B A N G L A D E S H

Evaluating national nutrition programs in Bangladesh: the role of the Nutritional Surveillance Project

Malnutrition has been estimated to cost Bangladesh $1 billion a year[1]. The Government of Bangladesh has recognized that malnutrition is a barrier to development and that investing in nutrition is a key to unlocking the country's greatest resource, its people. The model for this investment is the Bangladesh Integrated Nutrition Project (BINP) which provides a range of nutrition services specifically targeted at malnourished children and mothers. In an innovative role for nutritional surveillance, the Nutritional Surveillance Project is now providing an independent evaluation of the BINP and, over the long-term, will evaluate its successor, the National Nutrition Project, as well.

The prevalence of malnutrition in Bangladesh is amongst the highest in the world. Nationally representative data show that around 60% of young children are underweight, 55% are stunted, and 52% are anemic, while 42% of mothers have chronic energy deficiency, 45% are anemic and 2.2% are nightblind.[2-5] The Government of Bangladesh and international donors recognize this as a major barrier to national development and are planning to invest more than a billion dollars in nutrition programs over the next 10 to 15 years.

The model for this investment is the Bangladesh Integrated Nutrition Project (BINP), which was established by the Ministry of Health and Family Welfare in 1996 and is supported by a number of international donors and organizations, including the World Bank, the Canadian Government and the World Food Programme. The BINP works through NGOs to deliver community-based nutrition services including supplementary feeding, nutrition education, homestead gardening and other broader health and nutrition services. The BINP is currently working in 59 sub-districts (*thana*) in the country and over the next 4 years will be expanded to cover 139 sub-districts through its successor, the National Nutrition Project (NNP).

If the impact of the package of services provided to mothers and children by these two projects is to be assessed then any change in their nutritional status will have to be measured against underlying trends in nutritional status. For example, a recent NSP Bulletin (No 3, April 2001) showed that the prevalence of underweight among pre-school children has fallen by about 1.3% a year since 1991. The BINP will need to have a greater impact than this if it is to be considered to be effective. The data collected by the Nutritional Surveillance Project (NSP) of Helen Keller International and the Institute of Public Health Nutrition provides a means to measure the impact of these nutrition programs both in comparison with historical trends and against children living in areas where these programs are not being implemented (see Box 1).

A new role for the NSP

Over the last 10 years the NSP has been used as a source of high quality data for planning and implementing nutrition projects such as the BINP and NNP. The NSP has now taken on a new role - to provide an independent evaluation of the coverage and impact of these projects. Working closely with the Government of Bangladesh and USAID, the NSP was expanded at the start of its third

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Box 1: Evaluating public health programs

To meet demands for accountability donor agencies are increasingly requiring quantitative evaluations of the impact of the public health programs that they support. The design being used by the NSP to evaluate the BINP is novel because it provides:

- an external control group: data from a nationally representative sample of 24 sub-districts;

- an historical control group: data from surveys done in 5 BINP sub-districts before the program is implemented;

- and long term data on trends in nutrition and food security in Bangladesh since 1990.

The potential of the NSP to evaluate large scale development programs will be discussed in more detail in a forthcoming Bulletin.

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five-year phase in late 1999 to include sub-districts participating in both nutrition projects: five sub-districts taking part in the BINP were added in early 2000, and five NNP sub-districts were added in early 2001. Because a focus of both the BINP and NNP is children less than 24 months old, the NSP sample was increased in these 10 sub-districts to provide sufficient numbers of children in this age group for comparison in each survey with children of the same age in the other 24 NSP sub-districts. As well as collecting data in all 34 sub-districts on a core set of factors that are known to be the immediate or underlying causes of malnutrition, a module has been added to assess specific components of the BINP and NNP (see Box 2). Furthermore, the fact that data are collected every two months will allow the NSP to detect the impact of these projects on seasonally variable indicators: the prevalence of wasting, for example, shows a distinct and consistent seasonality in Bangladesh and ranges from 10% in winter up to 20% in summer.[6]

The first year of evaluation of the BINP

In February 2000 five of the 20 sub-districts newly recruited by the BINP were incorporated into the Nutritional Surveillance Project (see Figure 1). The NSP did three surveys in these five sub-districts during the year - in February and March, June and July, and October and November - in addition to its routine

surveillance in 24 sub-districts around the country (see Figure 1). The sampling procedure is described in Box 3. As the BINP had not yet begun activities in these sub-districts, the data collected during 2000 will serve as baseline measurements by which to assess the impact of the BINP interventions in comparison with nationally representative data from the 24 NSP sub-districts. The frequency of surveys was increased to six a year in 2001.

The first year of surveillance in the BINP sub-districts provided data on about 3,700 children aged 0 - 23 months (the target age group) in 6,750 households for comparison with 14,000 children in 27,000 households in the rest of the NSP sample.

Box 2: Data collected in all NSP and BINP sub-districts

Children aged 0-59 months
- Weight, length and arm circumference
- Diarrhea and acute respiratory tract infections
- Night blindness and whether given a vitamin A capsule recently
- Breast-feeding and food consumption

Mothers
- Weight and height
- Diarrhea
- Night blindness
- Food consumption
- Education

Households
- Socio-demographic characteristics
- Socio-economic indicators
- Income and expenditure
- Crises and coping strategies
- Agriculture and food production
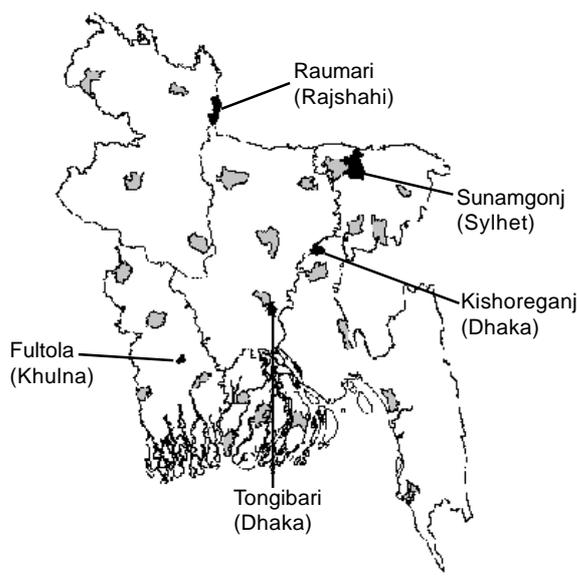- Sanitation and water sources

Village
- Price of essential commodities

Special data collected in BINP sub-districts

Indicators of participation
- Participation in BINP interventions
- Mother's knowledge and practices regarding health, nutrition and child care
- Child dewormed in last 6 months
- Child weighed within 3 days of birth
- Iron tablets given in pregnancy
- Mother had antenatal check-ups

Figure 1. *A map of Bangladesh showing the sub-districts (and Division) selected for the NSP (gray) and BINP survey (black).*
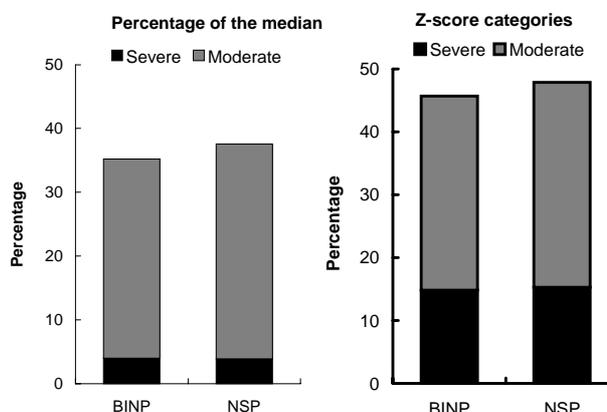

Figure 2. *The prevalence of underweight among children aged 0-23 months in the BINP sub-districts (n=3,680) and NSP sub-districts (n=13,263) in 2000 classified in two ways: left, using weight-for-age percentages (severe is <60% of the median; moderate is 61-75% of the median); right, using z-scores (severe is <3 standard deviations below the mean; moderate is between -3 and <-2 s.d. below the mean).*

A nutritional target of the BINP

The BINP set a target of reducing severe underweight by 40% among children less than 24 months old and of reducing moderate underweight by 25%.[7] There are different methods of estimating underweight which will affect how easily a potential impact can be estimated. Figure 2 shows how the children studied by the NSP in 2000 were classified as underweight according to the method used by the BINP in which body weight is expressed as a percentage of the median of a well-nourished and healthy sample of children.[8] Figure 2 also shows how the same children were classified according to the method recommended by the World Health Organization (WHO) which uses the same sample of well-nourished children but expresses values as standard deviation scores or z-scores.[8] Figure 2 reveals that the prevalence of underweight among children in the BINP sub-districts is not markedly different from children in the 24 nationally representative NSP sub-districts, although it is about 2% lower. However the two ways of classifying underweight show a disparity of about 12% for both the BINP and NNP samples of children, most of which is due to the difference in the percentage of children classified as severely underweight.

The WHO recommends the use of z-scores because a score of -3.0, for example, reflects an equivalent deviation from the median of a sample of well-nourished children, for children of any age and for all anthropometric indices. When a measurement is expressed as a percentage of the median however, a value such as 60% indicates different degrees of malnutrition depending on the age of the child, and is not the same for weight-for-age, height-for-age or weight-for-height. For these reasons nutritional targets are better set and evaluated using z-scores to classify children.

The targets set by the BINP could easily be modified and expressed as a reduction in the percentage of children below the z-score thresholds of -2 and -3 recommended by the WHO. The BINP would also be more likely to detect an impact of the program on

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Box 3: Sampling procedure

Five sub-districts were selected for surveillance from the 20 new sub-districts that joined the BINP in 2000. In each survey 15 clusters of villages were randomly selected in each sub-district. Within each cluster 30 households with children aged less than 60 months were systematically selected in BINP villages, and 25 households in NSP villages (HKI/IPHN, 2001). Five extra households were included in BINP villages to provide an adequate sample of children aged 0 - 23 months, the main target group of the project. This process provides in each survey a sample of 2,250 households in the five BINP sub-districts for comparison with 9,000 households in the 24 NSP sub-districts.

severe malnutrition if it is calculated using z-scores: a 40% fall in severe weight from 4.0% to 2.4% calculated using percentages of the mean (Figure 2) will be harder to detect than a fall from 15.4% to 9.2% calculated using z-scores.

Conclusions and recommendations

- For more than 10 years the The NSP has played an important role in advocating for nutrition and guiding policy and program development in health, food and agriculutre.

- Because of this experience in nutritional surveillance, HKI can provide technical assistance and guidance on nutritional indicators, evaluation design, and the analysis and interpretation of data.

- The existing Nutritional Surveillance Project was easily expanded and modified to provide an independent evaluation of the BINP and NNP.

- Sustained support is needed by the NSP for it to continue evaluating the BINP, the NNP and other large scale programs.

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