

Assessment of Knowledge of Community Health Workers and Mothers on Infant and Young Child Feeding and Practices of Mothers

**Anita Sharif Chowdhury
Qazi Shafayetul Islam
Sanjit Roy**

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Research and Evaluation Division
BRAC Centre, 75 Mohakhali, Dhaka 1212, Bangladesh
E-mail: research@brac.net, www.brac.net/research
Telephone: 9881265, 8824180-87

For more details about the report please contact: anita.s@brac.net

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ABSTRACT

Poor infant feeding practices are some of major causes of under-nutrition in children under five years of age in Bangladesh. In order to address the issue, BRAC has implemented the Alive and Thrive (A&T) programme to promote adequate infant and young child feeding (IYCF) practices in rural Bangladesh. The programme had already been in operation in 22 *upazilas* in nine districts for more than one-and a half years before the time of the survey (October 2011). We tried to understand the level of knowledge and practices of mothers in IYCF in A&T programme areas. In addition, the study also investigated the *Shashthya Shebikas'* (SS) (health volunteer) knowledge of IYCF. The study was a post-test cross-sectional study to compare areas with and without A & T intervention as no baseline data was available. Both structured and semi-structured tools were used to collect information. The respondents were: women with children aged under one year (n=1,224) and SSs (n=120). Findings reveal that both mothers and SSs had reasonably good knowledge of breast-feeding. For example, 95% of mothers knew about colostrum feeding and the duration of exclusive breast-feeding (without water). Breast-feeding practice was commendable as 89% of mothers fed colostrum immediately after birth, moreover, 75% of mothers practised exclusive breast-feeding. Gapes in knowledge were found regarding the types as well as the nature of complementary food among both mothers and SSs. For example, gaps in knowledge existed in offering age appropriate food, in the frequency of serving and in the quantity to be served to children under one year. In conclusion, it can be said that A&T had progressed well in terms of some important IYCF indicators such as breast-feeding practices. However, it more effort needs to be given to improve complementary feeding practices.

INTRODUCTION

Malnutrition is the major underlying cause of death that is directly or indirectly responsible for 3.5 million of all deaths among children under five years of age (Victoria *et al.* 2008). Both sub-Saharan Africa and southeast Asia have a high prevalence of underweight (weight-for-age $\leq -2Z$), who are stunted (height-for-age $\leq -2Z$) and who are wasted (weight-for-height $\leq -2Z$). This poses a serious public health concern for these regions (Onis and Blossner 2003). Besides death, under-nutrition has other negative consequences for children such as impediment to brain development and this in turn affects the overall productivity of a nation.

Despite different programmes and initiatives taken in appropriate Inappropriate breast-feeding and complementary feeding remain the major contributing factors responsible for poor nutritional status of children in Bangladesh and other developing countries despite different programmes and initiative taken over time (Lancet 2008; BDHS 2009). Cultural beliefs and lack of knowledge on optimal feeding practices of mothers or caregivers deteriorate nutritional status of children (Allen and Gillespie 2001, Moore *et al.* 2006). The first two years are the critical period of childhood development. The second half of the first year is a decisive phase to ensure adequate and appropriate nourishment to combat different malnourished state of children as well as stunting of under-five children (Lancet 2008, Couch 2006). Stunting, a state of under-nutrition, measures the prevalence of chronic condition of nutrition. This is an indication of poor dietary intake and frequent infection over a long period of time. Unfortunately, 43% of under-five children are stunted in Bangladesh (UNICEF 2007), implying that these percentages of children are at risk of impaired physical and cognitive development. This is a grave concern for the future of the country.

To ensure optimum growth of children, WHO has recommended infant and young child feeding (IYCF) practices for under-two children as an effective way to reduce malnutrition as well as stunting in developing countries. If the mothers/caregivers of under-two children in the community could adopt these recommended key practices, substantial progress can be achieved in reducing short-term (underweight, wasting) as well as long-term (stunting) malnutrition (Couch 2006, Deavaney 2004, Briefel 2004) According to Jones *et al.* (2003), optimal IYCF is the single most effective intervention. Jones *et al.* found that exclusive breast-feeding (EBF) could prevent 13 to 16% of all deaths; adequate complementary feeding (CF) between 6 and 24 months could prevent an additional 6% of all deaths; and if these practices spread to 90% of the deserving population, 19% of all deaths under five could be prevented.

Alive and Thrive (A&T), a multi-country project implemented in Bangladesh, Ethiopia, and VietNam, is an initiative to reduce stunting and ensure physical and mental development of children, as well as reducing mortality and morbidity of 0-24 months of age through IYCF practices. In Bangladesh, this programme aims to promote early and exclusive breast-feeding, quality complementary feeding including appropriate feeding practice, and hand-washing through home visits, antenatal care sessions and postnatal care visits, health forums and social mobilization (Alive & Thrive 2010), and thereby reduce stunting. The programme is implemented through front-line voluntary workers of BRAC Health Programme such as *Shasthya Shebika* (SS), and a newly created dedicated cadre of IYCF workers called *Pushti Kormi* (PK).

They are supervised by *Shasthya Kormi* (SK), a BRAC employee and Programme Organizers (PO) as in other BRAC Health Programmes. The first phase of the programme started in mid 2010 and included 22 *upazilas* in 9 districts. In 2 of the *upazilas*, the model was tested and refined during late 2009. These *upazilas* were selected because of high prevalence of stunted children and the presence of BRAC's Essential Health Care (EHC) infrastructure. It was more than one year that the intervention was in place and all the *upazilas* had been covered by all components of the IYCF community model intervention. It was high time to do a stock taking of the running programme to better understand the status of key programme output indicators (related to IYCF), and what adjustments, if any, was required for future implementation.

OBJECTIVES

This study was done to explore:

- I. Knowledge of SSs and mothers on IYCF after one+ year of programme implementation, and
- II. Status of different IYCF indicators including core impact indicators.

METHODS

STUDY DESIGN

The study was a post-test cross-sectional study comparing areas with and without A&T intervention as there was no baseline data available (Table 1.1). Both structured and semi-structured tools were applied to collect information.

Table 1.1. Selected treatment and control *upazilas*

District (n=9)	Treatment <i>upazila</i> (n=10)	Control <i>upazila</i> (n=10)
Sylhet	Balaganj	Golapganj
	Fenchuganj	Sylhet Sadar
Noakhali	Companiganj	Begumganj
Hobiganj	Madhabpur	Bahubal
Narsingdi	Polash	Shibpur
Kishoreganj	Pakundia	Kotiadi
Manikganj	Ghior	Doulutpour
Chuadanga	Alamdanga	Chuadanga Sadar
Bogra	Kahaloo	Adamdighi
Dinajpur	Kaharul	Birganj

STUDY POPULATION

There were two types of study respondents:

- I. BRAC community health workers (*Shasthya Shebika* or SS)
- II. mothers of children aged <1 year

SAMPLING AND SAMPLE SIZE

Sampling was done purposively from 22 *upazilas* (of 9 districts) of the 1st phase. At least one *upazila* from each district was randomly chosen, taking a total of 10 *upazilas*. From each selected *upazila*, six SSs were randomly chosen (n=60). Similarly, 10 non-A&T *upazilas* (control) were selected for comparison from the adjacent *upazila* where the programme is non-existent, and thus 60 SSs were selected. The catchment areas of the SSs were our study sites. SSs were asked to provide lists of mothers having children aged <1 year in their catchment areas, who were included in the study (n=1,224) (Table 1).

Table 1. Distribution of respondents

Mothers having children	A&T	Non-A&T	All
< 6 months	315	313	628
6-12 months	302	294	596
Total (n)	617	607	1224

TOOLS DEVELOPMENT

A questionnaire was developed containing both closed and open-ended questions. We collected information on

- I. Socio-economic profile of mothers and SSs (age, education, marital status, income, religion, occupation, etc.)
- II. Knowledge of mothers and SSs on IYCF (e.g., colostrum feeding, breast-feeding initiation, exclusive breast-feeding, complementary feeding initiation time, types and nature of complementary feeding, hand-washing, etc.)
- III. Practice of mothers related to IYCF (e.g., colostrum feeding, breast-feeding initiation, duration of exclusive breast-feeding, complementary feeding initiation time, hand-washing, etc.).

DATA COLLECTION

Data were collected during October 2011. Twenty-two skilled interviewers (social science graduates with field experience in conducting surveys) were recruited. A five-day intensive training was organized for them consisting of lectures, mock interviews, role play and open discussions. A pretest was done outside the study area to further improve their interviewing skills. Five teams were formed for data collection, each led by one supervisor. The supervisors were solely involved in quality control and monitoring. The team reached the study villages one day before the survey for rapport building with the community and for identifying the mothers' houses. Also, the team talked to programme persons and PKs for the list of the SSs. The interviewers took a list of mothers from the respective SS of a village, and accordingly identified mothers having under-one children from households. The field activities were supervised by the principal investigator and the field operations unit of RED.

ETHICAL ISSUES

The study was passed through the usual ethical review process in RED. Verbal consent was taken from each respondent informing them about the purpose and nature of the study, and assured of maintaining their confidentiality. When the interviewers were convinced that the participants understood the process and agreed to participate, only then they were included in the study.

DATA ANALYSIS AND PROCEDURE

Coding, entry and cleaning of data were done at Dhaka head office under the supervision of the principal investigator and analyzed by STATA version 10. Student's *t*-test was done for normally distributed continuous variables, the Man Whitney U test for non-normally distributed variables and Chi Square test for categorical variables. Statistical significance was accepted at a 5% level.

RESULTS

SOCIO-ECONOMIC PROFILE OF SSs

Table 2 presents the socio-economic profile of SSs. Around one-fourth of SSs in both A&T and non-A&T areas were aged <30 years. Mean age was around 42, mostly married (76%), and some were widow (17%). One-fifth (21%) had no school education. A great majority (48.3%) of them worked for >10 years in BRAC. They had an average income of Tk. 600 as commission from sale of various health commodities (medicine, ORS, etc.) in the community. Almost all (99%) regularly attended the monthly refresher training and were regularly supervised by their immediate supervisors (PKs).

Table 2. Socio-economic profile of SSs by BRAC programme areas (%)

Study variables	BRAC programme areas			p value
	A&T	Non-A&T	All	
Age in years				
<30	25.0	28.3	26.7	
30-39	36.7	30.0	33.3	
40-49	25.0	35.0	30.0	.414 ^b
50 +	13.3	6.7	10.0	
Mean age (\pm SD)	41.45 (\pm 9.56)	43.83 (\pm 9.63)	42.64 (\pm 9.6)	0.176 ^a
School education				
No education	18.3	23.3	20.8	
Primary (I-V)	50.0	56.7	53.3	.291 ^b
Secondary (VI-X)	31.7	18.3	25.0	
HSC and Above	0	1.7	.8	
Mean years of schooling (\pm SD)	4.55 (\pm 2.97)	3.73 (\pm 2.99)	4.14(\pm 2.9)	0.137 ^a
Marital status				
Unmarried	1.7	3.3	2.5	
Married	81.7	70.0	75.8	
Widow	10.0	23.3	16.7	.192 ^b
Separated/Divorced	6.7	3.3	5.0	
Years worked in BRAC				
<2	16.7	3.3	10.0	
2-4	20.0	11.7	15.8	
5-9	18.3	33.3	25.8	.023 ^b
10+	45.0	51.7	48.3	
Median (IQR), Years	8 (2.25, 14)	10 (6, 13)	8.16(4, 13)	.130 ^c
Have monthly income from health service	98.3	98.3	98.3	1 ^b

(Table 2 continued...)

(...continued Table 2)

Study variables	BRAC programme areas			p value
	A&T	Non-A&T	All	
Median income (IQR), Taka	600(400,1000)	500 (400,1000)	600 (400,1000)	.786 ^c
Received training on A&T	98.3		49.2	
SSs attended refresher training regularly	95	85	90	.179 ^b
Supervised by PK (regular)	100	88.3	94.2	.013 ^b
N	60	60	120	

a. Student's *t*-test.

b. Chi-square test.

c. Mann-Whitney U test.

KNOWLEDGE ON IYCF

Breast-feeding and complementary feeding

Table 3 presents key information on knowledge related to breast-feeding among the SSs. Almost all SSs of both areas knew about colostrum feeding (98%), breast-feeding initiation within the first hour of birth (100%), and appropriate duration of exclusive breast-feeding (six months). In non-A&T areas, lesser proportion of SSs knew about the appropriate duration of exclusive breast-feeding (87%). But awareness about common problems of breast-feeding was low (12.5%) in both areas. A clear difference was observed regarding 'how to increase breast milk' by study areas (57 vs. 27%).

Table 3. Awareness of SSs regarding breast-feeding by BRAC programme areas (%)

Study variables	BRAC programme areas			p value*
	A&T	Non-A&T area	All	
Awareness of SSs about colostrum feeding	98.3	90.0	94.2	0.301
Initiation of breast-feeding within one hour	100.0	88.3	94.2	0.006
Six months duration of exclusive breast-feeding	96.7	86.7	91.7	0.264
Common problems related to breast-feeding	15.0	10.0	12.5	0.408
Ways to increase breast milk				
Frequent feeding	56.7	26.7	41.7	.001
Mothers food	90	98.3	94.2	.051
Water intake	31.7	13.3	22.5	.016
N	60	60	120	

*=Chi -square test

Table 4 shows some key information on SSs' knowledge regarding complementary feeding. The SSs also had good knowledge on timing to start complementary feeding in both areas (98.3% in A&T and 87% in non-A&T areas). In both programme areas the SSs mentioned cereals, eggs, fish, meat and colored vegetables as types of appropriate food to offer as complementary food. The percentage of mentioning each type of food was higher in A&T areas than non-A&T areas. On the other hand, *Khichuri* was mentioned by 62% of SSs in non-A&T areas compared to 15% in A&T areas. Knowledge of age appropriate frequency and quantity of complementary food was remarkably high in A&T areas (81.7%) than in non-A&T areas (16.7%).

Table 4. Knowledge of SSs regarding complementary food (CF) by BRAC programme areas (%)

Study variables	BRAC programme programme areas			p value*
	A&T area	Non-A&T area	All	
Awareness about the age of starting CF	98.3	86.7	92.5	0.238
Complementary foods given to children given starting from 7m				
Cereals (rice/bread/suji)	58.3	48.3	53.3	0.272
Eggs	81.7	60.0	70.8	0.009
Fish	86.7	50.0	68.3	0.000
Meat	65.0	41.7	53.3	0.010
Liver	45.0	31.7	38.3	0.133
Colored vegetables	80.0	63.3	71.7	0.043
<i>Khichuri</i>	15.0	61.7	38.3	0.000
Reasons mentioned to start CF				
For gaining weight	40.0	35.0	37.5	0.572
For filling stomach	3.3	6.7	5.0	0.402
For child's nutrition	31.7	40.0	35.8	0.341
For physical growth	31.7	15.0	23.3	0.031
For energy	8.3	13.3	10.8	0.378
For vitamin requirements	0.0	13.3	6.7	0.003
For satisfying babies hunger	0.0	5.0	2.5	0.079
Frequency of CF				
2 times in 7-8 months	81.7	16.7	49.2	0.000
3 times in 9-11 months	70.0	63.3	66.7	0.004
3-4 times in 12-24 months	98.3	86.7	92.5	0.106
Quantity of CF				
1/2 cup/servings in 7-8m	90.0	63.3	76.7	0.185
1 cup/ serving in 9-11m	36.7	45.0	40.8	0.227
1 cup /serving in 12-24m	83.3	61.7	72.5	0.090
Consistency of CF at 7-8 months				
Liquid	35.0	36.7	35.8	
Mashed	53.3	38.3	45.8	
Semi hard	1.7	3.3	2.6	0.221
Soft	10.0	21.7	15.8	
N	60	60	120	

*=Chi -square test

Gap existed in both areas regarding knowledge of food consistency at age 7-8 months. A similar percentage of SSs (36%) still perceive that only liquid food can be given at age 7-8 months in both areas. Almost 98.3% of SSs in A&T areas and 70% in non-A&T areas believed that one should use different ways to feed a child if he/she was unwilling to eat (Table 5). The SSs in both areas had comprehensive knowledge regarding importance of hand-washing (Table 6).

Table 5. Opinions of SSs on how to feed disinterested children by programme areas (%)

Study variables	BRAC programme areas			p value*
	A&T	Non-A&T	All	
Need to apply different strategies to feed	98.3	70.0	84.2	0.000
Child should not be force fed	31.7	38.3	35.0	0.444
Child should be force fed	10.0	8.3	9.2	0.752
Have to consult with doctors	1.7	16.7	9.2	0.004
N	60	60	120	

*=Chi -square test

Table 6. Knowledge of Ss regarding hand washing by programme areas (%)

Study variables	BRAC programme areas			p value*
	A&T	Non-A&T area	All	
Reasons of hand washing before giving food to her children (Q35)				
To remove germs	70.0	66.7	68.3	0.695
To avoid abdominal problem	23.3	18.3	20.8	0.500
To avoid diarrhoea	13.3	18.3	15.8	0.453
To avoid worm infestations	8.3	5.0	6.7	0.464
To keep healthy	1.7	3.3	2.5	0.559
N	60	60	120	

*=Chi -square test

SOCIO- ECONOMIC PROFILE OF MOTHERS

Table 7 presents some key socio-economic profile of the mothers by programme areas. Larger proportion of mothers (84%) were young (<30) in both programme areas. The mean age was 23.9 years with a standard deviation of 5.3. About 86.5% had school education. Closer to 60% completed primary and attended secondary level. Nearly all mothers were occupied in household chores. A negligible proportion was involved in other occupation, for example service sector, small business or self employed. Majority were Muslims. Nearly one-fourth of the mothers perceived their household economic status as deficit in the previous year.

Table 7. Demographic and economic characteristics of mothers by programme areas (%)

Study variables	BRAC programme			p value*
	A&T	Non-A&T	All	
Age in years				
<30	85.4	82.5	84.0	
30-39	13.3	16.7	14.9	0.198 ^b
40+	1.3	0.8	1.1	
Mean age in years (±SD)	23.7±5.1	24.1±5.4	23.9±5.3	0.235 ^a
Can read and write				
Yes	86.1	85.0	85.5	0.578 ^b
No	13.9	15.0	14.5	
N	617	607	1224	
Education				
Primary (I-V)	30.0	32.6	31.3	
Secondary (VI-X)	51.9	47.3	49.6.0	0.435 ^b
HSC and Above	4.2	5.1	4.6	
No education	13.9	15.0	14.5	
Mean years of school (±SD)	2.5±0.8	2.4±0.8	2.4±0.8	0.396 ^a
N	531	516	1047	
Religion				
Muslim	81.2	95.7	88.4	0.000 ^b
Others	18.8	4.3	11.6	
Occupation				
Household chores	96.6	98.0	97.3	
Teacher	0.5	0.5	0.5	0.232 ^b
Others	2.9	1.5	2.2	

(Table 7 continued...)

(...continued Table 7)

Study variables	BRAC programme			p value*
	A&T	Non-A&T	All	
HH monthly income in Taka				
≤5000	34.4	34.8	34.6	
5001-10000	37.4	42.3	39.9	0.074 ^c
10,000+	28.2	22.9	25.5	
Median income(IQR)	7200	7000	7000	0.134 ^c
	(5000,12000)	(5000,10000)	(5000,11850)	
Perceived economy in previous year				
Deficit	23.2	29.5	26.3	
Equal	30.5	30.5	30.5	0.024 ^b
Surplus	46.3	40.0	40.2	
N	617	607	1224	

a. Student's *t*-test.

b. Chi-square test.

c. Mann-Whitney U test.

KNOWLEDGE OF MOTHERS ABOUT BREAST-FEEDING AND COMPLEMENTARY FEEDING

Tables 8 and 9 show mothers' knowledge on breast-feeding and complementary feeding. Eleven percent of the mothers still believed in giving honey or other things immediately after birth in non-A&T areas compared to 5% of mothers in A&T areas ($p < 0.001$). But a great majority (93%) knew of initiating breast-feeding within an hour in all programme areas. About 94.5% knew of exclusive breast-feeding (not even water) duration in A&T areas and about 92% in non-A&T areas. But like SSs a small percentage of mothers (6.6%) were aware of the common breast-feeding problems women usually face during exclusive breast-feeding period in all programme areas. Similarly, a little more than one-fifth of the mothers mentioned that frequent feeding should be practiced to increase breast milk flow.

Table 8. Knowledge of mothers regarding breast-feeding by BRAC programme areas (%)

	BRAC programme areas			p value*
	A&T	Non-A&T	All	
Knowledge of mothers about colostrum feeding	94.5	88.8	91.6	0.000
Initiation of breast-feeding within an hour	37.1	44.8	40.9	0.050
Six months duration of exclusive breast-feeding	94.5	91.8	93.1	0.059
Complications related to breast-feeding	6.3	6.9	6.6	0.674
Ways to increase breast milk				
Mothers food	95.5	96.2	95.8	0.512
Frequent feeding	25.8	19.9	22.9	0.015
Water intake	10.2	4.0	7.1	0.000
N	617	607	1224	

*=Chi -square test

Knowledge of timely introduction of complementary feeding was quite high (92.3%). Fish (57.5%), meat (30.6%), liver (26.1) except eggs (71.8%), colored vegetables (61.9%), and fruits (28.8%) were mentioned by mothers, but comparatively in lower percentages than rice-based cereals (76.6%) in all programme areas. Lower proportion of mothers could correctly mention the WHO-recommended age appropriate frequency, quantity and consistency of food. For example, 42%, 55% and 67% of the mothers could correctly mention the age-appropriate frequency, quantity and consistency of food respectively for children aged 7-8 months in both areas.

Table 9. Knowledge of mothers regarding complementary food (CF) by BRAC programme areas (%)

	Programme areas			p value*
	A&T	Non-A&T	All	
Knowledge of timely introduction of CF	94.8	89.8	92.3	0.116
Food mentioned as CF				
Cereals (rice/bread/suji)	78.6	74.5	76.6	0.087
Eggs	73.1	70.5	71.8	0.315
Fish	62.6	52.4	57.5	0.000
<i>Khichuri</i>	42.9	51.2	47.1	0.004
Meat	36.3	24.9	30.6	0.000
Colored vegetables	65.8	57.8	61.9	0.004
Fruits	26.3	31.5	28.8	.050
Liver	25.6	26.7	26.1	0.667
Reasons to introduce CF				
Maintain good health	36.8	41.9	39.3	0.070
Ensure nutrition	34.4	31.3	32.8	0.255
Cognitive development	20.3	15.0	17.7	0.016
To fill baby's stomach	8.1	9.7	8.9	0.321
Only breast milk not sufficient	2.3	2.1	2.2	0.879
Don't know	0.2	0.2	0.2	0.991
Frequency of complementary feeding				
2 times in 7-8m	44.6	39.4	42.0	0.420
3 times in 9-11m	66.0	62.8	64.4	0.427
3-4 times in 12-24m	87.4	84.0	85.7	0.295
Quantity (cups) of complementary feeding				
1/2 cup/servings in 7-8m	59.0	51.6	55.3	0.006
1 cup/ serving in 9-11m	34.5	26.0	30.3	0.020
1 cup /serving in 12-24m	79.9	77.3	78.6	0.086
Consistency of CF in 7-8 m				
Liquid	25.3	22.4	23.9	
Mashed	65.3	69.5	67.4	
Soft	7.9	5.1	6.5	0.055
Semi hard	1.5	2.8	2.1	
Hard	0.0	0.2	0.1	
N	617	607	1224	

*=Chi -square test

Practice of mothers regarding breast-feeding and complementary feeding

Eighty-nine percent of mothers gave colostrum as first food to their newborns in A&T areas and 83% in non-A&T areas (Table 10). Forty-nine percent of such practice was influenced by SSs in A&T areas followed by 31% by PKs compared to 19% by SSs in non-A&T areas (Table 10). In non-A&T areas larger proportion (43%) mentioned television as their source of influence (Table 10). A negligible proportion mentioned that they encountered problems to ensure colostrum feeding (Annex, Table A1). Sixty percent of the mothers initiated breast-feeding within an hour in all areas (Table 11). In A&T areas 22% of the mothers told that they were influenced by SSs compared to 8% in non-A&T areas (Annex Table A-2). The mothers of more than six-month old children were asked whether they practiced exclusive breast-feeding (not even water). In A&T areas, 75% responded positively while 57% practiced exclusive breast-feeding in non-A&T areas ($p<.001$) (Table 11). Around 20% of the mothers gave food other than breast milk within the six-month exclusive breast-feeding period in A&T areas and 35% in non-A&T areas ($p<.001$) (Table 11). Large proportion among these mothers in both areas (65.4%, Table 11) reported insufficient breast milk as the reason behind such practice.

Table 10. Practice of mothers regarding colostrum feeding by programme areas (%)

	BRAC programme areas			p value*
	A&T area	Non-A&T area	ALL	
Food practice immediately after birth				
Colostrums	87.8	83.2	85.5	
Honey	4.1	4.8	4.4	0.012
Others	8.1	12.0	10.1	
Who influenced you to do so				
SSs	48.8	19.3	34.2	0.000
PKs	31.1	0.0	16.2	0.000
Doctors	17.8	25.9	21.8	0.001
Neighbours	28.5	37.2	32.8	0.001
Radio	1.6	3.0	2.3	0.116
Television	31.8	42.7	37.2	0.000
Family members	7.3	10.7	9.0	0.037
Relatives	5.4	7.4	6.4	0.139
N	617	607	1224	

* = Chi -square test

Table 11. Practice of mothers regarding breast-feeding by programme areas (%)

	BRAC programme areas			p value*
	A&T	Non-A&T	ALL	
Breast-feeding initiation time				
<1 hour	58.4	62.1	60.2	
1-2 hours	35.0	31.1	33.1	
3-6 hours	3.1	4.5	3.8	.221
7-24 hours	1.6	1.3	1.5	
>24 hours	1.9	1.0	1.4	
N	617	607	1224	
Exclusive breast-feeding (even no water)	75.3	56.6	66.0	0.000
n	320	318	638	
Children were given foods within six months	19.8	35.1	27.4	0.000
supplementary foods given at age				
0-1 month	43.4	38.0	40.0	
2-3 months	27.8	26.3	26.8	
4-5 months	27.05	34.27	31.64	0.583
6 months	1.64	1.41	1.49	
Reasons for early initiation of supplementary food				
Insufficient milk	59.8	68.5	65.4	0.107
Satisfying hunger	16.4	11.7	13.4	0.229
Mother unwell	6.6	4.2	5.1	0.349
Baby cries	4.1	4.2	4.2	0.955
Baby feels thirsty	3.3	5.2	4.5	0.422
For nutrition	2.5	2.4	2.4	0.949
In order to feed medicine	2.5	1.4	1.8	0.485
Weight gain	1.6	0.9	1.2	0.570
Baby's well-being	1.6	0.5	0.9	0.274
Working mother	1.6	0.9	1.2	0.570
Baby cannot suckle	1.6	0.9	1.2	0.570
n	122	213	335	

* = Chi -square test

Table 12 presents the practice of mothers regarding complementary feeding. About 84.5% and 70% of mothers in A&T and non-A&T areas reported of giving animal protein and additional oil to their children from seven months of age ($p < 0.001$). Three-fourth of the mothers currently (during three days preceding the survey) gave animal protein in A&T areas and 60% in non-A&T areas ($p < 0.001$). A greater percentage of mothers currently gave family food in A&T areas (91%) compared to 79% in non-A&T areas ($p < 0.001$). Gap existed in the frequency and quantity in serving complementary food to children aged ≥ 7 months. For example, majority of the mothers in both areas did not give appropriate quantity of complementary food to children aged 7-8 months. For aged 9-11 months appropriate quantity per serving was much less, only 8%.

Table 12. Practice of mothers regarding complementary feeding by programme areas(%)

	BRAC programme areas			p value **
	A&T area	Non-A&T area	ALL	
Gave animal protein and additional oil from 7-month	84.5	70.3	77.4	0.000
n	304	306	610	
Reasons for giving animal protein and oil from 7-month				
Ensure nutrition	37.0	34.0	35.6	0.496
Weight gain	37.7	43.3	40.3	0.224
Physical growth	28.8	28.4	28.6	0.920
Cognitive development	26.1	15.4	21.2	0.005
Energy	7.8	10.7	9.1	0.273
Vitamin	5.5	5.6	5.5	0.949
Fill babies stomach	4.3	7.0	5.5	0.201
General well-being	2.7	2.8	2.8	0.965
n	257	215	472	
Gave animal protein and additional oil during 3-days preceding the survey for 7-8 months	73.9	50.0	63.2	0.000
n	115	97	212	
Gave animal protein and additional oil during 3-days preceding the survey for 9-11 months	81.9	69.5	75.6	0.010
n	155	164	319	
Gave family food during 3-days preceding the survey for 7-8 months	89.6	66.0	78.8	0.000
n	115	97	212	
Gave family food during 3-days preceding the survey for 9-11 months	96.8	91.5	94.0	0.045
n	155	164	319	
Frequency of complementary foods during 3-days preceding the survey for 7-8month children				
Two times	48.5	39.1	44.9	.464
n	103	64	167	
Frequency of complementary foods during 3-days preceding the survey for 9-11month children				
Three times	60.7	37.3	49.0	0.002
n	150	150	300	
Quantity of food per serving during 3-days preceding the survey for 7-8 month children				
1/2 cup	49.5	43.8	47.3	0.281
n	103	64	167	

(Table 12 continued...)

(...continued Table 12)

	BRAC programme areas			p value **
	A&T area	Non-A&T area	ALL	
Quantity of food per serving during 3-days preceding the survey for 9-11 month children 1/2 cup- 1 cup	10.0	6.0	8.0	0.532
n	150	150	300	
Nature of consistency of foods during 3-days preceding the survey for 7-8 month children Mashed	88.4	89.1	88.6	0.917
n	103	64	167	
Nature of consistency of foods during 3-days preceding the survey for 9-11 months children Mashed, semi hard, soft	95.3	98.0	96.7	0.778
n	150	150	300	

*=Chi -square test

Table 13 shows the frequency of visit by SSs. About three-fourth of the mothers reported SSs' visit as regular in A&T areas and 39% in non-A&T areas ($p < 0.001$). Majority (71%) of the mothers reported of receiving information on exclusive breast-feeding and timely initiation of complementary feeding (54%) (Table 13).

Table 13. Household visit by SSs by programme areas (%)

	BRAC programme areas			p value*
	A&T	Non-A&T area	ALL	
Household visit				
Regular	76	39.4	57.8	0.000
Sometimes	8.9	13.5	11.2	
Irregular	5.7	8.4	7	
Never	9.4	38.7	24	
N	617	607	1,224	
Topics discussed during visit				
Exclusive breast-feeding for six months	71.2	40.1	58.8	0.000
Timely initiation of complementary feeding	54.0	36.0	46.8	0.000
Importance of breast-feeding	50.3	32.8	43.3	0.000
Breast-feeding initiation within 1 hour	42	30.1	37.3	0.000
Hand washing	34.9	17.5	27.9	0.000
Types of family food	31.3	13.2	24.1	0.000
Said nothing	8.9	31.7	18.1	0.000
others	.5	.8	.6	.617
n	559	372	931	

*=Chi -square test

regular= monthly visit; sometimes= visits at two to three months interval; irregular= visits at more than three months interval; never= no visit

Majority of mothers did not receive information from the SSs on other relevant topics, for example breast-feeding initiation, types and nature of complementary food (Table 13).

Table 14. Feeding practice of mothers towards disinterested children by BRAC programme areas (%)

	BRAC programme areas			P value*
	A&T	Non-A&T	ALL	
Feeding approach				
Child was forced to have food	11.6	14.0	12.8	0.389
Applied different strategies to feed their children	73.5	61.9	67.8	0.002
Did not force to eat	24.8	34.7	29.7	0.008
Had to consult with doctors	0.3	1.0	0.7	0.303
n	302	294	596	

*=Chi -square test

Table 14 presents feeding practice of mothers when children were unwilling to eat. A good proportion of mothers reported to have applied different strategies to feed their children in A&T areas such as trying to offer variety of foods, telling stories, etc. Greater percentage also mentioned of hand-washing before feeding children in all areas.

Table 15. Practice of mothers regarding hand washing by programme areas %

	BRAC programme areas			P value*
	A&T area	Non-A&T area	ALL	
Wash hands before feeding your child	84.6	80.1	82.3	0.309
n	298	291	589	
Sources of information				
SSs	73.0	26.2	50.5	0.000
Television	51.2	68.7	59.6	0.000
Neighbours	23.0	33.5	28.0	0.010
PKs	42.9	0	42.9	0.000
Doctors	10.7	26.2	18.1	0.000
Radio	4.0	5.2	4.5	0.532
Self	8.3	10.3	9.3	0.456
n	252	233	485	

*=Chi -square test

Discussions

BRAC is implementing A&T programme to promote ideal feeding behaviour for under-two children among mothers in rural areas with the help of community health workers (CHW) of BRAC (SS) and a dedicated cadre of community-based nutrition workers (PK). This study attempted to explore what improvements, if any, have been achieved regarding relevant knowledge and practices among mothers including knowledge improvement among CHWs (i.e., SSs).

The SSs possessed adequate knowledge on breast-feeding in terms of colostrums feeding, initiation of breast-feeding, and exclusive breast-feeding for six months. Our findings also show that mothers had adequate knowledge regarding breast-feeding and timely initiation of complementary feeding. However, the knowledge about age appropriate quantity and consistency of supplementary food, and frequency of servings was not of expected level among SSs in A&T areas. Similar findings were observed in A&T areas where mothers lacked the knowledge and

medical importance of food diversity and age appropriate quantity, serving frequency, and consistency of complementary food. Although the SSs regularly visited mothers but did not disseminate adequate information on these important aspects of complementary food. Whether knowledge, cultural barrier or household economic condition is limiting them to effectively provide information on complementary feeding needs to be investigated, and appropriately incorporated during training of the SSs.

According to our survey, surprising proportion of mothers adopted the recommended practices of IYCF within little more than one year of A&T programme implementation. For example, significant number of mothers of 6+ children reported to practice exclusive breast-feeding (75.3%) compared to national estimate of 43% (BDHS 2007). Earlier studies done in developing countries including Bangladesh had also found that exclusive breast-feeding could be increased if mothers are appropriately counseled by trained workers (Haider 2000, Nankunda 2006, 2010, Aidam 2005). Also a good number of mothers timely initiated complementary feeding in A&T areas. This result has dissimilarity with the national level data (BDHS 2007). These appropriate IYCF practices could be the affect of regular visit and counseling of mothers by SSs in the A&T areas with appropriate follow-up and monetary incentives for the SSs.

It is well known that children are much more prone to linear growth faltering during weaning period. This happens in developing countries including Bangladesh mostly due to early or late initiation (Dewey 2001, Bhandari *et al.* 2004), and less diversified and inadequate quantity and quality of complementary foods that cause low intake and micronutrient density (Gibson 1998, Rashid 2009, Kimmons 2005). This is also common in rural Bangladesh and has not changed since last two decades (Kimmons 2005, Brown 1982). In fact, complementary feeding practices are far behind than recommended in IYCF practices in Bangladesh (Faruque *et al.* 2008). In this study, we also found that the practice of giving age-appropriate quantity of complementary food including its frequency of servings was not of expected level. We found that mothers did not have comprehensive knowledge regarding complementary feeding. This aspect of infant feeding has serious implication as it has been observed that even with optimum breast-feeding children will become stunted if they do not receive sufficient quantities of quality complementary foods after six months of age. The SSs also did not adequately focus on the nature of complementary feeding during their household visit. Although mothers reported to have given food from animal source and family food during three days preceding the day of survey, the quality and adequacy of such practice was still in question as determining adequacy of complementary foods was not within the scope of this survey. Further research on this topic is required to better understand this aspect of complementary feeding practices of mothers as it is a challenge to ensure quality diet to children aged >7 months in Bangladesh (Kimmons 2005).

So this finding had implications for programme in terms of providing nutrition education and change feeding behaviours of mothers.

The above findings are an indication that programme has progressed well in some of the IYCF-related activities within one-and-half years but still needs to put more emphasis and focus on complementary feeding behaviours of mothers to make a positive impact on its targeted goals of reducing stunting in the programme areas.

RECOMMENDATIONS

1. Knowledge of SSs regarding common breast-feeding problems and how they are supposed to manage complaints of insufficient milk needs to be revisited.

Insufficient milk is a common complaint by breast-feeding mothers. This is mostly related to inappropriate positioning of infant during breast-feeding, psychological attachment, and feeding frequency and pattern. Also having knowledge on common problems of lactating mother is essential. The SSs needs to be trained adequately on these topics to effectively communicate with mothers and do the counseling, otherwise sustained rate of exclusive breast-feeding will not be possible beyond programme duration. This knowledge needs to be disseminated to future mothers as well.

2. Knowledge of SSs on complementary feeding needs to be strengthened.

Training of SSs in this regard should be in a way so that they will be able to guide and advise mothers, regarding appropriate quantity and quality of complementary food according to age, and how to offer complementary foods in a child-friendly way. This could be done by giving training to SSs with adequate problem solving skills and supportive supervision.

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ANNEX

Annex Table A1. Practice of mothers regarding colostrum feeding problem (%)

	BRAC programme areas			P value*
	A&T area	Non-A&T area	ALL	
Have any problem to start colostrums feeding	2.9	2.8	2.9	0.903
N	617	607	1224	
Types of problem (42)				
3.Nipple problem	33.3	29.4	31.4	0.803
5.hardening of breast	27.8	58.8	42.9	0.064
6.no milk	16.7	11.8	14.3	0.679
7.baby cannot suckle	22.2	0.0	11.4	0.039
8.mothers become ill	5.6	5.9	5.7	0.967
n	18	17	35	
Who solved the above problem				
Doctors	44.4	58.8	51.4	0.395
Neighbors	5.6	5.9	5.7	0.967
Family members	61.1	41.2	51.4	0.238
Mid wife	5.6	5.9	5.7	0.967
n	18	17	35	

*=Chi -square test

Annex Table A2. Source of influence of breast-feeding within 1 hr

	BRAC programme areas			P value*
	A&T area	Non-A&T area	ALL	
Source of influence of such practice				
SSs	22.2	7.9	15.1	0.000
PKs	13.3	0.3	6.9	0.000
Doctors	14.8	22.9	18.8	0.000
Neighbours	20.3	28.3	24.3	0.001
Family members	4.4	2.3	3.4	0.044
Mother	17.3	20.6	18.9	0.147
Mid-wife	19.9	22.2	21.1	0.323
Relatives	15.1	16.3	15.7	0.552
Self	5.5	3.5	4.5	0.083
Nurse	13.5	15.5	14.5	0.312
Reasons for such practice				
Pacify baby	10.2	9.8	10.0	0.742
Ensure milk letdown	16.2	17.4	16.8	0.524
Mother and babies well-being	49.1	48.8	49.0	0.926
Babies energy	8.1	7.3	7.7	0.404
Ensure nutrition.	23.2	20.4	21.8	0.244
Cognitive development	13.1	8.1	10.6	0.004
N	617	607	1224	

*=Chi -square test