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ABSTRACT

Objective of this survey was to establish a baseline nutritional profile to assess the impact of the MNCH programme interventions at the end of the project duration. Nutritional status and related factors were assessed using different indicators - anthropometric status of under-5 children, adolescent girls and adult women (non-pregnant aged 20-49 years), household food security, intra-household food distribution, knowledge of women on micronutrient and food during pregnancy and lactation. Data were collected from 1,113 programme and 803 control households. Mean height, weight and MUAC of under-five children was similar in the programme and control households. More than half and one-third of children were underweight and stunted respectively both in programme and control households. Mean weight, BMI and MUAC was comparable between both groups of adolescent girls. No significant difference was observed in height, weight, MUAC and BMI of non-pregnant women between programme and control households. More than one-third women of both households were suffering from chronic energy deficiency.

INTRODUCTION

Poverty, illiteracy, and lack of basic environment, health, and nutrition knowledge form a vicious circle, the outcome of which is retarded growth and development. Bangladesh is a country with limited health, food and nutrition delivery facilities. Malnutrition has taken a serious and widespread form in the country, particularly among mothers and children. Still 36% of our new born babies are of low birth weight (LBW) (BBS 2005), more than twice the 15% threshold that indicates a public health problem; about 48% of the pre-school children are malnourished when WHO threshold for very high public health problem is 30%. Infant and maternal mortality rates are among the highest in the world: 1 in 15 children die before reaching the first birthday in Bangladesh (BDHS 2004). Globally 55% of child deaths are attributed to undernutrition (Pelletier 1995). In Bangladesh where undernutrition is highly prevalent, it is not considered as a major cause of under-5 child death; acute respiratory infections (ARI) comes first followed by birth asphyxia (11.7%), LBW (6.5%), diarrhoea (5.1%). Malnutrition is labeled as cause of death for only 3.6% of under-5 children.

Women of childbearing age constitute another population group who, like growing children, are highly vulnerable to nutritional insufficiencies because of their increased need for food and nutrients during pregnancy and lactation. One-third (34%) of adult women were found to be malnourished (BDHS 2004). The combination of early marriages, relatively high fertility, devastating ill health ignorance and social taboos, contribute to this rate of death among the mothers.

We are facing an intergenerational problem of malnutrition. Many malnourished adolescent girls and women give birth to babies that are born thin and stunted. These infants grow poorly and fail to thrive in subsequent years and, if they are girls, become malnourished mothers themselves (ACC/SCN, 2000). In this way, undernutrition is handed down from one generation to the next. Malnutrition is thus perpetuated through generations. Malnutrition among the preschool children is concentrated during the first two years of the life; the first six months are spent with inadequate breast feeding, the first 18 months are spent with poor weaning practices, with little or insufficient complementary foods.

The causes of malnutrition are many. Broadly three issues are identified– inadequate food in the household; poor health services and improper feeding, eating and caring practice. Poverty is probably the strongest cause of food insecurity at household level. However, it is often seen that malnutrition is visible with better-off households (BBS 2000). Better economic condition, therefore, does not necessarily ensure sound nutrition due to lack of knowledge, gender preference and cultural influence. Health care is an essential condition for good nutrition, even adequate nutritious food cannot keep a healthy status when diseases such as diarrhoea, measles, other infections and worm infestations drain away most nutrients. In this situation, it is important to stress the need for a healthy environment, e.g., safe water, sanitary facilities as well as good hygienic practices. Access of the people to available health is again a critical factor to ensure desirable nutrition.

Malnutrition being a multi-causal problem has to be addressed from various angles. Malnutrition should be the one of the major agendas of development in Bangladesh if we want to achieve the Millennium Development Goals (MDG) in maternal and child health. With the aim to achieve MDGs, BRAC has started a new programme, called Maternal Neonatal and Child Health (MNCH) programme, for scaling up existing efforts in Bangladesh that will

significantly improve maternal, neonatal and child health. Programme interventions are designed to meet the health need of the poor. Support for the whole life cycle approach will be considered. Pregnant and lactating women, neonates, children under five and adolescents will receive different interventions. Maternal and child health will be the major focus, though other issues such as family planning and adolescent health will also be a part of the intervention package. Working with the community as well as national strategies towards poverty reduction will be taken into account within the programme. Before starting the intervention programme, a baseline survey is proposed on different aspects of safe motherhood, neonatal and child health situation in the area. These will help develop informed intervention components, approaches and strategies for maternal, neonatal and child health initiatives, and provide necessary data for future evaluation of the project. Giving priorities to the relationship between maternal and child health, and nutrition; information on nutrition was collected from the same sample size who were covered for health issues.

The general objective was to establish a baseline nutritional profile to assess the impact of the MNCH programme interventions at the end of the project duration. To achieve this goal the following specific activities were undertaken:

- Measure anthropometric status of under-5 children, adolescent girls and adult women (non-pregnant aged 20-49 years)
- Assess the food security status of the households
- Describe the intra-household food distribution
- Assess the knowledge of women on micronutrient and food during pregnancy and lactation

METHODOLOGY

The baseline cross-sectional survey was a population-based descriptive study, which followed structured questionnaire. Data were collected during April–May 2006. Households included in the health survey were visited for all nutritional information. Anthropometric measurements of all adult women (15-49 years), adolescent girls and under-five children (6-59 months) of those households were taken. Height/length, weight and mid upper arm circumference (MUAC) were measured. Height was taken in cm using a wooden board fixed with a plastic tape to the nearest 1 cm. The recumbent length of 6 to 23 months old children was measured by the same wooden board with an adjustable foot piece. Weight was taken using electronic bathroom scale (UNISCALE) to the nearest 100 g. BMI of adolescent and adult was calculated as the weight in kg divided by the square of the height in meter. For Adult women cutoff point of 18.5 was used to distinguish the chronic energy deficiency (CED) from the normal. Severe CED was defined by BMI <16.0 (Shetty 1994). Three standard indices of physical growth to describe the nutritional status of under-5 children were considered- height-for-age (stunting), weight-for-height (wasting) and weight-for-age (underweight). The data was transferred to SPSS, and the Anthro programme was used to derive anthropometric indices from four collected parameters (age in month, gender, weight in kg and height in cm). The reference data set that is used by Anthro for anthropometric analysis of children is the National Centre for Health Statistics/World Health Organization (NCHS/WHO) reference dataset. Each of the nutritional indicators is expressed in standard deviations (Z-scores) from the mean of the reference population. Deviations of the indicators between below -2 and -3 standard deviation (SD) indicate that the children moderately affected, while deviations below -3 SD indicate that the children are severely affected (WHO 1995). TALK-MUAC tape was used to measure MUAC to the nearest 1 mm.

Food security at households was assessed using a questionnaires (10 questions) developed for rural households in Bangladesh. Out of 10 questions 7 questions were based on the BRAC/Cornell university study in Bangladesh (Frongilo 2003). To capture the effect of seasonal scarcity one question was constructed. Overall and perceived food scarcities were also incorporated. Households were categorized according to the conceptual meaning and severity of the response. The three categories created were as follows: 1) dependency for security, 2) recent food security, and 3) ability to purchase specific food. Three other dimensions– 1) seasonal food security, 2) year-round food security, and 3) perceived food security were calculated directly from responses. Households were categorized according to the definition listed in Table 1.

Table 1. Definition of the categories of household food security

Label	Categories	Definition of categories
Dependency for food security	Extreme	Had to borrow rice/wheat 3 to >5 times per week
	Moderate	Had to borrow rice/wheat 1-2 times per week
	Occasional	Had to borrow rice/wheat 1-2 times per month
	Secure	Never borrowed
Recent food security		
Quantity	Extreme	Two meal per day did not fulfill 3 to >5 times per week
	Moderate	Two meal per day did not fulfill 1-2 times per week
	Occasional	Two meal per day did not fulfill 1-2 times per month
	Secure	Always had two meal per day
Quality	Extreme	Had to eat only rice 3 to >5 times per week
	Moderate	Had to eat only rice 1-2 times per week
	Occasional	Had to eat only rice 1-2 times per month
	Secure	Never ate only rice
Ability to purchase quality food	Not at all	Never last one week
	Occasionally	1-2 times per week
	Frequently	3 to > 5 times per week
Year round food insecurity		Can't have at least two meals per day for most of the time in year.

RESULTS

The survey respondents were women from the sampled households. Households were selected with women of reproductive age (15-49 years) who were currently pregnant or mothers of under-5 children. Health data were collected from 1205 programme and 876 control households. Same numbers of households were not included during nutritional data collection. Nutrition team collected data after 5-10 days from health team in each area and 159 households (86 programme and 73 control) were missed due to migration and delivery of child.

The anthropometric measurements were done on under-5 children, adolescent girls (13-19 years) and women of reproductive age (20-49 years). A total of 1,472 children (880 programme, 547 control), 309 adolescent girls (194 programme, 115 control) and 984 non-pregnant adult women (561 programme, 423 control) were covered from sampled households (1,119 programme vs. 803 control). Since BMI during pregnancy is not a valid indicator of nutritional status, the identified pregnant women were excluded from this analysis.

Table 2. Overall nutritional situation of under-5 children.

Indicator (mean±SD)	Programme (n=880)	Control (n=547)	P
Height (cm)	85.1 ± 10.9	84.7± 11.2	0.52
Weight (kg)	10.7±2.5	10.5±2.5	0.13
MUAC (mm)	139.5±10.8	138.4±10.9	0.06
Weight-for-height z-score	-1.2±0.8	-1.3±0.9	0.04
Height-for-age z-score	-1.6±1.2	-1.6±1.2	0.36
Weight-for-age z-score	-2.0±0.9	-2.0±0.9	0.55

Table 2 shows the mean height, weight, MUAC and other related indicators related with weight and height of the surveyed children aged 6-59 months. Mean height and weight was similar in programme and control households. Average height and weight of the children were

around 85 cm and 11 kg respectively. MUAC of children living in control households on average 1 mm lower than programme households. The mean weight-for-height Z-score was significantly lower in control households. While Z-score of height-for-age and weight-for-age were calculated mean values for both groups of children were found to be similar and no difference was found between groups.

Table 3. Overall prevalence of malnutrition among under-5 children

Indicator (%)	Programme (n=880)	Control (n=547)	P
Stunting (Height-for-age)			
- Severe (<-3.00 SD)	10.9	11.3	0.62
- Moderate (-3.00 to -2.01 SD)	27.2	23.1	0.05
- Total (<-2.00 SD)	38.0	34.4	0.18
Underweight (Weight-for-age)			
- Severe (<-3.00 SD)	11.0	11.7	0.67
- Moderate (-3.00 to -2.01 SD)	39.9	40.8	0.75
- Total (<-2.00 SD)	50.9	52.5	0.57
Wasting (Weight-for-height)			
- Severe (<-3.00 SD)	0.9	2.2	0.03
- Moderate (-3.00 to -2.01 SD)	13.2	18.1	0.02
- Total (<-2.00 SD)	14.0	20.3	0.01

According to Z-score classification described earlier (Table 3), more than 50% of children were underweight both in programme and control households. Prevalence of stunting was found with more than one-third of children, programme and control households were suffering at the same level. Severe stunting and underweight was around 11% in both households. Though prevalence of severe wasting was lower compared to stunting and underweight, it was significantly higher in control households (2.2% vs 0.9%). Overall wasting prevalence was significantly higher in control households than programme households.

Table 4. Prevalence of malnutrition among under-5 children by age and sex

Age group (months)	Both			Boys			Girls		
	Programme (n=880)	Control (n=547)	P	Programme (n=418)	Control (n=217)	P	Programme (n=462)	Control (n=276)	P
Stunting, %									
- 6-11	26.7	15.8	0.12	31.7	15.6	0.11	22.0	16.0	0.53
- 12-23	42.9	43.4	0.93	43.9	45.3	0.88	42.0	41.5	0.95
- 24-35	33.8	32.8	0.85	34.0	27.0	0.35	33.7	39.3	0.48
- 36-47	36.3	35.6	0.90	40.2	37.3	0.73	33.0	34.3	0.86
- 48-59	45.9	35.9	0.10	48.9	36.0	0.14	42.9	35.8	0.41
Underweight									
- 6-11	34.1	31.1	0.70	40.5	26.5	0.20	28.3	37.0	0.44
- 12-23	59.3	60.5	0.83	53.4	61.0	0.38	63.8	60.0	0.64
- 24-35	57.7	54.7	0.58	52.7	45.1	0.31	62.5	64.7	0.77
- 36-47	46.3	52.8	0.25	46.9	44.6	0.78	45.8	59.2	0.08
- 48-59	48.7	52.8	0.49	49.5	43.1	0.47	47.8	61.8	0.10
Wasting									
- 6-11	5.8	12.3	0.17	9.8	15.6	0.45	2.2	8.0	0.25
- 12-23	22.7	27.4	0.39	18.2	20.8	0.72	26.1	34.0	0.32
- 24-35	16.9	23.5	0.150	17.0	23.8	0.30	16.8	23.2	0.33
- 36-47	7.4	13.6	.07	5.4	9.8	0.33	8.9	16.4	0.13
- 48-59	14.9	21.4	0.17	12.2	18.0	0.35	17.6	24.5	0.32

Distribution of prevalence of malnutrition by age and sex shows that stunting, wasting and underweight were highest in children aged 12-23 months and they were same for programme and control households. Then prevalence of malnutrition decreased with age until 4 years of age and again increased at the age of 5. No significant difference was observed between programme and control households for any age group in terms of any form of malnutrition. Prevalence of malnutrition among boys was insignificant in programme and control households. Girls of all age groups were equally malnourished in programme and control households (Table 4).

Table 5. Nutritional status of adolescent girls

Indicator (mean ± SD)	Programme (n=194)	Control (n=115)	P
Height (cm)	149.1±5.1	150.5±5.2	0.02
Weight (kg)	41.9±5.4	41.2±5.5	0.25
MUAC (mm)	225.4±20.4	222.0±18.9	0.10
BMI (kg/m ²)	18.9±2.2	18.2±2.0	0.04

Adolescent girls in control households were taller than girls in programme households. Mean weight was similar in both groups of girls. Opposite to height BMI was more among the programme households. Adolescents in programme households had more arm circumference than control households but not significantly different.

Table 6. Nutritional status of adult women

Indicator	Programme (n=560)	Control (n=423)	P
Height (cm), (mean±SD)	149.7±5.3	150.2±5.6	0.17
Weight (kg), (mean±SD)	44.1±6.5	43.8±6.3	0.39
MUAC (mm), (mean±SD)	235.3±22.6	232.5±22.3	0.06
BMI (kg/m ²), (mean±SD)	19.6±2.4	19.4±2.4	0.09
CED <18.5 (%)	34.1	35.9	0.57
Severe CED <16.0 (%)	1.8	4.4	0.06
Height <145cm (%)	17.7	16.1	0.52

Nutritional status of non-pregnant women in programme and control households was similar (Table 6). No significant difference was observed in height, weight and MUAC between programme and control households. The mean BMI were close between both groups. More than one-third women of both households were suffering from chronic energy deficiency (CED). Prevalence of severe CED was higher in control households but difference was not significant.

Table 7. Knowledge about micronutrient deficiencies

Indicator	Programme (n=1113)	Control (n=803)	P
Knowledge on iodine			
Consequence (goiter, cretinism)	34.9	28.4	0.01
- Prevention	59.4	39.4	<0.001
Use of iodized salt	82.3	86.6	0.01
Reason of not using iodized salt			
- Costly	91.3	86.5	0.20
Testing iodized salt	12.8	9.8	0.04
Source of knowledge			
- BRAC	19.4	4.3	<0.001
Knowledge on Vitamin A			
Awareness on night blindness	84.9	81.4	0.04
- Cause	39.0	37.0	0.41
- Prevention	80.8	89.0	0.00
Knowledge on Iron			
Awareness on anemia	44.4	54.3	<0.001
- Cause	4.9	1.1	0.01
- Prevention	86.8	93.1	0.02

Knowledge about the micronutrient deficiency including symptom, cause and preventive measure was explored in programme and control households. Goiter, cretinism, night blindness and anaemia were identified to proxy for the level of knowledge about micronutrient deficiency. These diseases are together known as micronutrient malnutrition. Knowledge on micronutrient was well shaped in programme households compared to control households except for iron. More than one-third (35%) respondents were aware of the consequence of iodine deficiency while 28% respondent had the same knowledge. Regarding the prevention of iodine deficiency programme households were significantly more knowledgeable than control households. A higher number of women in programme households knew how to test the iodine in salt compared to women in control households. Though control households had less knowledge, consumption of iodized salt was significantly higher. Among the non-consuming iodized salt households, majority of the programme (91%) and control (87%) households expressed that they could not afford iodized salt due to higher price. Some (12% in control, 8% in programme) did not know the usefulness of iodized salt. BRAC was not a major source of knowledge, 19% of programme households and 4% of control households received knowledge from BRAC. Media, friends, relatives and neighbours were considered as main source of knowledge. Only 14% of programme households consumed BRAC salt and 1% from control households.

Knowledge on vitamin A was considerably higher in both households, however percentage was significantly higher in programme households. Cause of night blindness was equally known in the programme and the control households. The respondent of control households who were aware on night blindness, were more knowledgeable about the prevention of that than programme households.

In the area of iron deficiency more than half of the women in control households heard the name of anaemia compared to programme households, but few respondents knew the actual cause of anaemia though it is significantly higher in programme households. Out of those who were aware of anemia, majority knew how to prevent anaemia and, it was significantly higher in control group.

Table 8. Food security at households

Indicator	Programme (n=1113)	Control (n=803)	P
Dependency for food security (last month)			
- Extreme	2.1	0.5	0.01
- Moderate	16.7	8.0	<0.001
- Occasional	20.3	24.8	0.02
- Secure	60.9	66.7	0.01
Ability of pay back	90.6	99.3	<0.001
Recent food security (last month)			
Quantity			
- Extreme	4.0	1.2	<0.001
- Moderate	16.6	13.6	0.07
- Occasional	11.6	13.8	0.15
- Secure	67.7	71.4	0.09
Quality			
- Extreme	6.6	2.1	<0.001
- Moderate	10.9	17.1	<0.001
- Occasional	11.9	13.7	0.23
- Secure	70.7	67.1	0.09
Ability to purchase quality food			
Fish			
- Not at all	20.5	16.9	0.05
- Occasionally	51.8	61.1	0.00
- Frequently	27.7	21.9	0.01
Meat			
- Not at all	70.8	69.4	0.50
- Occasionally	26.1	28.0	0.36
- Frequently	3.1	2.6	0.57
Vegetable			
- Not at all	1.8	3.1	0.06
- Occasionally	9.6	19.2	<0.001
- Frequently	88.7	77.7	<0.001
Seasonal food security			
- No change	36.0	32.1	0.08
- Decrease quality	34.3	45.0	<0.001
- Decrease quantity and quality	29.6	22.9	0.001
Year round food insecurity	15.0	13.6	0.38
Perceived food security			
- Always deficit	22.2	15.7	<0.001
- Deficit sometimes	26.1	33.1	0.01
- Neither deficit nor surplus	22.7	27.3	0.02
- Surplus	29.0	23.9	0.01

The concept of household food security refers to the ability of a household to assure all its members sustained access to sufficient quantity and quality of food to live active healthy lives. Food security in control and programme households is shown in Table 8. More than one-third of the families borrowed rice/wheat from others (neighbours or relatives) for preparing a meal both in programme and control areas, though extreme to moderate dependency for food were significantly higher in programme households compared to control households. On the other hand food security in terms of dependency was higher in control households. During the *Monga* time more than 60% of the families faced food deficiency, higher deficiency in quantity and quality reported in programme households and more quality deterioration was found in control households. Perception of food security was more in programme households than control households. Always insecurity was also reported higher in programme households than control. Similar proportion of the households could not afford two meals per day year round.

Table 9. Intra-household food distribution

Indicator	Programme (n=1113)	Control (n=803)	P
The member usually eat first in the family			
- Father	52.4	72.9	.000
The member usually eat last in the family			
- Mother	66.7	79.2	.000
The member is given the big portion of fish/meat			
- Father	69.7	77.2	.000
- Male child	5.7%	7.9%	
- Female child	3.5%	4.5%	
The member gets the egg if one is available			
- Father	64.2	66.7	.255
- Male children	13.0	12.7	
- Female children	8.0	8.6	
Increase allocation during pregnancy	79.3	75.5	0.045
Increase allocation during lactation	80.8	75.5	0.005

As shown in Table 9 food intake was highly influenced by gender and household head. Father is important member in households and he has priority in food consumption. This was more common in control household than programme. After father, father-in-law came in second position who consumed food first. Offer of food at first time for the female children was significantly lower than male children in both programme and control households, 2.9% vs. 6.0 and 0.9% vs. 3.4% respectively. In majority (80%) control households mothers received food at last and it was 67% in programme households. Larger portion of fish or meat was consumed by father most of the time and this practice is significantly higher in control households. Even if a single egg was available at home the father would have priority in consuming it, followed by the male children and then the female children. Around 80% of the respondents from programme households reported more foods were allocated during pregnancy and lactation, around 75% control households reported the same though significantly lower from programme households.

DISCUSSION

The health and nutrition baseline was conducted on the households where MNCH programme will be started to achieve MDGs with composite intervention programme. Mainly poor population will be focused, as they are always vulnerable and deprived from all facilities. Nutritional status, intra-household food distribution, nutritional knowledge and food security were compared between programme and control households. Overall nutritional situation was comparable between groups. Knowledge on micronutrients varied between programme and control households. The programme households were more knowledgeable on iodine and vitamin A deficiency while control households on iron deficiency, though it was not consistent. Same trend in intra-household food distribution was observed but control households were in worse condition in most of the case. Household food insecurity was more visible in programme households. Considering some area-specific differences, this report would provide a comprehensive picture on nutritional status and the related dimension of programme and control households. Except nutritional status, most other indicators were not comparable between groups. Control households were included to observe change over the time. Therefore, within group difference would be more important at the end of intervention in programme area than between group comparisons. This information would be of immense value for any future programme impact assessment to see the changes on nutritional status as well as other factors that could influence the situation.

According to government statistics, Nilphamari is one of the districts in Bangladesh where poverty density is high (PKSF 2005). Therefore, may be the findings of the study would not reflect the health and nutrition situation of the average population of the country. However, since the demographic, socioeconomic, health and nutritional characteristics of the poor in Bangladesh has a little variation between regions, the present survey may be considered as representative to reflect the nutritional situation of the poor people of the country as a whole.

NUTRITIONAL SITUATION

Stunting, underweight and wasting are all manifestation of physical retardation caused by protein-energy malnutrition (PEM). Indeed, the children of the target and control households were highly malnourished– their weight, height and MUAC being lower than the national average (BBS 2000). Overall malnutrition prevalence based on Z-score in programme households was similar to national average, except stunting. Underweight and wasting was found more in control households than national prevalence (BDHS 2004). Although the prevalence of severe stunting, underweight and wasting was not as high as in the nationally representative figure (10.9 vs. 16.9, 11.0 vs. 12.8 and 0.9 vs. 1.3 respectively), it should not be overlooked. In the children, underweight was more prevalent than stunting and wasting. More than 50% of the children were underweight, which is the symptom of acute malnutrition, reflects as result of cumulative effect of disease and poor diet. The children in this study live in poor socioeconomic conditions, and consume a diet lacking most of the micronutrients essential for growth and development. If height is taken as the most representative figure for overall growth and development (Waterlow 1994), about 1 in 4 children showed evidence of stunting, and this appeared to increase with age until 2 years of age then it decreased gradually up to 4 years. It may be that the increase in stunting with age is a reflection of faulty and adequate intake of supplementary food. On average the proportion of children with stunting was about 40%, less evident in younger children of 6-11 months (23%) than the children of 12-24 months (43%), again decreased for next two years (34% and 36% respectively) and went up

at 5 years (42%). This trend is similar to an estimation of a nationally representative survey (BDHS 2004).

Women in programme and control households are found to be equally suffering from malnutrition. The nutritional status of women by BMI and other anthropometric indicators is typical of many other studies in Bangladesh (Ahmed 1997, Bhuiya 1993). The mean BMI of the women was lower than the national average (BDHS 2004). A woman's height can be used to predict the risk of having difficulty in pregnancy, given the relationship between height and pelvic size. The risk of giving birth to low birth weight babies is also higher among the women with short stature. At the national level, the mean height for women is 150.5 cm, with 16% of women falling of 145 cm, which is the cut-off of point at when mothers can be considered at risk (BDHS 2004). Our sample had lower height and more percentage of women below cut-off point than the national average. To improve the situation, there is an urgent need to undertake targeted nutritional intervention within MNCH programme.

NUTRITIONAL KNOWLEDGE

Knowledge on micronutrients among the target and control households was precarious. The cause of goiter, night blindness and anaemia were not known by many mothers. A large proportion of mothers could not tell the consequences of iodine deficiency. It is indeed not to be expected that illiterate poor rural women would know the cause of unknown diseases like anaemia. It is therefore, somewhat surprising that a proportion of women could tell the causes of night blindness and goiter. In fact, there has been a lot of campaign in the mass media in favour of the importance of Vitamin A and iodine in human nutrition and the disease that result from its deficiency. It is perhaps the outcome of such campaign in programme area. BRAC staffs are there to disseminate knowledge about iodine deficiency may be to increase the sell of BRAC iodized salt. Response to Vitamin A was highest comparing to two other micronutrients. This may be the reflection of long-term campaign of the government and NGOs during National Immunization Day (NID) every six month. Iron deficiency might not be considered with special attention. Pregnant women are advised to take iron tablet, though rate of supplementation during pregnancy is only 29% (BBS 2005). To reduce the prevalence of anaemia, no message or education is disseminated through government and NGOs. MNCH may propagate the knowledge on micronutrient so that people can take care of themselves.

FOOD SECURITY

Household food security provides a very useful summary measure for targeting programmes at the population level, for monitoring the household food insecurity situation in an area over time, and for evaluating the impact of interventions (Coates 2006). There is no single measure or indicator of household food security that can be universally applied in the way that anthropometry was used to assess malnutrition. Considering the dynamic nature of poverty, it is important to understand the common factors influencing the trajectory of individual households' food insecurity over time and to better understand the interactions among household food security frequency, duration, periodicity, and severity so that these elements and their household level effects can be untangled for measurement and programme purposes. The short proposed method seems appropriate for community-based monitoring of household food security among the poor. The conceptualization of household food security that emerged from this study differs between programme and control households for most of the time. Couple of themes were identified that described the experience of household food security: 1) decrease quantity and quality of food intake for short time, 2) compromised diet in terms of quality and quantity during crisis, 3) dependency to other as coping mechanism, 4) purchasing capacity, and 5) perceived and year round food insecurity. Four characteristics related with present insecurity and two reflected the overall situation. The theme emerged from our study were consistent with another study in Bangladesh with regard to quantity, quality and

management mechanism (Webb 2003). Borrowing is a prominent management strategy in Bangladesh (Frongilo 2003), which is similar to our findings. Different aspects of food security varied between programme and control households, it was not consistent for any of the group. Though extreme insecurity was reported more in programme households, year round food insecurity did not show any difference between groups. The current work is difficult to compare across the country because of the different measure used and different relativity of hunger and food insecurity.

INTRA-HOUSEHOLD FOOD DISTRIBUTION

Information on intra-household allocation was collected to determine whether there was evidence of bias by gender in distribution of food. Fathers consumed larger portion and better quality of food than other family members including mother and children in both programme and control households. Our results, however, are comparable to the findings from a study conducted in another rural area where food intake was significantly higher among fathers than mothers (EM Kramers 1997). This finding suggests high possibilities in control households than programme. May be due to less exposure of NGOs, control households followed their traditional norms and culture. The females are particularly vulnerable due to not only less preference at home, but also due to smaller amounts of intakes (Noriko 2004). In our study we collected data on the intake of household heads and adult men to compare with women. The women's intakes remained at an almost constant proportion of the men's, no improvement was observed in amount and quality. Unequal dietary intake of women causes not only their malnourished situation but also child malnutrition. Intra-household food distribution, revealed by portion sizes and consumption should be regarded as the central focus improvement of nutritional and health status of not only women but also children in male dominate societies within and beyond Bangladesh.

Intra-household food distribution data were collected through interview rather than observation. It is examined that observation of dietary intake can overcome many of the problems of recall: relapse of memory, poor motivation, unawareness of food intake, wrong message (Witschi 1990). On the other hand day-long presence of an observer could alter usual patterns (EM Kramers 1997). Therefore, the trained interviewers collected data in our study with proper motivation and rapport build-up.

Nilphamari district is yet to benefit from the nutritional programme that has been going in the country for the last few decades. It is however, to be remembered that the households studied in the present baseline survey were the target households, which were poor. This study generated information that has value as a reference and can be used to guide the policies and programmes and possibly, to detect which particular elements of the intervention are need to be improved or not. These indicate that the nutritional status of this group of children and women should not be overlooked and suitable approaches designed to improve their nutritional status should be considered. Interventions targeting maternal or infant mortality should focus not only health but also special need for nutrition. Not only exclusive food supplementation programme or education can improve much. MNCH has indeed a big scope to do a lot for them to increase their human development index in terms of education, health and nutrition. Poverty reduction takes a central position in this intervention programme.

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