

# NATIONAL FAMILY HEALTH SURVEY BULLETIN

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*The NFHS BULLETIN summarizes findings from the 1992–93 National Family Health Survey. The NFHS collected information from nearly 90,000 Indian women on a range of demographic and health topics. The survey was conducted under the auspices of the Indian Ministry of Health and Family Welfare to provide national and state-level estimates of fertility, infant and child mortality, family planning practice, maternal and child health, and the utilization of services available to mothers and children.*

*The International Institute for Population Sciences (IIPS), Mumbai, conducted the NFHS in cooperation with various consulting organizations and 18 population research centres throughout India and with the East-West Center in Honolulu, Hawaii, and Macro International in Calverton, Maryland. The U.S. Agency for International Development provided funding for the NFHS and for this publication.*

## Women's Education Can Improve Child Nutrition in India

Among children in developing countries, malnutrition is an important factor contributing to illness and death. Malnutrition during childhood can also affect growth potential and the risk of morbidity and mortality in later years of life. Child malnutrition is generally caused by a combination of inadequate or inappropriate food intake, gastrointestinal parasites and other childhood diseases, and improper care during illness.

Child malnutrition has long been recognized as a serious problem in India, but national-level data on levels and causes of malnutrition have been scarce. In 1992–93, the National Family Health Survey (NFHS) collected anthropometric data on the height and weight of children below four years of age from a nationally representative sample. The survey provides a unique opportunity to study the levels and determinants of child malnutrition in India.

This issue of the *NFHS Bulletin* estimates levels of child malnutrition and examines the effects of mother's education and other demographic and socioeconomic factors on the nutritional status of children. Results indicate that more than half of all children under age four are malnourished. Children whose mothers have little or no education tend to have a lower nutritional status than do children of more-educated mothers, even after controlling for a number of other—potentially confounding—demographic and socioeconomic variables. This finding suggests that women's education and literacy programmes could play an important role in improving children's nutritional status.

### Measurement and analysis

Between April 1992 and September 1993, the NFHS collected information on all children under age four from a nationally representative sample of 88,562 households in 25 states (including Delhi, which became a state after the survey). In 20 of these states, the survey collected information on children's weight and height. In Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, and West Bengal, only children's weight was obtained because height-measuring boards were not available.

For the 20 states where both height and weight were measured, the NFHS provides three indices of children's nutritional status: height-for-age, weight-for-height, and weight-for-age. Each index provides somewhat different information about a child's nutritional status. Height-for-age measures linear growth retardation, primarily re-

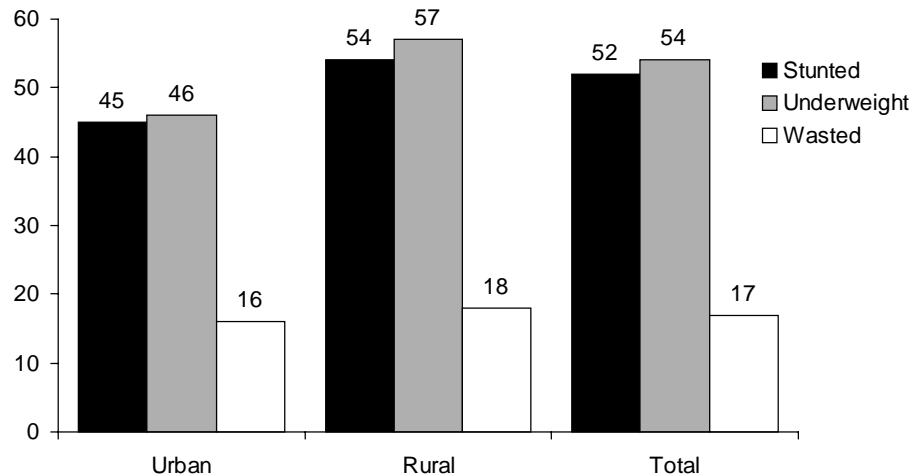
**Vinod K. Mishra and Robert D. Retherford**

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flecting chronic (long-term) malnutrition. Weight-for-height measures body mass in relation to height, primarily reflecting acute (short-term) malnutrition. Weight-for-age reflects both chronic and acute malnutrition.

These three indices are expressed in terms of standard deviations from the median for an international reference population specified by the World Health Organization (WHO). Children whose height-for-age falls more than two standard deviations below the reference median are defined as stunted. Those whose weight-for-height falls more than two standard deviations below the reference median are defined as wasted, and those whose weight-for-age falls more than two standard deviations below the reference median are defined as underweight. Children who fall more than three standard deviations below the reference median on any of these indices are defined as severely stunted, wasted, or underweight.

Several different characteristics may influence a child's nutritional status, confounding the effect of any single variable such as mother's education. For this reason, the independent effect of mother's education is estimated here using logistic regression and multiple classification analysis to control for the effects of 12 other—potentially confounding—variables. These are: child's age in months, child's sex, child's birth order, mother's age at childbirth, urban/rural residence, household head's religion, household head's membership in a scheduled caste or tribe, mother's exposure to electronic mass media, household economic status (based on an ownership-of-goods index), whether the mother received iron and folic acid tablets during pregnancy, whether the mother received two or more tetanus injections during pregnancy, and geographic region. In the analysis, these variables are held constant by setting them at their mean values.



**Figure 1. Percentage of children under age four who are stunted, underweight, or wasted, by urban/rural residence: India, 1992–93**

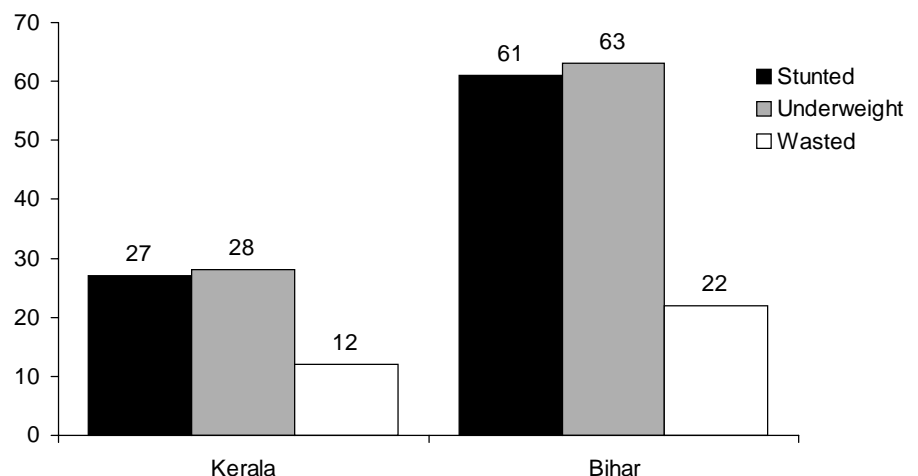
### Importance of child malnutrition

Many young children in India are malnourished. Figure 1 shows the proportion who are stunted, underweight, or wasted in the country as a whole and in urban and rural areas. More than half of all children under age four are stunted, indicating chronic malnutrition, about one in six is wasted, indicating acute malnutrition,

and more than half are underweight for their age. Child malnutrition is considerably higher in rural areas than in urban areas.

Many suffer severe malnutrition, as defined by WHO standards. Twenty-nine percent are severely stunted, 3 percent are severely wasted, and 22 percent are severely underweight.

The comparatively low proportions of children wasted indicate that acute mal-



**Figure 2. Percentage of children under age four who are stunted, underweight, or wasted: Kerala and Bihar, 1992–93**

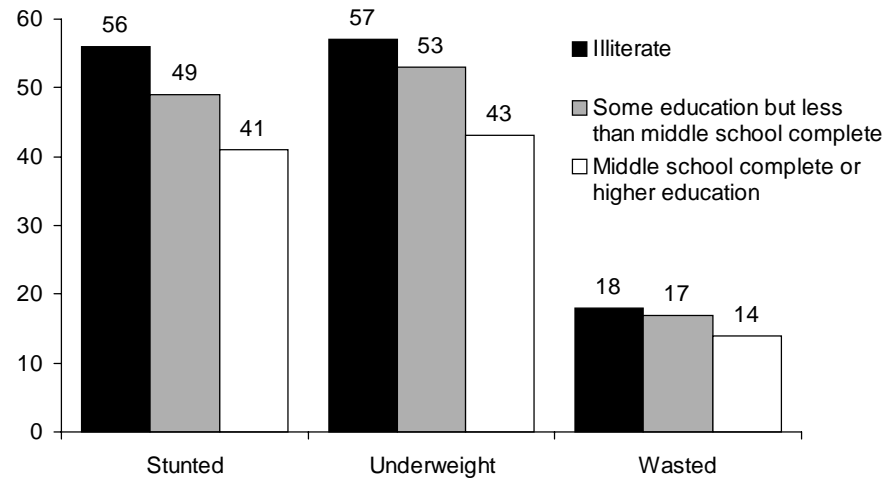
nutrition is less common in India than chronic malnutrition. Acute malnutrition is still high by international standards, however. The prevalence of wasting among young children in India is about 8 times the level in the international reference population, and the prevalence of severe wasting is about 25 times the international level.

Children's nutritional status varies widely by state. Figure 2 gives results for the states with the highest and lowest levels of malnutrition, Bihar and Kerala. Even in Kerala, which has the lowest infant and child mortality rates in India, more than one-fourth of young children are stunted, and a similar proportion are underweight. Other states with relatively low levels of malnutrition are Goa, Delhi, Manipur, Mizoram, and Nagaland. Other states with relatively high levels of child malnutrition are Madhya Pradesh and Uttar Pradesh.

## Factors affecting child malnutrition

Children whose mothers have some education but have not completed middle school are much less likely to be stunted, wasted, or underweight than are children whose mothers are illiterate (Figure 3). Children whose mothers have completed middle school or higher education are even less likely to suffer malnutrition. The results presented in Figure 3 show that mother's education has a strong independent effect on a child's nutritional status even after controlling for the potentially confounding effects of the 12 other demographic and socioeconomic variables.

Surprisingly, given widespread evidence of discrimination against girls in India, the proportions stunted and underweight are identical for boys and for girls (Figure 4). The proportion wasted is somewhat higher for boys. Controlling for mother's education and the other demo-



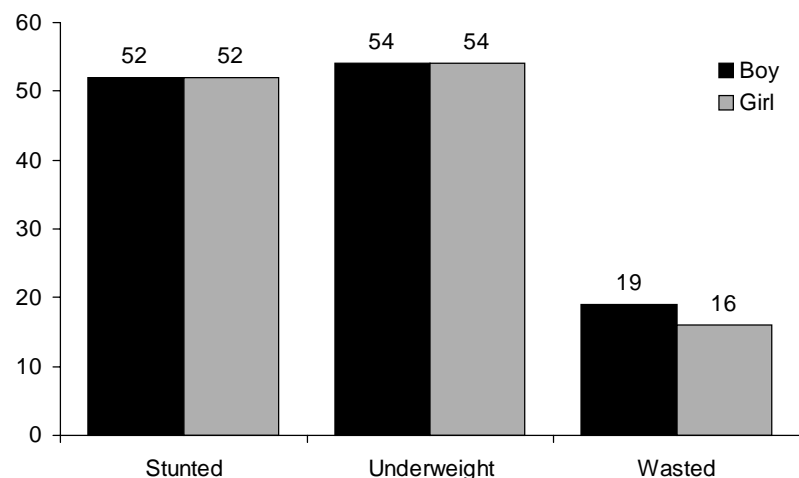
**Figure 3. Adjusted effects of mother's education on the proportion of children under age four who are stunted, underweight, or wasted: India, 1992-93**

graphic and socioeconomic variables has virtually no effect on gender differences in any of the three indices of child malnutrition.

Separate analyses of state-level data (not shown) indicate that even in Bihar, where the status of women is arguably the lowest in India, malnutrition levels are similar for boys and girls. Several other studies in India and in other developing countries with widespread sex discrimi-

nation have also failed to detect a gender differential in child malnutrition. The reasons for this unexpected result are unclear.

Among the other predictor variables included in the analysis, child's age, child's birth order, and household economic status all have independent effects on nutritional status. Infants less than six months old are less likely to be malnourished than are older children, probably because they tend to be breastfed.



**Figure 4. Percentage of children under age four who are stunted, underweight, or wasted, by sex of child: India, 1992-93**

Children with three or more older siblings are more likely to suffer chronic malnutrition than are children from smaller families, probably because competition for food increases with family size. Family size does not have a significant effect on acute malnutrition, however, as indicated by wasting.

Like family size, household economic status has a strong effect on chronic child malnutrition, shown by data on stunting and underweight, but no significant effect on acute malnutrition, indicated by wasting. None of the other variables analyzed has a strong, consistent, independent effect on the three measures of child malnutrition.

## Policy implications

Child malnutrition is a serious problem in India. Based on standards developed by WHO, 52 percent of children under age four are stunted, 17 percent are wasted, and 54 percent are underweight. The lower levels of wasting, compared with stunting and underweight, indicate that chronic (long-term) malnutrition is more common than acute (severe but short-term) malnutrition.

Efforts to improve child nutrition might usefully concentrate on states such as Bihar, Madhya Pradesh, and Uttar Pradesh where the problem is particularly severe. Infant and child mortality rates in

these states are also higher than the national average. An emphasis on the states with the highest levels of child malnutrition should not preclude steps to improve child nutrition in other states, however. Even in Kerala, the state with the lowest levels of child malnutrition in the country, more than one-fourth of all children under age four suffer from chronic malnutrition.

Among all the demographic and socioeconomic variables analyzed here, mother's education has the strongest independent influence on child malnutrition. The results of this analysis add emphasis to the many other arguments in favor of strengthening women's education and literacy programmes in India.

Although malnutrition is highest among children of illiterate women, more than 40% of children whose mothers have completed middle school or higher education also suffer from chronic malnutrition. This suggests that efforts to improve women's education need to be combined with more specific programmes to improve child-feeding practices.

The analysis shows that young children in small families are less likely to suffer chronic malnutrition than are children with three or more older siblings. This finding provides a strong justification for family planning programs to limit family size.

Mothers' exposure to electronic mass media has no statistically significant effect on levels of child malnutrition. This suggests that radio and television programming in India needs to include more—or more effective—messages on children's nutritional requirements.

These findings should be interpreted with a degree of caution because there is evidence for some age misreporting in the survey. Some children below age four were reported as older than they really were. This means that estimates of stunting and underweight, which are based on height-for-age and weight-for-age, may exaggerate the extent of malnutrition.

If families with uneducated mothers or low socioeconomic status are more likely to misreport the ages of young children than are other families, then the findings reported here may exaggerate the effects of socioeconomic status and mother's education on child malnutrition. This observation highlights the importance of improving age reporting in future surveys.

## Further reading

Mishra, Vinod K., Subrata Lahiri, and Norman Y. Luther. 1999. *Child nutrition in India*. National Family Health Survey Subject Reports No. 14. Mumbai: International Institute for Population Sciences; and Honolulu: East-West Center.

The **International Institute for Population Sciences** was established at Mumbai in 1956 as the regional institute for training and research in population studies for the Asia and Pacific region of the United Nations. Now also a deemed university, it is an autonomous institution sponsored jointly by the Government of India, the United Nations Population Fund, and the Sir Dorabji Tata Trust.

The U.S. Congress established the **East-West Center** in 1960 to foster mutual understanding and cooperation among the governments and peoples of the Asia-Pacific region, includ-

ing the United States. Principal funding for the Center comes from the U.S. Government, with additional support provided by private agencies, individuals, and corporations and more than 20 Asian and Pacific governments.

The *NFHS Bulletin* Editorial Committee consists of Fred Arnold, B. M. Ramesh, Robert D. Retherford, T. K. Roy, and Sidney B. Westley.

This and previous issues of the *NFHS Bulletin* may be downloaded from the East-West Center website at <http://www.ewc.hawaii.edu/res-ph.asp>.

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