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Nutritional Status of Young Children in a Bangladesh National Nutrition Program Area: A Case Study

by

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I. INTRODUCTION

Malnutrition rates in Bangladesh are very high. According to the latest surveys, 51 per cent of the children aged 6 to 71 months suffer from underweight, 49 per cent of the children suffer from stunting and 12 per cent of the children suffer from wasting (BBS 2002). Fourty five per cent of the women of reproductive age suffer from chronic energy deficiency indicated by a body mass index of less than 18.5kg/m^2 (BINP 1998). Fifty per cent of the women of reproductive age and 70 per cent of the children of one year old suffer from iron deficiency (BRAC 1997a). Although recently some progress has been made in the control of vitamin A and iodine deficiency, about 3 per cent of the pregnant

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women and 0.7 per cent of the children of 24 to 71 months suffer from night blindness (BRAC 1997b), and 45 per cent of the populations suffer from some forms of iodine deficiency disorders (Yusuf et al 1993).

The Government of Bangladesh has been implementing the Bangladesh National Nutrition Program (NNP) since 2001 with a view to address the problems of maternal and child malnutrition in the country. The program was developed from, and is a continuation of, the Bangladesh Integrated Nutrition Program (BINP) established in the country in 1995. At present the program is operating in 105 upazilas. Among other interventions, the program provides monthly weight gain monitoring and promotion to pregnant women; monthly growth monitoring and promotion to under two-year-old children; daily supplementary feeding to severely malnourished and growth faltered children and low BMI pregnant and postpartum mothers; micronutrient supplementation; home visits; and referral of infectious and complicated cases to hospitals. At the community level, the program is implemented by a local Community Nutrition Promoter (CNP) responsible for a Community Nutrition Center (CNC) covering 1,000 to 1,500 populations under the supervision of contracted NGOs (WB 2000).

II. OBJECTIVES

The main objective of the study was to assess the nutritional status of 6 to 59 months old children in an NNP area. Specifically the study observed the prevalence of underweight, stunting and wasting among the children and examined the determinants of malnutrition of the children in the area.

III. MATERIALS AND METHODS

The study was conducted in Bhanga upazila in Faridpur district where NNP had been in operation since 1995. The data were collected in April 2005 from a statistically selected representative sample of 528 households by the researchers themselves.[1] The households were selected in two stages. Bhanga had 195 CNCs. Assuming that, on the average, 70 households having 6 to 59 months old children would be available in each CNC, seven CNCs were selected systematically in the

[1] The sample size was calculated using the formula

$$n = \frac{Z_{\alpha}^{2} P(1-P)}{d^{2}} \text{ f.}$$

Where P = anticipated prevalence rate and Z_{α} = 1.96 at α =0.05. Assuming d = 0.05 and f = 1.25 the minimum sample size required for the prevalence of 50% is 480.

first stage. In the second stage all the households having 6 to 59 months old children in the selected CNCs were studied.

The socioeconomic and caring practice data were collected by personal interview of the mothers using a pre-tested questionnaire. All the children born after the introduction of BINP in the area had their birth records with the CNPs. The children's age was confirmed by verification of the birth records. The height data of the children were collected measuring the children's height using a locally made wooden height scale. For very young children who could not stand upright length data were collected using a special wooden frame having a platform and a sliding headpiece. Bodyweights of the children were collected barefooted with minimum of clothes using a digital uniscale. The height data were recorded to the nearest 1mm and the weight data were recorded to the nearest 100g.

The nutritional status was assessed using Z score and classified into severe (Z = -3.00 and below), moderate (Z = -2.99 to -2.00) and normal (Z = -1.99 and above).[2] WAZ and HAZ less than -6.00 and greater than 6.00 and WHZ less than -4.00 and greater than 6.00 were dropped from the analysis as biologically impossible values.[3]

IV. RESULTS

Nutritional Status

Valid anthropometrical data were available from 402 children. Overall, 49 per cent of the children were underweight, 43 per cent of the children were stunted and 20 per cent of the children were wasted (Table I). Comparable studies to validate the results were hard to find due to differences in age groups, data years and data cleaning rules applied in different studies. The nearest comparison was with the national level study as reported by the Bangladesh Bureau of Statistics (BBS 2002). The observed rates were broadly similar to the national estimates. The prevalence of severely underweight, not underweight, severely stunted and moderately stunted children were not significantly different between the two studies at 95 per cent level of confidence. However, significantly 4.9 per cent fewer children were moderately underweight, 5.8 per cent more children were not stunted, 1.6 per cent more children were severely wasted, 6.6 per cent more children were moderately wasted and 8.2 per cent fewer children were not wasted in the present study compared to the national estimates.

[2] Z = (observed value - median reference value) ÷ standard deviation of the reference.

[3] Similar data editing rules were applied in BINP (Karim et al 2003).

TABLE I

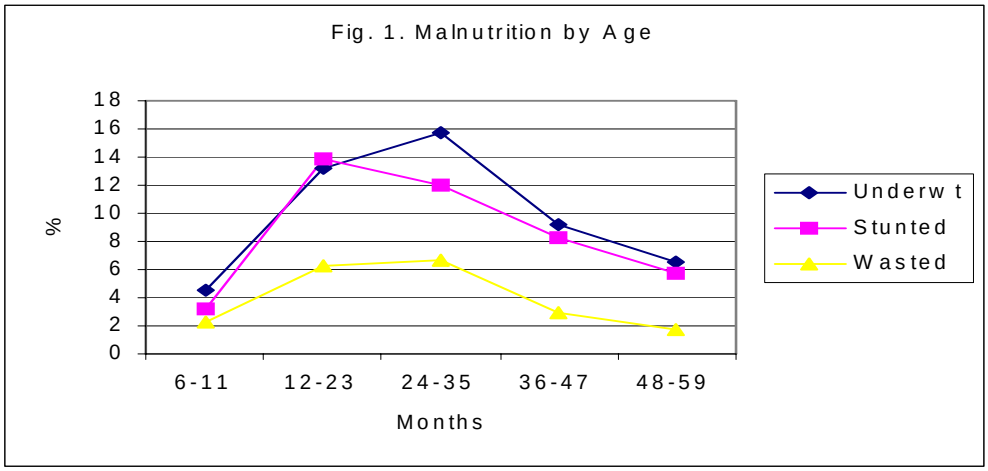
NUTRITIONAL STATUS OF THE CHILDREN

Status	Study Children (6-59 m) (n = 402) (%)	BBS 2002 (6-71 m) (n = 4000) (%)	Difference (% point)	95% CI of the difference	
				Minimum	Maximum
Severely underweight	15.4	12.6	2.8	-0.854	6.650
Moderately underweight	33.6	38.5	-4.9[a]	-9.775	-0.061
Not underweight	51.0	48.9	2.1	-3.031	7.222
Severely stunted	17.7	19.0	-1.3	-5.259	2.583
Moderately stunted	25.3	29.8	-4.5	-8.911	0.057
Not stunted	57.0	51.2	5.8[a]	0.683	10.847
Severely wasted	2.7	1.1	1.6[a]	0.009	3.264
Moderately wasted	17.2	10.6	6.6[a]	2.757	10.372
Not wasted	80.1	88.3	-8.2[a]	-12.229	-4.172

a. Significantly different from zero at 95% confidence level ($p < 0.05$).

Malnutrition by Age

The malnutrition rates showed a consistent pattern with the children's age (Figure 1). As the children's age increased, the prevalence of stunting increased up to about two years of life and the prevalence of underweight and wasting increased up to about three years of life. Then the rates declined and continued declining up to the fifth year of life. Similar trends were also observed in other surveys (BBS 2002).



Malnutrition by Gender

The study examined gender bias in the nutritional status of the children (Table II). Among all households, 26 per cent of the boys were underweight compared to 23 per cent of the girls, 22 per cent of the boys were stunted compared to 21 per cent of the girls, and 9 per cent of the boys were wasted compared to 11 per cent of the girls. The nutritional status of the children was unrelated to the children's gender status at 95 per cent level of confidence.

It might be argued that the gender bias existed in poor households where food insecurity was more common. The contention was tested selecting the landless households, landlessness being an adequate proxy for household food insecurity in rural areas. Significant gender variation was not observed even in the landless households in this study.

TABLE II

MALNUTRITION BY GENDER

Nutritional Status	All Households		Significant Level p-value [a]	Landless Households		Significant level p-value[a]
	Boys (no.)	Girls (no.)		Boys (no.)	Girls (no.)	
WAZ Measure:			0.453			0.466
Underweight	104	93		52	36	
Not Underweight	106	99		40	30	
HAZ Measure:			0.353			0.314
Stunted	88	85		44	35	
Not Stunted	122	107		48	31	
WHZ Measure:			0.058			0.427
Wasted	35	45		20	16	
Not Wasted	175	147		72	50	

a. The associations were tested using Chi-square.

Determinants of Malnutrition

A binary logistic model was estimated to observe the determinants of malnutrition among the children. The specification of the equation was based on the UNICEF model of the causality of malnutrition (UNICEF 1998).[4] The nutritional status of the children (severely and moderately malnourished = 1, else =

[4] The causality of malnutrition is well documented in the literature (Levinson 1995, Latham 1997 and UNICEF 1998) and the various causal models presented are fairly similar. According to the UNICEF framework, which is most commonly cited in the literature, inadequate dietary intake and infectious disease are immediate causes of malnutrition. Underlying these are household food insecurity, inappropriate feeding and caring practices and inadequate health services. Potential resources available in the country affect the underlying causes of malnutrition, and the socioeconomic and political structures and institutions that inhibit the utilization of these resources are regarded as the basic causes of malnutrition. At the household level, however, many of these factors are seen to involve care of children and women (Mason et al 1999).

0) was used as the independent variable. Farm size owned by the households was used as the proxy for household food security. Farm size (landless = 0, medium farmer = 1 and large farmer = 2), and the practice of a set of observed pregnancy cares, childcares and healthcares (practiced = 1, else = 0) were used as the independent variables.[5] The correlation coefficients between the independent variables were generally small (≤ 0.5). The regression coefficients for wasting showed theoretically inconsistent signs probably due to the small number of wasted children in the sample (n = 80). The equation for wasting was therefore dropped from the analysis.

The regression coefficients for underweight and stunting were not significantly different from zero but the coefficients had the theoretically consistent signs (Table III). Improved household food security was 39 per cent more likely to reduce underweight and 61 per cent more likely to reduce stunting. Practice of all observed pregnancy cares was 26 per cent more likely to reduce underweight and 17 per cent more likely to reduce stunting; practice of all observed childcares was 7 per cent more likely to reduce underweight and 11 per cent more likely to reduce

TABLE III

DETERMINANTS OF MALNUTRITION

Nutritional Status and Factors	Odds Ratio	95% Confidence Interval		Significant Level p-value
		Minimum	Maximum	
Severely and Moderately Underweight:				
Medium Farmers (0.01-99.99 decimals)	0.636	0.403	1.003	0.052
Large Farmers (100 decimals and more)	0.607	0.338	1.092	0.096
Practiced all Observed Pregnancy Cares	0.744	0.397	1.395	0.356
Practiced all Observed Child Cares	0.932	0.613	1.417	0.741
Practiced all Observed Hygienic Cares	0.774	0.487	1.231	0.279
Constant	1.470	-	-	0.057
Severely and Moderately Stunted:				
Medium Farmers (0.01-99.99 decimals)	0.678	0.429	1.069	0.094
Large Farmers (100 decimals and more)	0.394	0.211	0.736	0.004
Practiced all Observed Pregnancy Cares	0.832	0.437	1.583	0.575
Practiced all Observed Child Cares	0.892	0.583	1.366	0.600
Practiced all Observed Hygienic Cares	0.861	0.536	1.384	0.538
Constant	1.132	-	-	0.538

[5] The pregnancy cares included mothers visited 3 or more antenatal sessions, took more than 150 iron folic acid tablets, ate more food during pregnancy than before, took daytime rest and never did hard physical labor or lifted heavy objects during pregnancy with the target child. The childcares included children initiated breast feeding immediately after birth, fed colostrum, continued exclusive breast feeding for up to 5 to 6 months, and initiated complementary feeding at 6 to 7 months. The health cares included households used safe water for drinking and cleaning dishes, disposed household garbage in fixed covered place away from homestead, household members defecated in sanitary latrines and household members washed hands with soap and water after defecation.

stunting; and practice of all observed healthcares was 23 per cent more likely to reduce underweight and 14 per cent more likely to reduce stunting.

V. DISCUSSIONS AND POLICY IMPLICATIONS

The study observed the prevalence of underweight, stunting and wasting, and the determinants of malnutrition among a statistically selected 402 children aged 6-59 months in Bhanga upazila in Faridpur district where the Bangladesh National Nutrition Program had been in operation since 1995. The malnutrition rates in the upazila were broadly similar to the national rates, which lend support to the reliability of the present data.

However, significantly fewer children were moderately underweight and significantly more children were not stunted in the upazila compared to the national rates, which was an improvement in the upazila. Although many factors could affect this difference, the results were, at least partially, attributable to the interventions of NNP. The study also observed that significantly more children were severely and moderately wasted in the upazila compared to the national estimates. The results were probably due to the small sample size of wasted children (n = 80) in the present study.

The nutritional status of the children was unrelated to the children's gender status in the upazila. Higher prevalence of malnutrition in girls than boys was reported in the country (Chen 1981, NIPORT 2001) caused due to preferences of boys over girls in the provisions of household food and modern treatment facilities (Chen et al 1981). The lack of the relationship observed in the upazila indicates that NNP was successful, at least partially, in evening up the gender bias in feeding and caring of the children in the upazila.

Although statistically insignificant the study observed positive effects of household food security and caring practices in reducing the malnutrition among the children. The results were consistent with the UNICEF framework of the causality of malnutrition. The observed lack of significance w as probably due to the small sample size in this study (n = 402), and the levels of significance were expected to improve asymptotically with larger sample size. The important observation here was that the effect of household food security was substantial and higher than the other factors included in the study indicating that nutrition project designs should provide due importance to household food security interventions along with other interventions to maximize the benefits from the efforts. The high prevalence of malnutrition in the early years of life justified the targeting of children at an early age for effective improvement in their nutritional status.

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