

NATIONAL FAMILY HEALTH SURVEY

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The NFHS BULLETIN

summarizes findings from the 1992–93 National Family Health Survey. NFHS-1 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 NFHS-1 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 (USAID) provided funding for the NFHS. The United Nations Population Fund (UNFPA) supported this analysis and the publication of this report.

Are the WHO/UNICEF Guidelines on Breastfeeding Appropriate for India?

Breastfeeding practices can have a substantial effect on infant health and mortality in developing countries. Three benefits are well documented. First, breast milk contains the optimal combination of nutrients and is ideally suited to an infant's metabolism. Second, breastfeeding allows a mother to pass on immunities to her infant. Third, infants who are breastfed receive less of other foods and liquids that could be contaminated and cause disease.

Based on such findings, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend guidelines for infant feeding in developing countries. According to WHO and UNICEF, breastfeeding should be initiated for most children immediately after birth, and most infants should receive only breast milk until about six months of age. At about six months, complementary solid or mushy foods should be added to infant feeding as needed, and breastfeeding should continue, with complementary foods, up to the second birthday or beyond (Naylor 2000; UNICEF 1999; WHO 1999).

Breastfeeding is nearly universal in India and continues for most children beyond infancy. For many infants, however, supplemental food is introduced earlier or later than the age of six months, which is recommended by WHO and UNICEF. Using data from India's first National Family Health Survey (NFHS-1), this issue of the *NFHS Bulletin* examines breastfeeding practices and their effect on infant mortality. Separate analyses focus on three groups of states, distinguished according to levels of infant mortality.

Results show that both exclusive breastfeeding and breastfeeding with supplementary foods lower mortality during early infancy. A surprising finding, however, is that breastfeeding with supplementation is more beneficial than exclusive breastfeeding, even for children at very young ages (less than four months).

About the study

Conducted in 1992–93, NFHS-1 collected complete birth histories from a probability sample of 89,777 ever-married women age 13–49 years, including each of their children's date of birth, sex, and survival status. For children who died before reaching their second birthday, the birth histories also include age at death in completed months.

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For all children born in the four years before the survey, mothers were asked whether the child had ever been breastfed, how many months it had been breastfed, and at what age it had been given plain water, milk other than breast milk, other liquids, or solid or mushy food on a regular basis. From these responses, breastfeeding status can be calculated for each month of age, categorized as exclusive breastfeeding, breastfeeding with supplements (including plain water), or no breastfeeding.

Because the effect of breastfeeding on infant mortality varies according to the overall level of infant mortality, the analysis categorizes 19 states of India according to mortality level. High-mortality states—with estimated infant mortality of 85 deaths per 1,000 live births or higher—are Orissa, Uttar Pradesh, Bihar, Assam, and Madhya Pradesh. Medium-mortality states—with estimated infant mortality ranging from 68 to 75 deaths per 1,000 live births—are West Bengal, Haryana, Rajasthan, Andhra Pradesh, Gujarat, and Tamil Nadu. Low-mortality states—with estimated infant mortality of 65 deaths per 1,000 live births or lower—are Karnataka, Delhi, Himachal Pradesh, Punjab, Maharashtra, the Jammu region of Jammu and Kashmir, Goa, and Kerala.

Breastfeeding practices, infant mortality, and the effects of breastfeeding on infant mortality are known to change with child's age. For this reason the study examines the effects of breastfeeding at each month of infancy on mortality during the following three months.

Several household and maternal characteristics influence both breastfeeding practices and infant mortality. Using multivariate statistical models, the analysis controls for the effects of five socioeconomic background variables, three antenatal and delivery-care variables, and five demographic variables previously identified as having statistically significant effects on infant mortality.

The socioeconomic background variables are urban/rural residence, mother's literacy, religion of the household head (Hindu, Muslim, and other), whether the household head belongs to a scheduled caste or scheduled tribe,¹ and an index of household socioeconomic status based on the ownership of household goods. Antenatal and delivery-care variables are whether the mother received at least one antenatal check-up, whether the mother received two or more tetanus shots during pregnancy, and whether the child was delivered at a medical facility. Demographic variables are child's birth order and sex, whether the child was born within two years after the previous birth, whether the child was small at birth as reported by the mother, whether any of the child's older siblings died, and mother's age at childbirth (under 20 years, 20–34 years, or 35 years or older).

Breastfeeding practices

Ninety-five percent of all children born during the four years before NFHS-1 were breastfed. The median length of breastfeeding in India is slightly more than two years, but specific breastfeeding practices do not necessarily follow WHO/UNICEF recommendations.

This study examines the breastfeeding status of infants at ages 2, 7, and 11 months. WHO and UNICEF recommend that all children at age two months should receive only mother's milk. Among Indian children in this age group, 34% are breastfed exclusively in high-mortality states, 51% in medium-mortality states, and 40% in low-mortality states. Most other infants at age two months receive breast milk with supplements (57% of all infants in this age

group in high-mortality states). Only 15% or fewer are not breastfed at all.

WHO and UNICEF recommend that infants age 7 and 11 months should receive mother's milk plus complementary food. About three-quarters of all 7- and 11-month-old infants in India receive breastfeeding plus supplements. The remainder are divided—in most cases rather evenly—between children who are breastfed exclusively and children who are not breastfed at all. In both age groups, children in high-mortality states are more likely than other children to receive breast milk without supplementation.

In almost every case, children who live in rural areas, whose mothers are illiterate, and whose families have low socioeconomic status are more likely than other children to be breastfed exclusively without supplementary feeding. This pattern, which is especially pronounced in the high-mortality states, suggests that infant feeding practices depend in part on whether a child's family can afford supplements.

Effects on infant mortality

Although infant mortality has fallen substantially in India in recent years, it is still high by international standards. State-level infant mortality rates range from a low of 24 deaths per 1,000 live births in Kerala to a high of 112 in Orissa, indicating ample scope for improvement in infant survival in many states.

This study estimates the effects of exclusive and nonexclusive breastfeeding on mortality at ages 1–14 months by applying logistic regression models to NFHS-1 data. Statistical controls are included in the models to rule out any confounding effects of the 13 socioeconomic, antenatal and delivery-care, and demographic variables.

Results are expressed as odds ratios, showing the effect of exclusive or nonexclusive breastfeeding—relative to no breastfeeding—on the odds of dying. An

1. Scheduled castes (SC) and scheduled tribes (ST) are those castes and tribes identified by the Government of India as socially and economically disadvantaged and in need of protection from social injustice and exploitation.

odds ratio equal to one indicates that breastfeeding at a specified month of age has no effect on mortality during the following three months. An odds ratio less than one indicates that breastfeeding lowers mortality, and an odds ratio greater than one indicates that breastfeeding raises mortality.

Figure 1 shows the effects of exclusive and nonexclusive breastfeeding on the odds of dying during the three-month period following each specified month of age from 0 to 11 months. Perhaps the most striking finding is that breastfeeding with supplements tends to be more beneficial than exclusive breastfeeding, even for children at very young ages (below two months). A partial exception is in the medium-mortality states where exclusive and nonexclusive breastfeeding are about equally beneficial up to age five months.

Three explanations for this finding are plausible. First, it may be that the supplemental foods given to very young children in India are more hygienic and of higher quality than commonly assumed. Information in the national NFHS-1 report supports this hypothesis (IIPS 1995, p. 275). The most common form of supplemental food for children less than four months old is water and other types of milk, and mothers rarely use bottles with nipples (which are often a source of infection because of inadequate sterilization).

A second explanation may be that some mothers have inadequate breast milk, especially in high-mortality states, due to their own poor nutrition and health status, early childbearing, and high fertility. A third explanation is that, among infants with similar characteristics, those in poor health may be more likely than others to receive exclusive breastfeeding.

Both exclusive and nonexclusive breastfeeding lower mortality during the first two months of life, but at older ages mortality is higher among infants who are exclusively breastfed than among infants

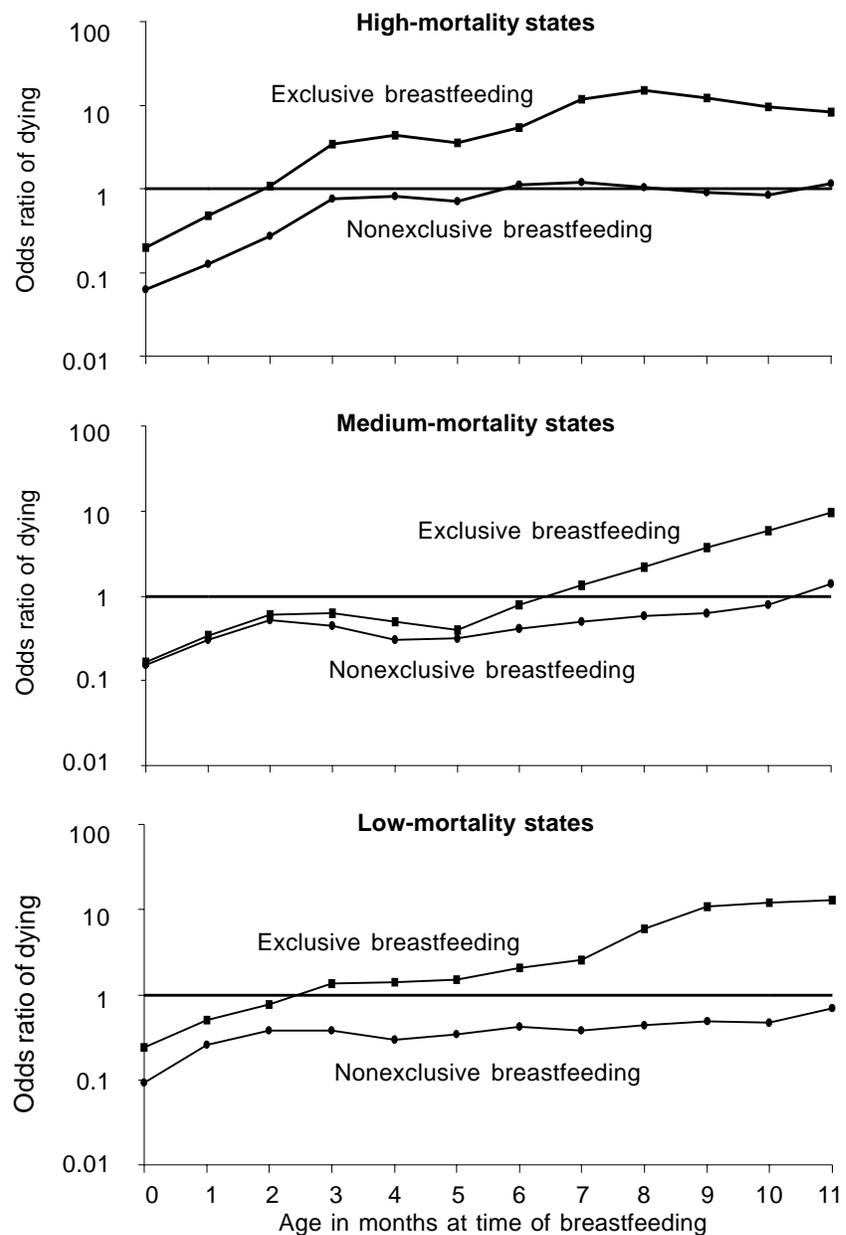


Figure 1 The effects of exclusive and nonexclusive breastfeeding on postneonatal mortality, compared with no breastfeeding (odds ratio = one), in high-mortality, medium-mortality, and low-mortality states: NFHS-1, 1992–93

who are not breastfed at all. This is not surprising because children's nutritional needs are not likely to be met completely by mother's milk after the first few months of infancy. What is surprising is that, in the high- and low-mortality states, the adverse effects of exclusive breastfeeding are already apparent three months after birth.

The effects of exclusive and nonexclusive breastfeeding at ages 3–6 months

vary among states with different overall levels of infant mortality. In the high-mortality states, mortality is higher for children who are breastfed exclusively than for other children. In the medium-mortality states, both exclusive and nonexclusive breastfeeding lower mortality, but breastfeeding with supplements has a slightly larger effect. In the low-mortality states, breastfeeding with supplements at

3–6 months lowers mortality, while exclusive breastfeeding raises it slightly.

Overall, the analysis shows that breastfeeding with supplementation is the most beneficial type of feeding for infant survival, even at very young ages. The benefits of breastfeeding plus supplements are strongest in the low-mortality states.

In the high-mortality states, the beneficial effects of both exclusive and non-exclusive breastfeeding are relatively weak. It may be that mothers in these states are more likely than other mothers to suffer poor nutrition and poor health themselves, which may reduce the benefits of breastfeeding. These mothers may also feed their infants lower-quality supplements than do mothers in the other states.

Policy implications

This analysis supports the hypothesis that breastfeeding reduces mortality in the first few months of life. The beneficial effects extend to older infants when breastfeeding is combined with supplemental foods. At the same time, the results indicate that the effect of breastfeeding in lowering infant mortality is smaller the higher the level of mortality. The beneficial effects of both exclusive and nonexclusive breastfeeding are weakest in states where infant mortality is high and strongest in the medium-mortality states.

The most surprising finding is that breastfeeding with supplements is nearly always more beneficial than exclusive breastfeeding, even for children at very young ages (less than four months) when exclusive breastfeeding is typically recommended. It appears that the dangers of disease contamination from supplemental foods may not be as great as has been commonly assumed, at least not in India.

These results suggest that educational programmes that promote breastfeeding with supplementation could help lower infant mortality in India. NFHS-1 findings also suggest that poor families rely on exclusive breastfeeding more than others, perhaps because they cannot afford supplements. If so, education efforts for such families need to be combined with programmes that provide appropriate supplemental foods for infant feeding, either free or at subsidized prices.

Further research is needed to clarify the causal relationship between breastfeeding practices and infant mortality. Does a child's growth pattern or history of illness affect breastfeeding practice? Does a mother's health status affect her breastfeeding behavior? And how does poverty affect breastfeeding, child immunization, and other health- and nutrition-related behavior?

Future studies will require detailed and accurate data on breastfeeding practices,

the content and preparation of supplemental foods, and the health status of infants and their mothers.

Further reading

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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-

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