Sex-Ratio in Relation to Fertility and Two-Child Norm in Madhya Pradesh

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Introduction

The 2001 Census of India shows an unusually low female-male ratio (sex-ratio) among children less than seven years of age for Madhya Pradesh. This ratio is declining indeed starting from the year 1971 through the consecutive census years. The decreasing female to male ratio for the child has been one of the important concerns of India's demography in recent times (Bhat 2002, Croll 2000, Nair 1996). The sharp decrease in the female-male ratio among the children in several states of India also has been a subject of diatribe by some sections of feminists. Madhya Pradesh is no exception to this.

The issue of declining sex-ratio is multifaceted and there is no simple explanation to this. Several researchers have examined the historical trends and factors affecting the female to male ratios (Agnihotri 1995, Bhat 2002, Clarke 2000, Guillot 2002, Mayer 1999, Visaria 1971). Some of the studies relate this decline in India to the existing son preference in several parts of the country (Arnold et. al. 1998, Arnold et. al. 2002, Das 1987). In other studies, it is found that differential stopping behaviour (with preferred sex composition for children by couples) is the main reason for decline of female-male ratio (Clark 2000, Cleland et. al. 1983, Yamaguchi 1989). In several other studies demographers are concerned with high fertility levels of India and attribute it to son preference (Bairagi and Bhattacharya 1989, Talwar 1975).

The fertility of Madhya Pradesh has also been declining with the declination of the child sex-ratio during the period 1971-2001 and many researchers claim to have an association between the fertility decline and the declination of the sex-ratio. According to Mallik (2002), some of the programmes promote the transition to small families through strategies that voluntary support outright two-child norm by social and economic incentives. In other study by Croll (2002), it is argued that without change in gender reasoning, the rapid fertility decline and imposed smaller family size means that daughters are subjected to new trade-offs. Explanations and clarifications are not sufficient regarding the association of decline in female-male ratio, fertility decline and two-child norm (Kishore 1993, Mamdani 1972). Therefore, it requires a comprehensible examination to understand the association of female to male ratio, fertility and two-child norm.

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Objectives of the Study

In this paper, we have tried to examine the association of sex-ratio with fertility and two-child norms in case of Madhya Pradesh. Here, we have studied also the spread of two-child norm in terms of desired and completed family-size and the association between desired fertility, completed family-size and sterilization in the state of Madhya Pradesh. The main objective of our study has been to find out the predicting demographic factors behind the female-male differential in this state.

Data and Methodology

For the present study, we have used the data from the National Family Health Survey - II (1998-99). In this survey, the woman-respondents were asked their desired family size, that is, the ideal number of children. Their reported ideal number of children is considered to represent their desired family size. Fertility has been measured in terms of number of total living children rather than total children ever born. This is because number of living children is supposed to have more impact on women's fertility control behaviour than the number children actually born. As proxy to female-male ratio, the difference between a woman's living sons and daughters has been calculated. This variable has been assigned the values as less sons than daughters, equal sons as daughters and more sons than daughters. Bi-variate analysis has been done to examine the spread and acceptability of the two-child norm in terms of desired and actual family size and contraceptive method use behaviour. Multivariate analysis has been carried out to find out the predicting factors of the declining female-male ratio.

Discussion of the Results

Spread of Two-child norm

To examine the acceptability and spread of two-child norm, we have carried out a bi-variate analysis between the respondents' reported ideal number of children and their current contraceptive method use behaviour (Table 1). Reporting of less than or equal to two ideal number of children justifies the spread of the two-child norm. But, to assess whether the woman reporting two ideal children, has accepted the two-child norm practically in her life, we have to depend on her fertility control behaviour. This is assessed by her current contraceptive method use status, in this study.

Result shows that a very few percent of women (only 4 percent) has reported non-numeric (up to God) response to the question of ideal family size. This value is maximum (4.6 percent) in case of women who are not using any family planning method. Women who are using other methods than sterilization have reported the lowest non-numeric response. Hence, it can be said that majority of women had reported a specific number of ideal children and the women with non-numeric response are negligible.

From Table 1, it is seen that majority of the women (58.4 percent) in Madhya Pradesh were not using any contraceptive method at the time of the survey. Among this 4055 women, 56 percent had reported their ideal number of children to be greater than 2. Among all 2472 sterilized women, majority had reported greater than two ideal children. Women using temporary methods of family planning, mostly reported less than or equal to two ideal children. Overall, reporting of more than two ideal children was high (55.7 percent) among the women of Madhya Pradesh. So, it can be said that the spread of two-child norm is very less in this state. Among all the 2795 women in Madhya Pradesh who had reported two or less ideal children, 57.2 percent were not using any contraceptive method. A need was felt to study those women, whether they were yet to achieve their ideal family size, or there was a lack of true acceptability of two-child norm among them. To assess this, we have study their fertility status in reference to family planning method use behaviour.

Acceptability of Two-child norm among the Women Reporting Two Ideal Children

In Table 2 the results of the bi-variate analysis of the respondent's total number of living children with her current status of contraceptive use has been reported, only for those women who had reported less than or equal to two ideal number of children. It is clearly seen that most of these women are far from the true acceptability of the two-child norm, in spite of reporting less or equal two ideal children. Around 36 percent of these women had more than two living children. Also, more than 10 percent of these women with more than two-children were not using any contraceptive method. Around 27 percent of these women were having exactly two-children and only 31.1 percent of them were sterilized. The rest were either not using any method or using some temporary method of family planning. So, although the spread of two-child norm is thought to be high in terms of ideal children, when coming to the living children it does not prove so. Hence, there found to be a lack of acceptability of the two-child norm in Madhya Pradesh even among those who reported two or less ideal children. Now, we got interested in studying the fertility of those women who were either sterilized or their husbands were sterilized.

Acceptability of Two-child norm among Sterilized women

In this analysis we have considered those women who were sterilized or their husbands were sterilized. Table 3 reports the results of the bi-variate analysis between the total living children and the ideal number of children of these women. It is clearly found that majority of the women had completed their family with more than two children. Prevalence of sterilization among women with two or less living children was expectedly skewed towards the women reporting two or less ideal children. But, still there were a very large number of sterilized women who reported two or less ideal children, but had more than two living children. Sterilization is most obviously very low among women who reported non-numeric answer to the question of ideal children.

Fertility in relation to Family planning

To examine the pattern of living children by family planning status, the percentage distribution of women by their current number of living children have been studied (Table 4). Most of the women in Madhya Pradesh were having more than two living children. Distribution of non-users was skewed towards the lower number of living children, except those having more than four children. This was skewed towards the higher number of living children in case of sterilized women. Modal value (highest percentage of women by number of living children) for the women using any temporary method of family planning was lying for the women having exactly two children. It is also high for those having one child. So, in Madhya Pradesh most of the women were not using any family planning method. Although a large number of women sterilized, most of them had completed their family with more than two children. Now, a need was felt to examine the relation of this fertility pattern and family control behaviour with the female to male ratio in this state. To assess the impact of these patterns on the declining sex-ratio of Madhya Pradesh, we have studied the female-male differential for the women with number of living children by their current status of family planning use.

Female-male differential in relation to Fertility and Family planning

To measure the female-male differential, we have used the proxy variable representing the difference between the numbers of respondent's living sons and daughters. We have computed this variable so as to have three values: less sons than daughters, equal sons as daughters and more sons than daughters. In Table 5, we have reported the results of the bi-variate analysis between this computed variable and the total number of living children for the women with their current status of various contraceptive method use. To take into consideration the two-child norm, we have assigned only two values to the total living children: less than or equal to two living children and more than two living children.

Results show that the number of women having more than two children is slightly higher than the number of the rest women. Most of the women having less than or equal to two children have equal sons as daughters. Women having more than two children mostly have more sons than daughters. This in turn can lead to a declination in the female to male ratio. Even in case of women with two or less living children also, the percentage of those having more sons than daughters is higher than those having less sons than daughters. Most of the sterilized women were having more sons than daughters. The women with less than or equal to two children who had less sons than daughters were least sterilized. Among these women only those who had more or equal sons as daughters, were sterilized. It is clear that the women in this state get sterilized if they achieve their desired number of sons, number of daughters least matter in it. This phenomenon is also evident from the fertility control behaviour of the women either not using any family planning method or using some temporary method of family planning. Most of these women having greater than two children, had less sons than daughters. So, their family planning behaviour may be attributed to their intention to have more sons. Hence, son-preference has been found to be very high in Madhya Pradesh.

Multi-variate Analysis determining Son-Daughter Differential

Large sample sizes are needed to distinguish differences in sex ratio (Retherford and Roy 2003). Therefore, instead of using sex-ratio as dependent variable we have used its proxy. In one form, if a woman has more sons than daughters she is assigned '1' and if sons are equal or less than daughters then she is assigned '0'. In another form, if a woman has more sons than daughters then she is assigned '1' and if sons are less than daughters then she is assigned '0'. Both the forms of the dependent variable are binary and we have used logistic regression analyses to examine the effect of various demographic factors on them. In Model-I, the explanatory variables are restricted to the demographic factors only, as these are the proximate variables that can influence the sex-ratio directly. The variables that have been considered in Model-I are number of total living children, ideal number of children, interaction of living and ideal number of children, death of child and current status of contraceptive use. In Model-II we have controlled for some of the socio-economic variables. The variables we have considered besides the demographic variables are age of the woman, type of place of residence and education of the woman.

In Table 6 we have shown the odds ratios of the determinants of the sex-differential for the first form of our dependent variable, that is, considering the women having equal sons as daughters with those having less sons than daughters. In both the models it is seen that women having one or three children have higher odds ratio in comparison to the women with two children with reference to the women having four or above children. This gives an indication that whenever women have an odd number of children, sons will be more in number. Ideal number of children here is considered as a qualitative variable and is found to be significant for both the models. The prevalence of more sons than daughters is lower among women who reported more than two ideal children when compared to women who reported two or less ideal children. Interaction of ideal and actual living children was considered to examine the actual impact of the two-child norm. Actual practice of two-child norm i.e. those who had two or less children and also desired to have that many children, is significant in both the models compared to those women whose actual number of children do not match with their preferred ideal family size.

As our dependent variable is calculated from the living children we have taken child death as an explanatory variable to see the influence of replacement and assurance effect on the difference between sons and daughters. This variable was found to be significant for the death of one son along with one daughter with reference to no death of child. But, when controlling for the socio-economic variables, this variable showed no significance. So, it can be concluded that child death has not much impact on the female-male differential. Coming to the family planning use, sterilized women have significantly higher chance to have more sons than daughters in comparison to the non-users. In the social variables women's education was found to have a strong significant impact on the determination of the son-daughter differential. Odds of having more sons than daughters are decreasing as the highest level of education increases for the women. The odds ratio of having more sons than daughters is the lowest for the women with the higher education than secondary in comparison to the women with no education. Women in

higher age-groups have higher chances of having more sons than daughters. Residential location did not show any significant impact on the son-daughter differential. So, in this analysis most of the demographic variables were found to be significantly related with the difference of number of sons and daughters.

Next we have run the logistic regression for the dependent variable excluding the women with equal sons and daughters, taking the same explanatory variables. The results are reported in Table 7. The variable total living children is showing different phenomena in this analysis. Odds ratio for the women with two children is higher than other living children categories. This mean that if we ignore the women with equal number of sons and daughters, odds of having more sons is higher among women with two children in comparison to women with four and above children. Ideal number of children and interaction of it with the total number of living children are showing the similar phenomena as the previous analysis. Here death of a son along with a daughter remained significant with reference to no death even after controlling for the social variables. Odds ratio for the sterilized women has increased slightly than before. That means ignoring the women with equal sons and daughters increases the odds of having more sons than daughters for the sterilized women than non-users. Social variables have the similar impact as above.

Conclusion

The declining female-male ratio for the children in Madhya Pradesh has been considered as a matter of concern by the present authors. We have also noticed the simultaneous declination in the fertility of this state. There is a general public concern about the apparent association of the female-male ratio among children and fertility decline. Some researchers blame the stopping rules (e.g. two-child norm) for the decline in female-male ratio. Their claim is that this rules impose fertility decline on the population and thereby initiates decline in the sex ratio. Explanations and clarifications are not sufficient regarding the association of decline of female-male ratio, fertility decline and two-child norm. So, the main aim of this paper is to throw light on the ongoing debate on child sex ratio in case of Madhya Pradesh.

Analyses show that most of the women in Madhya Pradesh have completed their family with three or more children. Hence, it can be concluded that two-child norm is not widely prevalent in this state. Even those reporting two or less ideal children were practically having more than two children. Those not having more than two children were either not using any family planning method or using some temporary method of family planning. Also there was a very high son preference among the women in Madhya Pradesh initiating the decline in the child sex-ratio. Multi-variate analysis also claims the same fact. However, multi-variate analysis showed that education of women can lessen the preference for a son and hence raise the female-male ratio. On the whole, it can be concluded that the difference in the sex-ratio is a function of both the ideal and living number of children. The two-child norm in Madhya Pradesh could not have any impact in determining the female-male ratio.

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Table 1: Percentage-distribution of Women reporting their Ideal number of Children by their Current status of Contraceptive method use

		Ideal number of children			Total
		≤ 2	>2	Non-numeric	
Current status of contraceptive method use	Not using	1598	2271	186	4055
		39.4%	56.0%	4.6%	100.0%
		57.2%	58.7%	67.1%	58.4%
	Sterilization	915	1473	84	2472
		37.0%	59.6%	3.4%	100.0%
		32.7%	38.1%	30.3%	35.6%
	Other method	282	125	7	414
		68.1%	30.2%	1.7%	100.0%
		10.1%	3.2%	2.5%	6.0%
Total		2795	3869	277	6941
		40.3%	55.7%	4.0%	100.0%
		100.0%	100.0%	100.0%	100.0%

Table 2: Distribution of Women Reporting Less or Equal to Two Ideal Children and using various Contraceptive- methods by their Total Number of Living Children

Number of living children	Current method of contraceptive use			Total
	Not using	Sterilization	Other method	
0	489	4	11	504
	(30.6%)	(0.4%)	(3.9%)	(18.0%)
1	482	20	94	596
	(30.2%)	(2.2%)	(33.3%)	(21.3%)
2	291	285	115	691
	(18.2%)	(31.1%)	(40.8%)	(24.7%)
3	163	310	34	507
	(10.2%)	(33.9%)	(12.1%)	(18.1%)
4+	173	296	28	497
	(10.8%)	(32.3%)	(9.9%)	(17.8%)
Total	1598	915	282	2795

Table 3: Percentage-distribution of Sterilized Women reporting their Ideal Number of Children by their Total Number of Living Children

Number of living children	Ideal number of children			Total
	≤ 2	>2	Non-numeric	
0	0.4	0.0	1.2	0.2
1	2.2	0.5	0.0	1.1
2	31.1	6.5	6.0	15.6
3	33.9	37.2	22.6	35.5
4+	32.3	55.8	70.2	47.6
Total number of sterilized women	915	1473	84	**2472**

Table 4: Distribution of Women using various Contraceptive- methods by their Total Number of Living Children

Number of living children	Current method of contraceptive use			Total
	Not using	Sterilization	Other method	
0	903	5	15	923
	(22.3%)	(0.2%)	(3.6%)	(13.3%)
1	843	27	110	980
	(20.8%)	(1.1%)	(26.6%)	(14.1%)
2	791	386	139	1316
	(19.5%)	(15.6%)	(33.6%)	(19.0%)
3	581	877	67	1525
	(14.3%)	(35.5%)	(16.2%)	(22.0%)
4+	937	1177	83	2197
	(23.1%)	(47.6%)	(20.0%)	(31.7%)
Total women	4055	2472	414	**6941**

Table 5: Percentages of Women with Current Status of Contraceptive use according to the Difference between Sons and Daughters by Total Number of Living Children

Current contraceptive use	Total number of living children	Difference between living sons and daughters			Total women
		Less sons than daughters	Equal sons as daughters	More sons than daughters	
Not using	≤ 2	23.8	51.2	25.0	2537
	>2	48.4	13.0	38.6	1518
	Total	33.0	36.9	30.1	4055
Sterilization	≤ 2	4.5	44.5	51.0	418
	>2	29.1	16.3	54.6	2054
	Total	25.0	21.1	54.0	2472
Other method	≤ 2	25.0	34.5	40.5	264
	>2	54.7	11.3	34.0	150
	Total	35.7	26.1	38.2	414
All	≤ 2	21.4	48.9	29.7	3219
	>2	38.0	14.8	47.2	3722
	Total	30.3	30.6	39.1	6941

Table 6: Odds Ratios from the Logistic Regression Analysis predicting the Determinants of Difference between Number of Sons and Daughters

	Model-I	Model-II
Total living children		
1	4.908***	6.341***
2	1.721***	2.035***
3	3.774***	4.222***
4+[R]		
Ideal number of children		
≤ 2 [R]		
>2	0.768**	0.730**
Interaction of ideal & living children		
Ideal >2 or Living >2 [R]		
Ideal ≤2 and Living ≤2	1.859***	1.859***
Child death		
No death [R]		
At least one son	1.117	1.013
At least one daughter	1.057	0.970
At least one son and daughter	1.302**	1.137
Current status of contraceptive use		
Non-user [R]		
Sterilized	2.189***	2.126***
Using other method	1.038	1.180
Age-group		
15-19 [R]		
20-24		1.076
25-29		1.182
30-34		1.362*
35-39		1.387*
40-44		1.616**
45-49		1.613**
Place of residence		
Urban [R]		
Rural		0.939
Highest educational level		
No education [R]		
Primary		0.749***
Secondary		0.743**
Higher		0.597***
Constant	0.242***	0.216***

* $p<0.05$, ** $p<0.01$, ***$p<0.001$; [R] Reference category;
Dependent variable category: Less/Equal sons as daughters=0, More sons than daughters=1.

***Table 7: Odds Ratios from the Logistic Regression Analysis predicting the
Determinants of Difference between Number of Sons and Daughters
(Excluding equal sons as daughters)***

	Model-I	Model-II
Total living children		
1	3.557***	4.560***
2	4.780***	5.811***
3	2.267***	2.569***
4+ [R]		
Ideal number of children		
≤ 2 [R]		
>2	0.692**	0.644***
Interaction of ideal & living children		
Ideal >2 or Living >2 [R]		
Ideal ≤2 and Living ≤2	2.115***	2.159***
Child death		
No death [R]		
At least one son	1.080	0.986
At least one daughter	1.054	0.981
At least one son and daughter	1.394**	1.226*
Current status of contraceptive use		
Non-user [R]		
Sterilized	2.867***	2.789***
Using other method	1.084	1.222
Age-group		
15-19 [R]		
20-24		0.986
25-29		1.028
30-34		1.246
35-39		1.277
40-44		1.530*
45-49		1.433*
Place of residence		
Urban [R]		
Rural		0.900
Highest educational level		
No education [R]		
Primary		0.735***
Secondary		0.746**
Higher		0.584***
Constant	0.345***	0.346***

* $p<0.05$, ** $p<0.01$, ***$p<0.001$; [R] Reference category;
Dependent variable category: Less sons than daughters=0, More sons than daughters=1.