

Nutritional Surveillance Project

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Nutrition and Health Surveillance in Urban Slums in Chittagong

Key results for the period: February 2001 to January 2002

Rapid urbanization in Bangladesh is fuelling a growth in urban poverty, particularly in the urban slums where the quality of life is extremely poor. Since its inception in 1990 the HKI/IPHN Nutritional Surveillance Project (NSP) has been source of high quality data on living conditions, health, nutrition, food security and poverty in urban slums of three cities: Dhaka, Chittagong and Khulna. This bulletin presents NSP data collected in 2001 from slums in Chittagong, the second largest city in the country. One half (50%) of households had an energy intake <1805 kcal/person/d, an indicator of 'extreme' poverty. According to international criteria, the prevalence of malnutrition in children and mothers was 'very high', 'serious', or even 'critical' at different times of the year, and almost 11% children were affected by diarrhea. The extremely high prevalence of wasting in children aged 0-23 mo (16-35%) demands immediate attention. Investing in nutrition is crucial because malnutrition contributes to poverty and impedes both social and economic development.

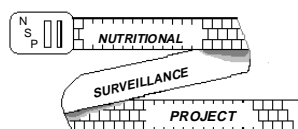
Urban population growth is occurring at an alarming rate throughout Bangladesh. The national census conducted in 2001 showed that the urban population had grown by 38% in the previous ten years, compared with only 10% in rural areas.¹ Much of this growth is caused by the flow of poor rural-urban migrants to slum areas, where appalling living conditions, poor health, malnutrition and poverty are rife. The rapid urbanization shows no signs of abating and the numbers affected by urban poverty continue to rise. Development agencies recognize that there is an urgent need to improve the welfare of poor slum residents and to stem the rise in urban poverty. In order to do so, detailed information on the magnitude and determinants of the problems is needed to design effective policies and programs.

Information generated by the NSP over the past 12 years has helped inform policymakers, program managers and donor organizations on many development concerns in Bangladesh including health,

nutrition, food security, gender disparities, and poverty. HKI encourages the use of its surveillance data to facilitate policy and program action for the benefit of the population from whom they were collected. Following the successful experience of the HKI Nutrition and Health Surveillance System (NSS) in data sharing in Indonesia, the data collected by the NSP in Bangladesh in 2001 on key indicators of nutrition, health and their determinants are included in a CDROM that accompanies this series of bulletins.

Data collection in urban slums of Chittagong

Data are collected every 2 mo from at least 350 households in urban slums in Ward 19 of Chittagong. A convenience sampling procedure was used to select households up to November 2001 and a two-stage cluster sampling design from December 2001. Households are only selected if they contain at least one child aged <5 years. A precoded questionnaire is used to record data from each household on the health and nutrition of one mother and all her children aged <5 years; household demography and socio-economic



status; household food consumption; natural disasters, household crises and coping strategies; and participation in NGO programs.

Findings presented

In this bulletin, data are presented on a selection of indicators of household demographic and socio-economic status, household food security (loans for food), caring practices (breastfeeding), the performance of national health programs (vitamin A capsule distribution), food consumption (household energy intake and consumption of non-cereal foods), health status (child and maternal diarrhea) and nutritional status (child and maternal nightblindness and anthropometry). The definition and method of data collection of each indicator are described together with the general findings for all NSP urban slum sites and the specific findings for the urban slum site in Chittagong. The figures show the data collected in the Chittagong slums. While the scope of this bulletin is limited to presenting the findings, they serve to facilitate discussion on the immediate and underlying causes of malnutrition and on ways to address it.

Demographic and socio-economic status (SEE TABLE)

What is indicated. The demographic and socio-economic status of a household determines the extent to which the household unit can adequately feed and care for all members, provide a healthy environment and gain access to health services. These factors are therefore important determinants of the health and nutritional status of household members.

Data collection method. A series of questions is asked to obtain the information shown in the Table.

Findings. *General* - Demographic and socio-economic conditions varied considerably between the three urban slum sites. *Chittagong slums* - The demographic and socio-economic conditions in the Chittagong slums were poorer than in Dhaka and Khulna. Chittagong had the highest level of crowding, 16% of households were dependent on manual labor as the main source of income, only 80% of households had closed latrines, and only 10% of mothers and 15% of fathers were educated.

Loan for food in the last month (SEE FIG 1)

What is indicated. A loan for food is a good indicator of household food insecurity in Bangladesh because it is a coping strategy used when a household is unable to produce or purchase sufficient food for consumption.

Data collection method. The respondent is asked whether the household took a loan to obtain food in the last month, either in cash or in kind.

Findings. *General* - The percentage of households that took a food loan was on average 5% in Dhaka, 9% in Chittagong and 14% in Khulna. The percentage was generally highest in Dec/Jan and lowest in Jun/Jul. *Chittagong slums* - The percentage was higher than Dhaka and lower than Khulna throughout the year, ranging from 6% in Jun/Jul to 17% in Dec/Jan.

Breastfeeding of children aged <60 mo (SEE FIG 2)

What is indicated. Infants and young children should be exclusively breastfed for the first 6 mo of life because of nutritional and health benefits. Breastfeeding should continue well into the second year of life, complemented with nutritious foods from 6 mo of age.

Data collection method. The mother is asked whether her child is currently breastfed.

Findings. *General* - In all three cities the majority of mothers breastfed their children well into the second year of life ($\geq 88\%$ of children aged 12-14 mo and $\geq 74\%$ of children aged 21-23 mo), and many for much longer. *Chittagong slums* - The percentage of breastfed children aged 12-14 mo (97%) was higher than in Dhaka and similar to Khulna, while the percentage of breastfed children aged 21-23 mo (76%) was lower than in Khulna and similar to Dhaka.

Vitamin A capsule receipt in children aged 12-59 mo (SEE FIG 3)

What is indicated. Preschool children in Bangladesh need vitamin A supplements because their diet does not supply enough vitamin A and so they are at high risk of illness, blindness and dying due to vitamin A deficiency. The Government of Bangladesh currently aims to give every child aged 12-59 mo a high-dose vitamin A capsule (VAC) containing 200,000 IU twice a year at six-monthly intervals during the National Immunization Days for polio. IVACG/WHO also recommend that children aged 6-11 mo be given 100,000 IU vitamin A. However, these children are currently not included in the national VAC distribution campaigns because the polio vaccine has a target age of 12-59 mo.

Data collection method. The NSP monitors the coverage of the VAC program during a round of NSP data collection that follows a VAC distribution. During the year 2001, the NSP collected data on coverage of the VAC program in Feb/Mar for the November 2000 VAC distribution and in Jun/Jul for the May 2001 VAC distribution. The mother is asked

whether her child received a VAC during the most recent distribution.

Findings. General - In the early 1990s, the coverage of the VAC program in children aged 12-59 mo in the urban slums generally exceeded 90% in Khulna and Chittagong and 95% in Dhaka. The coverage in November 2000 and May 2001 in all urban slum sites was $\geq 98\%$. *Chittagong slums* - Coverage of the VAC program was very high at 98%.

Household energy intake (SEE FIG 4)

What is indicated. Household energy intake is used as an indicator of household poverty: households with an energy intake < 1805 kcal/person/d are considered ‘extreme’ or ‘hard-core’ poor, and households with an energy intake of 1805-2122 kcal/person/d are considered ‘moderate’ or ‘absolute’ poor.² Household energy intake is also used as an indicator of household food security. However, this indicator neither incorporates the social or environmental dimensions of poverty, nor does it give an indication of the quality of the household diet.

Data collection method. Since December 2001, the NSP has collected data on household energy intake using a 7-day list-recall method. The respondent is asked to list all food and beverage items consumed by household members in the previous week and to estimate the quantity of each item consumed. These data are converted to a value of daily energy intake per household member.

Findings. General - There was considerable variation between the cities in the percentage of households with an energy intake < 1805 kcal/person/d (24-50%) and 1805-2122 kcal/person/d (21-25%). *Chittagong slums* - The percentage with a low energy intake (< 2122 kcal/person/d) was 24% higher than Dhaka and 4% lower than Khulna. One-half (50%) of households had a very low energy intake (< 1805 kcal/person/d) and were considered ‘extremely’ poor.

Household consumption of non-cereal foods (SEE FIG 5)

What is indicated. A high quality diet, which contains a diverse range of non-cereal foods that are good sources of micronutrients, reduces the risk of micronutrient deficiencies. One way to assess the quality and diversity of the household diet is to examine how often household members eat non-cereal foods.

Data collection method. The mother is asked to recall on how many days in the last 7 days the household members ate five common non-cereal foods: *dal* (lentils), eggs, green leafy vegetables, yellow/orange

Table Household demography and socio-economic status in 2001

	Chittagong	Dhaka	Khulna
No. household members (mean)	5.7	4.8	5.2
Household crowding (median no. household members per 100 sq ft)	6.7	4.8	4.2
Female decision-maker (%)	4	4	9
Manual labor as main source of income (%)	16	12	12
Clean source of drinking water ^a (%)	100	100	97
Closed latrine (%)	80	99	99
Parent’s education ^b	Mother	10	41
	Father	15	50

^a Water obtained from hand pump, deep tube well or tap

^b At least one year of formal education

Fig 1. Percentage of households that took a loan for food in the last month in 2001

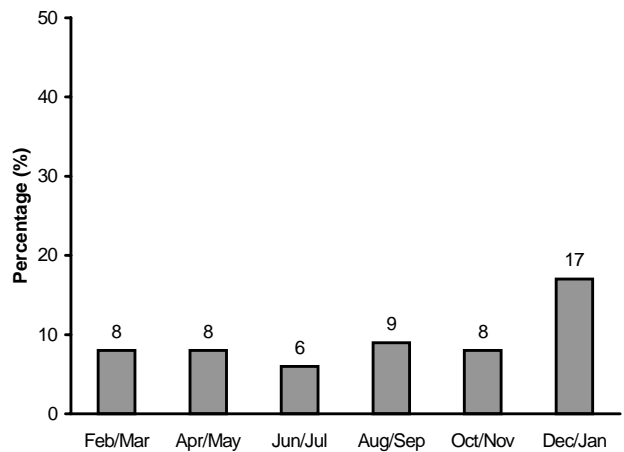


Fig 2. Percentage of breastfed children by age in 2001

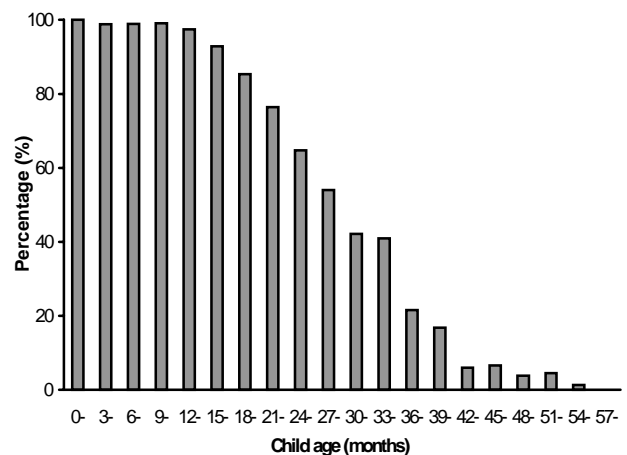


Fig 3. VAC coverage in children aged 12-59 mo in Nov 2000 and May 2001

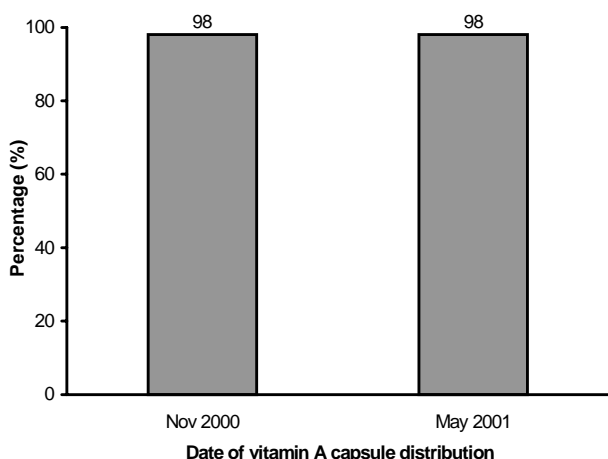


Fig 4. Household energy intake in Dec 2001/Jan 2002

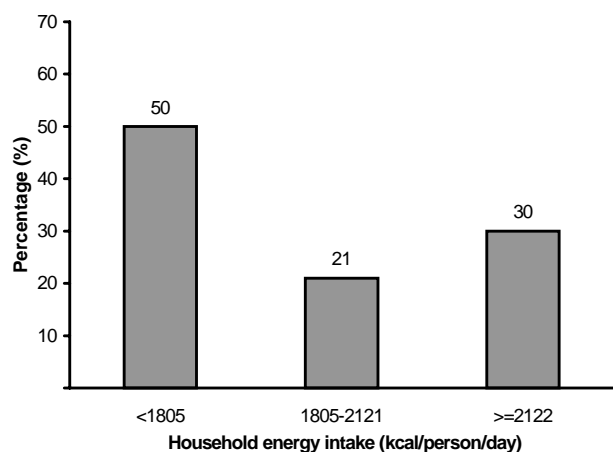
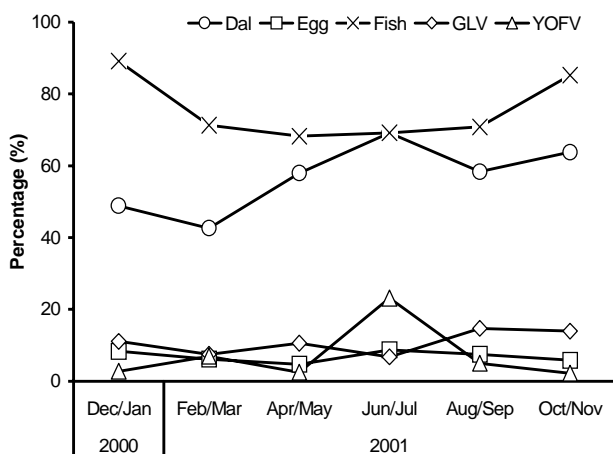


Fig 5. Percentage of households that consumed non-cereal foods regularly (≥ 4 d in previous week) in 2001. GLV = green leafy vegetables; YOFV = yellow/orange fruits or vegetables



fruit or vegetables, and fish. A household is considered to have eaten a non-cereal food ‘regularly’ if household members ate it on ≥ 4 days in the last 7 days. As data on this indicator were not collected in Dec 2001/Jan 2002, data from the previous year are included in Fig 5 in order to show seasonal variation throughout the year.

Findings. General - During most of the year <10% of households in the urban slums ate yellow/orange fruits or vegetables, eggs and green leafy vegetables regularly, and 40-70% of households ate *dal* and fish regularly. *Chittagong slums* - Consumption of non-cereal foods was similar to Dhaka and Khulna, except that regular consumption of fish was higher, exceeding 70% in four rounds of the year.

Child and maternal diarrhea (SEE FIG 6)

What is indicated. Diarrhea is a form of morbidity that is relatively easy to monitor, because it occurs relatively frequently and respondents easily understand its definition. It is also a major cause of undernutrition in developing countries, particularly among young children. The prevalence of diarrhea reflects hygiene conditions both inside the house and in the neighborhood.

Data collection method. The mother is asked a series of questions to determine whether she and her child had diarrhea in the last 24 hr. Diarrhea is defined as ≥ 3 loose, watery or mucoid stools in 24 hr.

Findings. General - The prevalence of diarrhea in mothers ranged from 0.0-1.4%, while the prevalence was about five times higher among children aged 6-59 mo, ranging from 0.8-10.6%. There was no consistent seasonal pattern in diarrhea prevalence in all three cities. *Chittagong slums* - The prevalence of diarrhea in mothers was less than in Dhaka and on average slightly greater than in Khulna, while the prevalence in children was up to 9.6% higher than in Dhaka and Khulna.

Child and maternal nightblindness (SEE FIG 7)

What is indicated. Vitamin A deficiency is associated with an increased risk of illness and dying and is a leading cause of blindness among children and mothers. Nightblindness is the first clinical sign of vitamin A deficiency and is considered to be a public health problem in areas where the prevalence in children aged 18-59 mo is $\geq 1\%$. For each person affected by nightblindness in a population, there are many more with a low vitamin A level, which increases their risk of illness and dying.

Data collection method. The mother is asked whether she or her child have difficulty seeing and therefore

moving around when there is insufficient light, for example, at dusk. Fieldworkers verify that this is due to nightblindness and not to any other sight defect. **Findings. General** - The data collected in 2001 show that the prevalence of nightblindness in children in the three cities was below the level that signals a public health problem. This is largely due to the high VAC coverage, which prevents a chronic vitamin A deficiency problem that would be caused by poor diet and repeated infections in these urban slums. The prevalence in non-pregnant mothers was also low (<1%). *Chittagong slums* - None of the children aged 18-59 mo interviewed in 2001 was nightblind, and only 0.20% of non-pregnant mothers were nightblind.

Maternal wasting (SEE FIG 8)

What is indicated. Wasting among mothers threatens both their health and survival because it increases their susceptibility to life-threatening diseases and their risk of dying, especially during childbirth. Wasted mothers are more likely to give birth to small infants and to be physically weak. The prevalence of adult wasting indicates a ‘critical’ food insecurity situation in areas where it is $\geq 40\%$ and a ‘serious’ food insecurity situation in areas where it is 20-39%. **Data collection method.** Wasting in non-pregnant women is defined as a body mass index (BMI) below 18.5 kg/m², which is calculated by dividing body weight by the square of height.

Findings. General - There was a large variation in the prevalence of maternal wasting between the three cities: the overall prevalence in 2001 in Chittagong (39%) was considerably higher than Khulna (29%) and almost twice as high as Dhaka (21%). In all three cities the prevalence fluctuated seasonally, peaking in Feb/Mar to Apr/May and falling in Aug/Sep. *Chittagong slums* - The prevalence of maternal wasting was higher than in Dhaka and Khulna throughout the year, and indicates a ‘serious’ or ‘critical’ food insecurity situation.

Child wasting (SEE FIG 9)

What is indicated. Child wasting (low weight for height) results directly from an inadequate intake of food and/or from diseases. It reflects recent or current nutritional status. The prevalence of child wasting indicates a ‘critical’ problem in areas where it is $\geq 15\%$ and a ‘serious’ problem in areas where it is 10-14%. **Data collection method.** Child wasting is defined as a weight for height z-score <-2 standard deviations (SD) of the median of the reference population (NCHS).

Fig 6. Percentage of children aged 6-59 mo and mothers with diarrhea in the previous 24 hr in 2001

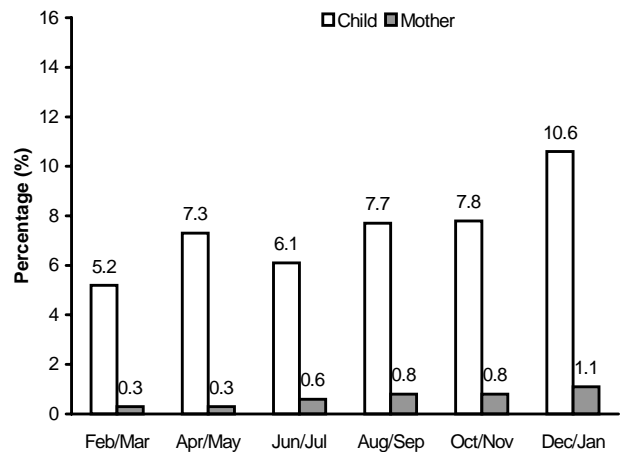


Fig 7. Percentage of children aged 18-59 mo and non-pregnant mothers with nightblindness in 2001

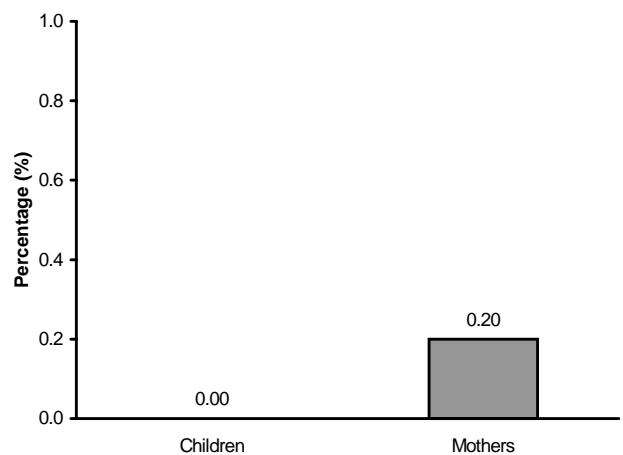


Fig 8. Percentage of wasted non-pregnant mothers (BMI < 18.5 kg/m²) in 2001

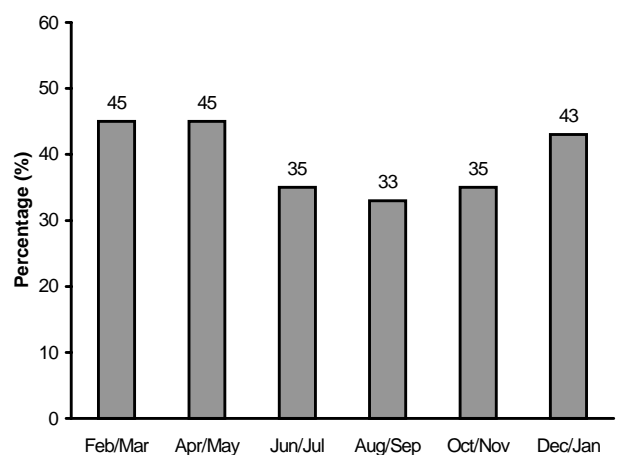


Fig 9. Percentage of wasted children (WHZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001

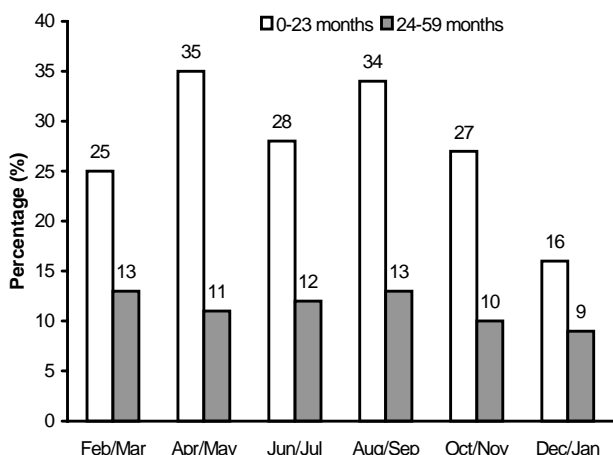


Fig 10. Percentage of stunted children (HAZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001

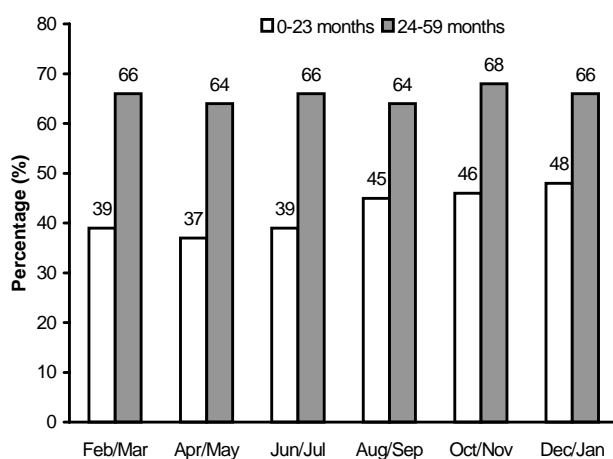
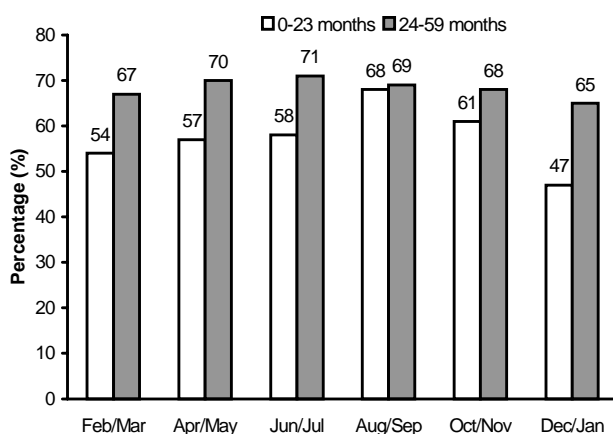


Fig 11. Percentage of underweight children (WAZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001.



Findings. General - Between 4-35% of children aged 0-23 mo and 4-15% of children aged 24-59 mo in the three cities were wasted during each round of data collection. The prevalence was highest in Apr/May or Jun/Jul and lowest in Dec/Jan or Feb/Mar. *Chittagong slums* - The prevalence of wasting in children aged 0-23 mo was up to 4 times the prevalence in Dhaka and Khulna, and was a ‘critical’ problem throughout the year. The prevalence in children aged 24-59 mo was also higher, but by a much smaller margin, and was a ‘serious’ problem throughout most of the year. The extremely high prevalence in the younger children suggests that mortality in these children is likely to be high. If only the better nourished children survive, this may explain why the prevalence in the older children was so much lower than in the younger children.

Child stunting (SEE FIG 10)

What is indicated. Stunting (low height for age) results from consumption of a diet of inadequate quality for a prolonged period of time. As stunting takes time to develop, it reflects past nutritional status or chronic undernutrition. A prevalence of $\geq 40\%$ is considered to be ‘very high’ and a prevalence of 30-39% is considered ‘high’.

Data collection method. Child stunting is defined as a height for age z-score <-2 SD of the median of the reference population (NCHS).

Findings. General - Between 37-55% of children aged 0-23 mo and 48-68% of children aged 24-59 mo in the three cities were stunted during each round of data collection. The prevalence of stunting in the older children was generally higher than in the younger children, and was ‘very high’ in both groups of children throughout most of the year. There was no consistent seasonal pattern in child stunting in all three cities. *Chittagong slums* - The prevalence of stunting in children aged 0-23 mo was lower than in Dhaka and Khulna, while the prevalence in children aged 24-59 mo was higher. The increase in the prevalence of stunting in children aged 0-23 mo during the year probably represents the seasonal pattern rather than a longer-term trend because stunting in this age group typically falls during the first half of the year and increases during the second half. In 2001 the typical fall in stunting during the first half of the year was not evident because of an unusually low prevalence in Feb/Mar.

Child underweight (SEE FIG 11)

What is indicated. Underweight (low weight for age) can be the result of wasting and/or stunting. A

prevalence of $\geq 30\%$ is considered to be 'very high'. Data collection method. Child underweight is defined as weight for age z-score < -2 SD of the median of the reference population (NCHS).

Findings. *General* - Between 33-68% of children aged 0-23 mo and 48-71% of children aged 24-59 mo in the three cities were underweight during each round of data collection. The prevalence of underweight was 'very high' throughout the year and was generally higher in older children than in younger children. The prevalence was generally lowest in Dec/Jan but it peaked at different times of the year in the different cities. *Chittagong slums* - The prevalence of underweight in children aged 0-23 mo and 24-59 mo was higher than in Dhaka and Khulna.

CONCLUSIONS

The scale of urban poverty in Bangladesh has become a critical policy issue. If current trends continue, it is predicted that the numbers affected by urban poverty will rise to 23 million by 2010.³ Many poor households live in the slums of the three largest cities - Dhaka, Chittagong and Khulna - which grew by 67%^{4,a} between 1986 and 1997. Data collected by the NSP in 2001 show that the health and nutrition of slum residents varies considerably between these cities. Although this heterogeneity makes it difficult to generalize the findings, it is clear that widespread poverty, poor health and malnutrition are common to all the urban slums, and that the problems are of similar magnitude, if not worse, than in rural Bangladesh.

The NSP findings for the Chittagong slums indicate that socio-economic status, sanitation conditions, health and nutrition were poor compared with the slums in Dhaka and Khulna. Chittagong slums were highly crowded and 20% of households did not have a closed latrine, which may explain the very high prevalence of diarrhea in children (5.2-10.6%). Fifty per cent of households had an energy intake < 1805 kcal/person/d and were therefore considered 'extremely' poor and 21% of households had an energy intake 1805-2121 kcal/person/d and were considered 'moderately' poor. The prevalence of wasting in children aged 0-23 mo (16-35%) indicates a 'critical' problem and warrants immediate attention by stakeholders in health and development. Wasting

was a 'serious' problem in older children (9-13%) and a 'serious' or 'critical' problem in mothers (33-45%), and both these groups should also be included in any strategies to reduce malnutrition. The prevalence of child stunting (37-48% in children aged 0-23 mo and 64-68% in children aged 24-59 mo) and child underweight (47-68% in children aged 0-23 mo and 65-71% in children aged 24-59 mo) were both 'very high' according to international criteria.

The VAC program had a very high coverage (98%) among children in the Chittagong slums and none of the children sampled by the NSP in 2001 was nightblind. However, the scale of the malnutrition problem, the low diversity of the diet, and the extremely high prevalence of anemia in children aged 6-59 months (71%) recorded by an NSP survey in 1999⁵ suggest that households had a low dietary intake of micronutrients.

The diversity in urban conditions in Bangladesh means that the most appropriate solutions to the problems may not be the same for all urban slums. Nonetheless, a number of common themes exist. Direct nutrition interventions are needed to assist those affected by malnutrition, including nutritional rehabilitation and direct feeding programs for the severely malnourished; micronutrient supplementation to prevent and control anemia and vitamin A deficiency among those at highest risk, particularly young children and women of child-bearing age; and food fortification to improve the micronutrient status of the population as a whole. Households in the urban slums need better opportunities to earn income so that they can afford a more nutritious and diversified diet. All food and urban development policies and programs should place greater emphasis on interventions to improve household food security, including employment and income creation, credit facilities, and food assistance. Urban households can also improve their access to food by using appropriate gardening practices to grow vegetables and fruits, as successfully demonstrated by HKI in urban slums in Bangladesh. Infectious diseases such as diarrhea are still a major cause of malnutrition, and so urban infrastructure needs to be improved so that households have a sanitary environment and better access to preventive and curative health services. These interventions should be complemented with poverty alleviation strategies that support labor-

^aSlum population of the statistical metropolitan area

intensive economic growth, sound macroeconomic management, good governance and social development, including the empowerment of women, and by global trade policies that stimulate the growth

of Bangladesh's economy. Surveillance should be used to monitor the implementation of policies and programs and to assess their impact.

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