The changing impact of socio-economic factors on fertility decline in India

Introduction: The study of fertility occupies an important position in the study of population. Over the last few decades the fertility in many developing countries is declining. In India the overall Total Fertility Rate has declined from 3.4 in 1992-1993 to 2.9 in 1998-98 and further 2.7 births per woman in 2005-06. And according to the latest Sample Registration System estimates, the Total Fertility Rate of India further declined to 2.4 births per woman in the year 2012. Studies show that socio-economic factors are the main determinants of this fertility decline. Therefore in this backdrop there is a need to see how fertility is changing in different sub-groups of population and the changing role of these socio-economic factors on India's fertility decline.

Objectives of the study: (i) To show the distribution of women having more than two children ever born (CEB) during two time periods. (ii) To study the gross and net differentials in children ever born according to background characteristics of mother. (iii) To assess the changing role of socio-economic variables on fertility reduction.

Materials and Methods: This paper uses the latest two rounds of the National Family Health Survey (NFHS) data sets. NFHS are nationwide surveys conducted with a representative sample of households throughout the country. The Ministry of Health and Family Welfare (MOHFW), Government of India (GOI), initiated the NFHS surveys to provide high quality data on population and health indicators. The three NFHS surveys conducted so far are landmark in the development of demographic and health data base for India. The second National Family Health Survey (NFHS-2), was undertaken in 1998–99, collected information from a nationally representative sample of more than 90,000 ever-married women in the age group 15–49. It provides state and national estimates on fertility, the practice of family planning, infant and child mortality, maternal and child health, and the utilization of health services provided to mothers and children. In addition, the survey provides indicators of the quality of health and family welfare services, women's reproductive health problems, and domestic violence, and includes information on the status of women, education, and the standard of living. The third National Family Health Survey (NFHS-3), collected information from a nationally representative sample of 109,041 households, 124,385 women in the age group 15-49, and 74,369 men in the age group 15-54. Like NFHS-1 and NFHS-2, NFHS-3 provides estimates of important indicators on family welfare, maternal and child health, and nutrition. In addition, it provides information on several

new and emerging issues, such as, family life education, safe injections, perinatal mortality, adolescent reproductive health, high-risk sexual behavior, tuberculosis, and malaria and HIV/AIDS.

In this study fertility is measured in terms of children ever born (CEB) and taken as dependant variable. The various independent variables considered for this study are place of residence, religion of mother, Caste of mother, educational level of mother, Mother's occupational status, Standard of living of mother, Mass Media Exposure and Age of mother. The number of children a woman has ever borne is a cohort measure of fertility. For the logistic regression analysis dependant variable is categorized into two groups, one with women having 1-2 children ever born which is here considered as low fertility and the other one having more than 2 CEB which is considered as high fertility. Women who don't have any children have been excluded from the analysis. Bivariate analysis has been done to show the Percentage of women having more than two children ever born in different sub-groups of population in India. In order to estimate the gross and net differentials in CEB within each sub-group of socio-economic factors, the technique of Multiple Classification Analysis (MCA) has been used. Multiple Classification Analysis (MCA) combines the features of analysis of variance and multiple regressions. This technique is useful to assess the impact of a number of categorized explanatory variables on a numeric dependent variable. In addition to this binary Logistic regression analysis has been carried out on dichotomous response variable 'Children Ever Born [0=CEB (1-2) and 1= CEB (>=3)] to show the net effect of each independent variable on the dependent variable in terms of Odds ratio. Odds ratio of reference category is one, so an odd value of less than one indicates lower CEB and odds ratio of greater than one indicates higher CEB for any category with respect to the reference category.

Results and Discussion:

From the analysis it is observed that fertility has declined in every socio-economic sub-groups of population but, the percentage of decline varies among them. The highest percentage decline was women with higher education (35.7%), followed by non-SC/ST/OBC group (19.5%), women having secondary education (15.8%) and non-working women (15.6%). From NFHS-2 to NFHS-3, the overall fertility reduction was 11.2 percent. The MCA analysis shows the differential CEB in various socio-economic groups in terms of adjusted and unadjusted deviations from the grand

mean. The table 3 and 4 provides the unadjusted and adjusted deviation in mean children ever born with socio-economic variables of mother in NFHS-2 and NFHS-3. The grand mean in NFHS-2 is 2.97 children ever born per woman. The adjusted deviations show the differential in cumulative fertility (CEB) by controlling other factors. The adjusted deviations in table 3 shows that among the socioeconomic groups, Muslim women have the highest number of CEB (3.51) followed by 'no education category' (3.35), SC (3.19), 'no mass media exposure' (3.15) and ST (3.12). Women having highest level of education have the least number of CEB (2.05) followed by 'secondary education' (2.54), women working in tertiary sector (2.78) and having mass media exposure (2.87). So once again the study highlights the importance of education in reduction of fertility. Table 4 (NFHS-III), the grand mean CEB is 2.11 and among the socioeconomic groups, women belonging to "no education category' the CEB is highest at 2.86, followed by Muslim women (2.51), 'no mass media exposure' (2.38), SC (2.22) and ST (2.21) children ever born per woman. The lowest CEB in ascending order are (1.3) for highest education, (1.71) for secondary, (1.96) service sector and (1.99) CEB for General category of women.

 In logistic analysis, the first model shows that almost all socio-economic variables included in the analysis have significant effect on children ever born. According to mother's place of residence, the CEB is 12 percent higher to mothers living in rural areas in comparison to mothers living in the urban areas. The likelihood of having more than two CEB is 55 percent more to mothers belonging to Muslim religion with reference to mothers belonging to Hindu religion. Under caste, OBC have 19 percent and others have 25 percent lower chance of having three or more CEB in comparison with SC. In this model education has a great impact on CEB and it shows that with increase in the level of education of mother, the chance of having three and above CEB is 29 percent less for mothers' having primary education and 64 percent less for secondary education and highest 91 percent less in higher educational level in comparison with no educated mothers'. Women's working status has also some effect on CEB. The model shows that women who were working in service sector have 11 percent less chance of having high CEB with reference to non-working women. The reason may be that opportunity cost is more for mothers' working in tertiary sector than non-working women. But those working in primary sector have no impact on CEB in reference to non-working women. The standard of living has not much impact on CEB. Similarly women having regular exposure to mass media have 20 percent less chance of high CEB with reference to no exposure to mass media. Hence mass

media has an impact in reducing fertility. Age of mother has significant effect on CEB. Mothers in the age group (30-39) and (40-49) having five times and ten times higher chance of having three and more CEB in reference with mothers in the age group (15-29) respectively. So it shows that as age increases, the women having high CEB increases. In NFHS-3 logistic model the probability of having high CEB has further declined in each category under each variable in comparison with same reference category except in case of religion and women's working in primary sector, showing the increasing impact of socio-economic variables in reducing fertility. In NFHS-2 model the chance of having high CEB in Muslim religion was 1.5 times more but in NFHS-3 it is more than two times higher and in the other religion category it has also increased to 11 percent with reference to women in Hindu religion. The chance has increased only 8 percent in case of women working in primary sector

Conclusion: The percentage change in women having three or more children ever born has declined in different degrees in almost all sub-groups of population except three categories (no education, no exposure to mass media and low standard of living) during the two NFHS rounds. The percentage decline was highest (35.7%) in mothers' belonging to highest educational level followed by in general caste group (19.5%), secondary education (15.8%), non working mothers (15%), in Hindu religion (13.3%) and women in the age group (10.7%). MCA result shows that in NFHS-2, the Muslim have the highest average CEB and followed by 'no education category' but in NFHS-3, it is just the opposite. Women having higher and secondary level of education have the lowest number of average children ever born in both the surveys. The average number of children ever born to women in the age group (40-49) has reduced from 4.37 children in NFHS-II to 3.61 children in NFHS-III. The R^2 values in NFHS-II (0.346) and NFHS-III (0.465) show that impact of Socio-economic variables in reducing fertility have increased. The logistic analysis shows that all the socio-economic factors have significant effect in reducing the chance of having high CEB except in case of religion. The net differential in fertility by place of residence has also declined. Mother's education is the most important determinant in fertility regulation.

Table No.1: Distribution of Women having more than 2 CEB by Background Characteristic of Mother

	Percentage of Women Having More Than Two Children Ever Born		
Variables	NFHS-II(98-99)	NFHS-III(2005-06)	% decline
Place of Resident			
Urban	51.9 (13144)	46.3 (17142)	10.8
Rural	63.4 (35225)	58.4 (27769)	7.9
Religion of Mother			
Hindu	59.2 (37100)	51.3 (32011)	**13.3**
Muslim	66.4 (6435)	63.6 (7023)	4.2
Others	56.6 (4834)	52.8 (5877)	6.7
Caste of Mother			
Schedule Caste	65.6 (8940)	59.7 (8594)	9
ScheduleTribe	65 (6391)	61.6 (6642)	5.2
OBC	60.3 (13958)	54.9 (15200)	9
Others	55.4 (18678)	44.6 (12556)	**19.5**
Level of Education			
No Education	72.1 (29593)	72.1 (24864)	**0**
Primary	63.2 (8800)	58.6 (7777)	7.3
Secondary	44.4 (8322)	37.4 (11259)	**15.8**
Higher	23 (1642)	14.8 (1008)	**35.7**
Mother's Occupation			
Not Working	56.4 (28462)	47.6 (23290)	**15.6**
Primary	68.5 (17576)	65.5 (17243)	4.4
Tertiary	48.5 (2201)	46.6 (4339)	3.9
Standard of Living			
Low	65.8 (14758)	65.8 (10239)	**0**
Medium	62.3 (23875)	60.8 (15196)	2.4
High	47.8 (9141)	45.1 (17531)	5.6
Mass Media Exposure			
No Exposure	69.8 (21438)	69.7 (11665)	**0.1**
Exposure	53.7 (26931)	49 (33246)	8.8
Age of Mother			
15-29	37 (12296)	30.8 (9475)	16.8
30-39	71.5 (20478)	60.6 (19262)	15.2
40-49	82.1 (15595)	73.3 (16174)	**10.7**
Total	59.8(48369)	53.1 (44911)	**11.2**

Table 2: Unadjusted and Adjusted Deviations in Mean Number of Children Ever Born By Socio-economic Background of women, India, NFHS-II (1998-1999)

		N	Predicted Mean		Deviation		Eta	Beta
			Unadjusted	Adjusted for Factors	Unadjusted	Adjusted for Factors		Adjusted for factors
	Grand Mean	88265	**2.97**					
Type of place of residence	Urban	27362	2.67	2.90	-.307	-.075	.098	.024***
	Rural	60903	3.11	3.01	.138	.034		
Caste	Scheduled caste	15064	3.19	**3.12**	.217	.142	.077	.054***
	Scheduled tribe	10740	3.23	**3.19**	.260	.215		
	OBC	25766	2.96	2.93	-.018	-.041		
	General	36695	2.82	**2.88**	-.152	-.092		
Standard of Living	Low	24646	3.26	2.95	.281	-.029	.136	.023***
	Medium	42460	3.05	3.02	.080	.049		
	High	21159	2.49	2.91	-.487	-.064		
Mass Media Exposure	No exposure	33174	3.47	3.15	.500	.179	.184	.066***
	Exposure	55091	2.67	**2.87**	-.301	-.108		
Mother's occupation	Not working	55732	2.82	2.98	-.156	.004	.124	.023***
	Primary Sector	27640	3.35	3.00	.380	.027		
	Service sector	4893	2.60	**2.78**	-.370	-.197		
Religion	Hindu	68592	2.91	2.90	-.063	-.076	.084	.093***
	Muslim	10528	3.45	**3.51**	.480	.533		
	Others	9145	2.89	2.93	-.082	-.044		
Mother's age	15-29	40217	1.87	1.87	-1.106	-1.101	.501	.497***
	30-39	28948	3.57	3.58	.599	.609		
	40-49	19100	4.40	**4.37**	1.421	1.395		
Level of education	No education	43948	3.56	**3.35**	.583	.380	.318	.211***
	Primary	15040	2.99	2.98	.015	.001		

		N	Unadjusted	Adjusted for Factors	Unadjusted	Adjusted for Factors		
	Secondary	21088	2.25	**2.54**	-.729	-.433		
	Higher	8189	1.70	**2.05**	-1.277	-.927		

R=.588, R2=.346   *** 1% level of significance

Table 3: Unadjusted and Adjusted Deviations in Mean Number of Children Ever Born By Socio-economic Background of Mother, India, NFHS-III(2005-2006)

		N	Predicted Mean		Deviation		Eta	Beta
			Unadjusted	Adjusted for Factors	Unadjusted	Adjusted for Factors		Adjusted for factors
	Grand Mean	110883	**2.11**					
place of residence	Urban	51429	1.82	2.07	-.288	-.036	.130	.016***
	Rural	59454	2.36	2.14	.249	.031		
Caste	Scheduled caste	19197	2.31	**2.22**	.203	.111	.095	.045***
	Scheduled tribe	15538	2.26	**2.21**	.156	.103		
	OBC	36923	2.22	2.13	.107	.022		
	General	39225	1.85	**1.99**	-.262	-.116		
Standard of Living	Low	19502	2.78	2.17	.676	.066	.200	.029***
	Medium	33909	2.35	2.17	.242	.061		
	High	57472	1.74	2.05	-.372	-.059		
Mass Media Exposure	No exposure	18392	3.20	**2.38**	1.096	.268	.237	.058***
	Exposure	92491	1.89	2.06	-.218	-.053		
Mother's occupation	Not working	65625	1.90	2.14	-.205	.035	.164	.032***
	Primary Sector	32308	2.64	2.11	.527	-.001		
	Service sector	12950	1.83	**1.93**	-.275	-.176		
Religion	Hindu	82599	2.08	2.05	-.034	-.061	.069	.071***

	Muslim	12646	2.49	**2.51**	.383	.404	
	Others	15638	1.98	2.10	-.132	-.006	
Mother's age	15-29	58681	.99	1.10	-1.117	-1.009	.585	.528***
	30-39	31016	3.08	2.99	.976	.886	
	40-49	21186	3.77	**3.61**	1.666	1.497	
Level of education	No education	35813	3.37	**2.86**	1.263	.752	.460	.275***
	Primary	15880	2.34	2.20	.227	.096	
	Secondary	47688	1.36	**1.71**	-.748	-.402	
	Higher	11502	.96	**1.30**	-1.145	-.809	

R=.682, R2=.465   *** 1% level of significance

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