

Does A Community Based Nutrition Project Work? An Evaluation of the Muktagachha Pilot Nutrition Initiative in Bangladesh

SM Ziauddin Hyder
Chowdhury S B Jalal
Rita Das Roy
AMR Chowdhury
HKM Yusuf



BRAC

Research and Evaluation Division
75 Mohakhali, Dhaka 1212
Bangladesh

Table of Contents

Acknowledgements	
Executive Summary.....	3
INTRODUCTION.....	3
The Community Based Pilot Nutrition Initiative of BRAC	4
Monitoring.....	5
Motivation	5
Nutrition education.....	7
OBJECTIVES OF THE PRESENT STUDY	8
Broad objective.....	8
RATIONALE OF THE PRESENT STUDY.....	8
METHODOLOGY	9
Study Area.....	9
Data Collection Procedure and Study Sample.....	9
Quantitative	9
Qualitative	10
Quantitative Analysis Strategy	11
Main Focus	12
Quantitative outcome indicators.....	12
Validation of Data	13
RESULTS.....	16
Quantitative.....	16
Birth weight recording trend	17
Changes in prevalence of low birth weight	18
Supplementation	19
Nutritional status of children	21
Qualitative	24
Nutritional Knowledge	24
Changes in food behaviour.....	26
Food Preparation	26
Food Purchasing and Consumption.....	26
Changes in food purchased and consumed.....	27
Child feeding practices	29
Child care.....	31
Division of household tasks.....	32
Male Perception of Growth Monitoring and ANCC	33
Community Perception of the Role of SK.....	33
Village Level Change	34
Supplementation Withdrawal in Gabtoli	35
SK's Perceptions on the Programme.....	36
DISCUSSION.....	38
Quantitative	38
Qualitative	40
CONCLUSION	42
RECOMMENDATIONS	43
REFERENCES	44

EXECUTIVE SUMMARY

A study was undertaken to evaluate the impact of the multidisciplinary Muktagacha pilot nutrition project on the nutritional status of under-2 children, adolescent girls and pregnant and lactating mothers in three areas covered by the project – Paratongi, Gabtoli and Chechua. Both quantitative and qualitative methods were used in the study. Quantitative data included information on nutritional status of the target population. Data were taken only for January and July of the years from 1994 to 2000. Qualitative data, collected mainly through focal group discussions (FGD), included information on health and nutrition status of the target population and perception at household, village and community levels about the nutrition project. Results showed that the project made partial success in achieving the target objectives.

INTRODUCTION

Malnutrition continues to be a major public health problem in Bangladesh. Children under two years of age and pregnant and lactating women are particularly affected. The nutrition situation revealed by the first nutrition survey conducted in the country in 1962-64 (DU/USDESW 1966) has not changed much ever since. According to recent statistics, 55% of the under-two children are stunted (21% severely stunted) and 17% are wasted (HKI/IPHN 19.....). About 50% of adult women are underweight (10% severely underweight) and about half of the children are born with low birth weight (<2.5kg) (ACC/SCN 2000). Micronutrient malnutrition is also high- 50% of pregnant and 45% of non-pregnant women are anaemic, 3% of pregnant women are nightblind (HKI/IPHN year) and about two-thirds of the total population are iodine deficient (Yusuf et al. 1994; INFS/UNICEF 2001). Poverty forms a vicious circle with malnutrition and therefore poverty is often cited as the main cause of malnutrition (ACC/SCN 1997). However, there are also many other factors, which contribute to malnutrition. These include imbalanced food intake, sanitary and health status, and erroneous health and food beliefs. These can all lead to inadequate and inappropriate feeding practices. Programmes across the world have attempted to address these causes of malnutrition. Many of these studies have focussed on a combination of nutrition education and food supplementation. The multidisciplinary community based nutrition project of BRAC in Muktagachha is one of these endeavours, the main essence of which are described in this report.

The Community Based Pilot Nutrition Initiative of BRAC

In 1993 the Women's Health and Development Programme (WHDP) of BRAC launched a Multidisciplinary Community Based Pilot Nutrition Initiative in Bangladesh. The initiative was undertaken to assess the feasibility of such a multidisciplinary project in the Bangladesh context. The project was implemented in three areas (Paratongi, Chechua and Gabtoli) of Muktagachha Upazilla of Mymensingh district. The project area covered 158 villages with a total estimated population of 156,542 in 1992. This included 5,328 under-two children. A *Shasthyo Kormi*¹ (SK) was appointed in each village to cover about 150-200 households (about 1000 population). The role of the SK was to visit every household within the village at least once a month and monitor the health and nutritional needs of the household members. She was also responsible for documenting all vital statistics of the household, (e.g. marriages, pregnancies, births and deaths, and migrations). She also disseminated health and nutrition education and held monthly meetings, which were designed to reach at least one woman per household (often including mother-in-laws).

The targeted population groups of the project were women (pregnant and/or lactating), children under 2 and adolescent girls, who are known to be most vulnerable to malnutrition. The project activities included regular monitoring of the nutritional status of the three target groups, provide nutrition education, and to rehabilitate the malnourished and nutritionally vulnerables through short-term food supplementation. Therefore, monitoring, motivation and supplementation were the three main working instruments of the project.

Pregnant women in the community were identified by the SK and registered at the antenatal care centres (ANCC) by the third month of the pregnancy. They were weighed regularly to ensure the desirable weight increase. They remained in the programme for up to six months post-partum and received education on lactation, breastfeeding, weaning and caring practices. All pregnant women received iron-folate

¹ A *Shasthyo Karmi* is a female community health worker who receives an honourarium of Tk. 500 for her time and labour. She must be married with a child more than 2 years of age, commonly accepted by the community, preferably with some high school-level education and willing to work hard.

supplementation (60 x 2 mg Fe daily) from the date of registration continuing till 6 months post-partum.

Monitoring

Growth-monitoring centres were established in the villages of all three project areas, each centre covering around 20-25 under-two children every month. All mothers were encouraged to bring their under-two children to the Centre for weighing once a month. Through regular weighing, mothers were made aware whether or not their children were gaining enough weight². Nutrition education was imparted to them and they were advised on how it was possible to improve the nutrition of the faltering children. Short-term food supplementation was another activity carried out to promote nutritional status of the targeted population.

The targeting criteria were:

- i) Women with BMI of less than 18.5 from second trimester through six months post-partum.
- ii) All adolescent girls enrolled in BRAC non-formal primary schools in the three programme areas.
- iii) (a) children who did not show a gain of 500 gm (if aged from 6 to 12 months) or 300 gm (if between 1 and 2 years of age) in three successive monthly weighings;
(b) children with severe malnutrition, i.e., weight-for-age < 60% NCHS median;
(c) children born with birth weight less than 2.5 kg.

All malnourished children were expected to receive food supplementation for a total period of 90 days. However, after 90 days of food supplementation, if children were still faltering then feeding was extended for a further period of 30 days. If after the 120 day period they still did not attain the required weight for graduation, then they were referred to secondary or tertiary health centres. But, severe malnutrition cases were referred immediately.

Motivation

² Criteria of not gaining weight were : for children aged 6-12 months gain in weight < 500 gm and for children aged 1-2 years gain in weight < 300 gm, in three successive monthly weighings.

Some previous studies have shown that targeting pregnant women for nutritional programmes may not have an impact on the outcome of the immediate pregnancy, instead it helps to reduce nutrient depletion and improve the mother's nutrient store for the succeeding pregnancies (Kramer 1987). Targeting adolescent girls for nutrition programmes was thus identified as a possible important intervention to improve maternal as well as child health.

All girls enrolled at the BRAC *Kishor-Kishori* (Adolescent) Schools in the project areas received food supplementation before their mid-day meal. The food consisted of a snack of puffed rice, molasses and peanuts total (640 kcal of energy per day, see later for detail composition). They consumed the snack in school under the supervision of the SKs and their teachers.

For these girls, a book titled "*Amader Shasthyo*" was prepared, including an expanded health and nutrition component. Table 1 provides an outline of the main chapters of the book.

Table 1. The curriculum of '*Amader Shasthyo*'

Main chapters	Issues
Child growth and development	Physical, mental and biological development
Food	Food groups and nutrient content
Hygiene	Latrine and environmental hygiene
Diseases	Diarrhoea management, hook-worm, goitre, nightblindness, anaemia, malnutrition
Ante and post natal care	Food requirements, personal hygiene, tetanus toxoid (TT), childbirth
Child care	Colostrum, child growth, complementary feeding, vaccination
Primary health care	First aid about fracture, drowning, snake and dog bites, fever
Family care	Household work, marriage, equal food distribution, equal education, health care facility
Adolescent information	Biological and mental change, nutrition, hygiene

Source: Das Roy et al. 1999

All *Kishor-Kishori* school students were taught from the book when they reached grade three. Chapters from the book were taught once every week. The entire book covered a total of 45 hours of schooling time, which was spreaded over 272 school days a year.

In addition to classroom activities, the girls conducted extra-curricula activities. Being associated with the mothers, each of them was made responsible to ensure that at least two under-two children receive vaccinations, and attend growth-monitoring and, if needed, feeding sessions. They were also trained on proper feeding practices at home. These activities were aimed to teach the girls the importance of childcare and child health as future mothers as well as to motivate them to become community mobilisers for improvement of health and nutrition of the community.

Nutrition education

The Muktagachha Pilot Nutrition Initiative was designed to include an extensive nutrition education component to raise community awareness of health, appropriate child feeding practices and intra-household food distribution. Food supplementation was included in the project design as a temporary measure to enforce nutrition education messages, and to give it a practical grounding through an example of food purchasing, preparation and consumption. It was believed that supplementation would help to enforce nutrition education messages within the community and produce long-term behavioural and attitudinal changes. Nutrition education was to eventually enable the community to identify and correct their own health and nutritional problems.

Change in project strategy

In 1999 the project adapted its strategy in the three pilot areas (Chechua, Paratongi and Gabtoli). In Chechua, the intervention remained unchanged with ante-natal care, growth monitoring, nutrition education and food supplementation given to all malnourished pregnant and lactating women and under-two children. In Paratongi, food supplementation was given only to moderately and severely malnourished children and adolescent mothers up to 18 years of age. In Gabtoli, only growth monitoring, nutrition education and antenatal care services were provided, with no

food supplementation. Activities of the SK were not changed in any of the areas, except for those directly related to the food supplementation.

The three different intervention approaches have been implemented to test which design would most effectively produce long-term changes in attitude and behaviour aimed at improving nutritional status. The present study explores to see how effective the three different approaches have been in reaching their objectives at both the household and community levels. Based on the findings, it will put forward recommendations on the most effective way(s) of improving nutritional status of the community in general and the poor women and children in particular.

OBJECTIVES OF THE PRESENT STUDY

Broad objective

The broad objective of the present study was to evaluate the impact of the Muktagachha Pilot Nutrition Initiative in improving the nutritional status of under-two children, adolescent girls and pregnant and lactating mothers.

Specific objectives

The specific objectives were:

- To evaluate the impact of the project in reducing the prevalence of low birth weight (LBW).
- To evaluate the impact of the project on nutritional status of under-two children
- To evaluate the impact of the project on changes in nutrition related knowledge and practices.
- To compare the efficacy of different approaches of the programme on child nutritional status.
- To identify changes in community nutrition attitudes towards pregnant and lactating women and under-two children.
- To identify changes in attitude and behaviour of food managers within the household towards mothers, children and adolescents.
- To evaluate changes related to extra food need, food preparation, purchase and consumption.
- To assess the perception of the community on withdrawal of the food supplementation, when the project would cease to operate.

RATIONALE OF THE PRESENT STUDY

Since the initiation of the Muktagachha Pilot Nutrition Initiative in 1993, various studies were conducted to assess its progress and impact. These include an analysis into the cost and composition of supplemented food (as well as dynamics issues

related to its preparation, distribution and consumption), nutrition education given to adolescent girls in the BRAC schools, growth patterns of adolescent girls, a broad study looking at lessons learned from the Pilot Project and community perception on the pilot project initiative (Khatun and Hyder 1996a, b; Chowdhury et al., 1999; Das Roy 2001). The present study fills in some of the crucial gaps identified after these previous researches - the actual nutritional status of children in the pilot project, whether long-term nutritional behaviour change can be detected at the community level, and in the perception of the project from the point of view of the SKs. It is expected that this research will complete a series of integrated and concise studies carried out on the Muktagachha Pilot Nutrition Project in answering the question: Does a community based multidisciplinary nutrition project really work in the Bangladesh context?

METHODOLOGY

Both quantitative and qualitative methods were used in this research study.

Study Area

Data for the quantitative research were taken from 32 units³ : 10 from Paratongi and 11 each from Gabtoli and Chechua villages of Muktagachha *Upazila*. The qualitative research was conducted in three villages: Khilgathi near Paratongi, Paru Lota near Gabtoli, and Kuripara near Chechua.

Data Collection Procedure and Study Sample

Quantitative

The quantitative component of the research included collecting information from nutrition registers of all 158 units between 1993 and 2001. These registers contain all information collected by the SKs. In the area offices, data were transferred to a pre-constructed format, used for this study. At first, data were collected on total number of children residing in each unit and number of children attending growth-monitoring sessions, in order to see the trend of programme participation in each year. This also gave chance to compare between the three areas in terms of percent of children

³ Unit: A sampling unit was a Community Nutrition Centre (CNC).

reporting for growth monitoring. This will be termed as 'first data set' so forth, for convenient reference.

To specifically look at the nutritional status of U-2 children, all programme registers with complete information on each year were selected for the study and brought to BRAC Head Office. Year 1993 and 2001 were excluded for not being complete in information. Out of the total 32 units, 10 from Paratongi, 11 from Grabtoli and 11 from Chechua, were randomly selected as primary sampling units. Only data of January and July in the years between 1994 and 2000 from each unit and nutrition register were entered into the computer. The reasons for taking data for these two months only were two-fold : (1) due to time constraints; (2) to account for seasonal differences: January being the end of the harvesting period and July being the lean period. Under-two children, who were in the programme during these periods, were the study sample. This made a sample size of 13,544; 50.9% of them were female. Average number of boys and girls were 316 and 328 respectively. This data set will be termed as 'second data set'.

Data was first copied to a format by 4 graduates and then entered into the computer. A skilled Research Assistant supervised these activities.

Qualitative

The qualitative study looked at community perceptions at both the household and village levels and the study population comprised of both male and female residents of the selected villages. Three focus group discussions (FGD) were conducted separately in each village: one with mothers, one with fathers and one with mothers from BRAC's *Kishor-Kishori* School. A total of nine FGDs were conducted in the study. The selection criteria for the qualitative study were:

- ⇒ Mothers/fathers whose children received/were receiving supplementation
- ⇒ Mothers/fathers who had an under-two child before the nutrition programme began in the village and who presently also had one
- ⇒ Mothers who studied at BRAC's *Kishor-Kishori* School

Each FGD included around six to eight people. One FGD was held with mothers who had studied at least up to class III of BRAC's *Kishor-Kishori* School. Another FGD

was held with mothers who had not attended BRAC schools (although having studied at other schools did not disqualify them). The third FGD was carried out with fathers. As the adolescents, under-two children and pregnant and lactating women have been the main focus of the Project, they were included in the FGDs. Although fathers or men were not a focus in the project, it was important to gather their perceptions to assess whether the project has had an impact at the household and community levels. Fathers were found to be important decision makers in the household, thus their perspective was necessary to understand the household nutritional behaviour. In addition, men are often the representatives of households in external relations and thus influence the community outlook. To fully understand whether the project has had an impact at the community level it is important to also include the perceptions of those outside the project.

The *Shasthyo Kormis (SK)* were interviewed to understand their level of knowledge on the overall objectives of the Pilot Project. The study aimed at understanding their possible role during and after phasing out of the project. In Gabtoli, where supplementation has been stopped completely, the SK was asked in detail about her present role within the project.

FGDs were also carried out in order to understand villagers' behaviour and attitude. FGDs were decided over individual interviews as they took less time and could include a greater number of participants. FGDs were also useful in cross-checking information within the group.

Each FGD lasted for around 90 minutes. Questions were asked by one person and responses were noted by another. The proceedings of the FGDs were recorded using a tape recorder. In addition, at the end of each day the notes were checked to ensure that all the information had been recorded accurately and there were no gaps which needed to be filled. If gaps were found the investigators returned to the village and informally questioned a key informant (e.g., a participant who had been very communicative, or the SK) to help fill it. After carrying out the 9 FGDs similar results were noticed, indicating fair replicability of FGD procedures.

Quantitative Analysis Strategy

The programme followed each child up to the age of two. This caused data on many of the children to be repeated two or more times. But for each month they were considered as individual cases.

Except supplementation, all other activities were running in full swing from the beginning of 1994. Therefore, most of the data collected in 1994 revealed the baseline nutritional status in the three areas. The programme changed its input strategy in 1999. This provided the opportunity to compare changes in nutritional status from the baseline level in 1994 to 1999, as well as comparing 1994 data with that of 2000. Effects of the different approaches of the programme were also analysed and nutritional status of 1999 was compared with that of 2000. However, during analysis of birth weight data, the year 1994 was excluded, as there were only a few cases available.

Analysis was done using SPSSwin 7.5 software.

Main Focus

Quantitative outcome indicators

Prevalence of severe malnutrition, i.e., weight-for-age ($-2z$ score) $<60\%$ of NCHS median reference, was the main focus. Apart from this, area-wise percentage of children with low birth weight (below 2.5 kg within 72 hrs of birth) and severely malnourished children who were not given food supplementation were highlighted.

The quantitative research used variables such as the date of birth, age, sex, birth weight, monthly weight, and supplementation status.

Qualitative issues

In the qualitative research, questions focussed on knowledge of the Nutrition Programme, food behaviour (specifically towards under-two children and pregnant and lactating women), household food distribution and management, perceptions of benefits of the Nutrition Programme and village level change.

Validation of Data

Quantitative

In order to express the main outcome indicator, it was important to validate the data collected on weight and age. But there were limitations as data used in this study were collected well before.

Weight: To validate weight, options left were to review the procedure of weight taken by the SKs, type, standardisation and calibration of scales used and training/refreshers training given. Unfortunately no clear-cut information was available.

Age : The Shasthyo Kormi's role included following up of mothers from the time of identification of pregnancy to 6 months after delivery. At the time of delivery or within 72 hours of delivery, they recorded the date of birth of the baby as well as other data. This means that there was less chance of recall biases in data collection. But age recorded in the initial two years were mostly based upon the information given by the parents.

Limitations of the Study:

Quantitative

There has not been much documentation on the minor changes in the programme, which might have had some impact on children's nutritional levels. Moreover, no longitudinal follow up research was conducted simultaneously with periodical data collection within the programme. Data collected by SKs were the only source available in this study for entry and analysis. For obvious reasons, analysis was done ignoring confounding factors such as quality of introductory training and refresher's training, individual skill variations, measurement and instrumental error.

Qualitative

In order to complete the field research within the time frame given, we decided that it would be more efficient for us to visit each of the area offices in advance of data collection. We approached Programme Organisers (POs) in each area and asked them to visit a village, which met all our criteria, and gather an idea of which villagers we could include in our FGDs. However, on arriving at the selected village in Gabtoli we found that the SK and the villagers had been too eagerly briefed on the purpose of our study. We found it difficult to encourage an open and frank discussion where responses were spontaneous. We realised that many of the villagers quoted, what

sounded like word for word, of what they have been taught on the programme by the SK. Only on deeper questioning we received a more genuine response.

Nutritional Composition of the Supplementary Foods

There was little difference in the average nutrient content of supplementary food in Chechua, Paratongi and Gabtoli. Table 2 below presents the average nutrient content.

Table 2. Nutrients provided to the mothers and children through the supplementary food.

Amount per package	Energy (calorie)	Protein (gm)	Fat (gm)	Iron (mg)	Calcium (mg)	Zinc (mg)	Fibre (gm)	CHO (gm)	Moisture (gm)	Ash (gm)	Copper (mg)
Mothers: Moa: 175gm	752	16.4	22.0	12.4	79.0	5.2	1.1	122.1	9.7	3.7	0.7
Children U2: 1 teaspoon Powder: 45gm Oil: 5gm	167 45	3.63	0.9 5.0	9.0	44.1	2.50	0.29	36.12	2.9	1.09	0.30
Total	212	3.63	5.9	9.0	44.1	2.50	0.29	36.12	2.9	1.09	0.30

Source: Khatun and Hyder 1996b

It can be seen that on average the programme provided each mother with 752 kcal energy, 16.4 gm protein and 12.4 mg iron, 79.0 mg calcium, and 5.2 mg zinc per day. Therefore, the additional daily supply of energy, protein and iron was about 33%, 31% and 42% of the daily requirements for pregnant women and 29%, 23% and 44% for lactating mothers respectively. From the same table it can be seen that each child was provided with 212 kcal energy, 3.6 gm protein, 9.0 mg iron, 44.1 mg calcium and 2.5 mg zinc per day. Thus the supply of energy, protein and iron to each child was around 15%, 11% and 85% of the daily requirements.

The supplementary food for children consisted of a packet of roasted and powdered rice and pulse with molasses and vegetable oil. This is prepared by the Graam Committee members (GC)⁴ under the supervision of the SK. The packet was supplied to the mother at the feeding centre, where she mixed the contents together with oil and water, and fed the child in the presence of the SK. Severely malnourished children

⁴ The Graam Committee is made up of 9-11 women members from BRAC's Village Organisation. Their time input is voluntary.

received two such packets. Table 3 provides details of the food composition given to the under-two children.

Table 3: Nutritional composition of supplementary food given to under-two children

Food Ingredient	Amount (g)	Energy (kcal)	Protein (g)	Calcium (mg)	Iron (mg)
Rice	25	87	1.75	3.75	1.5
Pulse	10	34	2.50	1.5	0.6
Molasses	10	39	-	1.0	-
Oil	5 (ml)	40	-	-	-
Total	45	200	4.25	6.25	2.1

Source: Chowdhury et al. 1999:22

GC members also prepared the supplementary food for malnourished pregnant and lactating mothers. Four *moas* (balls of flat rice, molasses and peanuts rolled together) were given to mothers every morning. The GC member who delivered the food ensured that the mother ate at least two *moas* in her presence. Table 4 gives the details of the food composition given to malnourished pregnant and lactating women.

Table 4: Nutritional composition of supplementary food given to pregnant and lactating women

Food ingredient	Amount (g)	Energy (kcal)	Protein (g)	Calcium (mg)	Iron (mg)
Flat rice	50	162	3.75	3	3
Molasses	100	394	-	10	-
Peanuts	50	280	12.00	3	1
Total	200	836	15.75	16	4

Source: Chowdhury et al. 1999:21

Table 6 provides details of the food composition given to adolescent girls. The supplementary food provided 640 kcal of energy a day.

Table 5: Nutritional composition of supplementary food given to adolescent girls

Food ingredient	Amount (g)	Energy (kcal)	Protein (g)	Calcium (mg)	Iron (mg)
Flat rice	50	163	3.75	3	3
Molasses	50	197	-	5	-
Peanuts	50	280	12.00	3	1
Total	150	640	15.75	11	4

Source: Chowdhury et al. 1999:21

RESULTS

Quantitative

Distribution of children by age, sex and area

As mentioned before, there were 13544 children under 2 years of age from 32 units of the three areas. Among them 50.9% (6897) were girls. Area wise distributions of boys and girls are shown in Table 6. In total, there were 3601 children in Paratongi, 5197 in Gabtoli and 4746 in Chechua.

Table 6: Distribution of boys and girls in the three project areas

	Project Area			Total
	Paratungi	Gabtoli	Chechua	
Male	47.4 % (n=1708)	49.1 % (n=2550)	50.3 % (n=2389)	49.1 % (n=6647)
Female	52.6 % (n=1893)	50.9 % (n=2647)	49.7 % (n=2357)	50.9 % (n=6897)
Total	3601	5197	4746	13544

When grouped by 6 months, U2 children were distributed as shown in Table 7. All the groups had almost equal percentage of children.

Table 7: Distribution of different clusters of children by age in three project areas.

	Area			Total
	Paratongi	Gabtoli	Chechua	
0-6 months	22.9 % (n=823)	23.3 % (n=1209)	23.2 % (n=1102)	23.1 % (n=3134)
>6- 12 months	27.7 % (n=996)	28.5 % (n=1483)	28.2 % (n=1339)	28.2 % (n=3818)
>12- 18 months	27.1 % (n=976)	25.9 % (n=1346)	26.4 % (n=1251)	26.4 % (n=3573)
>18-24 months	22.4 % (n=806)	22.3 % (n=1159)	22.2 % (n=1054)	22.3 % (n=3019)
Total	100 % (n=3601)	100 % (n=5197)	100 % (n=4746)	100 % (n=13544)

Birth weight recording trend

Starting from 1994, a total of 8319 birth weights out of 13544 cases were recorded in three areas till year 2000. Table 8 shows number of birth weight collected in each area during different years. At the beginning of the programme less than five-percent birth weight were recorded. From 1995 all three areas showed rapid increase in number of birth weight data collection. This increasing trend continued till 1997 and reached to a level of more than 73 percent for all the areas. No significant change was observed since then onward till year 2000. Thus, more than 20 percent cases have always been left unrecorded even after the programme completed its seven years of activity in 2000 (Figure 1).

Table 8: Birth weight recording in the three areas from 1994 to 2000 (in percentage)

	Paratongi	Gabtoli	Chechua	Total
1994	3.5	2.4	1.9	2.5
1995	52	40.5	38.9	43.1
1996	74.1	68.7	71.9	71.3
1997	73.8	73.8	78.4	75.4
1998	78.3	77.8	78.2	78.1
1999	76.1	81.9	79.5	79.6
2000	75.2	80.3	79.7	79.2

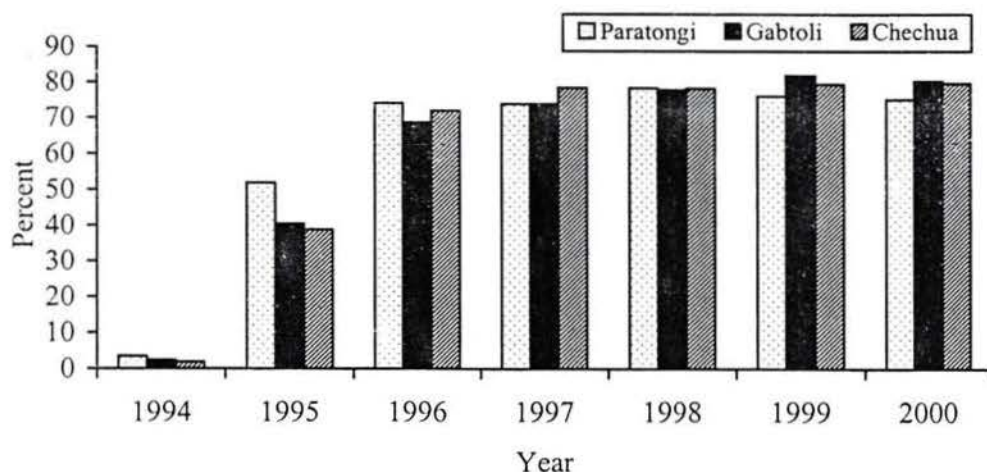


Fig 1: Changes in birth weight record over time in three areas of Muktagachha

Changes in prevalence of low birth weight

Data on birth weight shows that the prevalence of low birth weight (below 2.5 kg within 72 hours of birth) was quite high in Gabtoli (38.6%) and Chechua (24.5%) at the beginning of the project (1995). The prevalences in these two areas then consistently decreased and the prevalences were only 18.8% and 12.9% respectively (Table 9 and Figure 2). On the other hand, percent LBW in Paratongi was low at the beginning (16.2%), but, for reasons not known now, the prevalence rather showed an increasing trend to reach a value of 24.0% in 2000 (Table 9, Figure 2).

Table 9: Area wise percentage of low birth weight children, between 1995 and 2000.

Year	Area			Total (%)
	Paratongi (%)	Gabtoli (%)	Chechua (%)	
1995	16.2 (n=36)	38.6 (n=102)	24.5 (n=50)	27.2 (n=188)
1996	13.7 (n=55)	30.9 (n=157)	19.7 (n=83)	22.1 (n=295)
1997	13.9 (n=55)	26.0 (n=143)	13.4 (n=68)	18.3 (n=266)
1998	16.8 (n=84)	19.7 (n=140)	16.6 (n=93)	17.9 (n=317)
1999	18.3 (n=79)	17.4 (n=134)	12.4 (n=76)	15.9 (n=289)
2000	24.0 (n=44)	18.8 (n=68)	12.9 (n=89)	16.3 (n=201)

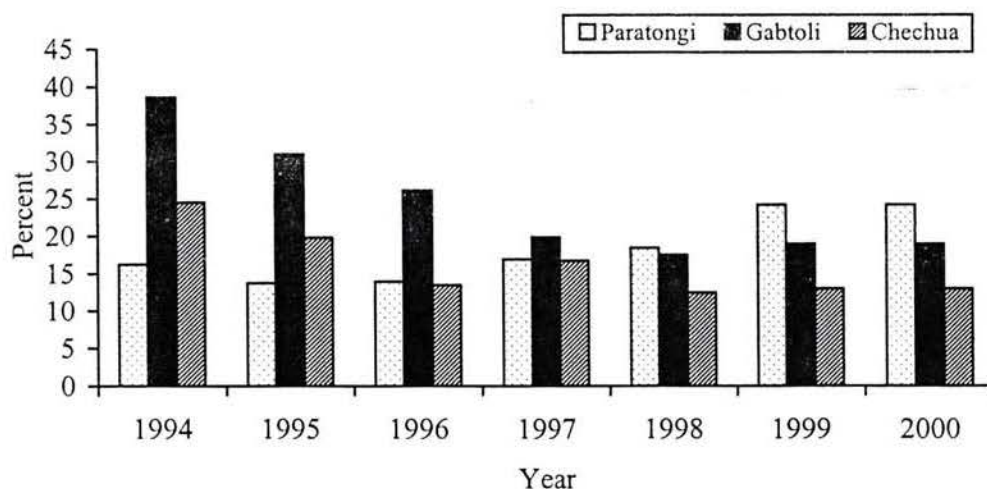


Figure 2: Area wise percentage of low birth weight children

The increase in LBW in Paratongi was significant ($p=0.03$). Also the decreases in Gabtoli and Chechua were significant ($p=0.00$) from 1995 to 2000 (Table 10). However, none of the areas showed any significant difference between 1999 and 2000 (Table 10).

Table 10: Difference between years within areas.

	Area		
	Paratongi (<i>P value</i>)	Gabtoli (<i>P value</i>)	Chechua (<i>P value</i>)
Difference between 1995 & 1999	0.38	0.00	0.00
Difference between 1999 & 2000	0.11	0.77	0.54
Difference between 1995 & 2000	0.03	0.00	0.00

Supplementation

Supplementation data was used mainly to assess SK's ability to identify undernourished children. According to the programme, all children with low birth weight would receive supplementation at any period starting from the beginning of their 6th month to the end of 12th month. Data on children who were within that range of age and were born with low birth weight were selected for this particular analysis.

Table 11 shows the percentage of children who were born with low birth weight in different years but not supplemented after 6th month. All three areas showed an increasing trend in not supplementing the children. More than 66 percent children in Paratongi and 77 percent in Gabtoli were not given any supplementation in 1995, although they were eligible to have so. By year 1999, 93.7 percent of such children in Paratongi and 99.3 percent in Gabtoli were not given supplementation. Chechua started with 86 percent in 1995 and ended up with 92.1 percent in 1999. Since supplementation was withdrawn from Gabtoli in 1999, no child was included in 2000. But both the other two areas showed further downward trend from 1999 to 2000 (Table 11).

Table 11: Percentage of low birth weight children who were not supplemented during 6-12 months of age.

Year	Area		
	Paratongi (%)	Gabtoli (%)	Chechua (%)
1995	66.7 (<i>n</i> =24)	77.5 (<i>n</i> =79)	86.0 (<i>n</i> =43)
1996	80.0 (<i>n</i> =44)	82.8 (<i>n</i> =130)	91.6 (<i>n</i> =76)
1997	80.0 (<i>n</i> =44)	90.2 (<i>n</i> =129)	86.8 (<i>n</i> =59)
1998	77.4 (<i>n</i> =65)	92.1 (<i>n</i> =129)	93.5 (<i>n</i> =87)
1999	93.7 (<i>n</i> =74)	99.3 (<i>n</i> =133)	92.1 (<i>n</i> =70)
2000	95.5 (<i>n</i> =42)	100 (<i>n</i> =68)	96.6 (<i>n</i> =86)

In order to see if children were not supplemented because they had better nutrition during their 6th to 12th month, the number of children who were born with LBW but were not given any supplementation, even though they were moderate to severely malnourished, was found out and shown in Table 12. Data show that the SKs in Chechua had always kept more than 90 percent of the eligible children out of supplementation. Although only 55 percent of such cases were observed in Paratongi in 1995, by the year 2000 majority (93.5 percent) of the eligible children were not able to get any supplementation. Gabtoli also showed similar trend in supplementing children with low birth weight.

Table 12: Percentage of children with low birth weight and weight for age below -2 z score but not supplemented

Year	Area		
	Paratongi (%)	Gabtoli (%)	Chechua (%)
1995	55 (<i>n</i> =11)	76.9 (<i>n</i> =40)	90.9 (<i>n</i> =20)
1996	85.7 (<i>n</i> =36)	86.2 (<i>n</i> =100)	98.0 (<i>n</i> =48)
1997	83.8 (<i>n</i> =31)	88.2 (<i>n</i> =90)	90.2 (<i>n</i> =37)
1998	79.1 (<i>n</i> =53)	89.7 (<i>n</i> =87)	95.4 (<i>n</i> =62)
1999	92.3 (<i>n</i> =48)	100 (<i>n</i> =87)	90.2 (<i>n</i> =46)
2000	93.5 (<i>n</i> =29)	100 (<i>n</i> =37)	94.7 (<i>n</i> =54)

Nutritional status of children

Table 13 show 5 the percentage of mild to moderately malnourished children in the three areas who were not supplemented. It can be seen that in Chechua and Gabtoli, the percentage of such children significantly decreased, from 51.4% and 55.1% in 1994 respectively to 43.1% and 30% in 2000. In Paratongi, there was no significant change in the prevalence. Supplementation seemed to have no discernible effect on the nutritional status of the mild to moderately malnourished children, for in Chechua and Gabtoli, the percentage of such children decreased but the decreases were similar to those seen for the non-supplemented children in these two areas (Table 13, 14). Moreover, the percentage of such children in Paratongi rather increased significantly from 61.8% in 1994 to 90.5% in 2002. The reason for this negative effect of supplementation in Paratongi needs to be investigated.

Table 13: Percentage of mild to moderately malnourished children in the three areas who were not supplemented

Year	Area			
	Paratongi (%)	Gabtoli (%)	Chechua (%)	Total (%)
1994	47.7	55.1	51.4	51.6
1995	44.2	43.4	39.1	42.1
1996	53.6	48.7	40.8	47.4
1997	50.1	46.2	42.3	46
1998	41.8	41.5	47	43.3
1999	41.9	34.8	44.7	39.8
2000	43.4	30	43.1	39.2
P	0.12	0.00	0.00	0.105

Table 14: Percentage of mild to moderately malnourished children in the three areas who were supplemented

Year	Area			
	Paratongi (%)	Gabtoli (%)	Chechua (%)	Total (%)
1994	61.8	67.4	57.6	63.1
1995	51.6	56.6	62.6	57
1996	63.5	49.7	46.2	54.6
1997	62.3	45.9	44.3	51.9
1998	62.3	64.8	47.8	59.9
1999	63.2	40.8	50	58.4
2000	78.5	27.3	44.8	52.5
P	0.00	0.00	0.00	0.00

Similar to the mild-to-moderately malnourished children, no consistent effect of supplementation was seen in the three areas on the nutritional status of severely malnourished children. For example, Table 15 shows that there were significant decreases in the prevalence of severely malnourished children who were not supplemented in Paratongi and Gabtoli, but not in Chechua, whereas, Paratongi showed no significant change in such children who were supplemented (Table 15, 16).

Table 15: Percentage of severely malnourished children who were not supplemented in the three areas.

Year	Area			
	Paratongi (%)	Gabtoli (%)	Chechua (%)	Total (%)
1994	7.1	6.7	3.8	5.6
1995	9.2	7.6	5.6	7.3
1996	10.6	6.1	5.3	7.1
1997	4.6	5.1	4.2	4.7
1998	5.3	3.5	5.7	4.7
1999	4.7	3.6	4.3	4.1
2000	2.7	3.2	4.4	3.8
P	0.00	0.00	0.76	0.00

Table 16: Percentage of severely malnourished children in the three areas who were supplemented

Year	Area			
	Paratongi (%)	Gabtoli (%)	Chechua (%)	Total (%)
1994	7.9	12.9	7.1	9.9
1995	7.5	3.7	8.1	6.1
1996	7.3	4.4	5.8	5.7
1997	5.7	7.2	0	4.8
1998	4.3	6.8	4.3	5.1
1999	3.3	0	8.1	6.5
2000	4.8	0	0	1
P	0.88	0.01	0.05	0.03

Comparison of weight-for-age within areas

In Paratongi, nutritional anthropometry (weight-for-age) did not show any major difference ($p=0.81$) between that of 1994 and 1999, and the same was noticed between 1999 and 2000 ($p=0.72$). It also did not show any significant change in weight-for-age between year 1994 and 2000 ($p=0.28$) (Table 17).

In Gabtoli, there were gradual positive changes from year 1994 onward in the nutritional status. Mean weight-for-age Z scores were -2.35, -1.86 and -1.73 in year 1994, 1999 and 2000 respectively. The differences between all these years were significant, having p values of 0.00, 0.03 and 0.00 in 1994 to 1999, 1999 to 2000 and 1994 to 2000 respectively (Table 17).

Chechua also showed significant positive change in nutrition of under 2 children between 1994 and 1999 ($p=0.00$). Mean weight-for-age Z score increased from -2.28, in 1994 to -2.04 in 1999 and -2.02 in year 2000. Although there was no significant change from 1999 to 2000 ($p=0.60$), the overall increase in mean weight-for-age was significant enough (0.00) (Table 17).

Table 17: Difference between years within areas.

	Area		
	Paratongi (P value)	Gabtoli (P value)	Chechua (P value)
Difference between 1994 & 1999	0.81	0.00	0.00
Difference between 1994 & 2000	0.28	0.00	0.00
Difference between 1999 & 2000	0.72	0.03	0.60

Qualitative

Total population of the focus group discussions (FGDs) was 53 (mother 17, father 19, adolescents 17), with a mean age 27.75 years (Table 18). Fifty percent of the mothers and fathers were illiterate. Mothers and adolescents were mostly involved with household activities. Nearly half of the study group fathers were involved in the non-agriculture profession, e.g. small business, wage employment. The mean number of children in the FGDs for mothers and fathers were over 2.5. However, in adolescent groups it was 1.12.

Table 18: Profile of the study population for focus group discussions (FGD).

Indicators	Mothers (n=17)	Fathers (n=19)	Adolescents (n=17)	All (n= 53)
Age range	18-43	25-50	18-22	18-50
Mean age	25.65	36.47	20.12	27.75
Illiterate	10	8	0	18
Literate	7	11	17	35
Occupation				
Housewife	16	0	13	29
Agricultural worker	1	8	4	13
Non-agricultural worker	0	11	0	11
No. of children (mean)	2.66	2.53	1.12	2.12
Age of older children (mean)	8.00	7.84	3.43	6.66
Age of younger children (mean)	2.00	5.63	2.50	3.52
Marriage years (mean)	12.00	13.68	5.47	10.51

Nutritional Knowledge

The study, first of all, aimed at establishing whether adequate nutrition knowledge existed in the village to lead to behavioural changes. The existence of knowledge was seen as a pre-requisite for change.

It was found that good knowledge existed in all three villages regarding the nutrition programme. Mothers and fathers stated that the nutrition programme began because their children were malnourished. *Kishori* student mothers (i.e. women who had studied at BRAC's *Kishor-Kishori* school and were presently mothers of under-two children) added that households were not supplying enough food for their members and as a result the nutrition programme was initiated in their village. The programme taught villagers that pregnant and lactating women and young children needed extra food. They listed the foods which women should eat more during this period. Mothers also mentioned that they were now more aware of what foods increased breast milk production. They also expressed that complementary feeding for children should begin at six months of age. Men stated that they knew women needed extra food during pregnancy and lactation. They named foods such as eggs, milk, vegetables and meat as important during these times. In Paratongi men asserted that 90% of men in the village were aware of this. In Gabtoli men also said that after pregnancy women needed to eat even more, and that this was essential for both the child and mother's health. One father in Gabtoli said:

Children are healthier now because they weigh more
at birth, and because mothers know more.

This statement shows that the father directly linked higher birth weights and mother's knowledge with healthier children.

In all three study villages it was found that the *Kishori* student mothers were very knowledgeable about the food requirements for both adolescent boys and girls as well as for pregnant and lactating women. They highlighted that during these periods extra food was required for optimal growth and development.

The villagers stated that their knowledge on nutrition was gained from the *Shasthyo Kormi* and from *Gono Shikkha* books. The *Kishori* student mothers, in addition, attributed their knowledge source to BRAC's *Kishor-Kishori* School.

Changes in food behaviour

Food Preparation

In all three areas changes in food preparation were identified. A major change mentioned by both mothers and father was that fewer chillies were now used in their daily cooking than before the initiation of the nutrition programme. They had learned this from the SK. Kishori student mothers explained that fewer chillies were now used so that children could share their meals. In Gabtoli mothers mentioned that they also cooked with less spices now.

It was found that in all three areas vegetables were now washed before cutting (as opposed to washing after cutting as was usual in the past). Both men and women stated that they had learned this directly from the SK. Mothers also mentioned that in the past they used to boil spinach, throw away the water and fry it with little oil. However, they now fry it with more oil and do not throw away the water.

In Paratongi women reported that in the past they cooked once a day. Now they cook fresh meals three times a day. They also no longer cook fish or meat dishes on its own but always include vegetables with it.

Food Purchasing and Consumption

Purchasing Decision-making

It was found that in all three areas male members of the family purchased the majority of the food required in the household. This included fathers, grandfathers and uncles. The study aimed to discover whether mothers, even if they were not involved in the direct buying, had any influence over purchasing decisions. It was found that with regards to fresh foods, such as vegetables and fish, men often bought whatever was available in the *bazaar*. However, mothers often informed them about other foods that were needed, e.g. oil, spices, salt etc. No change was found between the present influence women had over purchasing decisions from that of the past. However,

mothers claimed that they were now more likely to request certain items as they were older and had more children.

In Paratongi one man told us that as his children were now healthier he felt more obliged to ask his wife what types of food she wanted from the *bazaar*. She would tell him what the children liked to eat and what they did not, and he would buy what she requested. Another man stated that if he did not involve his wife in purchasing decisions then there would be more quarrelling between them. In Gabtoli a few of the fathers reported that in smaller households they often knew what was needed. They thus felt no need to discuss the shopping requirements with the mothers.

Kishori student mothers talked of how the decision-making process within their household was continuously changing. One woman stated:

The longer we are married for, the more open we [husband and wife] become with each other. As we raise children together we learn to share and talk about family matters. This was not the case when we were newly married. At that time they did not listen to us much.

Men were asked if they had a limited amount of money but a long shopping list, what would they buy and what would they omit. In all three areas it was firstly mentioned that they would buy the most important things first, such as rice, fish and vegetables. They then responded that they would also try and buy everything in smaller proportions. They would return home and explain to their wives that they did not have enough money and so she would have to manage with the smaller amounts. In Chechua and Paratongi men mentioned that before going to the *bazaar* they would sit down with their wives and discuss together what was more needed in the household. *Kishori* student mothers also stated that if their husbands mentioned that they did not have enough money to cover the food purchasing expenses then they would contribute money from their own savings (this was also stated in relation to buying farming necessities such as fertilisers).

Changes in food purchased and consumed

In all three areas both women and men said that they now consumed more vegetables than in the past when BRAC first came to their village. Reasons given for this change

included that they were now encouraged by BRAC staff to grow vegetables at home and eat more. Red spinach was given as an example, in all the areas, as a food which they rarely had in the past and now ate regularly (it was not eaten previously as the colour was associated with blood).

Another interesting change found was related to the *bazaar*. Men mentioned that in the past a huge variety of vegetables were not sold, such as various spinach (marrow leaves, jute leaves, aram leaves etc.). Now the demand as well as the supply had increased. One man in Paratongi explained:

Our fathers sometimes used to eat just a handful of rice
with chillies before going out to work in the fields.
But we won't leave the house without having at least
one vegetable curry dish with rice.

During pregnancy and lactation women in all three areas stated that at meal times they made sure that they ate higher amounts of vegetable, fish, milk, eggs and fruits than before. They also had extra 'snacks' between meals. This included sweet dishes made with rice powder and lentils, fruits such as bananas, guavas and papaya, as well as *khichuri*, peanuts and pop rice. When asked who within the household had given them this extra food, they said that they themselves had taken the food. In Paratongi, some of the women also said that their husbands had bought and given them this extra food.

Kishori student mothers added that extra food was consumed more by women who belonged to wealthier households, particularly if their husbands worked in the city or farmed their own land. In general they mentioned that other households sometimes just increased the amount of food cooked so that pregnant and lactating women could eat more during meal times. Mothers in Chechua also stated that during lactation they ate even more than during their pregnancy. They explained that this was because they felt hungrier due to the milk that their body was producing. In Paratongi mothers mentioned that eating marrow, milk and lentils increased their breast milk production, and that potato mash reduced it. In Gabtoli they explained that if they ate more then they would produce more breastmilk.

Mothers stated that in the past they ate less food at meal times because the household did not understand the importance of extra food needed during this period. In addition certain food taboos were strongly followed. Villagers in Gabtoli reported that in the past pregnant women were not allowed to eat *mriegal* fish or any fish caught on fishing rods. In Paratongi women reported that they were told not to eat eggs as it was believed that this would result in white babies. They were also prohibited from eating bitter-gout and milk. In Chechua the men stated that, in the past, after child birth women were only given potato mash for the first week. Food taboos were not found to exist in any of the three study areas any more. Villagers accredited this disappearance of these food labours to the awareness raising of the SK and from *gono shikkha* books.

In all the areas it was noted that family members all ate together at the same time except where the mother- and father-in-law also resided. In the latter situation mothers would eat on their own after the rest of the family. *Kishori* student mothers added that the benefit of everyone eating together included a more describable distribution of food. They also said that if their husbands were late returning home then they would eat without them. However, in this case, they would have to keep a larger share of food aside.

Child feeding practices

The study found that colostrum and breast milk were commonly given to babies in all three areas. Fathers also mentioned that in the past colostrum was not given as often as it is now. The majority of mothers knew that exclusive breastfeeding should continue for the first five to six months. However, it was found that one *Kishori* student mother claimed that when her baby was born she was not producing enough milk. She therefore stopped breastfeeding within a few days and replaced it with cow's milk.

Mothers claimed that they began complementary feeding at six months of age. One *Kishori* student mother stated:

*I feed my children all types of food after six months.
I prefer cooking with less chillies so we can all
eat together.*

However, when we tried to discover whether this was really the case, we found that, in many cases, complementary feeding was actually introduced only when the child began walking. This could be as late as ten to twelve months. Within this period the child would only be fed breastmilk, bananas, barley, *shuji*, cow's milk or plain rice mash. No vegetables, fish or meat would be given. *Kishori* student mothers explained that although all mothers now knew that their children should be given complementary food from six months of age this knowledge could rarely be translated into practice in extended family households. They reported that their mother-in-laws or other older female members would not allow them to feed the child a variety of foods till this later stage marked by the child beginning to walk.

Mothers and *Kishori* student mothers mentioned that in general they did not cook separate meals as complementary food for the child. They would just make the adult food soft by adding water or lentil soup. In addition they washed vegetables and fish from the spicy curry dish and fed this with the rice. Although separate cooking for children was found to be rare in all three areas they often gave them extra 'snacks' throughout the day, such as cakes, biscuits, *shuji*, fruits, rice powder with molasses, barley and *khichuri*. A mother in Gabtoli, called Kanchoni, mentioned that for her previous child she used to cook separately. However, for her present under-two child she did not. She began to explain that in the past the SK used to tell her to cook separately. However, she ended her sentence here before finishing it, realising that she had perhaps said something controversial.

In the past women in Paratongi reported that with their older children they had tried to introduce complementary foods (such as rice powder) before five months of age, however, the baby would often vomit. Many of them also used to feed bananas before five months of age.

Mothers were asked what they did when their child did not want to eat. In all three areas they responded that they would coax them into eating. This often included

pointing out birds or other objects, wandering around the courtyard behind the child and feeding. Women in Chechua said that they would sometimes try changing the food, for example give them *khichuri* or *shuji*, which they were more likely to eat. One woman in Chechua explained that if her child did not want to eat she would not feed him then; she would wait and try again later. *Khishori* student mothers explained that children sometimes did not want to eat if they were ill. In such situations they would consult the SK or the BRAC Health Centre.

No change was found, in any of the three areas, on past and present methods of feeding children when they did not want to eat.

Child care

Kishori student mothers firmly stated that they knew how to take care of their children. As a result they told us that their children's nutritional status was good:

*Now a days we live more cleanly than our mothers.
In the past babies under 6-months used to play on the
mud ground but we don't allow our children to do
this before they walk.*

They stated that the nutritional health of a child could easily be assessed during growth monitoring sessions. They added that beyond the age of two, when growth monitoring no longer occurs at the GM Centre, mothers themselves closely watched the development of their child.

When mothers were asked what they would do if their child was not growing normally, they responded that it meant they needed to take greater care of them. They also said that they would increase the amount of all foods given, including vegetables, fruits and eggs. In addition they would take it as a sign that their child was perhaps ill and take them to the doctor.

In all three areas mothers mentioned that in the past there were more child illnesses in their villages, such as frequent occurrences of diarrhoea and dysentery. *Kishori* student mothers and other mothers all stated that children were now kept cleaner. They

mentioned that before feeding they washed their hands, which they did not always practice in the past. Both mothers and fathers in all three areas mentioned that food was now always kept covered so flies could not sit on it. In Chechua one mother said that if flies did sit on the food then she would not feed it to her child.

Division of household tasks

Men and women were both asked about the kind of household chores they carried out during women's state of pregnancy and lactation. Within all three villages we found a variety of opinions on the matter. No one situation was predominant within a particular village. Some women (both *Kishori* student mothers and other mothers) mentioned that they did not vary their household chores at all during pregnancy, willingly. This was found to be the case especially in the poorest households, where women were seen to continue with their paddy husking work as normal. Some mentioned that the only change they made to their daily work was that they did not pull around too many of the wheat bags. In Gabtoli two women stated that they did not change the amount of household work they did, and proudly claimed that this meant their bodies remained light. One of the women explained how she had helped make her mud house whilst pregnant. In wealthier households it was found that hired help was often used to carry out many of the domestic chores, such as bringing water from the tube-well, washing clothes and paddy husking.

In joint families women reported that in many of the cases their mother-in-laws or sister-in-laws did the extra work on their behalf. The women explained that if you work too hard during pregnancy then delivery would be hard. In all three areas mothers mentioned that, when they were pregnant with their first child, they did not know they were not supposed to do all the chores at home. They reported to have participated more in household chores in the past than they do now. The *Shasthyo Kormi* had taught both the men and the women the need to do less work during times of pregnancy and lactation.

Questions were also asked regarding the father's role in household chores, and whether this changed during times of women's pregnancy and lactation. The majority of women (including *Kishori* student mothers) reported that their husbands helped

when they could. Chores which they occasionally did included cooking, bringing water from the tube-well and washing heavy clothes. In Gabtoli one woman mentioned that her husband fed the children. *Kishori* student mothers reported that if husbands were understanding then they helped more in the home. Men also confirmed that they changed their role within the home during their wives pregnancy. From the discussions it became obvious that the younger husbands were more likely to carry out the necessary household chores. In Paratongi the men explained that their expectation of what their wife should do at home was reduced, thus creating less pressure for her to carry out certain chores whilst pregnant. Men mentioned that, in general, they participated in looking after their children more now than they did in the past. Men in Paratongi agreed with one husband who said:

We do more work in the house than our fathers did for our mothers.

Male Perception of Growth Monitoring and ANCC

Men were asked how they viewed growth monitoring (GM) sessions and ANCC, and whether they had any objections to their wives' attendance. In all the areas the men strongly denied any objections, especially as these services were free of charge and situated closeby. They claimed that they saw the GM and ANCC services as positive interventions in their village. In Chechua one husband mentioned that he went to the feeding centre to see the feeding process and cleanliness of the centre. However, they stated that they did not visit the GM sessions or the ANCC, as these were very women centred activities.

One woman in Gabtoli also stated that her husband often reminded her to attend the GM session, and enquired about it later.

Community Perception of the Role of SK

In all three areas villagers' perception of the role of the SK did not vary considerably. They mentioned that her duties included house-to-house visits around the village daily to advise villagers on their general health and nutritional condition. It also included providing medicine, contraceptives, ligation advice and support and referrals to the BRAC Health Centre. In addition it was mentioned that she was responsible for

administering polio and other injections (i.e., community mobilisation for national immunisation campaign). In Paratongi the *Kishori* student mothers added that she was particularly well known for her pneumonia and hookworm treatments to children. In Paratongi and Gabtoli mothers mentioned that the SK sold birthing equipment to pregnant women. When asked who in the village benefits most from the work of the SK, mothers responded that it was children. It was also found that the SK was more likely to visit nearby houses regularly (almost daily) than those further away (once a week or fortnight).

Village Level Change

Men and women were asked what difference they had noticed in their village since the arrival of the Nutrition Programme. In all three areas it was first mentioned that they lived more cleanly now – children were kept clean and fed in a clean manner from clean pots and dishes. Incidences of diarrhoea were less. Mothers and children were now healthier and less prone to illness. Tuberculosis treatment could now be received. Village people had learned that children, adolescents and pregnant and lactating mothers need extra food. The SK in Paratongi described this situation clearly:

In the past, pregnant women didn't like taking supplementation – they believed that their stomachs would get bigger. Now they understand and eat more.⁵

Vegetables were also stated to be eaten more. A grandfather in Chechua, named Jagadish Chandra, said that in the past women used to go without eating for two days. Now there was no one in the village who goes without rice. It was also stated that people were more educated now because of the teachings from the nutrition programme. They were more aware of which foods were more nutritious. Food is also kept covered from flies. In Paratongi mothers added that children were no longer fed food made the previous day, and that hookworm infections were less frequent. In Chechua mothers stated that they believed child mortality was higher in the past. A mother in Chechua, named Khaleda, said:

My mother-in-law told me that if you give injections to

children it will hurt them and make them cry. I said that
I didn't care about that – it would stop them from
falling ill.

Khaleda was able to confidently convince her mother-in-law and ensure that her children were immunised.

Discussions with men on village level change since BRAC's arrival emphasised increased access to loans. This has resulted in people becoming more productive and participating in income generating activities, with an increase in women's income. This resulted in reduction of poverty in the village. The opening of NFPE schools meant an increase in children's, and especially girls', education. This has led to better levels of cleanliness. Increased access to tube-wells and safe water, increased use of sanitary latrines, the introduction of food supplementation, greater cultivation and consumption of vegetables and increased access to medical treatment (especially for women) has led to better health in the village and the reduction of diseases.

In addition, men in Paratongi mentioned the improvement in housing. In Gabtoli they added that high yield rice varieties were now used in agriculture. In Chechua other changes mentioned included the introduction of adult education for women, the opening of a *bidi* factory near the village, a reduced agricultural labour force and less robberies in the village, which has resulted in a more peaceful environment.

Supplementation Withdrawal in Gabtoli

This study attempted to gather some preliminary information about the impact of withdrawal of food supplementation in Gabtoli. In February 1999 food supplementation was stopped in Gabtoli. Mothers were asked whether this caused any problem for them. They responded that it did not make any problem; they had already been taught what was best for them to eat and so they could now continue implementing this knowledge themselves. They even stated that they felt good that they could now feed themselves appropriately. The most important thing was that they now felt they were self reliant.

⁵ All quotations, unless otherwise stated, have been taken from field notes.

It was found that after supplementation was stopped *laru*⁶ was not made in the homes. However, they explained that other types of extra food were given to women and children, as was found in the other two villages.

SK's Perceptions on the Programme

This study aimed to understand the possible impacts of phasing out the Pilot Nutrition Project, especially in relation to the role of the SK. With this objective in mind SKs in all three areas were interviewed independently through structured and semi-structured questions.

In both Paratongi and Gabtoli the SK's stated that since the change of the programme in 1999 (in Paratongi this change involved the closer targeting of supplementation and in Gabtoli supplementation was completely withdrawn) their activities had increased. They reported that in the past they used to talk to all the mothers during feeding sessions, and used this time to impart nutrition and health education messages. However, since the change they have found that they need to visit house-to-house more often in order to reach all the families.

However, we acknowledged that this perspective of their work is not necessarily objective. In both these areas the SKs were found to be anxious about the changes that had occurred in the programme and were insecure about the continuance of their roles. This anxiety was further increased in the first few months of this year, when they did not receive the annual BRAC diary usually sent to them by Head Office. Programme staff in the field offices informed us that this omission had caused concern amongst the SKs in the area, and they feared for their positions within the programme.

The SK's were questioned on their understanding of the change in the programme in 1999. In both areas they mentioned that it was because they had already taught the

⁶ *Laru* is the food supplementation which was given to pregnant/lactating women. It is made from flat rice, molasses and peanuts

community what they needed to and it was now up to the villagers to continue improving the nutritional health of their families.

The SKs in Paratongi and Gabtoli were asked what the immediate reaction of the community was after the programme was changed. In the former place the SK said that she did not face any problems from villagers, and no body demanded for the food. She explained to everyone that they could now make it themselves at home. In Gabtoli the SK reported that the community demanded to know why they were not given supplementation anymore, and said that they would refuse to go to growth monitoring sessions. However, she reminded them about the importance of their children's health and they gradually understood.

It was interesting to note that the SK in Chechua, where the programme had remained unchanged, was less aware of the objectives of the Pilot Nutrition Initiative. When she was asked why food supplementation had been given to certain groups she stated that it was because they were malnourished and we needed to improve their nutritional health. Only on prompting she mentioned that it had also helped to promote women and children eating extra food at home. This suggests that in areas where food supplementation has been changed to closer targeting or stopped altogether the SKs become more aware of the reasons for its introduction in the first place. The SK in Chechua, although aware that the programme had changed in some of the surrounding areas, did not realise why this had happened. She believed that it might have been due to the areas having less malnourished mothers and children than in her village. This further highlights that her concept of supplementation as a temporary measure to enforce/stimulate nutritional behaviour change was not clear.

SKs were asked whether they had benefited at all from the programme. All three of the SKs mentioned that they benefited from the cash honourarium given. In Paratongi and Gabtoli they both mentioned that they also now knew more. In Paratongi the SK added that she was more respected in the village. In Gabtoli the SK said:

I now know more, and am able to help other people understand more too. People are able to take care of their children better. This has been my benefit even more so than the honourarium – helping mothers to ensure that their children are nutritionally healthier.

The SK further mentioned that it had been a benefit for her to help people in her village to understand more about how to take care of themselves and their children. No negative impact on their lives from the project was found.

DISCUSSION

Quantitative

Birth weight: The Pilot Nutrition Initiative project started in full swing from 1994. Most of the children registered at that time were born before the programme started. Since there were no existing surveillance programme when these children were born, no birth weight data were kept in record with the parents. Birth weights of the children born after the project started were recorded by the SKs. As newer children were born, more and more of them were included in the registers who outnumbered the children without record within two years. However, contrary to expectation, in neither of the areas, not more than 80 percent birth weight was recorded in any year throughout the programme period. There are many known reasons why birth weight records are very difficult to increase beyond a certain extent. Traditionally many pregnant women move to their natal home few weeks before delivery. If the homes were not within the area covered by the data collector (i.e. SKs), virtually no data could be collected at all unless the parents were well aware to record it through the local community worker or by some other means. This is the commonest reason behind inability to record birth weight by community workers. Other problems include embargo from fathers or older members of the family as well as fakirs to weigh the newborn child.

Although no change was seen between 1999 to 2000, all three areas showed significant increase in mean birth weight between 1995 to 2000 (Table 11). Positive changes in birth weight indicates that there has been gradual improvement in maternal nutrition during pregnancy which might have been due to the cumulative effect of many other components of the programme.

Nutritional status: Since there was no comparison group in any of the project areas, it was very difficult to establish any statement about the nutritional changes brought

about by the pilot project. However comparison of data between the areas after 1999 revealed the differences between the different approaches of the programme. On the other hand, comparison of the nutritional status of the children at the beginning and at the end of the programme, gave the opportunity of assessing the impact of the programme.

Paratongi showed little improvement in the nutritional status of children despite having supplementation from the beginning till the end of the programme period, whereas, Gabtoli showed gradual improvement in nutrition even after withdrawal of supplementation in 1999. Later the difference among them increased even more. Possible reasons behind this are discussed later.

Low birth weight children : In all three areas, there was a very high incidence of low birth weight with moderate to severe malnutrition, among children who were not supplemented. Reasons why these children were not supplemented may be multiple. But no data was available on this and it is impossible to make any conclusive statement by analysing the data collected from a limited source. Migration of children from the project area, reluctance of the mothers to attend supplementation and undocumented programme changes may give partial explanation. But the actual picture can only be revealed by further in-depth research.

Growth monitoring: Growth monitoring is the major project activity participated by the beneficiaries. It is very difficult to depict the actual nutritional status without weighing a child or a pregnant mother and consequently to take necessary measures such as supplementation, counselling etc.

Absenteeism from the growth monitoring sessions may indicate the inability of the Shasthyo Karmi to effectively mobilise the community. However, other reasons may act behind this. Without further in-depth study, firm conclusion cannot be drawn on this. However, the possibility of a relationship between reluctance in attending growth monitoring sessions and poor nutritional status of Paratongi children compared to those of Gabtoli and Chechua cannot be excluded at this point of time.

Reduced workload due to the withdrawal of supplementation in Gabtoli may have increased the performance of the SKs. There may also be fear of joblessness among

the SKs, which caused the performance to increase. Natural disaster and socio-economic factors may also have reduced malnutrition in Paratongi.

Qualitative

Validity of Data: BRAC' multi-sectoral intervention to improve nutritional health was found to have various levels of impact in the programme villages. However, differences were found between households and not necessarily between programme areas. We found some houses in a village to have witnessed change whereas others from the same village had not, even though good knowledge on nutrition was discovered to exist in both types. This was the predominant situation found throughout the three different programme areas. It can therefore be stated that the withdrawal or closer targeting of supplementation, which occurred in certain villages in 1999, was not found to influence the effectiveness of nutrition messages. However, this may just mean that it is still too soon since the change to notice any difference.

In this study it was found that in the areas where the programme had changed, SKs were more aware of the objective of promoting food behaviour change through education within the families. The withdrawal and closer targeting of supplementation was found to help clarify this objective amongst the SKs.

The SKs in Gabtoli and Paratongi reported being busier since the change in the programme. They claimed that although there was now less emphasis on feeding they no longer had daily contact with all the women together at the Feeding Centre. In order to reach all the families they needed to make house-to-house visits more often than before to impart nutrition education messages. We observed SKs to be anxious about their continuing role in the programme, and believe that this may have resulted in their becoming even more active in the community. Villagers confirmed their activities by stating that they visited most houses regularly. However, it was also noted that SKs may have claimed to be busier since the change in the programme in 1999 to prove that even though their responsibilities around feeding have been reduced they still had a lot of work to do. As mentioned previously, Khatun and Hyder (1996b) observed very little evidence of nutrition education being imparted in their study villages. They reported that the activities at the feeding centre were

limited to food distribution and monitoring, with very little communication of nutritional messages. The findings from the present study suggest that the SKs were now more motivated to regularly conduct house-to-house visits and impart nutrition education messages. A two-fold reason for this was discovered. Firstly, SKs no longer have the option of meeting with a large number of women at the feeding centre, and therefore have to visit them in their home. And secondly, from a fear that they may become obsolete within the programme design and therefore wish to show themselves as active.

The study found little evidence to support a more balanced food relationship between in-laws and daughter-in-laws. In households where the mother-and father-in-law reside it was found that the daughter-in-law eats last, after all the other family members had eaten.

However, possible harmful child rearing traditions and practices passed down and often enforced by the mother-in-law (or other older female family members) were found to be less influential. This included food taboos observed by women during pregnancy and lactation. All three villages reported women now eating foods, such as certain types of fish, which they had previously been denied. It was also found that exclusive breast-feeding for the first five months was interrupted, often on the insistence of the mother-in-law, with foods such as banana, barley, *shuji*, cow's milk or plain rice mash. However, it was found that the age of introducing complementary foods was slightly later now than it had been with the previous children. This slight delay may suggest that mothers are now able to request this delay with more effect. It was also found that Khaleda, a mother in Chechua, was able to insist on having her children immunised despite her mother-in-law's belief that the injection would hurt the children, make them cry and therefore was not good for them.

An interesting case, which was noted, was that of Jolendah in Chechua. She was from a fairly well-off family who regularly hired help for domestic and other purposes. However, her child receives food supplementation from the programme. This highlights that the popular belief, of poverty as the cause of malnutrition, is not necessarily true in all cases. Children from rich households can also have

malnourished children if families are not aware of appropriate feeding practices for children and women.

High levels of health and nutritional knowledge existed amongst all mothers. However, *Kishori* student mothers were able to better explain the mechanisms behind certain positive or negative nutritional behaviour. For example, they explained the role played by the mother-in-law in the delayed introduction of complementary foods. However, in terms of practice it was found that as young mothers, they usually lived in joint family units, and were not able to translate this knowledge into practice. Two *Kishori* student mothers, who were interviewed, were found to be the exception to this rule. They lived in nuclear family units and were discovered to be able to better assert their knowledge and introduce a full-range of complementary foods at six months of age.

CONCLUSION

All above results, quantitative and qualitative, thus clearly show that a community based nutrition project, as the one undertaken by BRAC as Muktagachha Pilot Nutrition Initiative, can have positive impact on the nutritional status of children and mothers. Recording of birth weight is practiced up to 80%; the reason why it could not go beyond 80% has to be found out through further research. Prevalence of low birth weight decreased in two of the three project villages (Gabtoli and Chechua). Why it was not the case in the third (Paratongi) remains a question. The improvement in birth weight indicates improvement of maternal nutrition during pregnancy, due to supplementation. It was heartening to note that even when the supplementation from the project was stopped (as in Gabtoli), birth weight continued to remain satisfactory, meaning that the mothers were well motivated about the need of better nutrition during pregnancy. There were also improvements in the health and nutrition status of the adolescent girls when given supplementation. It is now needed to see how the situation sustains itself.

One big outcome of the project was the dramatic change in the attitude of elder family members (mother-and father-in-law, husbands) and also the community towards the nutritional needs of pregnant and lactating women and growing and adolescent children. A health worker (*Shasthyo Kormi*) can bring this miracle if given proper

training and incentive. The community can find a mechanism as to how it can sustain such a programme without external help.

RECOMMENDATIONS

Retrospective qualitative study may reveal the causes of why only a small proportion of children were supplemented although they were born with low birth weight and identified as undernourished between 6th to 12th month of their life.

Quantitative research may be conducted in order to explore the reason behind reluctance of Paratongi community in participating programme activities, although they were in a better position than Gabtoli and Chechua in terms of geography and urban exposure.

Stronger nutrition education messages are needed to household food managers (in particular the mother-in-law), other than the mother.

A current programme option to cut expenses is to reduce the number of SKs, so that one SK covers a greater number of households. In such a situation *Kishori* student mothers could be mobilised to work with SKs and cover the required area. *Kishori* student mothers were found to have very good knowledge of nutritional health.

The community may be encouraged to develop a mechanism of sustained community nutrition without external help.

REFERENCES

- Chowdhury, A.M.R., Hyder, Z.S.M., Mahmud, Z., Chowdhury, S.A. 'Targeted Nutrition Project at Mukthagacha in Bangladesh: Lessons Learned'. BRAC, RED, Dhaka
- Das Roy, R., Hyder, Z.S.M., Chowdhury, A.M.R., Mahmud, Z. Food Supplementation and Nutrition Education for Adolescent Girls'. BRAC, RED, Dhaka 1999
- INFS/UNICEF. Report of IDD survey in Bangladesh-1999 (in press).
- Jalal C.B.S., Hyder, Z.S.M. 'Ability of Grassroots Workers to Understand Indicators for Monitoring Nutrition Project Activities'. RED, BRAC, Dhaka 2000
- Khatun M., Hyder Z.S.M 'Community Perception on the Mukthagacha Pilot Nutrition Initiative of BRAC'. RED, BRAC, Dhaka 1996a
- Khatun M., Hyder, Z.S.M. 'Assessment of Supplementary Food in Mukthagacha Pilot Nutrition Initiative of BRAC'. RED, BRAC, Dhaka 1996b
- Kramer 'Determinants of low birth weight: methodological assessment and meta-analysis'. Bulletin of the World Health Organisation, 65 (5): 663-737
- Programme Document 1 'A Community Based Nutrition Initiative: A Pilot Nutrition Project Proposal for July 1992-1994' BRAC, HPD, Dhaka
- Programme Document 2 'Growth Patterns of Adolescent Girls in the Mukthagacha Nutrition Pilot'. HPD, BRAC, Dhaka 1997
- Programme Document 3 'Community Based Pilot Nutrition Initiative: Report on Children Under Two Years'. BRAC, HPD, Dhaka
- Programme Document 4 'KAP, Mukthagacha *Upazila*, Mymensingh'. BRAC, Dhaka 1993
- Yusuf, HKM., Quazi, S., Islam, M.N. et al., Current IDD status in Bangladesh. Lancet 364: 167-168, 1994.