Selective Gender Differences in Child Health among Small Families in Eight Replacement Fertility States of India

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Paper prepared for the 2014 Meeting of the Population Association of America, Boston, MA

1-3 May 2014

Draft – Please do not cite or quote without the authors' permission.

Abstract

This paper enquires the desired family size-sex composition of children and the role of the sex composition of the older sibling on gender differentials in health seeking behavior and outcome of the younger one using NFHS III data. Analysis confirms that the desired sex composition is one-son and one-daughter followed by two sons. The binary logit models reveal that boys who are born into a household with no other boys and an older sister appear to be most 'wanted.' They have significantly higher odds in favor of immunization and lesser chance of being underweight than a single girl child. Girls are seemed to be most discriminated when they are the younger ones. It is higher when they have an older sister than an older brother. In terms of same sex composition of siblings, younger girls are significantly more discriminated when they have a same sex sibling than the younger boys.

1. Introduction

Parental preferences towards desired sex composition of their children have been a major barrier towards fertility decline in a developing patriarchal society like India. India has adopted the goal of universalizing the 'two child family norm' by the end of this century which has consequences at the household level, ultimately affecting the nation's economic development in the long run. The recent National Family Health Survey III has shown that ten out of twenty-nine states of India has achieved the replacement or below replacement level fertility. Out of these ten, eight have been selected (two states Sikkim and Goa form statistical outliers) viz, Punjab, Delhi and Himachal in the north, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Kerala in the south. Interestingly some of the Northern states which has a long tradition of gender bias in children born like Punjab, Himachal Pradesh and Delhi have swept below the 2.1 fertility rate and some scholars (Dasgupta and Mary Bhat, 1995) have argued that in some of these Northern states the 'parity effect' has been outweighed by an 'intensification effect' rendering pronounced parity specific gender bias at lower levels of fertility.

Given the small families, it is quite natural that the flavors of discrimination as it was in large families shall be diluted as with the limited resources, the cake can be distributed at least equally among the few who are the desired ones. The present study is focused on gender bias among children from health parameters in small families. A study of gender bias in child health is relevant as an area of its own research as health being one of the most important basic capabilities, removal of gender bias in child health can go a long way in achieving gender parity among many other aspects of human development. The study is divided into two basic parts; the first part deals with the desired size-sex composition among families and the second part focusing on the intra household resource allocation among the desired children in small families.

2. Background

A great body of literature has been flooded dealing with the discriminatory mechanisms among children of opposite sex as sons are considered vital not only economically but so as socially and performance of religious pursuits. So, a strong preference for sons holds the rule-thumb in Indian society and this becomes more pronounced when we move towards the Northern Indo-Gangetic

plains. In a seminal paper by *Dasgupta and Mary Bhat*[1] (1997) have tried to explore the relations with fertility decline and net manifestations of sex bias impacting sex differentials in childhood mortality. In societies characterize by a strong preference for sons, fertility decline has two opposing effects on discrimination against girls. On one hand, there are fewer births at higher parities where discrimination against girls is strongest, and this reduces discrimination (the 'parity' effect). On the other hand, parity-specific discrimination becomes more pronounced at lower levels of fertility, and makes for increased discrimination (the intensification effect). These two effects counterbalance each other in determining the net change in excess mortality of girls as fertility decline proceeds. Fertility decline in India has reduced adult females' disadvantage in mortality because of reduced reproductive stress, but increased that for children. During the 1980s, the decade when fertility in India declined most rapidly, the sex ratios increased even in the Southern States where discrimination had not traditionally been as strong as in the North. However, it is noticeable that sex ratios have changed less in the South than in the North, despite the much more rapid fertility decline in the former area. This shows that increased manifestation of sex bias (in excess mortality of girls) is greatest where the manifestation was already highest, and that the regional patterns of sex bias persist.

Counterclaiming to the 'intensification effect' *Mary Bhat and Francis Zavier*[2] (2003) argued the phenomena of son preference with the decline in fertility in Northern India. Using data from the National Family Health Survey they found that in Northern India preference for sons is reduced when the ideal family size becomes small, though it does not completely disappear. They suggested a modification to Das Gupta and Bhat's (1997) proposals on the effects of the decline in fertility on sex bias. They replaced the hypothesized intensification effect of a decline in fertility with the son-preference effect and the technological effect while retaining the earlier concept of the parity effect. From the Indian data the son-preference effect, like the parity effect, would generally reduce sex bias when fertility is falling. But the increasing ability of parents to eliminate children of an unwanted sex during the course of fertility transition (i.e., the technological effect) would intensify the sex bias revealed in actual behavior. As the Indian experience suggests, the technological effect could outweigh the influence of the other two

[1] Das Gupta, M and Mary Bhat, P.N. (1997) "Fertility Decline and Increased Manifestation of Sex Bias in India", Population Studies, Vol. 51, No. 3, pp. 307-315.

[2] Mary Bhat, P.N. and Francis Zavier, A.J. (2003), "Fertility Decline and Gender Bias in Northern India", Demography, Vol. 40, No. 4, pp. 637-657.

effects when the sex-detection techniques are newly introduced in societies with a strong preference for sons. Its adverse effect on the sex ratio would be larger if the technology becomes available earlier in the transition when the preference for sons is stronger.

Chen[3] etal, 1981 tried to examine the validity of the hypothesis of their earlier paper on Matlab of Bangladesh wherein the reversal of sex-biased mortality during childhood was largely a function of gender differentials in health and nutrition related behaviour favouring male children. The analysis suggested substantial discrimination in health services between sexes that is well reflected in the health outcome. The Matlab health service utilization pattern amply demonstrated that even free services may not reach the disadvantaged, in their case the female children, because of sex-biased utilization of services.

Countering to Chen's argument, *Basu*[4] (1989) hypothesized that sex differences in childhood nutrition are not responsible for observed sex differences in mortality wherein she presented a counter-example to the thesis that more severe malnutrition leads to higher mortality and examined other data on the malnutrition-mortality link. Considering the evidence for other possible determinants of sex differences in child mortality she concluded that differential use of health care by the two sexes is probably an important such factor. Lastly, drawing some socio-economic determinants especially women's status particularly women's employment outside the home has lead to greater equality in the treatment of boys and girls in the household.

Another study by *Mishta*[5] etal (2004) while pointing out the sex differential in childhood feeding, health care and nutrition found greater female disadvantage in childhood health care and nutrition and excess female childhood mortality in families with older female siblings. However for certain outcome variables discrimination against girls is as strong in the South as in the North. Discrimination against girls in exclusive breastfeeding may benefit girls more than boys, and that there is some discrimination against boys in families with no living daughters.

[3] Chen, L.C. etal (1981) "Sex Bias in the Family Allocation of Food and Health Care in Rural Bangladesh", Population and Development Review, Vol. 7, No. 1, pp. 55-70.
[4] Basu, A.M. (1989), "Is Discrimination in Food Really Necessary for Explaining Sex Differentials in Childhood Mortality?", Population Studies, Vol. 43, No. 2, pp. 193-210.
[5] Mishra, V. (2004) "Sex Differentials in Childhood Feeding, Health Care, and Nutritional Status in India", Population and Development Review, Vol. 30, No. 2, pp. 269-295.

Study by Hill and Upchurch[6] (1995) based on DHS data found that on a cross-national basis, gender differences in the health-related indicators are only weakly, if at all, related to gender differences in child mortality. Thus, for example, female-male differences in rates of sickness, stunting, wasting, and ARI treatment are not associated with female-male differences in mortality rates. Among the health-related variables examined in their article, only female-male differences in immunization coverage and in diarrhea treatment rates are significantly related to female-male mortality differentials, the latter with a perverse direction. Their health-related variables do not capture the societal processes that contribute to the continuation of gender-based mortality differentials in the developing world.

A major breakthrough in studies pertaining to childhood survival and mortality (Mosley and Chen[7], 1984) gives a reorientation in research approached by both health and social scientists. Specifically, they suggested that child mortality should be studied more as a chronic disease process with multifactorial origins than as an acute, single cause phenomenon. Use of the model should facilitate specification of the different orders of causality and possible interactions among the socioeconomic determinants. Regarding the dependent variable, the degree of physical deterioration (growth faltering) among surviving children in a population is combined with the mortality experience into a nonspecific measure of the level of adverse conditions facing the population.

Pande[8], 2003 drawing data from National Family Health Survey (1992-93) examined the role of the sex composition of surviving older siblings on gender differences in childhood nutrition and immunization. Logit and ordered logit models were used for severe stunting and immunization, respectively. The results showed selective neglect of children with certain sex and birth-order combinations that operate differentially for girls and boys. Both girls and boys who were born after multiple same-sex siblings experience poor outcomes, suggesting that parents want some

[6] Hill, K. and Upchurch, D.M. (1995), "Gender Differences in Child Health: Evidence from the Demographic and Health Surveys", Population and Development Review, Vol. 21, No. 1, pp. 127-151.
[7] Mosley, W.H. and Chen, L.C. (1984), "An Analytical Framework for the Study of Child Survival in Developing Countries", Population and Development Review, Vol. 10, Supplement: Child Survival: Strategies for Research, pp. 25-45.
[8] Pande, R.P. (2003), "Selective Gender Differences in Childhood Nutrition and Immunization in Rural India: The Role of Siblings", Demography, Vol. 40, No. 3, pp. 395-418.

balance in sex composition. However, the preference for sons persists, and boys who were born after multiple daughters have the best possible outcomes.

3. Hypotheses

Based on the existing literatures that discuss some of the pertinent issues of desired family size and its outcome on child health, the following hypotheses have been constructed:

a. There exists gender preference towards son in small families as an outcome of desired sex.
b. Assuming this preference gets reflected in differential health treatment between boys and girls, families possessing same sex children are relatively worse than those having both the sexes.
c. Even among the same sex siblings, boy-boy combination has lower discrimination at higher parity than girl-girl.

The main objective of my study is to enquire the selective gender differentials in health seeking behavior and outcome among the preferred children in small families.

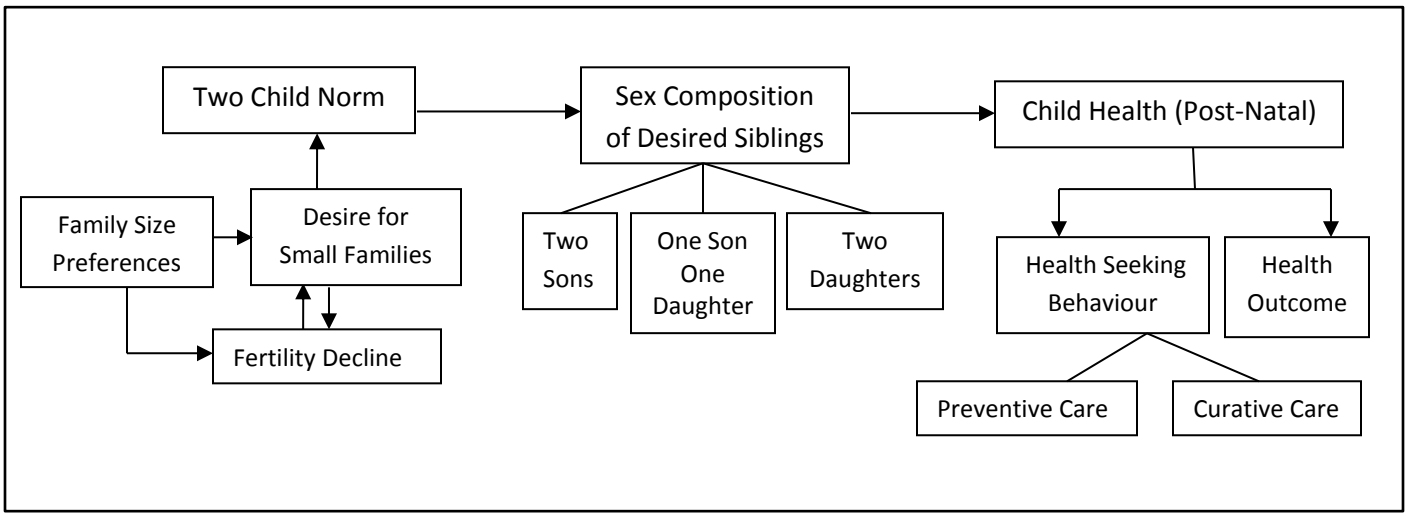
4. Analytical Framework

In the analytical framework an attempt has been made to provide the linkages between small families, gender preference among the desired siblings and their expected impact upon health captured both through personal illness control (full vaccination and fever/cough treatment) and health outcome through underweight.

Excluding endogenous genetic factors at the individual level, it is assumed that the chances of child survival depend upon the degree of care in which the child is brought up. Broadly visualized, care, is important for an understanding of the determinants of child's health status. The two dimensions of individual level factors which have a direct bearing on child care are:

i. Timing
ii. Type of care

Schematic Representation of Desired Family Size-Sex Composition over the Dimensions of Child Health



Source: Developed by author

Timing may be divided into three categories namely,

i. Pre-natal
ii. Peri-natal
iii. Post-natal

Type of care accrues to

i. Medical
ii. Non-medical care.

Medical care includes immunization, treatment of illness and medical attention at birth. Non-medical care includes feeding practices, protection from environmental insults and general cleanliness. However, in the present analysis, only the post-natal medical care of the child has been considered since the aim is to enquire how family size affect child care after the child is born. Thus, the two main dimensions of care yield the following three main individual-level factors:

i. Post-natal preventive medical child care- immunization.
ii. Post-natal curative medical child care- incidence and treatment of illness and effectiveness of treatment.
iii. Apart from medical care, a third dimension has been added which is the adverse health outcome of underweight. This outcome may itself result from the negligence and improper medical attention and therefore has a correlation with the other two indicators.

These factors are not arranged in any order of priority. Their relative importance may vary from population to population and for the same population at different times. But we put forward the hypothesis that household and community level factors would affect the chances of child care through one or more of these proximate determinants.

5. Data and Methods

The study has been conducted with the women's (individual) file covering an overall sample size of 1345 in case of one son and one daughter, 976 for two sons and 653 for two daughters. The analysis has been conducted for all currently married women (15-45 years) who have one or two surviving children (excluding the dead children) for selected eight replacement or below replacement fertility states. For considering only the surviving children, I have generated two variables which consist of the sex of the younger and older sibling. In this way for analyzing the different child health indicators, two separate variables, one for the younger sibling and the older ones were generated through permutation-combination method. For example for immunisation, imm1=immunisation status of younger sibling, imm2=immunisation status of the older child and so on.

The analysis uses bivariate and multivariate binary logistic regression analysis. The logit model is based on cumulative logistic probability function and it closely resembles the t-distribution with 7 degrees of freedom. Unlike OLS regression, logistic regression does not assume linearity of relationship between the dependent and independent variables, does not require normally distributed variables, does not assume homoscedasticity, and in general has less stringent requirements.

The binary logit model is specified as:

$$P = F(z) = \frac{1}{1+e^{-z}} \quad \text{……. (1)}$$

Where, $z = \alpha + \beta_1 X_1 + \mu$. Here, e represents the base of natural logarithms, which is approximately equal to 2.718 and P is the estimated probability of vaccination given X_i's. It is noteworthy that z is not the response variable but a linear function of a set of predictor variables.

$$(1) \rightarrow \frac{P}{1-P} = e^z = \Omega = Odds$$

and, $Logit\ P = log\frac{P}{1-P} = z = log\Omega = LogOdds$ ……..(2)

Hence, $Log\Omega = \alpha + \beta_1 X_1 + \mu$ ……(3)

Here, X_1 is an interaction between the sex of the child and sex composition of the older sibling.

Thus, Ω log is calculated first, then $\Omega = e^{log\Omega}$

Separate logit models have been run for both sexes of younger child and for different child health indicators. Therefore, nine different models have been computed, three for each of the child health indicators. For example, in case of immunization, there are two models for younger girls and younger boys while an additional model compares girls with boys. These three sets of models have been replicated for other two indicators as well.

Table. 1 Selected Indicator for Analyzing Desired Gender Composition and Child Health

Indicators	Source & Year	Level of Consultation
A. Family Size Preferences		
Currently married women (15-49)and men (15-54) who wants no more children by number of living children	2005-06 (NFHS-3)	Unit Level
A.1 Sex Preference in Family Composition		
Currently married women (15-49)and men (15-54) who have 2 or less than 2 living children and wants no more children (by sex of surviving children)	2005-06 (NFHS-3)	Unit Level

B. Child Health		
B.1 Child Health Seeking Behaviour		
B.1.1 Preventive Care		
Proportion of Children (1-5 years) who have received universal immunisation	2005-06 (NFH-3S)	Unit Level
B.1.2 Curative Care		
Proportion of Children (0-5 years) who have received treatment suffering from fever/cough	2005-06 (NFHS-3)	Unit Level
B.2 Child Health Outcome		
Proportion of Children (0-5 years) who are underweight	2005-06 (NFHS-3)	Unit Level

Appropriate bi-variate analyses are worked out to see the gross effect of different level factors over child health. However, the net or independent effects of intra household discrimination have been captured through binary logistic regression models. Three separate models have been used according to each of the dimensions of child health as described above based on sibling order.

6. Results

6.1. Family Size Composition: revisiting son preference

The family size transition in India largely evokes out of the parent's conscious desire to have small families. The debate has been initiated since long back and the common slogan 'hum do hamara do' has now been profusely translated in the new era with ten states achieving the replacement level fertility (Punjab, Himachal, NCT Delhi, Sikkim, Goa, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Kerala) in 2005-06. Out of these ten states, I have excluded Sikkim and Goa as outliers, and the analysis restricts with those of eight states, three from the North and the rest from the South.

That ‘two child family’ is becoming a norm is clearly depicted in Fig. 1 and 2 where the proportion of currently married women and men in their respective reproductive age group shows the maximum desire of not wanting any more children when they have two living children. This tendency is more strengthened for the replacement level fertility states wherein 44.7% men and 41.3% women do not wish any more children when they have two living children.

[Figures. 1 and 2 about here]

A common theme permeating a number of analyses of family size preferences is the underpinning given these preferences by norms dictating not only overall family size levels but also how families should be composed in terms of the sex of children. Figures 3 and 4 show the preferred gender composition in small families among currently married men and women in India. Both the figures, especially in Figure. 4 depicts the situation in replacement fertility states the most preferred combination emerging is the one son one daughter followed by two sons. Two daughters cases show that parents have a desire of 44% to bear an additional child (Figure. 4) whereas the All-India value (Figure. 3) has still a more higher desire (52.4%) of bearing more children in case of two daughters. From this analysis three things can be concluded:

I. The study claims daughter aversion more than son preference as two sons are not the most desired combination in replacement fertility states.
II. This may be attributed to the factor that the decline in family size is more rapid than the number of desired sons.
III. Compared to India, the eight states together show a better tendency of limiting birth after having two living daughters.

[Figures. 3 and 4 about here]

6.2. Health care and outcome of the younger sibling depending upon the sex of the older sibling

The common notion arising from the above discussion that the parents are now consciously planning their families and more or less there is a gender neutral desire of wanting children although slightly biased for differing sexes and son-son combination. Hence, one should not expect a major biasness for any particular sex in health considerations. Whether this gender neutrality is maintained or not, is the crux of the following discussion.

As already stated, three indicators have been taken for analyzing child health, namely, children (1-5 years) who have received universal immunisation, children (0-5 years) who have received any treatment suffering from fever/cough, and lastly, for health outcome, children (0-5 years) who are underweight.

Despite the long-standing persistence of gender differences in mortality on the Indian subcontinent, patterns of gender discrimination in the proximate determinants of child mortality in other words, in the health status of surviving children-have not received adequate attention in the literature. The study therefore focuses on this gap by examining gender differences in immunization, fever/cough treatment and underweight particularly the effects of sex composition on gender discrimination for surviving girls and boys for these three outcomes. Figures. 5, 6 and 7 show the levels of health care and health outcome of the younger sibling depending upon the sex of the older sibling. Both in inmmunisation and medical treatment, younger brother seem to be relatively well immunised when he has an older brother as well as an older sister. However, for younger daughters contradictory care happens, when she has an older sister seem to be given better care rather being a younger sister of an older brother. However, the equations differ for the health outcome, boys having older brother in two sons family has the highest levels of underweight. But one should not be carried away with the height differences in the bar graph as the difference between the highest (younger brother with older brother) and the lowest (younger brother with older sister) levels of underweight is only 4%.

[Figures. 5, 6 and 7 about here]

6.3. Gender differences in child health according to household, individual and location specific parameters

Universal Immunization

The effect of the sex composition of surviving older children on gender differences in health status is influenced by social norms that form gender preferences for children, as well as by the household's ability and access to resources to realize their preferences. Generally, across all the factors, the older sibling seems to be better immunized than the younger counterparts and the case becomes even stronger for older brothers who have younger daughters (Table.2). However, for poor and SCs the younger sister who has an older brother is not as much discriminated, in fact the discrimination is reverse. Girls are more valued among the STs as whatever be the order of girls (younger or older) or whatever brother they have (younger or older), sisters are given better preventive care than brothers. The broad locational features too depict some interesting facts. Two contextual discrimination of the older brother occurs across the region and place of residence. The older brother having a younger brother seems to be less immunized than those having a younger sister. Contrary to it, this younger sister does not pay the cost when they have an older sister. The lines of discrimination remains almost the same in individual features as that of household features except that parents who have attained secondary and higher education is found to be less discrimination compared with no or primary or below primary education. In case of service women, the equations take different turns. Here, younger siblings are given better care, and for the first time the older sister given more immunization than the younger sister.

[Table.2 about here]

Fever/cough treatment

In case of medical treatment of fever/cough, the case reverses as now the younger siblings get better care (Table.3). But households having two daughters, the older sister becomes now preferred. The gap is not so much wide in rich and nuclear households. One interesting fact comes out from this bivariate association that whatever be the gender of the younger child, they are more favored. In one son one daughter households, where the younger one is a daughter they

are given better curative care than the elder son. The same thing also happens in case of younger son having an elder sister. So the issue of gender is not a question over here, rather what speaks out from the analysis is the parity order instead of parity specific gender bias. However, one limitation to this kind of association was the limited sample size for which some of the figures became so abnormally inflated/deflated has been marked bold. A limitation of the analysis is that it has not incorporated those children who are dead, which may have died owing to selective discrimination of medical treatment.

[Table.3 about here]

Underweight

The older siblings irrespective of sex are at a disadvantageous position when weight for age as a negative deviation from two standard deviations is considered intersecting across multiple levels (Table.4). For STs the girl child is highly valued and the first daughter is welcome than the first son. The levels of discrimination are somewhat lowered in the rich households, among mothers who have received above secondary education and those who are working. Two exceptional cases occurs for mothers who have no education and in urban areas, here the younger child have higher levels of being underweight than the older ones. Weight for age is one of the standard indicator to measure nutritional status. However, improper nutrition may not be the sole factor for being underweight, if the child suffer from continuous illness and not properly treated, if they have not being provided adequate vaccination, it may have some impact on the overall weight potentials of the child. This fact could be related to the degree of medical treatment for the older child in Table.3 which shows that older child is often discriminated against the younger; this effect could fall on the overall body weight of the older siblings. However, the statement is not conclusive rather indicative of the interrelated phenomena linked to child health status.

[Table.4 about here]

6.4. Summary results of the binary logit model

The interactions between gender and sex composition provide the test for the key hypotheses in this study. So in order to capture the net or independent effect of health of the younger child

(disaggregated by gender) depending upon the sex of the older sibling, binary logistic models have been attempted. Three separate models have been constructed for each of child health indicators according to different sibling combinations.

The three tables (Tables.5a, 5b and 5c) support the fact that sex composition of the siblings influences health status differently for girls and boys. Boys who are born into a household with no other boys and an older sister appear to be most 'wanted.' They have significantly higher odds in favour of immunization and lesser chance of being underweight than a single boy child. Not only the younger boys are at a better position when he has no siblings or a surviving older sister, they too have higher odds of better immunisation status even if there is an older brother. This finding somewhat contradicts with the bivariate results where the older chunks showed better immunisation status. However, consistency is maintained for underweight with the bivariate results as the younger boys have also shown lesser chances of being underweight (14.3% less) than the older counterparts. However, if one looks into the different gender combinations of the younger child, when the first child is a son, the younger girl is slightly more discriminated than the younger boy in case of immunisation, while the younger girl takes the upper hand who are less likely to be underweight than the younger boy.

All girls do not face equal discrimination. Girls are seemed to be most discriminated when they are younger child. It is higher when they have an older sister than an older brother. Moreover, the odds of a girl in favour of immunization are significantly low (by 21%) when she has an older sister than a boy who has an older sister. Girls who have an older sister are more likely to be underweight than boys who have an older sister. Correspondingly, girls who have older brother have less chances of being underweight in comparison to boys who have an older brother. Thus, for girls the situation is worse when they have same sex sisters in comparison to only one daughter or one older brother.

So in terms of same sex composition of siblings, there is a difference. Younger girls are significantly more discriminated when they have a same sex sibling than the younger boys. For example, a girl who has an older sister are likely to have 7% less chance to be immunized than a single girl child, when the corresponding value is 20% more for a boy having an older brother.

In terms of medical treatment of fever/cough, a boy with an older brother has significantly lesser chance of being treated than is the first son, indicating marginal neglect for the younger boy child. The same thing is also noticed for younger girls although the value is not significant. Young girls who have an elder brother have significantly lesser chances of getting medical treatment compared to single girl child. And in families which have an older sister, young girls are less likely to get treatment than young boys.

[Tables.5a, 5b and 5c about here]

7. Discussion

Two child families has almost become a norm in the recent past. Within this desired family size, there is a marked gendered choice. Parents' desire of not bearing any more children if they have two living daughters is the lowest. At the same, parents also want atleast one daughter. Desire for not wanting any more children is highest when they have one son and one daughter in the replacement fertility states. So, as suggested by Dasgupta and Mary Bhat (1997), this study also clearly shows that the desire for small families is more intense than the desire for sons. At the same time some forms of discrimination is observed at this lower fertility levels. With the desire of wanting of small families, along with the need to accommodate the phenomena of having atleast one son resulted in greater pressure to remove girls. Thus daughter aversion has become more common than son preference. But whatever be the gender, the children are the preferred ones. Among these preferred children too, lines of discrimination is still good to prove itself that gender bias in child health have not disappeared altogether. Young girls in same sex families are found to be much more discriminated than two sons case or if it is only one daughter. However, the equations change when these young girls have one older brother, in many cases like in underweight, girls are significantly less underweight than boys in households having an older brother. Boys who are born into a household with no other boys and one older sister appears to be most wanted showing significantly less chances of becoming underweight and higher odds for immunisation respectively. In general households having balanced sex composition tend to perform badly than with opposite sex. This conforms to the second hypothesis and is also indicative of maximum utility of parents to have one son and one daughter. However, within

these balanced sex households also, there is a difference. Girls of same sex in the higher parity are more discriminated than the younger boy with an older brother. Across the socio-economic aspects of the household and the individual's achieved features, some differences are also found. The gap between the younger and the older child's health conditions was not enough consistent though, yet it is very important to incorporate these features in order to understand the *intersectionalities* which cross-cuts across the gender dimension. From all these factors, it could be found that households where modernisation traits have entered (nuclear, urban, rich and educated parents) show lesser gap in two children health standards as compared to others.

8. Concluding remarks

It appears that, as hypothesized, not all girls and boys are treated equally, and there is evidence of patterns of selective neglect in the case of underweight, immunization and medical treatment of fever/cough that are consistent with the literature on mortality differences and that persist even after household, and individual factors are taken into account. The strength of the preference for sons and the low value of girls are evident in that the harmful effect of having surviving older siblings of the same sex alone is harsher for girls than it is for boys. Also those girls who are born later in households with one surviving brother are at a better position rather than if she is the single child or has one elder sister. Thus girls face multiple reactions depending upon which parity is she situated. It is a matter of utter shame for the parents that despite so much of Universal Immunization Programme as well as the Expanded Immunization Programme which has been place in India for decades, their behavior is so selective among girls and boys. Given that immunization is provided free of cost and is provided through a mass program that should theoretically be accessible to all eligible children, the female disadvantage seen here is somewhat surprising. These results indicate that there are costs to immunization other than monetary costs, for example, opportunity costs of time taken to vaccinate a child or to take care of side effects that may contribute to a female disadvantage. Not mentioning the case of underweight separately, as those children who are not properly vaccinated are likely to fall ill as much which may cause them not is having balanced weight apart from the nutritional aspects. Thus, the study recommends a gender parity in child health standards, as if these ill-treated girls again has to face mortality in the long run, it would add again dozens and hundreds to the 100 million unborn girls.

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Figure.1

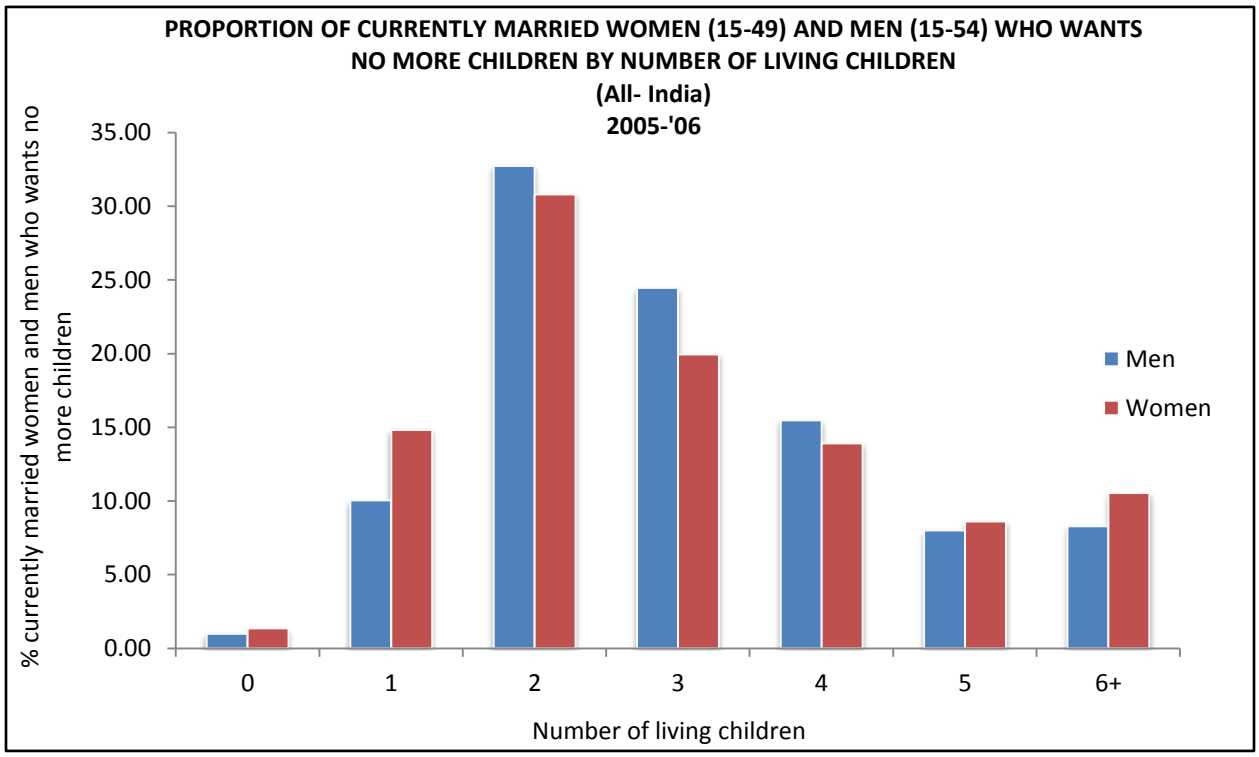

Figure.2

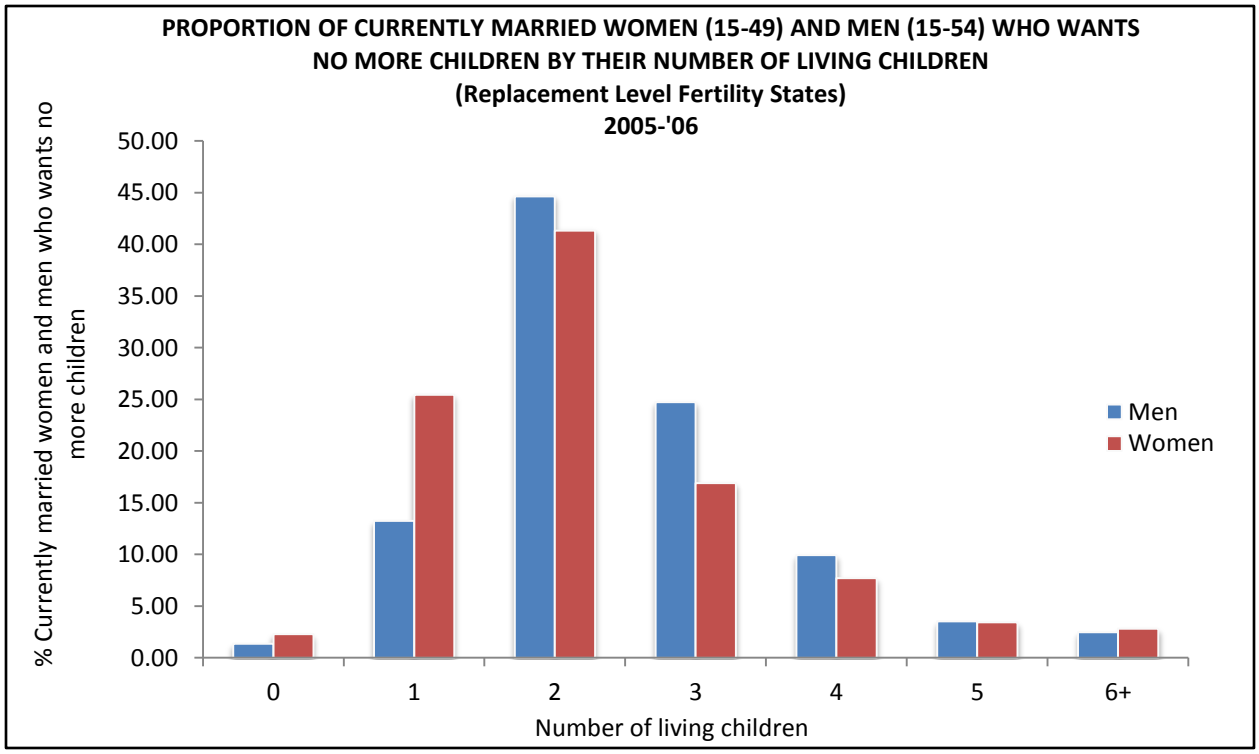

Figure.3

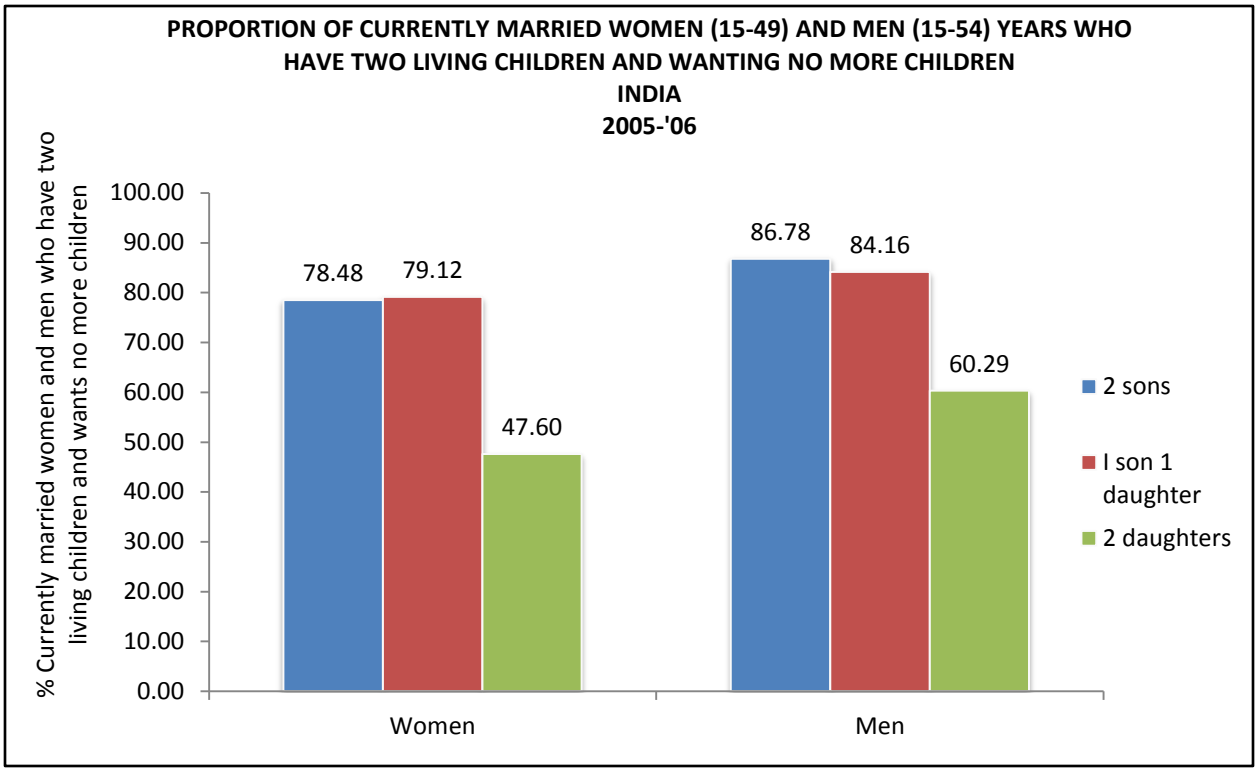

Figure.4

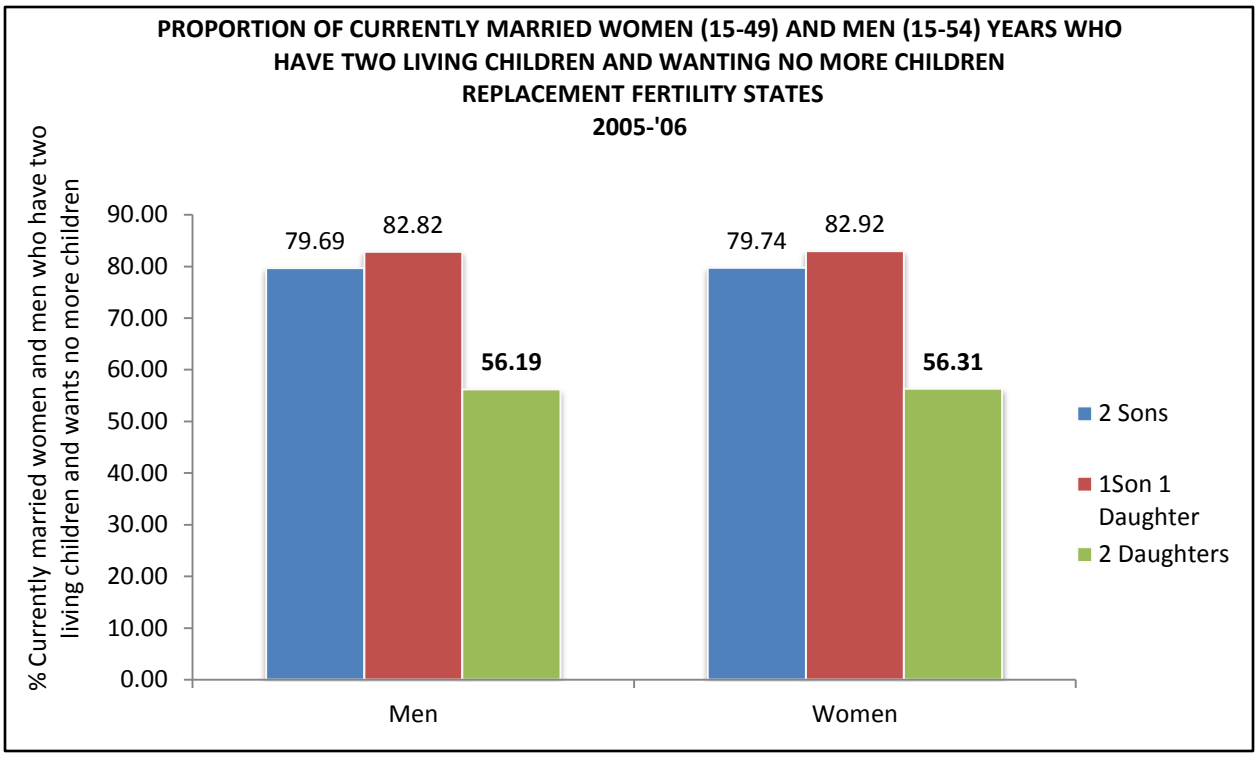

Figure.5

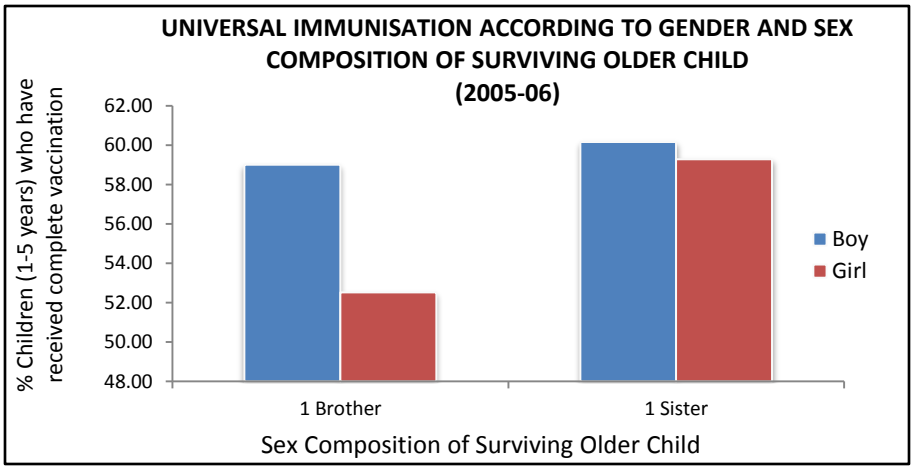

Figure.6

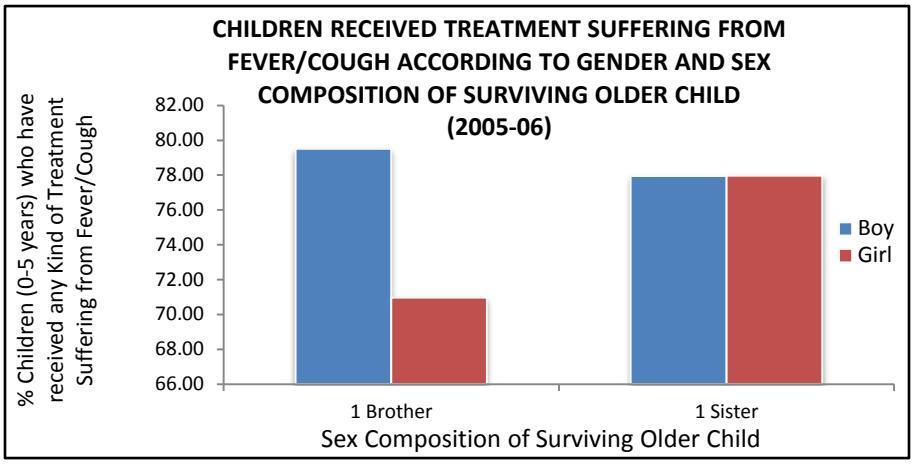

Figure.7

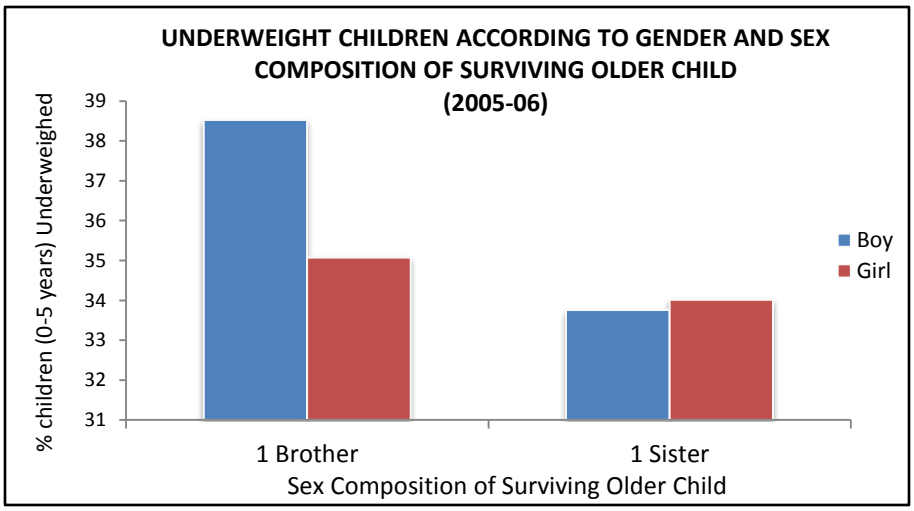

Table.2 Percent Children (1-5 years) who are universally immunized according to background characteristics

	2 Sons		1 Son 1 Daughter				2 Daughters	
HOUSEHOLD FEATURES (Acsribed/Achieved)								
WEALTH INDEX	Elder Brother	Younger Brother	Elder Brother	Younger Sister	Elder Sister	Younger Brother	Elder Sister	Younger Sister
Poor	44.36	29.65	55.82	37.18	61.42	60.51	41.23	49.04
Middle	54.47	57.22	47.70	42.50	56.63	51.50	48.22	47.02
Rich	84.90	71.70	73.32	64.08	75.03	64.56	77.40	71.18
CASTE								
SC	72.23	62.86	66.50	56.48	62.01	65.77	56.15	64.77
ST	57.77	45.66	32.28	40.57	72.91	58.41	54.48	52.18
OBC	62.59	54.25	61.22	48.01	66.89	56.54	61.88	59.08
GEN	73.48	62.70	64.52	60.08	69.83	60.92	56.88	54.13
HH_TYPE								
Nuclear	60.96	57.98	61.52	57.68	67.19	60.10	68.53	62.74
Non-Nuclear	74.96	60.25	64.08	52.47	67.13	62.26	55.92	56.36
LOCATION SPECIFIC PAPRAMETERS								
REGION								
North	67.67	70.88	76.74	70.77	79.93	62.97	53.76	71.26
South	57.63	68.48	60.64	50.34	64.96	59.84	59.59	60.15
RESIDENCE								
Rural	51.25	58.64	59.38	50.50	65.87	57.58	53.82	54.66
Urban	72.06	84.08	66.41	55.37	68.03	64.07	67.91	76.10
INDIVIDUAL FEATURES (Achieved Feature)								
MOTHER'S EDUCATIONAL ATTAINMENT								
No education	51.55	29.95	33.74	30.17	53.32	50.65	27.43	35.26
Primary (complete & incomplete)	52.03	39.58	63.20	43.09	68.92	59.43	68.80	61.81
Secondary (complete & incomplete) and higher	78.81	73.68	71.49	61.78	71.08	64.25	73.45	82.20
FATHER'S EDUCATIONAL ATTAINMENT								
No education	33.58	35.90	43.77	41.13	59.31	49.33	33.46	44.80
Primary (complete & incomplete)	67.89	48.41	55.94	48.09	61.50	67.37	67.43	61.00
Secondary (complete & incomplete) and higher	77.62	65.59	68.31	56.08	69.19	60.99	60.67	66.35
MOTHER'S OCCUPATION								
Not working	73.34	63.59	66.87	55.65	68.36	60.35	60.67	63.76
Service	81.85	86.09	54.24	56.77	86.67	75.96	44.74	38.90
Agriculture	44.65	44.41	46.35	39.76	58.84	57.24	42.10	49.60
Other Unskilled	83.13	48.75	73.61	65.69	55.75	58.80	56.15	61.69

Source: Computed from NFHS-3 (2005-'06)

Table.3 Percent Children (0-5 years) who had any kind of treatment suffering from fever/cough according to background characteristics

	2 Sons		1 Son 1 Daughter				2 Daughters	
HOUSEHOLD FEATURES (Acsribed/Achieved)								
WEALTH INDEX	Elder Brother	Younger Brother	Elder Brother	Younger Sister	Elder Sister	Younger Brother	Elder Sister	Younger Sister
Poor	73.95	82.42	59.58	62.20	63.53	71.80	91.47	71.34
Middle	72.88	86.37	56.10	73.90	48.66	69.70	57.97	65.20
Rich	68.19	74.86	70.24	72.29	81.74	84.57	86.44	84.64
CASTE								
SC	66.95	87.87	70.49	100.00	85.06	84.36	63.76	68.50
ST	38.00	**87.31**	100.00	61.45	36.15	53.21	**73.80**	**99.12**
OBC	73.87	73.23	56.30	64.80	66.95	73.51	80.40	85.64
GEN	72.78	81.16	67.35	71.20	87.74	82.44	99.01	67.46
HH_TYPE								
Nuclear	72.78	72.37	67.47	74.77	62.47	74.83	84.12	77.46
Non-Nuclear	66.86	83.29	59.45	66.88	85.82	87.19	75.87	86.48
LOCATION SPECIFIC PAPRAMETERS								
REGION								
North	79.54	83.88	59.56	82.45	82.61	96.85	83.78	88.68
South	68.99	79.18	62.75	70.05	70.59	74.24	82.08	76.43
RESIDENCE								
Rural	76.06	81.53	61.24	66.48	59.60	73.99	81.35	75.53
Urban	64.88	75.33	64.36	78.80	86.10	83.57	85.51	82.40
INDIVIDUAL FEATURES (Achieved Feature)								
MOTHER'S EDUCATIONAL ATTAINMENT								
No education	60.79	85.53	15.36	48.52	42.21	74.90	73.22	73.33
Primary (complete & incomplete)		80.74	63.67	70.39	99.23	68.31	**98.39**	70.33
Secondary (complete & incomplete) and higher	66.49	77.06	68.65	76.17	77.23	80.45	84.26	80.92
FATHER'S EDUCATIONAL ATTAINMENT								
No education	66.49	86.29	33.38	59.28	40.42	61.61	**33.54**	80.40
Primary (complete & incomplete)	56.60	86.82	69.49	72.17	71.86	67.40		84.53
Secondary (complete & incomplete) and higher	69.97	76.76	65.03	73.58	77.18	83.24	83.85	75.78
MOTHER'S OCCUPATION								
Not working	69.97	80.12	55.12	68.32	78.30	84.15	87.18	73.17
Service			56.64	55.76	98.44	96.25	**93.81**	**98.49**
Agriculture	65.86	76.18	72.55	74.44	27.77	54.14	66.09	82.63
Other Unskilled	**19.39**	87.77	100.00	99.26	92.53	98.37	**86.93**	**94.46**

Source: Computed from NFHS-3 (2005-'06)

Table.4 Percent Children Underweight (0-5 years) according to background characteristics

	2 Sons		1 Son 1 Daughter			2 Daughters		
HOUSEHOLD FEATURES (Acsribed/Achieved)								
WEALTH INDEX	Younger Brother	Elder Brother	Elder Brother	Younger Sister	Elder Sister	Younger Brother	Elder Sister	Younger Sister
Poor	49.11	64.05	61.74	46.48	48.46	45.33	45.67	42.54
Middle	47.05	42.41	42.48	38.02	53.80	37.89	55.61	29.49
Rich	31.20	27.43	25.87	29.36	26.46	27.03	24.63	31.66
CASTE								
SC	50.92	40.39	48.09	40.77	47.11	40.60	46.27	41.46
ST	37.02	63.89	80.79	36.33	33.27	53.95	48.86	48.31
OBC	37.02	45.07	32.32	32.72	41.77	33.55	28.69	31.94
GEN	33.63	23.67	31.51	35.66	27.23	25.71	38.96	29.80
HH_TYPE								
Nuclear	40.08	46.05	35.86	35.15	43.24	35.52	47.45	35.87
Non-Nuclear	40.02	33.59	37.02	36.07	35.20	32.94	29.63	31.79
LOCATION SPECIFIC PAPRAMETERS								
REGION								
North	29.43	24.88	29.42	31.06	26.59	25.62	23.91	26.84
South	39.76	41.19	38.49	35.61	40.77	34.91	39.09	34.65
RESIDENCE								
Rural	44.34	43.95	42.26	36.73	43.96	35.93	41.36	36.27
Urban	29.05	32.21	30.09	32.82	30.22	30.53	31.30	30.50
INDIVIDUAL FEATURES (Achieved Feature)								
MOTHER'S EDUCATIONAL ATTAINMENT								
No education	57.83	59.39	52.51	40.62	48.03	42.87	59.26	37.72
Primary (complete & incomplete)	34.11	33.66	42.49	46.96	40.96	46.80	42.70	38.11
Secondary (complete & incomplete) and higher	32.67	33.37	32.75	30.55	35.30	27.83	30.47	32.03
FATHER'S EDUCATIONAL ATTAINMENT								
No education	49.85	52.99	44.98	38.27	46.27	40.87	51.63	45.15
Primary (complete & incomplete)	42.93	45.76	43.28	41.18	42.43	39.47	49.65	36.61
Secondary (complete & incomplete) and higher	35.13	34.15	34.25	33.17	36.62	31.21	31.90	31.14
MOTHER'S OCCUPATION								
Not working	34.85	38.04	33.09	30.97	38.22	31.47	36.82	31.25
Service	32.84	14.57	20.24	29.20	26.63	34.39	13.79	26.61
Agriculture	49.73	47.85	59.81	53.17	38.60	41.19	49.45	44.74
Other Unskilled	45.62	31.74	45.95	24.97	67.80	30.32	29.78	45.29

Source: Computed from NFHS-3 (2005-'06)

Table.5 Odds Ratios for selected interactions between gender of the younger child and sex composition of the older sibling in different child health indicators

Table.5a Universal Immunisation

Category	1 older Sister	1 older brother
Boy (ref. no sibling)	1.949**	1.201*
Girl (ref. no sibling)	0.933***	1.287*
Girl (ref. boys)	0.793*	0.927**

Table.5b Underweight

Category	1 older Sister	1 older brother
Boy (ref. no sibling)	0.770**	0.857*
Girl (ref. no sibling)	1.783***	0.837*
Girl (ref. boys)	1.023	0.933***

Table.5c Medical Treatment of Fever/cough

Category	1 older Sister	1 older brother
Boy (ref. no sibling)	0.817	0.965***
Girl (ref. no sibling)	0.784	0.934**
Girl (ref. boys)	0.869	0.833***

Significance Levels: *1%, **5%, ***10%
Source: Computed from NFHS-3 (2005-'06)