Child Health and Nutritional Status of Children: The Role of Sex Differentials

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Abstract

Son preference, or the privileging of sons over daughters in accordance to a patriarchal system, is a growing phenomenon in India. In the era of UN Millennium Development Goals where one of the objectives is to 'increase gender equality and empower women', the issue of son preference is even more widely debated. The data for the study is drawn from the National Family Health Survey-2 (NFHS-2) of 1988-99. The main objective of this paper is to examine the patterns of gender differences for children in the north state of Haryana in India for health outcomes. Specifically it addresses the incidence, and use of preventive and curative health care services and nutrition. Does the extent of male bias if it is present, depend on the socioeconomic status, caste, religion, education, and rural/urban residence of the head of the household? The odds of female children being discriminated against with respect to each of these indicators are estimated by using logistic regression analysis. Analyses results the gender bias as prevalent in health enchasing treatment for immunization and in giving nutrition to boys specifically. In *Haryana*, discrimination against girls and favor of boys is inherited by each generation of parents. Studies reflect that people living in both the rural and the urban parts of *Haryana* prefer sons to daughters. Also, nutritionally girls have lower ratings than boys. The living status of a family does not matter in the biased preference for a boy child; whether the family is rich or poor, the lower nutrition food is confined to a girl child only.

Key words: Gender, health care, nutrition, children, discrimination and Goals.

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Introduction

While India has made remarkable progress as apparent in its reducing poverty levels and improving social indicators such as access to and quality of health facilities, very little of this progress is reflected in the Indian woman's situation. On the surface gender indicators such as the GINI coefficient, female literacy and female political participation, show a positive development for women in India. However, limiting gender roles remain unchanged and the preference for sons does not only continue but is an option when welfare rises and the population achieve a higher economic standard. With modern technology, the possibility of sex selective abortions reinforce patriarchal values that still dominate and are embedded in everyday life, 'justified' by culture and religion. Thus, in India, the son is often described as an insurance, e.g. as an old age support as the parents get older. Moreover, the son is considered as the bearer of traditions and symbolises a ritual aspect, e.g. the son lights the funeral pyre when the parents die. A family without a son is incomplete and a social embarrassment.[2] Or as an Indian mother put it: 'In India every mother must have a son'[3]. Daughters by comparison are seen as a burden. Although prohibited by law, dowry it is still widely practised, which shows that social belief is larger than the regulation. The notion is that raising daughters is a waste of time and money. Married into her new family, a girl will leave her parents with a fragile economic situation after paying the inevitable dowry. Daughters are therefore equal to investments with little return.

A rise in welfare has led to a decline in fertility levels at 3.4% in India today. Successful campaigns with popular slogans such as *'Small family – Happy family'* have made family planning important. For families with strong patriarchal values, the small family preference makes it even more important to have a son. If these families decide to have only one child, it has to be of the 'right' sex. With access to technology there is no need to take chances.

Education and access to information have not led to a decline in the use of ultrasound to determine the sex of the foetus; it has actually had the opposite effect. The

[2] Bumiller 1990:114
[3] Ibid.1990:118.

most widespread use is in the urban middle- and upper class families, where money has made it possible to choose the sex of your child. 'If there is a choice, it is always for a male child'.[4]

In India, there has been a steady decline in the sex ratio from 972 in 1901 to 933 females per 1000 males in 2001. From 1961 to 1991, sex ratios for children under age 10 became more masculine across all India (Bhat, 1989; Das Gupta and Bhat, 1997; Desai, 1994; El-Badry, 1969; Miller, 1981; Parasuraman and Roy, 1991). In South Asia and India traditions, values and customs entrenched in time have resulted in an insatiable desire for sons. Sons are preferred over daughters for a number of economic, social and religious reasons, including financial support, old age security, property inheritance, dowry, family lineage, prestige and power, birth and death rituals and beliefs about religious duties and salvation (Dyson and Moore, 1983; Kishore, 1993;Das Gupta, 1987; Das Gupta and Mari Bhat, 1997; Basu, 1989, Miller, 1981; Caldwell and Caldwell, 1990). Consequently, women and girls are accorded a lower status in Indian society. Women in India face discrimination in terms of several political, and economic opportunities as a result of their inferior status. A majority of women cannot inherit parental property while political and employment participation are very limited. Gender inequalities prevail in work, education, allocation of food, health care and fertility choices. On the other hand, at the family level women are exclusively burdened with household chores cooking, cleaning collecting fuel and water and caring elderly and children (Arokiasamy, 2003).

India exhibits wide variations in the degree of son preference, with a stronger son preference found in northern India than in the south (Dyson and Moore, 1983). A review of literature indicates that while the existing studies document the existence of the sex bias in India, detailed state level explorations into the extent, pattern and nature of gender difference in various possible parameters of discrimination has not been undertaken. Most research in this field has been concentrated in the state of Punjab in India (Das Gupta, 1987).

[4] Shefalee Vasudev (2003) .'Female foeticide', India Today .(2003-11-19)

Studies across India have found that boys are much more likely than girls to be taken to a health facility when sick (Das Gupta, 1987; Govindasamy and Ramesh, 1996;Kishor, 1993). Boys had higher immunization rates than did girls in all except Goa and Karnataka, although the extent of this difference varied by states. Similarly, girls are more likely to be malnourished than boys in both the northern and southern states (Arnold et al, 1992; Sen and Sen Gupta 1983; Pebley and Amin, 1991,). Gender differentials in nutritional status are documented during infancy, with discriminatory breastfeeding and supplementation practices. Infant girls are breastfed less frequently, for shorter duration, and over shorter periods than boys (Wyon and Gordon, 1971; Das Gupta, 1987). However, the national family health survey indicated some variable evidences where boys and girls are equally likely to be stunted, on underweight but boys were slightly more likely than girls to be wasted (Mishra. et al, 1999).

This paper of Haryana, (the state in North India), examines patterns of gender differences in child health outcomes, including disease incidence, use of preventive and curative health care services and nutrition. The focus on health outcomes for children is because outcomes, such as child morbidity, are indicative of differential treatment by their parents (and other adults) and hence may indicate more clearly one particular source of gender difference. Specifically it addresses the following questions: First, are boys more likely to have complete vaccination coverage than girls? Second, are girls more likely to suffer from diarrhoea? Are boys more likely to receive care for an episode of diarrhoea, and are they more likely to receive "better" care than girls? Third, are girls more likely to be malnourished than boys? If so, does the extent of pro-male bias depend on various socioeconomic and demographic factors? A knowledge of the levels and patterns of sex differentials in ill-health, malnutrition, and treatment is important for policy makers and programme managers in order to : (1) ensure equitable access to service utilization, and

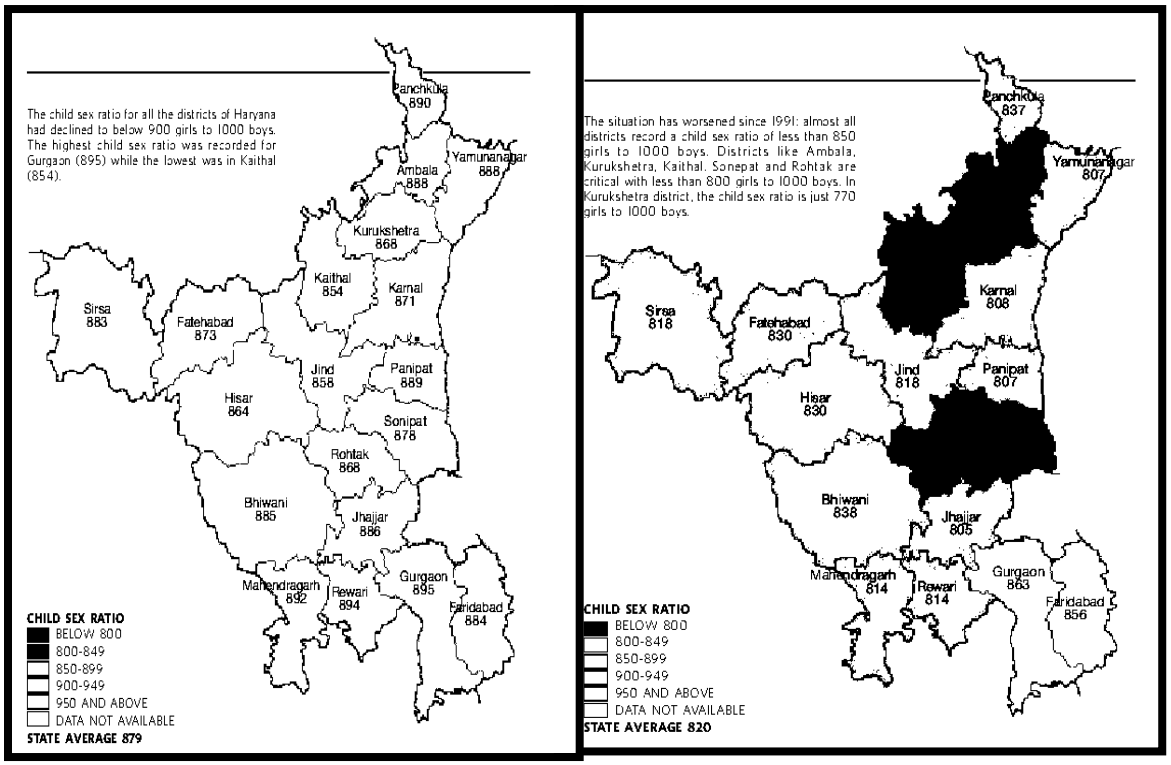
(2) avoid any adverse impact of a preference in a population. For example, a high level of son preference in countries with a low level of fertility has resulted in a skewed sex ratio at birth because the women have access to methods of identifying the sex of foetuses and to induced abortions. A skewed sex ratio, in turn, has worrisome implications for the future population structure, the marriage and labour market, and personality development. In this regard, population policy needs to pay special attention to the possible consequences of high son preference that go beyond the retardation of fertility decline. This is particularly important in states like Haryana where the practice of sex-selective abortion is most widespread (Das Gupta and Mari Bhat, 1997: 312).

Haryana is one of the educationally forward states in India. According to the 2001 Census, the literacy rate among the population age seven and above was 69 percent, compared with 65 percent for India as a whole. The literacy rates were 79 percent for males and 56 percent for females in Haryana, compared with 76 and 54 percent for males and females, respectively, for India. It is a fairly well developed state with the third highest per capita income in India (Government of India, 2001). As per the survey of NFHS-2, Haryana and India, (1998-99), which has shown strong evidence of son preference. In Haryana the total child mortality ages (1-4) Female/Male is 2.16 in comparison if we look at the figure of India it is 1.47.In India the ratio of ideal no of son/daughters is 1.4 whereas particularly in Haryana it is 1.6. In India the proportion of boys and girls fully vaccinated is 1.05 and in Haryana it is 0.99. Prevalence of diarrhea (Boy/Girl) in India is 1.02 where as in Haryana it is 0.85. Proportion (Boy/Girl) taken to health facility or provided in Haryana is 1.03 in contest to India it is 1.04. In Haryana, proportion stunted (Girl/Boy) is 2.12 in Haryana and 1.06 in India. Proportion of both boy & girls undernourished is 1.20 whereas in India it is 1.08. In India excess female child mortality is 47 whereas it is drastically difference in Haryana, which is 119. It has the most unbalanced child sex ratio in India (Office of the Registrar General of India, 2001), which is a grim indicator of the persistence and severity of discrimination against

girls and women. Of the 10 districts with the lowest child sex ratio in India, four are in Haryana (Office of the Registrar General of India, 1991). According to UNICEF "female feticide is reported to be a cause for an adverse sex ratio in some Indian districts in the 1991 Census.

Map 1: Child Sex Ratio in Haryana 1991& 2001

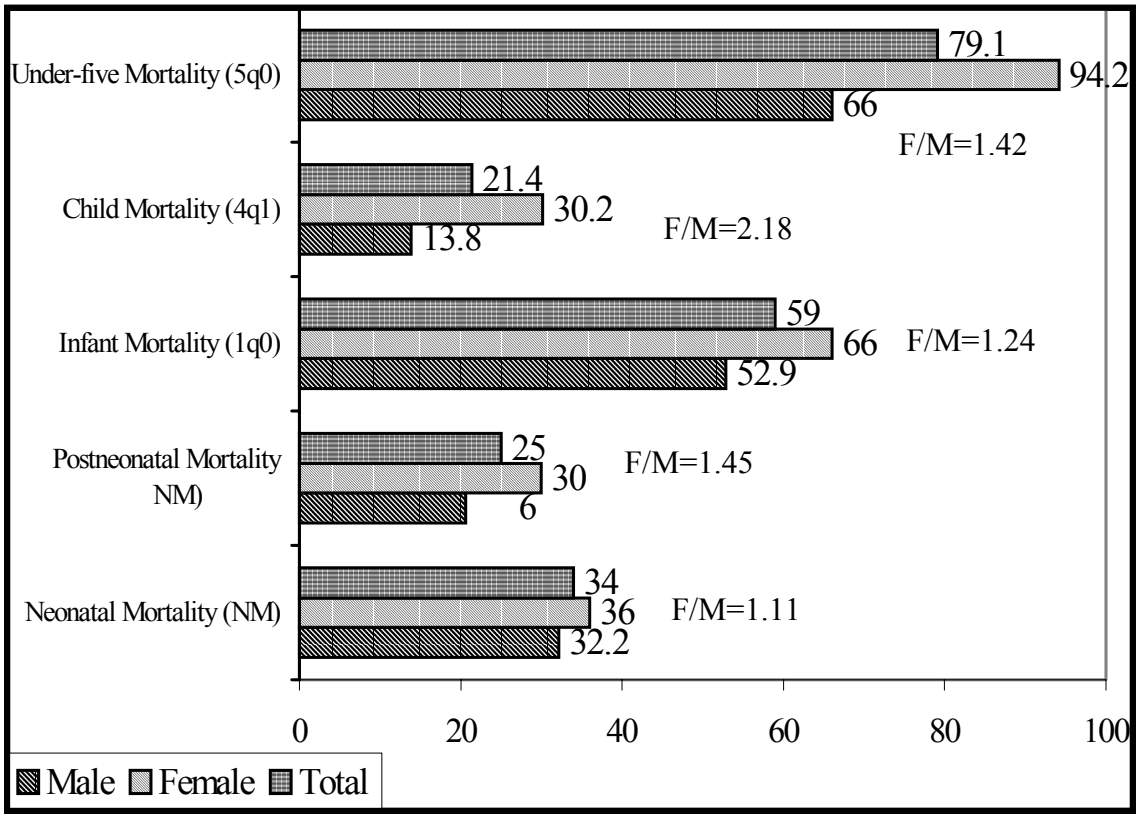
1991 **2001**



Mapping of the child sex ratio in Haryana 1991 and 2001 is presented in Map-1. It is observed that the child sex ratio for all the districts of Haryana had declined to a level of below 900 girls to 1000 boys in 1991. The highest child sex ratio was recoded for Gurgaon district (895) and lowest was in Kaithal district (854). The situation has worsened since 1991; almost all the districts recorded a child sex ratio of less than 850 girls to 1000 boys. Districts like Ambala, Kurukshetra, Kaithal, Sonepat and Rohtak are critical with less than 800 girls to 1000 boys. In Kurukshetra district, the child sex ratio is only just 770 girls to 1000 boys.

The pattern of sex differentials in mortality by age provides evidence of the differential treatment of male and female children, leading to higher mortality risks for females. The mortality rate for girls is considerably higher than for boys in every age group below five years (see Fig. 1). The ratio of female to male mortality rates ranges from a low of 1.1 in the case of neonatal mortality to a high of 2.1 in the case of child ortality (age 1-4 years) (IIPS, 2001).

Fig. 1: Neonatal, Postneonatal, Child and Under Five Mortality by Sex of the Child in Haryana, 1998-99



Note: Neonatal mortality: the probability of dying in the first month of life;

Post neonatal mortality: the difference between infant and neonatal mortality;
Infant mortality ($_{1q0}$): the probability of dying before the first birthday;
Child mortality ($_{4q1}$): the probability of dying between the first and fifth birthday;
Under-five mortality ($_{5q0}$): the probability of dying before the fifth birthday.

The mortality rate is considerably higher for girls than for boys in every age–group below age five years. The neonatal mortality rate is slightly higher for girls than for boys, but the post neonatal and child mortality rates are much higher for girls than for boys. A

slightly higher neonatal mortality rate for girls than for boys is unexpected, because neonatal mortality (which largely reflects mortality due to congenital conditions) tends to be higher for boys than for girls in most populations. The neonatal mortality rate is only 12 percent higher for girls than for boys, but the post neonatal mortality rate is 46 percent higher and child mortality rate is 119 percent higher for girls than for boys (see table-1). This pattern of increase in female disadvantage in mortality with increasing age has been observed in other studies in South Asia and is thought to reflect the relative medical and nutritional neglect of the girl child (Das Gupta, 1987; Basu, 1989). According to a World Bank study (Gilmer et al., 1998) the ratio of female to male child mortality in Haryana state is worse than that reported in any country in the world. This is a state where the technical means to identify sex through amniocentesis and ultrasounds have been used to accommodate the widespread preference for sons.

The female life expectancy in Haryana is 1.4 years less than for male (63.4 years for male and 62.0 years for females (IIPS, 1995). The birth rate is higher (TFR is 4.0 compared to 3.6 for India as a whole). Women with sons in Haryana are more likely to want to stop having children and use contraception than women with daughters. By this measure, among all the states of India, son preference is the strongest in Haryana (Mutharayappa et al., 1997) Despite exhibiting a strong son preference; there has been little exploration of the nature of the gender difference in child health in Haryana.

Data and Methods

As already mentioned, data for this research is mainly drawn from the second National Family and Health Survey (NFHS-2), undertaken in 1998-99. The NFHS-2 is a nationally representative survey; which covered a sample of more than 90,000 ever-married women aged 15-49. In Haryana, NFHS-2 collected information from 2,908 eligible women. The analyses for this paper are based on data from a sub sample of 994 children born to eligible women in the three years preceding the surveys and who were alive at the time of the survey. The NFHS-2 provides high-quality, up-to-date information on all of the key variables required for the analysis. It has collected extensive information on child health indicators such as immunization coverage; prevalence and treatment of diarrhoea among

children; and anthropometric indicators of nutritional status for children born three year preceding the survey-all of which can be examined by sex of the child.

For each child born during the reference period, the mother was asked a series of questions about breastfeeding, immunizations, and treatment seeking for common childhood disease such as acute respiratory infections (ARI) and diarrhea. If excess female mortality were high enough, this would imply a bias in the sample towards including surviving girls for those families that do not discriminate against girls, thus to some extent invalidating any analysis of differential treatment. However, an examination of the sex ratios in the sample, when children who have died are included or excluded, shows that they are not significantly different from each other, suggesting that the selectivity bias of the sample should be negligible. Another point to note about the sample used in the analysis is that all children born three years preceding the survey were included; in other words, if a woman gave birth to two children in this time period, both the children were included in the sub sample. To assess the physical growth and nutritional status of children, measurements of weight and height/length and blood hemoglobin levels were also obtained. Details about these measurements are included in the basic survey reports (IIPS and ORC Macro 2000).

The quantitative analysis gives an understanding of the relationship between dependent and independent variables, thus establishing the overall patterns and correlations gender difference. The qualitative information provides a clear insight into the social dynamics and processes by which these independent variables themselves are influenced. For example, while quantitative data establish the link between gender differences in child health outcomes, qualitative information explores the reasons why a significant proportion of female children are discriminated against in Haryana. The role of qualitative data in this study was to provide not statistically general sable information, but rather information that could expose the attitudes, opinions and belief patterns underlying factors affecting gender difference.

The analysis was carried out using both descriptive and multivariate statistical methods. In the first part of the descriptive analysis, all indicators of gender difference are measured either as percentages or as ratios, these variable are defined in Appendix 1. Each outcome variable is binary (yes or no), so that logistic regression is an appropriate method of multivariate analysis. The NFHS-2 provides information on three summary indices of nutritional status: weight-for-age, height-for-age, and weight-for height. Only weight-for-age and height-for age are used in the analyses. Weight-for-height is left out of the analysis due to the prevalence of low weight-for-height or wasting among the study population being very low (5.3 percent). These two indices of nutritional status are expressed in standard deviation units (z-score) from the median for the international reference population. Ratio of female to male children of 0-35 months of age is used to measure gender difference in nutrition status.

For logistic regression analyses, the nutritional status variables weight-for-age and height-for-age, which are both continuous variables, were treated as dichotomous, with two values 'well-nourished' and 'under-nourished'. For an analysis of the undernourished children, the dependent variable was equal to 1 if the child's z score was a below-2 standard deviation unit (under-nourished child) and equal to 0 if a z score fell within an above-2 standard deviation (well-nourished child). The study variables are defined into two broad categories: dependent and explanatory variables. The dependent variable, health status of children, is expressed in terms of the nutritional status, whereas the sex of the child is considered as the explanatory variable. A set of demographic and socioeconomic variables is considered as control variables. The control variables included in the logistic regressions are: Child's age (0-11, 12-23 and 24-35 months), Mother's age at time of the birth of the index (below 19, 20-29 and 30 years or more), Sex of the child categorized as male and female, Education of both women and their husbands were categorized as either illiterate or literate including primary, middle or secondary or higher, Preceding birth interval was classified into two categories as first birth and more than or equal to 24 months and less than 24 months, Mother's current work status can greatly influence child health through lack of time for childcare and

feeding, particularly breast-feeding. This variable was categorized as “currently not working “and “working”, Caste was grouped into “scheduled caste” and “non-scheduled caste”, Religion was classified into Hindu and non-Hindu, Area of residence was classified into urban and rural.

Coefficients are estimated using the maximum likelihood method (MLM) of estimation. The independent variables are recoded into categorical indicator variables. One value of each variable is chosen to be the reference category. The reference category was the first category of the variable. For ease of interpretation, the results are discussed in terms of the odds ratios. The odds ratio is a measure that approximates how much more likely, (or unlikely) it is for the outcome, in this case, for example, children whose z-score falls into below-2 standard deviation units are classified as undernourished (coded 1) and those in the above-2 standard deviation group as well nourished (coded 0). The odds ratios for the reference category attributes are relative to the reference category. The odds ratio for the reference category is equal to 1. If an odds ratio is greater than 1 this indicates an increased likelihood of the event occurring, while an odds ratio less than 1 indicates a decreased likelihood of its occurring. A variable was considered significantly associated with mortality when its p value was below 0.5.

Results and Discussion

Tables 1. Presents information about the sample that was used in this analysis and summarizes some of its characteristics. Of the mothers in the sample, around 50 percent have received no education, compared with 23 percent of the fathers. This finding is congruent with the lower levels of female literacy in Haryana. It also indicates that 77 percent of the sample lives in rural areas.

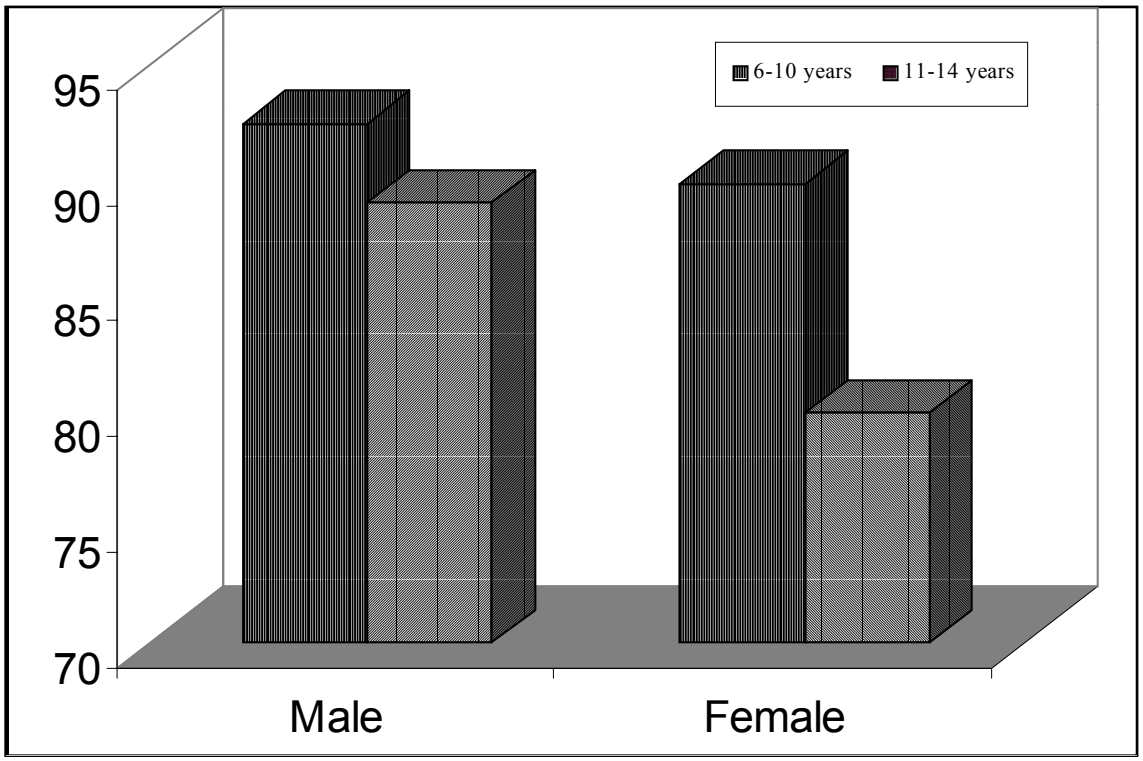
Table 1: Percentage of Children Under Age 3 Years According to Selected Demographic and Socioeconomic Characteristics, Haryana, 1998-99

Variables	Percentage	Number of Children
Child's Characteristics		
Sex of the Child (Sex)		
Male	55.3	549
Female	44.7	445
Age of the Child in Months		
<6	18.3	193
6-11	15.2	140
12-23	33.8	334
24-35	32.6	327
Birth order		
1	29.3	290
2-3	46.1	461
4+	24.3	243
Biomaternal Characteristics		
Mother's Age at Birth of Child (years)		
<19	11.1	101
20-29	72.1	740
30+	16.6	153
Preceding Birth Interval		
First birth/>=24 months or more	18.1	182
<24 months	81.8	812
Socioeconomic Characteristics		
Education Level of Father		
Illiterate	22.0	229
Literate	78.0	765
Education Level of Mother		
Illiterate	49.5	488
Literate	50.4	506
Mother's Current Work Status		
Not Employed	93.2	927
Employed	6.9	67
Religion		
Hindu	85.1	856
Non-Hindu	14.9	138
Caste		
Schedule Caste	24.7	246
Non-Scheduled Caste	75.3	748
Type of Residence		
Rural	76.7	232
Urban	23.3	762

Gender bias in Schooling

The female /male ratio in school attendance is used to assess discrimination against female children. Figure 2 shows a gender bias against female children in terms of school attendance rate by age of child, i.e. age group 6-10 years and 11-14 years. The female /male ratio in school attendance rates indicates a striking deprivation for female children.

Figure 2:Gender Bias in school attendance rate by age of children



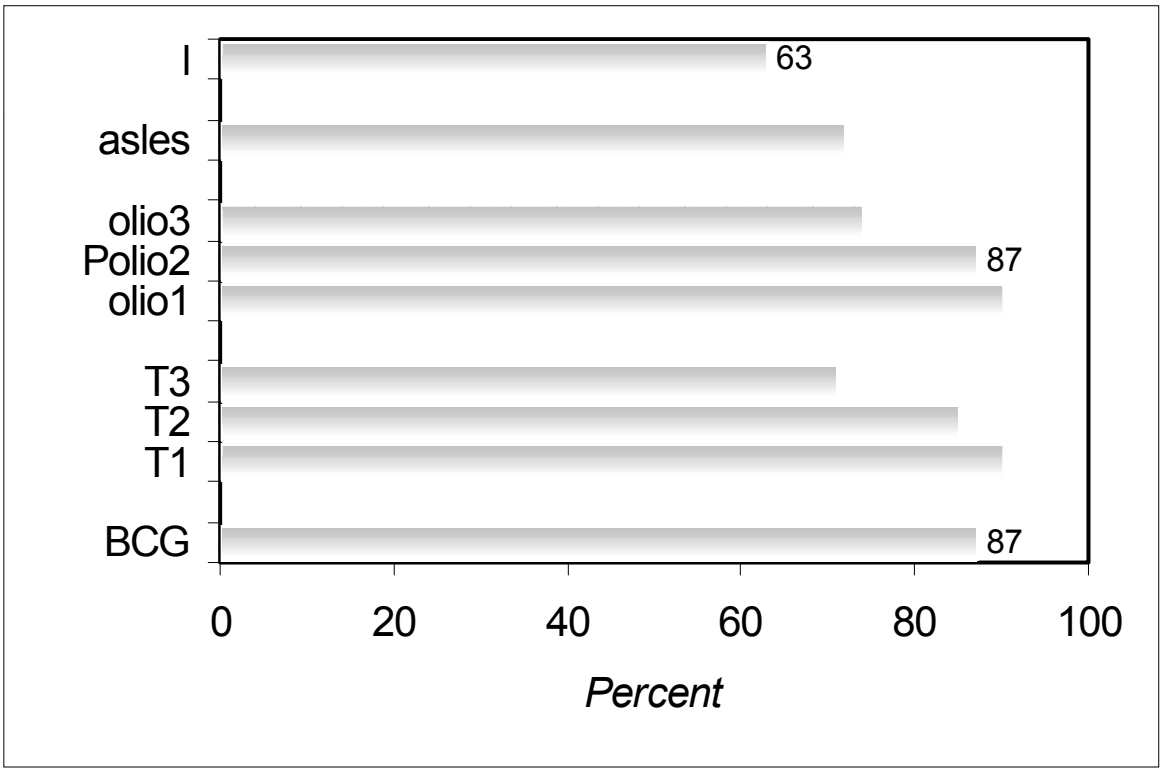
The F/M ratio for school attendance indicates lesser differences for the age group 6-10 years but more pronounced differences in the 10+ years, due to the higher dropout rate for girls compared to boys at the later stage. While the gap in primary enrolment constitutes a first stage, discontinuation of girls at the middle and second level is the second stage in the discrimination of girls. This is one of the important means of gender bias against female children.

Gender bias Immunization

Child immunization is an important component of child-survival programmes in India, with efforts focusing on six serious but preventable diseases-tuberculosis, diphtheria, pertussis, tetanus, polio, and measles. The objective of the Universal Immunization

Programme (UIP), launched in 1985-6, was to extend immunization coverage against these diseases to at least 85 percent of infants by 1990. In Haryana, 63 percent of children ages 12-23 months are fully vaccinated, another 27 percent have received some but not all of the recommended vaccinations, and 10 percent have not been vaccinated at all.

Figure 3: Percentage of Children Age12-23 Months Who Have Received Specific Vaccinations, Haryana, 1998-99



Immunization coverage, although far from complete, has improved considerably since NFHS-I, when 54 percent of children were fully vaccinated and 18 percent had not been vaccinated at all. In fact, child immunization coverage in Haryana is higher than would appear from information on full coverage alone. Eighty-seven percent of children, ages 12-23 months have been vaccinated against tuberculosis, 71 percent have received three doses of DPT vaccine, 74 percent have received three doses of polio vaccine, and 72 percent have been vaccinated against measles (see Fig.-3). Dropout rates for the series of DPT and polio vaccinations are a considerable problem. Ninety percent of children received the first DPT vaccination, but only 71 percent received all three doses; 90

percent received the first polio vaccination, but only 74 percent received all three doses of polio.

The first step in the analysis is to consider immunization coverage among the sub sample of children aged 12-35 months. Based on information obtained from a card or reported by the mother ('either source'), 65.5 percent of children aged 12-35 months are fully vaccinated, and only 8 percent have not received any vaccination. Coverage for each vaccination is much higher than the percentage fully vaccinated. BCG, the first and second dose of DPT and polio vaccine has each been received by at least 87 percent of children (see Table 2).

Table 2: Percentage of Children Aged 12-35 Months, by Source of Information and Specific Vaccination, According to the Sex of the Child, Haryana, 1998-99

Vaccination Source	Male	Female	Male/Female
BCG	88.9	89.3	1.00
DPT1	90.8	90.4	0.99
DPT2	88.1	86.3	0.97
DPT3	76.2	75.9	0.99
Polio1	92.2	91.4	0.99
Polio2	90.3	88.0	0.97
Polio3	75.1	74.6	0.99
Measles	77.0	78.1	1.01
Has vaccination card	56.2	59.8	1.06
Parentage fully vaccinated	65.1	66.0	1.01
Percentage ever vaccinated	92.4	91.4	0.98
Total Children (N)	370	291	661

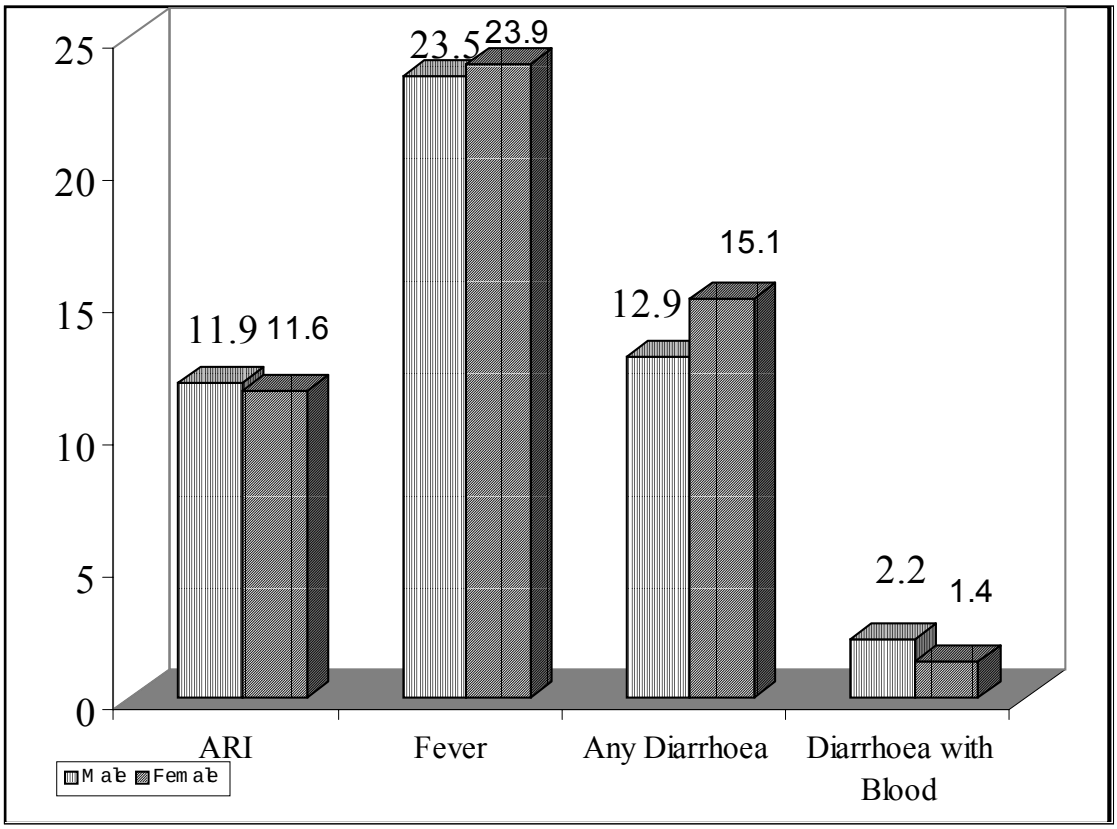
Although DPT and polio vaccination are given at the same time as part of routine immunization the coverage rates are slightly higher for polio than for DPT, which may be because of THE Pulse Polio campaigns. The overall figures for immunization coverage suggest that girls are slightly more likely to be fully vaccinated than boys (66 percent versus 65 percent). However, girls are slightly less likely to have received each of the individual vaccinations except measles. Mother's showed a vaccination card for 26 percent of boys and 22 percent of girls.

Immunization adequacy is also influenced by some demographic variables such as age of the child and birth order of the child and also by socioeconomic status, as measured by education and exposure to radio. Woman's education shows a positive association but is not statistically significant. Surprisingly, children of working mothers are less likely to be fully immunized than children of non-working mothers. Perhaps this is because the opportunity cost of not going to work is greater than the immunization effect of children. But the effect of mother's work on adequacy of immunization is not statistically significant.

Gender bias in treatment seeking

The prevalence and treatment of acute respiratory infection (ARI), fever, and diarrhoea is a major cause of illness among infants and children and the leading cause of childhood mortality through the world (Marrary and lopez, 1996). Mothers of children less than three years old were asked if their children suffered from cough, fever, or diarrhoea during the two weeks preceding the survey, and if so, the type of treatment given. Accuracy of all these measures is affected by the reliability of the mother's recall of when the disease episode occurred. The two-week recall period is thought to be most suitable for ensuring that there will be an adequate number of cases to analys and that recall errors will not be too serious. Figure 4 shows the percentage of children with cough accompanied by fast breathing (symptoms of acute respiratory infection), and diarrhoea during the two weeks preceding the survey and the percentage with acute respiratory infection who were taken to a health facility by selected background characteristics.

Figure 4: Sex differentials in the incidence of illness, Harvana, 1998-99



The next set of questions relate to the occurrence of diarrhoea and the treatment that is provided to children who have diarrhoea. Table 4 shows that 14 percent of children under age three suffered from diarrhoea in the two-week period before the interview.

Among children under age three, boys (13 percent) are somewhat less likely to have suffered from diarrhoea than girls (15 percent). This table also shows the percent of boys and girls under age three with diarrhoea during the two weeks preceding the survey, who were and were not treated for diarrhoea, by where they were treated. For 93 percent of children in Haryana who suffered from diarrhoea during the two weeks preceding the survey, medical advice or treatment was sought from a health facility or provider a much higher percentage than the national level of 63 percent. Seven percent of children with diarrhoea did not receive any treatment at all).

Figure 5: Gender Bias in Treatment Seeking for Diarrhoea, Haryana,1998-99

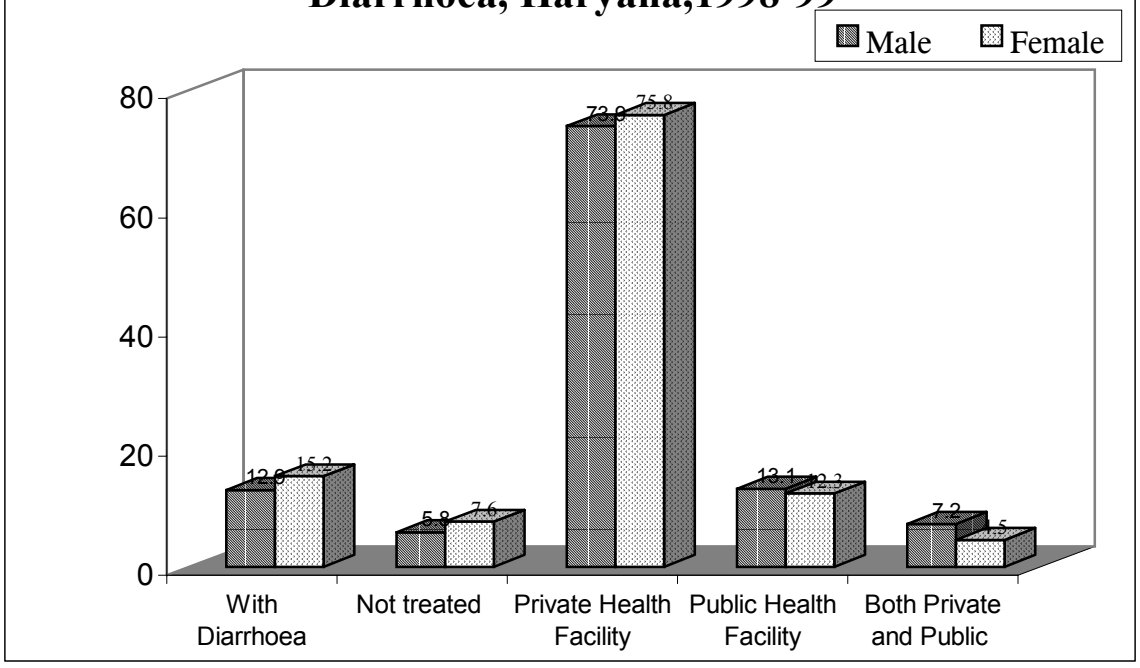


Fig.5 also indicates that the proportion not treated is slightly higher among girls than among boys (7.6 percent compared with 5.8 percent), and the proportion who are taken to a health facility is slightly higher among boys than girls 94.2 percent). But the proportion taken to a private health facility is also slightly higher for girls than for boys (75.8 percent compared with 73.9 percent respectively). Due to the small number of cases the effect of the sex of the child on the choice of a treatment alternative is not assessed in a regression model.

Breastfeeding

The mean durations of any breastfeeding, exclusive breastfeeding, and exclusive breastfeeding or breastfeeding with water only are 25.1 months, 2.9 months, and 5.3 months, measures because the mean is affected by the extreme value of the duration of breastfeeding for some children, whereas the median is not. The median length of any breastfeeding in Haryana is slightly more than two years (24.3 months). Supplementation beings relatively early, however. The median length of exclusive breastfeeding is 1.2

months, and the median length of exclusive breastfeeding or breastfeeding with water only is 3.9 months.

An alternative measure of the duration of breastfeeding is the prevalence-incidence mean, which is calculated as the 'prevalence' of breastfeeding divided by its 'incidence'. In this case, prevalence is defined as the number of children whose mothers were breastfeeding at the time of the survey, and incidence is defined as the average number of births per months (averaged over a 36-month period to overcome problems of seasonality of births and possible reference-period errors). For each measure of breastfeeding, the prevalence-incidence mean is about the same as the mean calculated in the conventional manner.

Table 3: Median duration of breastfeeding among children under age 3 years by sex of child and residence and mean duration of breastfeeding, Haryana, 1998-99

Background characteristic	Any breastfeeding	Exclusive breastfeeding	Exclusively breastfeeding or breastfeeding plus water only	Number of Children
Sex of Child				
Male	25.8	1.0	3.5	584
Female	23.5	1.4	4.8	476
Residence				
Urban	24.0	1.1	3.1	246
Rural	24.4	1.2	4.1	814
Median duration	24.3	1.2	3.9	1060
Mean duration (months)*	25.1	2.9	5.3	1060
Prevalence/incidence mean	24.5	2.4	5.1	1060

Note: Table includes only the two recent births in the three years preceding the survey.
* Based on current status

The median duration of breastfeeding is two months shorter for girls than for boys. This pattern is often observed in societies where son preference is strong, because the parents may stop breastfeeding a girl at a younger age to increase their chances of having another child earlier (with the hope that the next child will be a boy). The median length of

breastfeeding is also slightly shorter in urban areas than in rural areas. In both urban and rural areas, children are exclusively breastfed for a very short median period of about one month.

Gender bias Nutrition

Nutritional status is a major determinant of the health and well being of children. Inadequate or unbalanced diets and chronic illness are associated with poor nutrition among children. To assess their nutritional status, measurements of weight and height/length were obtained for children born in the three years preceding the survey. Children were weighed and measured with the same types of scales and measuring boards used for women. Children under two years of age were measured lying down and older children were measured standing up. Data on weight and height/length were used to calculate the following three summary indices of nutritional status: Weight-for-age, Height-for-age, and Weight-for-height. The nutritional status of children calculated according to these three measures is compared with the nutritional status of an international reference population recommended by the World Health Organization.

The three indices of nutritional status are expressed in standard deviation units (z-scores) from the median for the international reference population. Children who are more than two standard deviations below the reference median on any of the indices are considered to be *undernourished*, and children who fall more than three standard deviations below the reference median are considered to be *severely undernourished.*

Each of these indices provides somewhat different information about the nutritional status of children. Weight-for-age is a composite measure that takes into account both chronic and acute under nutrition. Children who are more than two standard deviations below the reference median on this index are considered to be *underweight.* The height-for-age index measures linear growth retardation. Children who are more than two standard deviations below the median of the reference population in terms of height-for age are considered short for their age or *stunted.* The percentage in this category indicates the prevalence of chronic under nutrition, which often results

from a failure to receive adequate nutrition over a long period of time or from chronic or recurrent diarrhoea. Height-for-age, therefore, does not vary appreciable by the season in which data are collected.

The weight-for-height index examines body mass in relation to body length. Children who are more two standard deviations below the median of the reference population in terms of weight-for-height are considered too thin or wasted. The percentage in this category indicates the prevalence of acute under nutrition. Wasting is associated with a failure to receive adequate nutrition in the period immediately before the survey and may be the result of seasonal variations in food supply or recent episodes of illness.

Overall, girls are more likely than boys to be underweight and stunted, whereas boys are slightly more likely to be wasted. Under nutrition generally increases with increasing birth order. Young children in families with six or more children are nutritionally the most disadvantaged. First births have lower than average levels of under nutrition on all three measures. Children born after a short birth interval (<24 months) are more likely than other children to be underweight and stunted.

Table 4: Percentage of Children under Age 3 Years Classified as Under nourished on three Anthropometric Indices of Nutritional Status by Sex of the Child, Haryana, 1998-99

Anthropometric Indices	Male	Female	Male/Female
Height-for-age (Stunted) Percentage below -2SD	47.6	53.2	1.11
Weight for height Percentage below -2SD	5.9	4.6	1.28
Weight-for-age (underweight) Percentage below -2SD	31.8	38.0	1.18
Both underweight and stunted Percentage below -2SD	27.3	31.1	1.13
Total Children (N)	487	389	876

The last set of questions relates to the nutritional status of boys and girls. Table 4 shows the nutritional status of children in Haryana state as calculated according to weight-for-

age, and height-for-age measures. Discrimination against girls in Haryana state is particularly pronounced in the nutritional status of children as depicted by these two nutritional indices. Under nutrition is more common among female children than male children. For instance, 38 percent of female children compared to 32 percent of male children are underweight and 53 percent of female children compared to 48 percent of male children are stunted.

Multivariate Analyses

The effect of the sex of the child on the nutritional status is assessed in two different models. In the first, the effect of the sex for the likelihood of low weight-for age is modeled, taking into account various demographic and socioeconomic characteristics. In the second, the dependent variable is the odds of having a low height-for-age as comparing with normal height-for-age. Both models control for the effect of a number of demographic and socioeconomic variables. The results are presented in Tables 5 and 6. The odds ratios indicate that in Haryana girls are more likely to be underweight (OR=1.43; $p<0.05$) and stunted (OR=1.34; $p<0.05$). In both models, a preceding birth interval of more than 24 months is associated with lower odds of being underweight and stunted. Fathers' education, young age of mother at the time of childbirth (20-29 years) and rural residence is also associated with lower odds of being underweight. In both models, the higher age of child (12-23 and 24-35) is associated with its being underweight and stunting. This may be due to the positive effect of breastfeeding on the nutritional status of children.

Table 5: Logistic Regression Analysis of the Low Weight-for Age as a function of selected Explanatory Variables

Variables	Regression Coefficient β	Exp (β)	SE	95% confidence interval
Sex of the child				
Male	.000	1.000		
Female	.347	1.423*	.151	1.031-1.931
Age of the child in months				
<11	.000	1.00		
12-23	1.767	5.876**	.217	3.764-8.863
24-35	1.662	4.853**	.217	3.118-7.198
Birth order				
1	.000	1.000		
2-3	.197	1.312	.226	0.782-1.893
4+	.215	1.336	.275	0.704-2.167
Mother's age at birth of child (years)				
<19	.000	1.000		
20-29	-.615	.569*	.293	0.313-.0950
30+	-.441	.713	.367	0.317-1.513
Preceding birth interval				
First birth/>=24 months or more	.000	1.000		
<24 months	-.454	.739*	.218	0.429-0.957
Education level of father				
Illiterate	.000	1.000		
Literate	-.267	.788	.213	0.536-1.152
Education level of mother				
Illiterate	.000	1.000		
Literate	-.437	.659*	.189	0.450-0.941
Religion				
Hindu	.000	1.000		
Non-Hindu	-.048	0.985	.238	0.599-1.519
Caste/Tribe				
Schedule Caste	.000	1.000		
Non-Scheduled Caste	.059	1.121	.198	0.739-1.551
Type of residence				
Rural	.000	1.000		
Urban	-.427	.625*	.226	0.401-0.963
Note: *p<0.05, **p<0.00				

Table 6: Logistic Regression Analysis of the Low Height-for Age as a function of selected Explanatory Variables

Variables	Regression Coefficient β	Exp (β)	SE	95% confidence interval
Sex of the child				
Male	.000	1.000		
Female	.276	1.337*	.159	0.976-1.803
Age of the child in months				
<11	.000	1.00		
12-23	1.984	6.721**	.189	4.513-9.823
24-35	1.691	5.753**	.197	3.731-8.040
Birth order				
1	.000	1.000		
2-3	-.246	.768	.214	0.523-1.183
4+	.232	1.443	.287	0.726-2.153
Mother's age at birth of child (years)				
<19	.000	1.000		
20-29	.029	1.123	.286	0.592-1.785
30+	.021	1.234	.367	0.479-2.163
Preceding birth interval				
First birth/>=24 months or more	.000	1.000		
<24 months	-622	.546**	.215	0.357-0.811
Education level of father				
Illiterate	.000	1.000		
Literate	-.229	.837	.216	0.546-1.218
Education level of mother				
Illiterate	.000	1.000		
Literate	-.235	0.776	.174	0.535-1.108
Religion				
Hindu	.000	1.000		
Non-Hindu	.121	1.157	.221	0.703-1.747
Caste/Tribe				
Schedule Caste	.000	1.000		
Non-Scheduled Caste	-.013	.988	.199	0.688-1.447
Type of residence				
Rural	.000	1.000		
Urban	-.066	.978	.217	0.618-1.443
Note: *p<0.05, **p<0.00				

Conclusion

The most notable finding from all these analyses is that evidence for the preferential treatment of boys is very strong in the case of nutrition. There is some evidence, as well, of sex differences in immunization coverage and diarrhoea treatment. Where differences are found favoring boys in immunization coverage and in treatment of diarrhoea, they are relatively small and not significant.

In Haryana, 63 percent of children ages 12-23 months are fully vaccinated, another 27 percent have received some but not all of the recommended vaccinations, and 10 percent have not been vaccinated at all. Immunization coverage, although far from complete, has improved considerably since NFHS-I, when 54 percent of children were fully vaccinated and 18 percent had not been vaccinated at all. In fact, child immunization coverage in Haryana is higher than would appear from information on full coverage alone. Eighty-seven percent of children ages 12-23 months have been vaccinated against tuberculosis, 71 percent have received three doses of DPT vaccine, 74 percent have received three doses of polio vaccine, and 72 percent have been vaccinated against measles (see Fig.3). Dropout rates for the series of DPT and polio vaccinations are a considerable problem. Ninety percent of children received the first DPT vaccination, but only 71 percent received all three doses; 90 percent received the first polio vaccination, but only 74 percent received all three doses of polio.

Gender differences in the nutritional status among the 0-5 year old children; found that girls in Haryana state have much lower value for many of the health and nutritional variables than boys. In Haryana, parents consider their daughters to be less valuable and provide inferior care in terms of food allocation. For example, the median duration of any breastfeeding in Haryana is 25.8 months for male children and 23.5 months for female children (IIPS, 2001). NFHS data supports this finding in Haryana state.

Boys are breastfed for a slightly longer period of time than girls in India as a whole. The duration of breastfeeding is much shorter for girls than for boys in Haryana, Rajasthan and Madhya Pradesh. One reason for the shorter period of breastfeeding for

girls is the parents' desire to have another child sooner after the birth of a girl than after the birth of a boy, in the hope of having a boy for the next birth. Although the intent of parents may not always be to provide less adequate nutrition to daughters by weaning them earlier, the effect is the same (Mutharayappa et al., 1997:12).

Gender discrimination in treatment seeking has been observed among the children affected by acute respiratory infection (ARI), and diarrhoea. In Haryana, 24 percent of children under age three were ill with fever during the two weeks preceding the survey, 12 percent were ill with ARI, and 14 percent had diarrhoea. For 9 out of 10 children who became ill with ARI or diarrhoea, treatment was sought from a health facility or health provider. Twenty-six percent of the children with diarrhoea received a solution facility or health provider.

NFHS-2 uses three internationally recognized standards to assess children's nutritional status namely, weight-for–age, height-for–age and weight-for-height. Children who are more than two standard deviations below the median of an international reference population are considered underweight (measured in terms of weight-for-age), stunted (height-for age), or wasted (weight-for-height). Stunting is a sign of chronic, long –term undernutration, wasting is a sign of acute, short-term undernutrition, and being underweight is a composite measure that takes into account both chronic and acute undernutrition.

Based on the measures, more than one-third (35 percent) of children under age three years are underweight, one-half (50 percent) are stunted, and 5 percent are wasted. The nutritional status of children in Haryana has not changed much since the time of NFHS-I. The proportion underweight and proportion stunted are higher in rural areas and among children from disadvantaged socioeconomic groups, but the proportion wasted does not vary much by background characteristics. The prevalence of undernutrition is about the same for girls as for boys. More than four-fifths (84 percent) of children aged 6-35 months are anaemic, including a large majority of children in every subgroup of the population.

Based on a weight-for-height index, about one-fourth (26 percent) of the women in Haryana are undernourished. Nutritional deficiency is particularly serious for women in the rural areas and women in the disadvantaged socioeconomic group. Women who are undernourished themselves are also much more likely than other women to have children who are undernourished. Overall, 47 percent of women in Haryana have some degree of anaemia, and 16 percent are moderately to severely anaemic. Anaemia is a serious problem among women in every population group, with prevalence rates ranging from 37 to 57 percent.

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Appendix 1:

Sex ratio school attendance

F/M ratio of school attendance rate (6-10 year), = proportion of girls attending school / proportion of boys attending school.

F/M ratio of school attendance rate (11-14), = proportion of girls attending school/ proportion of boys attending school.

Sex ratio in nutrition status

F/M ratio of breast feeding duration (median duration of breast feeding in months), = Median duration for girls/ median duration for boys.

M/F ratio of prevalence of malnutrition: sex ratio of prevalence of malnutrition (children below the threshold of-2 standard deviation of the median of weight –for-age, height-for-age, and weight -for-height, = proportion of boys below threshold/ proportion of girls below threshold.

Sex ratio in immunization

F/M ratio of children fully immunized, = proportion of vaccinated girls/proportion of vaccinated boys.

F/M ratio of children having vaccinated card, = proportion of girls having vaccination card/proportion of boys having vaccination card.

M/F ratio of children having no vaccination = proportion of boys not vaccinated/proportion of boys not vaccinated/ proportion of girls not vaccinated

Sex ratio of disease incidence

M/F ratio of proportion of children suffering from cough accompanied by fast breathing = proportion of boys suffered/ proportion of girls suffered.

M/F ratio of incidence of fever = proportion of boys suffered/ Proportion of girls suffered
M/F ratio of incidence of diarrhea = proportion of boys suffered/ proportion of girls suffered

Sex ratio in treatment seeking

Diarrha
F/M ratio of children seeking treatment from health provider, = proportion of girls taken to health provider/ proportion of boys taken to health provider.