it has shown a slight affect on fertility among Dhangars. Women with age at marriage less than 16 years showed higher fertility (3.84 live births) as compared to those with age at marriage more than 16 years (3.3 live births). Our finding is similar to many other studies that find that older age at first marriage played a significant role in reduction in fertility (Bumpass, 1969; Andorka, 1978; Guru et al, 2003). The maternal age at first conception is an important demographic indicator which determines the overall fertility of a woman. Age at first conception starts the child bearing years. The delay in the first conception is associated with low fertility. Mean age at first conception was found to be 19.65 ± 2.76. 39% of Dhangar Women had their first pregnancy by 18 years of age.

In studies on fertility behavior, income is often used to explain fertility differences (manifesting negative relationship) across areas and populations (Stycos, 1963; Frisancho et al, 1976; Mamdani, 1981; Mahadevan 1989). We hypothesized that the poorest women would have higher fertility. The relation between income and fertility can be clearly seen in the present study. An inverse relationship was found out between income and fertility, with significantly lower fertility among the women whose family income is more than 10000 per person compared to fertility among the women whose family income is less than 10000 per person. This result is the same as for other studies (Easterlin, 1980; Robinson, 1997). The reason could be that people with less income may consider children as a source of income, thus motivating them to have more children. Another reason could be that the poor people have less access to education and family planning methods.

It is well known that the fertility of the woman is negatively associated with her level of education (Balakrishnan, Lapierre and Krotki, 1993). We hypothesized that illiterate women are more likely to have a higher number of children than the literate women. Statistical test (one-way ANOVA) carried out between literacy status of women and number of live births showed that fertility is significantly lower among illiterate women than literate women. Illiterate women have almost double the number of mean live births than do literate women. Education exposes women

to information, empowers women, makes them more likely to be employed outside their home environment, and makes them more aware of their own health and the health of their children, all of which are negatively associated with the number of children a women will have during her reproductive life. Similarly, educated women are more likely to postpone marriage, have smaller family size, and use of contraception than uneducated women (Martin, 1995). Other studies also suggested that education has a negative effect on women's cumulative fertility (Pradhan, 1993; Caldwell, 1992). However literacy status of women was not a significant predictor in linear regression model.

Furthermore, this study found that women who desired for more children were likely to have more children than those who desired for low number of children as ideal. Our finding is similar to many other studies that find higher number of children desired favor high fertility (Davis, 1980; Girad and Roussel, 1982). The reason for this could be that the sons are primarily valued for their roles in carrying family name and tradition, extending help in farm business and being a support for old age, on the other hand daughters are valued for their role in taking care of siblings, extending help in household chores and for social and moral support (Sharma et al, 2009). Thus the results of the present study indicate that fertility is strongly influenced by the number of children desired. Among Dhangars, the fertility was found to be significantly higher among those women who had a desire for more than 2 sons as compared to those who had a desire for less than 2 sons. This findings corroborate with NFHS data. According to NFHS-3 the strength of son preference varies substantially across the states. Son preference tends to be stronger among women in the northern part of the country, especially in Bihar, Uttar Pradesh and Rajasthan (NFHS-3, 2007). Numerous studies have found that the Indian couples have a strong preference for sons over daughters (Bhatt and Zavier, 2004; Clark, 2000; Cleland et al. 1983; Varma and Babu, 2007). Thus it can be said that son preference does have an impact on fertility among Dhangar women.

The child death experienced by women is considered as a very important determinant of fertility. A relationship between fertility and mortality can be found in our results. The multivariate linear regression analysis show that women who had a child-death experience has been found to have a higher number of live births than those who had no such experience. As the number of child death increased, women were exposed to a higher risk of fertility. Casterline (2001) in their study

have suggested that where mortality declines more rapidly, the pace of fertility decline will also be more rapid (Casterline, 2001). Similar results can also be found in many other studies, which show that child mortality had a significant positive impact on fertility, that is, an increase in child mortality rate would significantly increase fertility (Dust, 2003; Randall and Legrand, 2000; Hossain, Philips and Legrand, 2005; Alene and Worku, 2008).

CONCLUSION

In the present study, the number of children ever born among Dhangar tribe is high. Many factors contribute to this phenomenon. Factors such as lower age at conception of females, desire for bigger family, strong desire for son can be attributed to prevailing high fertility among them. The situation is worsened by low income level of people, low female literacy and lower status of women. Despite the legal restrictions against marrying at a young age, early marriage is common in this community. It is also found that parent's preference for son does exist in this population like in many other Indian populations. In the process of wanting more sons, fertility is increasing. Similarly, the relation between fertility and child mortality experienced by mothers was found to be very strong and positive in the study. This study demonstrates that there existed a tendency among women who experienced a child loss to replace the dead child. Such an urge was stronger in case of those who suffered the loss of a male child. A substantial proportion of couples whose child died constitute a high-risk group. In short, it can be concluded that among Dhangars, age of women, maternal age at first conception, wealth status, ideal number of children desired, ideal number of son desired and child death experience are the identified important and strong predictors that has the most significant effect on fertility**.**

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