IMPACT OF PEER COUNSELLORS ON BREASTFEEDING PRACTICES IN DHAKA, BANGLADESH

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Dedicated to my children,

Shahran and Narissa,

who taught me the meaning of breastfeeding

Abstract

In Bangladesh, mothers rarely breastfeed exclusively. The national programme promoting exclusive breastfeeding has focused mainly on hospitals, but the majority of mothers deliver at home, and it is important to reach them there. This research aimed to assess the impact of community-based peer counsellors on the prevalence of exclusive breastfeeding. Other objectives were to assess the impact on infant morbidity and growth, and the acceptability of the lactational amenorrhoea method (LAM) for contraception.

In Dhaka, 40 localities were randomised as intervention and control clusters. One woman in each intervention cluster was trained as a peer counsellor. The intervention comprised a minimum of fifteen counselling visits (two in the third trimester of pregnancy, two within 5 days of delivery, one between 10-14 days and then fortnightly), to help mothers establish and continue exclusive breastfeeding for 5 months.

A total of 726 mothers, with mean of 4.5 years of school, from the lower-middle socio-economic class, were enrolled during 1996, of whom 573 completed 5 months of follow-up. In the intervention group, 69% of mothers fed their infants colostrum as the first food compared to 11% of the controls ($p<0.0001$), and 70% breastfed exclusively for 5 months versus 6% of the controls ($p<0.0001$). Despite small differences in morbidity from diarrhoea, cough and fever, there was a substantial impact on weight gain. At the end of 5 months, the mean weight-for-length Z score was +0.1 (SD 0.8) in the intervention group and -0.9 (SD 0.8) in the control group ($p<0.0001$). The majority of mothers who breastfed exclusively, also accepted and practised the LAM (59% at 5 months).

This trial has demonstrated that trained community-based peer counsellors can significantly increase exclusive breastfeeding and appropriate contraceptive practices, with benefits to infant health. Inclusion of peer counsellors in mother and child health programmes is recommended.

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GLOSSARY OF TERMS

BF	= breastfeeding or breastfed
BM	= breastmilk
EBF	= exclusively breastfed (only breastmilk)
PRBF	= predominantly breastfed (breastmilk and water/juice/tea)
PTBF	= partially breastfed (breastmilk with other milk/gruel/solids)
NBF	= non-breastfed
FBF	= fully breastfed (includes exclusive and predominantly breastfed)
prelacteals	= any fluid or food given before breastmilk
postlacteals	= fluid or food given after starting breastfeeding, within 3 days of birth
C	= control
I	= intervention
PC	= peer counsellor
BC	= breastfeeding counsellor
PI	= principal investigator
FP	= family planning
LAM	= lactational amenorrhoea method
OC	= oral contraceptive
ICDDR,B	= International Centre for Diarrhoeal Disease Research, Bangladesh (referred to as the Centre)
NGO	= non-government organisation
UTPS	= Unity Through Population Services
CPPBF	= Campaign for Protection and Promotion of Breastfeeding
now named	
BBF	= Bangladesh Breastfeeding Foundation (referred to as the breastfeeding programme)
LSHTM	= London School of Hygiene and Tropical Medicine
NCHS	= National Centre for Health Statistics
BFHI	= Baby Friendly Hospital Initiative
UNICEF	= United Nations Children's Fund
WHO	= World Health Organization

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CHAPTER 1: INTRODUCTION

This thesis describes an intervention aimed at promoting exclusive breastfeeding among mothers in Dhaka, Bangladesh, and the evaluation of its impact by means of a randomised controlled trial. This first chapter provides the background to the study, the rationale for conducting it, and the objectives it set out to achieve in the context of the hypothesis. A brief outline of the thesis is presented at the end.

1.1 Background information

In developing countries, the major health problems of mothers and children often result from three inter-related conditions; malnutrition, infection, and the consequences of ill-timed, closely spaced and too frequent pregnancies. Associated with these conditions are other unfavourable social and environmental factors. Inappropriate infant feeding practices are intimately related to these maternal and child health problems [WHO, 1982]. An example of a country where these inter-related problems are common, is Bangladesh, a densely populated country in South Asia, which has infant and child mortality rates of 77 and 134 per 1000 births, respectively. Malnutrition is high, with 47% of children between 6-71 months moderately malnourished, and 7% severely malnourished [Bangladesh Bureau of Statistics and UNICEF, 1995]. Moderately malnourished children are those with weight-for-age between 60-74.9%, of the median value for the National Centre for Health Statistics (NCHS) reference population [US Dept. of Health, Education and Welfare, 1977]. Severely malnourished children are those with weight-for-age, below 60% of the median value of this reference. Although the majority of women breastfeed in Bangladesh, and very few infants are non-breastfed, exclusive breastfeeding is not the norm. Infant feeding practices are inappropriate (details of which are provided in chapter 2, section 2.5), and have been suggested to be a contributory factor for malnutrition in infancy. This factor, along with others described in the rationale for the study, provide the reasoning for the development of this research project.

1.2 Rationale for the study

The six main considerations that influenced the decision for this intervention, and its implementation through peer counsellors, were the following:

- Prevention of diarrhoea and malnutrition are key components of child survival, and breastfeeding promotion is recognised as an important intervention strategy for their control.

- UNICEF, the Ministry of Health and Family Welfare (Government of Bangladesh), and the Campaign for Protection and Promotion of Breastfeeding in Bangladesh (CPPBF) are concerned that present strategies recommending exclusive breastfeeding for 5 months, do not adequately reach mothers.

- The Baby-Friendly Hospital Initiative (BFHI) is focused on helping mothers initiate breastfeeding in hospital but has no mechanism to initiate and ensure continuation of exclusive breastfeeding at home. Mothers delivering at home have either no access, or insufficient access, to correct infant feeding information and support.

- About 90% of women in Bangladesh have home deliveries, therefore information regarding breastfeeding has to be provided to them at home.

- In most government and non-government family planning projects, family planning workers, who generally visit mothers once every two months, have no time for encouraging breastfeeding or solving breastfeeding problems, because too many couples are assigned to them.

- Counselling of mothers of partially breastfed infants with diarrhoea, was successful in achieving and maintaining exclusive breastfeeding in a hospital in Dhaka, and thereafter at home, for five months [Haider *et al.,* 1997]. The project demonstrated that women were substantially benefited from one-to-one counselling and support.

Taking the above facts into account, this project was designed to offer mothers one-to one counselling at home, by trained peer counsellors, who would help and support them to breastfeed their infants exclusively for the first five months.

1.3 Objectives of the study

Primary

To assess the impact of a peer counselling intervention on the prevalence of exclusive breastfeeding in the first five months.

Secondary

To compare in intervention and control groups:

1. The prevalence of diarrhoea, dysentery, cough and fever.
2. The anthropometric status (weights and lengths) of infants.
3. The acceptability and reliability of the Lactation Amenorrhoea Method (LAM).

1.4 Hypothesis

The hypothesis to be tested is that, in communities having a trained peer counsellor, significantly more mothers will breastfeed exclusively in the first five months, as compared to communities with no peer counsellors.

1.5 Organisation of the thesis

The thesis is organised in eleven chapters. After this brief account of the background to the research, its rationale, objectives, and hypothesis, chapter 2 reviews the literature in relation to the objectives of the study, and briefly describes infant feeding practices in Bangladesh. Chapter 3 describes the peer counselling intervention. Chapter 4 outlines the methods used in the study design, data collection and analysis. Chapters 5 to 9 provide the quantitative results of the study, including baseline comparisons between the control and intervention groups, and the impact of the intervention. Each of these chapters ends with a discussion of the findings. Chapter 10 provides information obtained by qualitative methods. It includes the views of the beneficiaries regarding the intervention, and those of the implementers, the peer counsellors, about their role in it.

Chapter 11 summarises the main aspects of the intervention, provides recommendations, and identifies future research needs.

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CHAPTER 2: LITERATURE REVIEW

The literature reviewed for this chapter will be described in five sections. The first section describes the studies which have sought to quantify the difference in diarrhoeal and respiratory morbidity between infants exclusively breastfed, and those predominantly or partially breastfed. The second section describes the growth of exclusively breastfed infants, and the third examines the usage of the lactation amenorrhoea method in other countries and the contraceptive prevalence in Bangladesh. The fourth section will focus on the impact of breastfeeding promotion programmes, especially those which provided postnatal support. The fifth section will describe briefly the current breastfeeding practices in Bangladesh which interfere with exclusive breastfeeding, and were to be addressed in this project.

Trying to quantify the results of breastfeeding studies in a uniform manner, was difficult and complicated. Comparative review became further complicated as researchers have used the same terminologies, but meant different things. For example, exclusive breastfeeding may have meant breastmilk only, or breastmilk with non-nutritive fluids, or even breastmilk with occasional feeds of other milk. This made it difficult to compare outcomes across those studies. These problems have similarly been stated by others [Winikoff, 1981]. Studies also have to be differentiated according to the type of methodology used; quantitative from qualitative, retrospective from prospective, longitudinal from cross-sectional, and observational from recall data. Reliability of studies using long periods of recall can be questioned, especially for feeding and morbidity variables. Cross-sectional surveys collecting data for the previous 24 hours may eliminate these recall biases, but require large sample sizes to obtain a good representation of both feeding practices and morbidity. They cannot however, provide similar or sensitive information that studying a cohort prospectively can provide, because mothers are often reluctant to divulge information to interviewers with whom they are not familiar.

Much literature has been published about breastfeeding and infant morbidity, breastfeeding and growth, breastfeeding and contraception. For the purpose of the morbidity and breastfeeding promotion parts of the review, publications from 1985 onwards were selected because those prior to this date were unlikely to have used the WHO terminology for exclusive and predominant breastfeeding. Another reason was that Feachem and Koblinsky [1984], had already reviewed the prior publications. Also excluded from this review, were comparisons of morbidity with non-breastfed infants, who are rare in Bangladesh. Following these exclusions, surprisingly few reports were available for this review.

2.1 Comparisons of morbidity according to breastfeeding status

The studies described here will first address those which have compared diarrhoeal morbidity in infants exclusively breastfed with those predominantly breastfed, and exclusively breastfed with partially breastfed. The next section will review the studies which have compared respiratory morbidity in infants with these feeding modes.

2.1.1 Comparison of exclusive and predominant breastfeeding with regard to diarrhoeal morbidity

Only two published studies, both longitudinal, have compared diarrhoeal morbidity in infants who were exclusively breastfed with those predominantly breastfed (Table 2.1.1). In a peri-urban Peruvian community, new-born infants (n=153) were followed for 12 months, feeding status was recorded monthly, and illnesses were assessed by thrice-weekly surveillance. The study showed that 12% of the infants were exclusively breastfed at one month of age and that the addition of other fluids or milk doubled the risk, and increased the prevalence of diarrhoea in infants below 6 months of age (15% of days with diarrhoeal illness in predominantly breastfed versus 7% among the exclusively breastfed, $p < 0.0001$) [Brown *et al.*, 1989].

In the Philippines, more than 3000 urban and rural mother-infant pairs were observed two-monthly from birth to 12 months, and mothers were asked whether the child had diarrhoea in the previous 7 days. The risk of diarrhoea tripled in infants aged 0-2 months, and doubled in those aged 3-4 months, when they were predominantly breastfed, compared to those who were exclusively breastfed [Popkin *et al.*, 1990].

Table 2.1.1 Comparisons of diarrhoeal and respiratory morbidity in predominantly breastfed versus exclusively breastfed infants

Author and date of publication	Location and sample	Age group (mo)	RR for diar in PRBF vs. EBF	Resp illness PRBF vs. EBF	Factors controlled
Brown et al., 1989	Peru, peri-urban poor, n=153	0-2 3-5	1.91 2.04	increased rates of resp illness in PRBF	age, socio-economic status
Popkin et al., 1990	urban Philippines rural Philippines total n=3000	2 4 6 2 4 6	3.10 2.12 3.18 2.24 1.97 2.21	not studied	gestational age, birth weight and sex of infant, measures of personal hygiene, water quality, excreta disposal, food hygiene, preventive health care, crowding in community and household, animals in house

RR = relative risk, PRBF = predominantly breastfed, EBF = exclusively breastfed
diar = diarrhoea, resp = respiratory

2.1.2 Comparison of exclusive breastfeeding compared to partial breastfeeding in reducing diarrhoeal morbidity

Various types of studies have compared the effects of exclusive breastfeeding with partial breastfeeding. Their salient features are shown in Table 2.1.2. Since the type of information obtained from studies with different methodological designs are not strictly comparable, results from the studies are described separately below.

<u>Longitudinal, prospective studies</u>

The Peruvian study reported above, found that infants aged 3-5 months receiving complementary foods had a relative risk of 1.79 for incidence, and 3.35 for prevalence of diarrhoea, as compared to exclusively breastfed infants. Infants on complementary foods were also more likely to have longer duration of diarrhoeal illness than those who were exclusively breastfed [Brown *et al.*, 1989].

In the Philippines, the risk of diarrhoea increased 10-13 times, when the infants were partially breastfed [Popkin *et al.*, 1990]. The risk was slightly lower in the rural, compared to the urban sample.

In West Bengal, India, 148 infants were followed for one year. By the fourth month, only 25% were exclusively breastfeeding. Those who had started other fluids or foods before 3 months, were termed "weaned early". This group had a diarrhoeal incidence rate ratio of 3.02 (95% CI, 1.04-8.80), compared to those who were "weaned late" or exclusively breastfed for at least 4 months [Mondal *et al.*, 1996].

Weekly monitoring of morbidity was carried out in 50 households in Brazil. The impact of early complementary feeding on 17 infants born during the study was reported. Only 1.6% of 309 days in which babies were exclusively breastfed involved an episode of diarrhoea, compared to 8% of 1,141 days among infants who were partially breastfed ($p<0.0001$) [Guerrant *et al.*, 1983]. It is not clear if the ages of the infants at different periods were accounted for, and the numbers are too small to be conclusive.

Cross-sectional prevalence

In a house-to-house community survey of nearly 6000 persons in Nigeria, information on diarrhoea in the preceding 8 days was obtained. Diarrhoea was associated with 75% of illnesses in children. Among infants aged 3-5 months, 18% were exclusively breastfed and 82% were partially breastfed, with the latter having a relative risk of 4.8 of developing diarrhoea. The study showed a strong protective effect of breastfeeding [Huttly *et al.*, 1987].

Using a cluster sampling technique, mothers with children below 6 months of age (n=331), in a rural area of Ethiopia, were identified and interviewed. Among the exclusively breastfed group, 12% had diarrhoea starting in the past two weeks and among the partially breastfed, this proportion was 40% ($p <0.0001$), giving an odds ratio of 5.2 (95% CI, 3.0, 9.1). Except for age, no social or other factors were taken into account [Ketsela *et al.*, 1990].

The next set of studies are all case-control studies for infants hospitalised with diarrhoea.

Hospital admissions

Children admitted with moderate or severe dehydration (n=192), were matched with controls from the same neighbourhood in a case-control study in Brazil. Allowing for father's education and age of the child, those exclusively breastfed had a lower risk for admission, with an Odds Ratio of 1.4 for those partially breastfed (95% CI, 0.5, 3.4) [Victora *et al.*, 1992].

A study of 597 infants admitted with diarrhoea in a hospital in Iraq, compared them to 723 controls enrolled at maternal and child health clinics. Logistic regression was used for confounders (see Table 2.1.2), and significant differences in diarrhoeal morbidity were obtained for the different types of infant feeding status. Partially breastfed infants, who received bottle feeds, either with or without food, had an increased risk of hospitalisation for diarrhoea. Those partially breastfed with food, but not bottle fed, had a lower risk than those exclusively breastfed, but not significantly so [Mahmood, *et al.*, 1989].

A recent review of studies on breastfeeding and diarrhoeal morbidity, including causative pathogens, showed that there was consistent evidence of a protective effect of exclusive breastfeeding in the first 4-6 months of life, and that the protection was more in the case of non-viral diarrhoea [Golding *et al.*,1997].

In summary, out of the studies reviewed above, only two compared the effects of exclusive with predominant breastfeeding on diarrhoeal morbidity. Both of these studies demonstrated that predominantly breastfed infants had at least twice the risk of diarrhoea compared to those exclusively breastfed. Of 8 studies comparing the effects of partial with exclusive breastfeeding, 4 quantified morbidity by providing Relative Risks (RR range = 2.1-13.3), 2 provided Odds Ratios (OR, 1.5 and 5.2) and one gave an Incidence Rate (3.0).

Table 2.1.2 Comparisons of diarrhoeal and respiratory morbidity in partially breastfed versus exclusively breastfed infants

Author and year of publication	Location, study design and sample	Age group (mo)	Diarrhoeal illness PTBF vs. EBF	Respiratory illness PTBF vs. EBF	Factors controlled
Brown et al., 1989	Peru, peri-urban, longitudinal, n=153	0-2 3-5	RR = 2.1 = 2.8	increased rates of resp illness in PTBF	age, socio-economic status
Popkin et al., 1990	Philippines, urban and rural longitudinal, n=2886, 2806, 2720	2 4 6	RR= 13.3 = 12.9 = 10.6	-	sex, birth weight, personal hygiene, crowding in community and household, presence of animals in house
Mondal et al., 1996	W.Bengal, India, rural, longitudinal, n=148	0-4	weaning before 4 months associated with a diar incidence rate of 3 (95% CI, 1.04-8.80)	-	birth order, birth spacing, sex, maternal age and education, family size and income
Guerrant et al., 1983	Brazil, longitudinal, 17 infants (in 50 households)	0-6	diar in 1.6% days when EBF, and 8% of days when PTBF	-	not clear for this age group
Huttly et al., 1987	Nigeria, rural, cross-sectional n=199	0-2 3-5	RR = 3.3 = 4.8	-	age and sex of infants
Ketsela, Asfaw & Kebede, 1990	Ethiopia, rural, cross-sectional, n=331	0-6	in last 2 weeks, 12% diar in EBF, 40% diar in PTBF ($p<0.0001$) OR 5.2 (95% CI, 3.0, 9.1)	-	age of infants

PTBF = partially breastfed, EBF = exclusively breastfed, RR= relative risk, CI = confidence interval, OR = odds ratio, diar=diarrhoea, resp = respiratory

Table 2.1.2 contd. ....

Author and year of publication	Location, study design and sample	Age group (months)	Diarrhoeal illness PTBF vs. EBF	Respiratory illness PTBF vs. EBF	Factors controlled
Victora et al., 1992	Brazil, case-control hosp adm, diar with dehydration n=192 cases, and 192 controls	2-3	OR for PTBF 1.4 (95% CI 0.5, 3.4)	-	age, father's education
Mahmood, Feachem and Huttly, 1989	Iraq, case-control, hosp adm with diar n=597 cases and 723 controls	2-3 4-5	for all PTBF, RR 6.2 (95% CI, 2.8, 14.0) for all PTBF, RR 2.9 (95% CI, 0.9, 9.9)		age, month of selection, maternal education, place of residence, sex, housing type and ownership, car, boiled drinking water
Holberg et al., 1991	Arizona, USA longitudinal n=579	1-3	-	at 2 months, 1.3% of EBF infants had RSV vs. 2.9% of PTBF	not significant when controlled for maternal education, no. in child's room, sex, ethnicity

PTBF = partially breastfed, EBF = exclusively breastfed, hosp adm = hospital admission, RR= relative risk, CI = confidence interval, OR = odds ratio
RSV = respiratory syncytial virus

2.1.3 Respiratory illness in exclusively breastfed versus predominantly and partially breastfed infants

As opposed to diarrhoeal morbidity, very few researchers have studied the association between breastfeeding status and the prevalence of respiratory infections. Only one study has compared the effect of exclusive breastfeeding with predominant breastfeeding, and only one has compared exclusive with partial breastfeeding in this regard (Table 2.1.1 and 2.1.2). What follows is a review of these two studies.

Brown and colleagues in Peru, in addition to demonstrating differences in diarrhoeal morbidity according to different infant feeding categories, also showed that there were increased rates of respiratory illness in infants who were partially breastfed. As the number of infants with respiratory illness was small, infants aged 0-5 months were grouped together. The RR was 2.06 for infants fed breastmilk and other milk, and 6.88 for those fed breastmilk and solids [Brown *et al.* 1989].

In a large study of respiratory syncytial virus (RSV) infections conducted in Arizona, USA, 1179 infants were followed during the first year of life. At 2 months of age, 1.3% of the 234 exclusively breastfed infants had RSV compared to 2.9% of the 105 partially breastfed. When other features such as the number of other children sharing the bedroom, and the sex of the child were taken into account, these differences were not significant. For mothers with a lower education level however, breastfeeding had a significant protective role [Holberg *et al.*, 1991].

The results of these two studies show that exclusive breastfeeding was protective compared both to predominant and partial breastfeeding for respiratory infections, but further research is required, in different countries and settings, for conclusive evidence.

2.2 Exclusive breastfeeding and infant growth

2.2.1 Studies comparing growth of exclusively breastfed infants with the NCHS reference

The growth of infants is commonly assessed world-wide by comparing weight and length against the NCHS reference population [US Dept. of Health, Education and Welfare, 1977]. This reference has various limitations. The data were collected at three-monthly intervals from a Caucasian sample of North American infants from predominantly middle class families, most were non-breastfed, and the remainder breastfed for short durations. Over the past years, many studies have shown that even in affluent populations, the growth of breastfed infants differs from that of the NCHS reference, and from infants fed infant formulas [Whitehead and Paul, 1981; Hitchcock *et al.*, 1985; Salmenpera *et al.*, 1985; Persson, 1985; Whitehead *et al.*, 1989; Dewey *et al.*, 1992]. Six studies, however, showed no differences in growth between breastfed and formula-fed infants [Evans, 1978; Saarinen and Siimes, 1979; Volz *et al.,* 1983; Kohler *et al.*, 1984; Jung *et al.*, 1985; Krebs *et al.,* 1994]. This may be because in the latter studies, the breastfed group were partially breastfed, or breastfed for a few months only.

Where exclusive breastfeeding has not been defined, or intake of water, juice or tea not mentioned, the supposedly "exclusively" breastfed infants are more likely to be fully breastfed (FBF). In this section, eight studies which compared the growth of "exclusively" breastfed infants with the NCHS, will be described. Most of these studies included infants weighing more than 2500 g at birth. Further, the studies of growth of exclusively breastfed infants used by the WHO Working Group to derive the WHO-breastfed pooled data set, are not included, as their results are provided in that set [WHO, 1995].

A retrospective study was carried out after random selection of 96 "exclusively" breastfed infants of mothers from La Leche League International, in Washington DC, USA. Weights and lengths of the infants were noted from the mothers' records of measurements taken during regular visits to the paediatrician's office. The infants' mean weights and lengths remained above the 50th percentile of the NCHS from 0-6 months [Ahn and MacLean, 1980].

Forty-five expectant mothers in Texas, parity one or two, from the middle to upper socio-economic stratum, who planned to breastfeed exclusively, were recruited. The mean gestational age and birth weight of the infants was 39.2 ± 1.8 weeks, and 3.58 ± 0.45 kg, respectively. Breastmilk intake of infants averaged 751 ± 130g/day at 1 month, and 740 ± 128 g/day at 4 months, with an overall mean of 733 ± 89 g/day during the 4 months. Growth performance of this group of exclusively breastfed infants compared favourably with the NCHS reference median, with a slight downward trend in weight-for-age percentiles in the fourth month [Butte *et al.*,1984].

In India, 384 infants were enrolled at birth and followed for one year. Among them, 155 were said to be "exclusively" breastfed throughout the period of study. Comparisons with the NCHS reference showed the mean weights and lengths of "exclusively" breastfed male infants were similar until 7 months of age, and those of females until 4 months of age. The females were lighter and shorter at birth [Bai *et al.*, 1980].

Two hundred and forty-two Chilean infants who were exclusively breastfeeding at one month of age, had their growth patterns described. Among these infants, 59% were fully breastfeeding at 6 months, the monthly weight increments were greater during the first 3 months of life. The mean weights of the infants remained above the NCHS reference until 6 months [Juez *et al.*,1983]. Infants in this study were excluded if their weights showed faltering in growth (less than 20 g since last visit), which showed a selection bias for the better growing infants.

A study from Arizona, USA reported slower growth velocity in fully breastfed infants compared to the NCHS reference. Of 40 mothers initially recruited for the study, and who agreed to breastfeed their infants exclusively for 6 months (only occasional water allowed, but no medicines), 6 (15%) mothers dropped out at 2 months because of difficulties in establishing breastfeeding or problems with the infants, and another at 5 months when she resumed work. The 33 infants who remained in the study, showed significantly slower rates of growth through the first 6 months compared to the NCHS reference [Duncan *et al.*, 1984].

The exclusively breastfed infants in a study in Baroda, India, had lower weight-for-lengths compared to the NCHS median for the first four months (along the 5th percentile), after which they deviated further downwards [Pathak *et al.*, 1993].

In Bangladesh, 43 exclusively breastfed infants grew parallel to the NCHS reference for the first 3 months, and then slowed down [Talukder and Kawser, 1986].

Thus, of the eight studies described above, most showed that infants grew above the NCHS median for at least 4 months. Two studies showed infants to follow a lower track compared to the NCHS all through 0-6 months. There was no mention of breastfeeding support provided to the mothers during these studies.

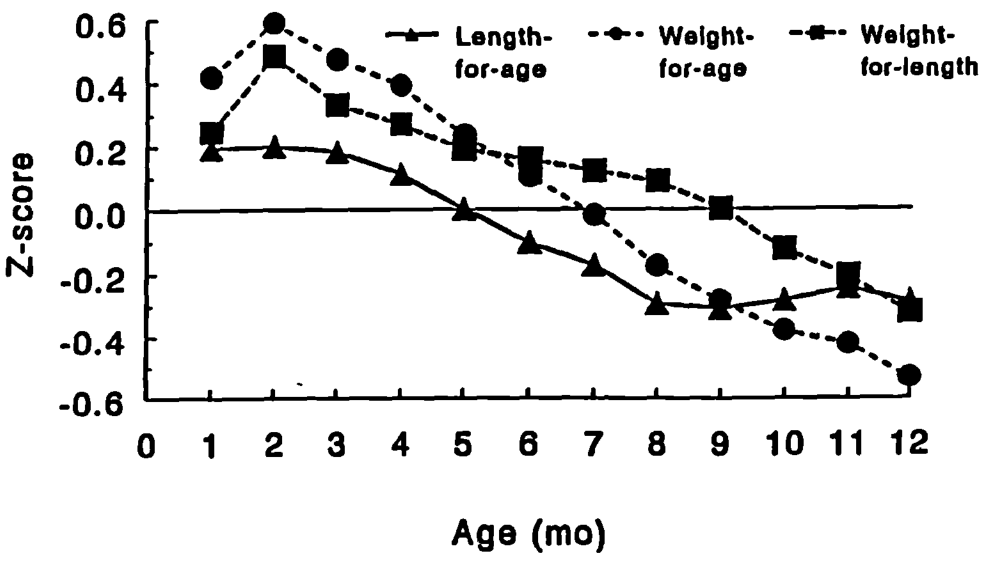
But when breastfed infants in general (including "exclusive" and partial) are compared with the NCHS reference, they are usually seen to grow rapidly in the first 2 to 3 months, then show a relative deceleration, giving an appearance of faltering. This often causes health care workers to question the adequacy of lactation, and lead to a recommendation for complementary foods, which in developing countries, may increase the risk of infectious illness, and decrease contraceptive protection for the mother [Dewey *et al.*,1992; WHO, 1995].

2.2.2 The WHO breastfed pooled data set

Frequent reports from investigators and programme staff about problems related to usage of the NCHS, caused WHO to become concerned whether their recommendations for exclusive breastfeeding for 4-6 months, (with the addition of complementary foods thereafter, and breastfeeding for two years or beyond), would continue to be followed, if infants appeared to falter on comparison with the NCHS. The WHO Nutrition Unit established a Working Group, which focused on two issues not covered previously in their reports on anthropometry during infancy. These were, a) the characterisation of growth patterns of infants following current WHO feeding recommendations and b) the relevance of such patterns to the development of growth references for infants [WHO Subcommittee on Infant growth, 1995].

For addressing the first issue, the Working Group collected data from 7 longitudinal studies of infant growth in North America and northern Europe (n=453 breastfed infants). A subset of 226 infants who were exclusively breastfed for 4 months and breastfed for the first year (minimum 9, and maximum 68 from each country), and therefore following current WHO recommendations, was analysed separately. These data are referred to as the WHO-BF or 12-month breastfed pooled data set. The report of this committee showed that infants breastfed for at least 12 months grew faster in the first 2 months, and less rapidly from 3 to 12 months, compared to the NCHS reference. The mean z-scores of infants in this data set, which also differ compared to the NCHS reference, are shown in Fig. 2.2.

Fig. 2.2 Mean Z scores of infants in the 12-months breastfed pooled data set, compared to the NCHS reference



Source: WHO, 1995

The above section shows that there is a scarcity of reliable studies that have evaluated the growth of sufficient numbers of exclusively breastfed infants. And because of differences in the way they were conducted and analysed, it is difficult to draw definite conclusions. Most of them excluded infants with a birth weight below 2500 g, and the infants were predominantly breastfed. The number of exclusively breastfed infants following the WHO recommendations, was even smaller. This highlights the need for further research where the growth of larger numbers of exclusively breastfed infants can be studied in different settings.

2.3 Usage of the Lactational Amenorrhoea Method (LAM) in other countries and contraceptive prevalence and usage in Bangladesh

Breastfeeding and family planning are recognised as complementary child survival intervention strategies [Labbok, 1989]. As the contraceptive effect of breastfeeding became quantified in population-based surveys, it led to the recognition that any decrease in breastfeeding prevalence would require an increase in contraceptive practice to keep fertility in check [Thapa *et al.,* 1988; Kennedy *et al.,* 1989]. Applying the model of the proximate determinants of fertility [Jain and Bongaarts, 1981] to the World Fertility Survey data set, lactation is estimated to inhibit an average of 4 births per woman in Africa and 6.5 births per woman in Bangladesh [Thapa *et al.,* 1988].

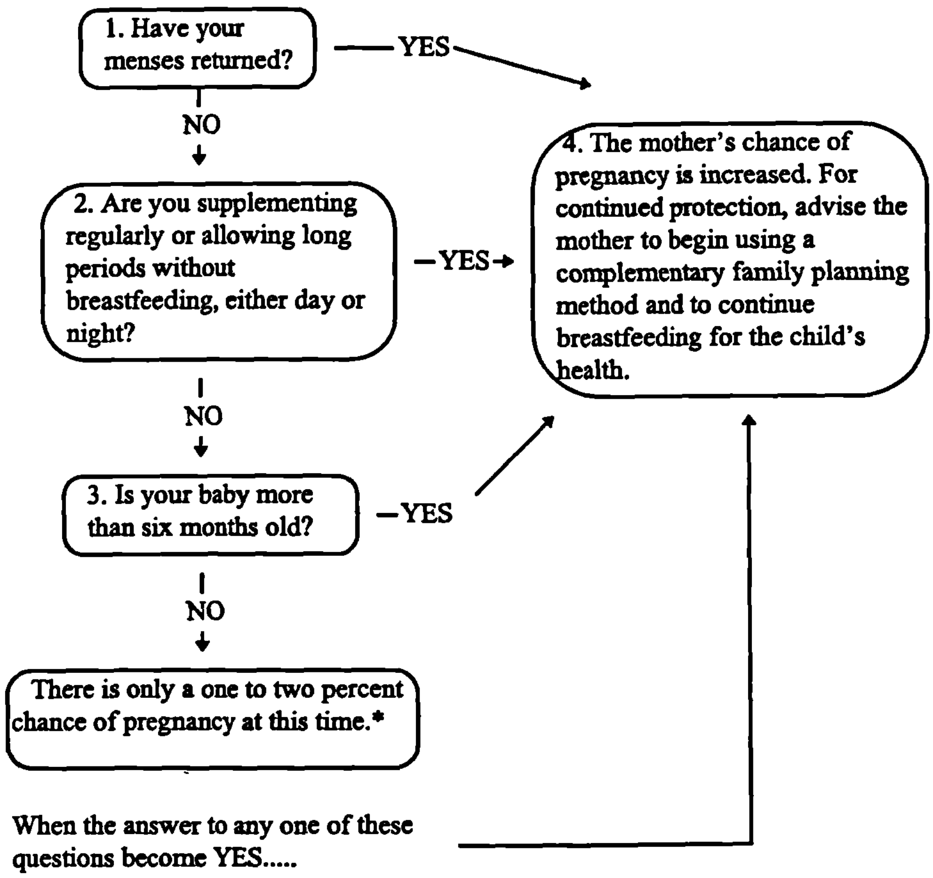
To utilise the contraceptive potential of breastfeeding, mothers have been encouraged to use the LAM, and results of the studies in countries where it was evaluated are described in the first section. As the LAM was to be promoted in this project, the second section provides a brief overview about contraceptive prevalence and usage in Bangladesh.

2.3.1. Lactational Amenorrhoea Method (LAM)

The LAM for family planning, is based on the physiological infertility experienced by breastfeeding women due to the hormonal suppression of ovulation [WHO, 1988]. The LAM was categorised as a family planning method at Georgetown University in 1989, after scientists attending the 1988 Bellagio Consensus Conference reviewed 13 studies from eight countries and agreed that "breastfeeding provides more than 98 percent protection from pregnancy during the first six months postpartum if the mother is fully or nearly fully breastfeeding, and has not experienced vaginal bleeding after the 56th day postpartum" [FHI, 1988; Kennedy *et al.,* 1989]. The group suggested that breastfeeding could be used as a birth spacing method in its own right, especially when there were no alternatives available, or if a couple chose not to use other family planning methods; or, that it could be used as a means to delay the introduction of other family planning methods [Family Health International, 1988]. The method would be especially useful when there were difficulties with family planning availability, acceptability, or continuation. Figure 2.3. shows the guidelines for usage of the LAM.

Fig. 2.3 The Lactational Amenorrhoea Method

Ask the mother, or advise her to ask herself these three questions:



*However, the mother may chose to use a complementary method at any time.

Source: Labbok, 1989

Results of intervention studies in which mothers used the LAM are briefly described below. In Chile, more than 56% of 422 middle-class women were able to continue the LAM through 6 months, with a 0.5% pregnancy rate (1 woman pregnant in month 6), while they received intensive support for breastfeeding [Perez *et al.,* 1992]. Successful usage of LAM has also been reported from Ecuador where it was accepted by 133 breastfeeding women (total n=431) who met all the LAM criteria and selected LAM from the methods available to them. They constituted 31% of the new postpartum clients, and 5% of the old. During the first 5 months of the programme, there were no pregnancies among those who followed the criteria correctly [Wade *et al.,* 1994]. In Pakistan, 391 women were followed for one year after delivery. During full or nearly full breastfeeding, when the women were amenorrhoeic and not otherwise using other forms of contraceptives, the rate of pregnancy was 0.6%. [Kazi *et al.*, 1995]. A later review of studies conducted in 9 countries (Mexico, Thailand, Egypt, Pakistan, rural and urban Philippines, Canada, Australia and UK), showed that most women accepted the LAM and used it consciously as a contraceptive method. Only 8% of these women, however, could receive the full 6 months' protection of the LAM. The reasons for discontinuation at 3 months were, 33% for addition of complementary foods and 10% for menstrual bleeding. At 6 months, the reasons were, 0.3% because of pregnancy, 20.5% because of bleeding and 71% because they had started complementary foods [Kennedy and Visness, 1992].

2.3.2 Contraceptive prevalence and usage in Bangladesh

The contraceptive acceptance rate is 40% at the national level in Bangladesh, and 65-67% in some of the non-government organisation service areas [Stalker, 1994]. The combined oestrogen-progesterone oral contraceptives (OCs) account for 41-47% of the contraceptives used. Hormonal contraceptives are often encouraged at 45 days postpartum by many family planning workers. This practice has led to some concern, because the OCs have been documented to cause a significant decrease in milk output, including changes in its constituents, and total energy content [WHO, 1984, WHO 1988]. In rural Bangladesh, lactating women who had used OCs early in the postpartum period and stopped soon after, did not return to their previous amenorrhoeic status. The majority of women who had used OCs, actually became pregnant earlier than those who continued breastfeeding without using contraceptive methods [Bhatia *et al.,* 1987].

Life table analysis for 2380 women in the same rural area as in the above study during 1987-88, showed that women receiving regular injections of depo medroxy progesterone acetate (DMPA) and those using non-hormonal contraception, breastfed significantly longer than women using no contraception. But women using OCs did not breastfeed longer than women using no contraception. So, although the next pregnancy was delayed in the former group, breastfeeding was not prolonged. The authors concluded, that in communities where prolonged breastfeeding is associated with child survival, non-hormonal contraceptive methods, or injectable DMPA, rather than OCs, should be preferred for lactating mothers [Briend *et al.,* 1991].

A year later, in 1988-89, interviews with 4,580 women in the rural areas indicated that pregnancies among breastfeeding amenorrhoeic women did not occur until after 12 months postpartum, compared to women who were menstruating and became pregnant after 3 months postpartum [Weis, 1993].

The above studies had shown relatively long duration of lactation amenorrhoea in Bangladeshi women. But a few years later, this duration seemed to be decreasing [Salway *et al.,* 1993]. Meanwhile, it had been reported that the addition of solid foods to babies' diets significantly increased the risk of resuming menstruation, with earlier complementation resulting in shorter periods of amenorrhoea in Bangladeshi women [Ford and Huffman, 1988]. These results were similar to those from India, where women who gave complementary foods to their infants between 0-3 months of age, had amenorrhoea for an average duration of 7.6 months, compared to those who started these foods later [Prema and Philips, 1980]. Breastfeeding practices are thus an important factor affecting the duration of lactational amenorrhoea and subsequent birth intervals. If breastfeeding rates were to decline further, the increase required in family planning services to replace the lost fertility impact would be prohibitive, both in terms of cost and difficulty [Huffman and Labbok, 1994].

In Bangladesh, family planning workers employed by the Government of Bangladesh, are directed to inform lactating mothers about the possible disadvantages of the combined OC pill, and advise them to avoid these if they are breastfeeding exclusively [Govt. of Bangladesh, 1994]. But despite reports of success of the LAM from other countries, the Family Planning programmes in Bangladesh have not included it as a contraceptive method. So while breastfeeding women are encouraged to contracept, they are not informed how, and when, breastfeeding itself can be used as an effective means of contraception.

2.4 Breastfeeding Promotion Programmes

Despite recommendations by major paediatric and nutrition groups that infants should be fed only breastmilk for the first 4-6 months of life, the prevalence of exclusive breastfeeding remains low in the world [Tontisirin *et al.,* 1983; Talukder, 1984; Dimond and Ashworth, 1987; Almroth and Bidinger, 1990; UNICEF, 1998]. Programmes to promote, protect and support breastfeeding have been carried out in many countries all over the world, with varied degrees of success [Jelliffe and Jelliffe, 1988; Rea, 1990; Popkin *et al.,* 1991]. The protection component of breastfeeding has been partially successful, as health and hospital policies related to infant feeding practices have largely been modified as have, to some extent, the marketing policies of some of the infant formula manufacturers, following the development of the International Code of Marketing of Breastmilk Substitutes [WHO, 1981; WHO, 1989]. In most of the national programmes, involvement of the media, changes in health and hospital policies, antenatal education, practical help after delivery, and ongoing support in the community, have been used to try to increase breastfeeding rates in general. In Bangladesh, three out of these five approaches have been utilised. Only minimal effort has been given to improving antenatal education, and none at all to providing community support. As 90% of mothers have home deliveries, the last component is especially important. The pupose of this review is to focus on studies that have reported changes related to exclusive or full breastfeeding in the hospital and/or community as a result of their support component, including those from 1985 onwards (where WHO definitions for breastfeeding may have been used).

2.4.1 Hospital-based promotion programmes with post-discharge support

Women have expressed the need for advice and assistance especially during the first week of lactation. Much emphasis, however, has been directed at initiating and promoting breastfeeding during hospitalisation, while minimal attention has been directed to supporting mothers post-partum [Saunders and Caroll, 1988]. Regular and frequent contact with the same care-giver leads to an increase in breastfeeding duration, and the most common reasons for supplementing and/or discontinuing breastfeeding, that of "insufficient milk", can be overcome most effectively by unrestricted feeding, good positioning and appropriate and practical support [Woolridge, 1986a and 1986b, Royal College of Midwives, 1991]. This requires health personnel to be knowledgeable about breastfeeding and to have the skills to help mothers and babies, which they often lack because of inadequate training. To overcome these deficiencies, the Baby-Friendly Hospital Initiative (BFHI) was launched in many countries, including Bangladesh [WHO 1989; UNICEF, 1992; Haider, 1993], and training packages of 18 and 40 hours, were developed for providing standardised information [UNICEF, 1991; WHO, 1993].

This section briefly discusses the reports of hospital/clinic-based studies which provided breastfeeding support for mothers, while their limitations are shown in Table 2.4.

A breastfeeding promotion and education programme provided pre-natal and post-natal support for mothers attending a health centre in Chile. Pre-natal support consisted of 4 lectures and slide presentations given by an auxiliary nurse. Postnatal support was provided for two post-intervention groups of mothers, comprising monthly follow-up in the well-baby clinic, with 8 home visits from a programme staff member (either midwife or auxiliary nurse, and a paediatrician). The difference between the two post-intervention groups, was that the second group was studied in the absence of the originator of the programme. Peer encouragement was mentioned to have played an important part in the programme's success, but by whom, and how, was not described. Initiation of breastfeeding rates was already high at 85% before the programme started, but the intervention helped mothers to sustain exclusive breastfeeding for 6 months (74% vs. 30% before the intervention) [Burkhalter and Marin, 1991].

Table 2.4 Comparison of hospital and community-based studies with a postnatal support component

Author, year of publication, country	Study design	Study limitations	Numbers studied	Contact persons and site	Number of visits	Follow up period	% achieved EBF/FBF I vs. C
Burkhalter and Marin, 1991 Chile	pre and post intervention post I immediately after pre-int post II after 8 months	-no baseline data -no control for possible changes with time	pre-int = 137 post I = 115 post II= 117	midwife auxiliary nurse physician, at clinic	4 prenatal 8 postnatal	6 months	pre-int - 30% post I - 74% ** post II - 64% **
Neyzi et al., 1991a Turkey	randomly selected in 2 wards on 2 days postnatal education in hospital, control vs. intervention	dropouts high 21%	C = 444 I = 499	trained dieticians using video, booklet and education,	max (2)	at 1 week at 1 month at 2 months	47% vs. 12% ** 16% vs. 4% 4% vs. 2%
Neyzi et al., 1991b Turkey	same	unequal size of C and I	C= 313 I = 96	+ well baby clinic + obstetrican + paediatrician	at 7-10 days then monthly (max 7)	4 months	68% vs. 5%***
Valdes et al., 1993 Chile	pre vs. post intervention recruited postnatally + promoted LAM	not randomised highly select and motivated mothers, baseline characteristics not controlled, results of subgrp included	pre-int = 313 post-int = 422	prenatal, natal, lactation clinic + home visits for sub group n= 94	(max 9) 6 1	6 months	67% vs. 32%***
Pugin et al., 1996	pre and post intervention, with and without antenatal education	same as above	pre-int = 363 post-int = 59	trained nurse-midwife, at prenatal checks	last trimester, number of visits not mentioned	6 months	65% pre-int*** 80% post-int

pre or pre-int = pre-intervention, post or post-int = post intervention * $p < 0.01$, **$p < 0.001$, ***$p < 0.0001$, chi squared test

Table 2.4 contd .....

Author, year of publication, country	Study design	Study limitations	Numbers studied	Contact persons and site	Number of visits	Follow up period	% achieved EBF/FBF I vs. C
Frank et al., 1987 USA	randomised controlled trial in hospital	nil	C = 83 I1= 78 I2 = 84 I3= 79	C rout BFC+compak I1 rout BFC+BFpak I2 res BFC+compak I3 res BFC+BFpak	- 8 tel calls within 3 months by res BFC	2 months	C = 20% I1 28% vs. 20% ** I2 29% vs. 20% I3 43% vs. 20%
Barros et al., 1995 Brazil	not randomised, but confounders controlled. referred from maternity ward	differences in unmeasured characteristics of 2 groups	non-attenders =312 attenders = 243	paediatrician	3 visits (after 2 months)	4 months	43% for attenders vs. 18% for non-attenders**
Haider et al., 1996 Bangladesh	randomised, controlled trial in a diarrhoea hospital, PTBF infants	nil	C =125 I = 125	BF counsellors	2-3 sessions in hosp 1 at home after 7 days	2 weeks	75% vs. 8%***
Davies-Adetugbo et al., 1996 Nigeria	C and I from health facilities in different areas	not randomised, diff religious grp in C and I	C =130 I = 126	trained health workers clinic + home	6	4 months	40% vs. 14%**
Alvarado et al., 1996 Chile	control and intervention groups followed prospectively in health centres	-definitions not clear -one-to-one comparison may not reflect actual effects of the intervent	C = 66 I = 62	health promoters + midwife+ physician	3 home visits in last trimester of preg & in hosp after delivery by promoters mothers visit health centre 3x in mo 1 then 1x month (8)	6 months	46% vs. nil**

* $p < 0.01$, **$p < 0.001$, ***$p < 0.0001$, chi squared test, intervent/ I = intervention, C= control, preg = pregnancy, tel = telephone, hosp = hospital, BFC = breastfeeding counselling, rout = routine, res = research, compak= commercial pack BFpak= BF pack

Table 2.4 contd ....

Author, year of publication, country	**Study design**	**Study limitations**	**Numbers studied**	**Contact persons and site**	**Number of visits**	**Follow up period**	**% achieved EBF/FBF I vs. C**
Kistin et al., 1994 USA	control vs. intervention	nil	C = 43 I = 59	peer counsellor after delivery in hospital	1 visit in hospital followed by telephone calls at home	4 months	77% vs. 40% [a] at hospital discharge
Leite et al., 1998 (prelim) Brazil	randomised controlled trial	nil	C = 455 I = 385	peer counsellors	3 home visits in 1st month	1 month	65% vs. 51% [b]

[a] $p < 0.05$, [b] RR= 0.56 (95%CI, 0.42, 0.75)

In Turkey, investigators who assessed an educational intervention on breastfeeding, provided after birth in hospital, and one week later at home, found significant differences in the practice of exclusive breastfeeding between intervention and control mothers (47% vs. 12% at week 1, 16% vs. 4% at month 1), but the impact was lost by the second month (4% vs. 2%) (Neyzi *et al.*, 1991a). When some mothers in the same project were offered further breastfeeding support through a well-baby clinic at the hospital for 4 months, a striking difference in exclusive breastfeeding rates was seen between them and the mothers who had earlier received only two sessions, 68% vs. 5% at month 4 [Neyzi *et al.*,1991b].

In Chile, a breastfeeding promotion programme was carried out at one hospital. The programme consisted of training health staff, providing mothers with pre-natal care (individual, and in groups with nurse trainers using booklets, videos and parents' seminars), support after delivery in hospital, and through an outpatient lactation clinic after discharge. After the programme, there was a significant increase in the duration of full breastfeeding, 67% at 6 months in the intervention group, as compared to 32% in the pre-programme control group [Valdes *et al.*, 1993].

In an experimental study comparing pre- and post-intervention breastfeeding rates, 80% of 59 women who received prenatal group education in a hospital in Chile as part of a breastfeeding promotion programme, fully breastfed for 6 months versus 65% of 363 women who did not receive prenatal education ($p<0.003$). But the effect was significant only in primiparas, 94% of whom breastfed exclusively for 6 months, compared to 57% of those who did not receive prenatal education [Pugin *et al.*, 1996].

In Chile, community health promoters paid three home visits during the last trimester of pregnancy, and one visit in the hospital after delivery. Subsequently, mothers and babies visited a midwife and a physician at the health centre, three times in the first month, and then monthly. The study showed marked differences in the post-intervention group with 42% of the infants exclusively breastfed at 6 months, compared to none in the pre-intervention group [Alvarado *et al.*, 1996].

The personnel promoting breastfeeding in the studies described above, had used their previous staff for providing breastfeeding information. Some hospitals, however, had trained certain staff (midwives or nurses) additionally, or employed new staff, as lactation or breastfeeding counsellors specially for helping women to start and sustain breastfeeding. In the USA, two groups received a 20 to 40 minutes' session with a breastfeeding counsellor in hospital, followed by 8 telephone calls at home. Two other groups received routine postpartum nursing care and a discharge teaching session with some breastfeeding information. The groups who received extra counselling, had more mothers breastfeeding fully at 2 months and breastfeeding partially at 3 months [Frank *et al.*, 1987].

In Brazil, 605 mothers were provided breastfeeding information in a maternity ward by a paediatrician, who advised them to attend a lactation centre for breastfeeding follow-up. Mothers who attended the lactation centre were again seen and helped by a paediatrician trained in breastfeeding. Of the attendees, 124 (43%) were exclusively breastfeeding at 4 months compared to 44 (18%) who did not attend the centre [Barros *et al.,* 1995]. The attendees were different in many ways from the non-attendees, younger, of lower parity (more primiparous) had more pre-natal sessions, and houses with better sanitary conditions. These variables were controlled in the analysis, but attitudes, which were not measured, may have differed significantly.

In Bangladesh, a diarrhoeal disease treatment centre employed lactation counsellors who were trained over 4 weeks using the 40-hours breastfeeding counselling training course [WHO, 1993]. Mothers of partially breastfed infants aged 1-12 weeks admitted for treatment of diarrhoea, were randomised to receive counselling by lactation counsellors or to receive the usual health education messages. Two weeks after discharge, 75% of mothers were breastfeeding exclusively in the intervention group compared to 8% in the control group ($p<0.001$) [Haider *et al.*, 1996].

A combination of breastfeeding talks at clinic and at home, exposure to breastfeeding promotional posters and leaflets, and one-to-one counselling by trained health workers monthly in Nigeria, showed that full breastfeeding was significantly higher in the intervention group than in the controls at 4 months (40% vs. 14%) [Davies-Adetugbo, 1996].

Assessment of a BFHI intervention in a hospital in Nepal showed earlier initiation of breastfeeding within 24 hours of birth (84% vs. 29%), and decreased use of prelacteal foods by the mothers (43% vs. 96%) during the intervention period as compared to before the intervention. By 6 months, however, these rates had deteriorated (59% initiating early breastfeeding and 77% giving prelacteal feeds) [Prasad and Costello, 1995]. The results of this study are very important. They demonstrate that training of health staff alone, will not be sufficient to maintain appropriate breastfeeding practices in hospital settings - policy changes, monitoring and reinforcement will also be necessary.

Although the BFHI is reported to have increased initiation rates of breastfeeding, and the practice of exclusive breastfeeding in maternity hospitals in Bangladesh, these practices are often not sustained for long periods (personal communication and observations). The next step will be to facilitate the maintenance of exclusive breastfeeding when the mothers return to their homes, which is discussed in the next section.

2.4.2 Community-based promotion and support programmes

Mothers may be encouraged to breastfeed their babies if they have received breastfeeding promotion messages through the media, or through the health services. But often, despite their intentions to breastfeed, are not able to do so. Even where access to health facilities is good, mothers may hesitate to consult health professionals about breastfeeding difficulties if the babies are not sick. It is now recognised that continuing support from family, friends and neighbours, is important to sustain breastfeeding [Bryant, 1982]. When women live in nuclear families, without access to the extended family, they can particularly benefit from mother-to-mother support groups and experienced peer counsellors.

Reports of studies which have documented the results of mother-to-mother support groups are not generally available. A WHO report [WHO, 1998] has cited two studies (one in the USA by Meara, and another in Guatemala by Maza), where they were said to have been effective in helping breastfeeding mothers, but no reports were provided of their impact on increasing exclusive breastfeeding.

Table 2.4 lists the studies which are described below.

Peer support has been shown to be particularly effective in communities where breastfeeding mothers do not receive sufficient support from families, health staff, and cultural norms. Peer support has also been effective in middle-income women. During 1989 in Chicago, women who were supported by peer counsellors, had significantly greater breastfeeding initiation (93% vs. 70%), exclusivity (77% vs. 40% at hospital discharge), and duration (mean 15 weeks vs. 8 weeks), than women who also wanted to breastfeed but were not assigned to peer counsellors [Kistin *et al.*,1994].

In Bristol, UK, peer counsellors were also successful in helping women to breastfeed but figures regarding exclusive breastfeeding are not yet available [Sheppard, personal communication].

By discouraging the use of herbal teas and water, a community-based education programme in Peru managed to increase the numbers of infants exclusively breastfeeding for 4 months. As the number of women who went on to partial breastfeeding remained the same after the intervention, the authors concluded that the intervention did not adequately increase mother's confidence in their ability to produce breastmilk [Fukumoto and Kanashiro, 1994]. The report neither explained who provided the education and how frequently, nor gave any figures about the changes in infant feeding status.

Preliminary results from a study in Brazil where community counsellors visited mothers three times during the first postpartum month, showed that the intervention mothers were more likely to be breastfeeding predominantly compared to the controls (65% vs. 51%) [Leite *et al.*, 1998].

Thus, of 10 hospital-based studies providing support for breastfeeding mothers, the personnel promoting breastfeeding, and the number of visits were variable. All of these studies, however, were successful in increasing exclusive breastfeeding during the follow-up periods, except for one study [Neyzi *et al.*, 1991a] which demonstrated that a single follow-up after one week of discharge was not sufficient to improve the exclusive breastfeeding rates for more than a month. Most of the studies had some methodological limitations (Table 2.4), but there was a consistent pattern, that was highly suggestive in showing an impact. Only two interventions were carried out with peer counsellors, and only one of these provided support at home [Leite *et al.*, 1998]. The latter study is reported to be a randomised controlled trial, but details of the methods were not given in the abstract provided as a preliminary report.

It is thus extremely important that more randomised intervention trials be conducted with peer counsellors, to assess their impact on breastfeeding practices of mothers in different situations.

Exactly what kind of intervention is most effective for promoting and supporting breastfeeding, and the number of visits required, is not yet clear, but possibly a combination of antenatal information, and support at delivery and during early infancy, may act synergistically to initiate and sustain exclusive breastfeeding. Most probably, a combination of day-to-day support from community members, backed up by specialised help from health facilities when required, may be more effective than either one alone [WHO, 1998].

2.5 Current breastfeeding practices in Bangladesh which hamper exclusive breastfeeding

Bangladesh is a country where children were traditionally breastfed for long durations, with a median duration of 30 months in the rural areas [Huffman *et al.*, 1980]. Breastfeeding is, however, not practised optimally, and exclusive breastfeeding rarely, which could account for the high rates of malnutrition in the country, as has been indicated in chapter 1. This section discusses only those feeding practices that interfere with exclusive breastfeeding, namely delay in initiating breastfeeding, use of prelacteals (see glossary) and water, early complementary feeding and bottle-feeding.

2.5.1 Delayed initiation of breastfeeding and use of prelacteals

One of the current recommendations for mothers, is that they should start breastfeeding within half an hour of giving birth, or as soon as possible [WHO, 1989]. This directive is based on research which demonstrated that early postpartum contact leads to increased mother-infant interaction, and that mothers who suckled their infants within one hour of delivery, and breastfed frequently, subsequently breastfed longer than those who started breastfeeding after a few hours [de Chateau and Wiberg, 1977, Salariya *et al.*, 1978].

In Bangladesh, delay in initiating breastfeeding is common. In 1974, only 41% of rural Matlab mothers began breastfeeding during the first 24 hours, and by the third postpartum day, 97% had started breastfeeding [Huffman *et al.*, 1980]. The situation was worse in urban Dhaka, where 9% mothers had initiated breastfeeding within six hours and another 11% in 6-24 hours [Nasirullah *et al.*,1984]. The delay was longer in clinic-delivered babies, only 5% of whom were given to the mother for breastfeeding within the first 12 hours, as compared to 26% of babies born at home [Muttalib *et al.*, 1983]. A few years later,a study from rural Tangail reported that 15% of 248 mothers started breastfeeding within the first 12 hours [Rizvi, 1992].

In the interval between birth and the commencement of breastfeeding, the new-borns were almost universally fed prelacteal foods, which were usually honey, ***misri*** water (rock sugar and water), plain water, mustard oil and sometimes cow's milk, goat's milk or powdered milk [Lindenbaum, 1966; Chowdhury *et al.*, 1987; Nasirullah *et al.*, 1984; Rizvi, 1992; Islam, 1992; Islam and Nielsen, 1993]. A cross-sectional survey was carried out prior to the proposed intervention in the same area in Badda and adjoining areas of Dhaka, where 1100 mothers with infants below six months of age were interviewed. Two or more fluids were generally given as prelacteals, of which the commonest were honey and sugar-water, given for a sweet voice/to speak sweet words and to satisfy hunger or thirst, and mustard oil, for cleaning the mouth, stomach or throat. Additionally, postlacteals (see glossary) were given by 68% of mothers. These were again sugar-water and honey, if they had not previously been given as prelacteals, and plain water and milk for satisfying thirst and hunger [Haider *et al.*, 1998].

In the rural areas, 420 mothers were interviewed at home one month after delivery. The researchers reported that the type and duration of prelacteal feeding had a significant negative influence on "coming in" of milk ($p<0.05$), defined as a subjective experience of fullness, heaviness and tingling in the breast [Ahmed *et al.*, 1996].

Problems regarding the feeding of colostrum have previously been described, commonly stating that mothers discard or reject colostrum [Chowdhury *et al.*, 1987 and personal communication with researchers and health workers]. Careful evaluation of the infant feeding literature in Bangladesh over the last twenty years, shows that although they have used the term "colostrum", it has often not been defined [Haque *et al.*, 1987; Chowdury *et al.*, 1987; Islam, 1992; Das and Ahmad, 1995]. When Haider *et al.*, [1994] explained what was meant by colostrum, mothers reported they had fed it to their babies within 1-5 days of birth, but some had expressed and discarded the first few drops. Furthermore, colostrum was not observed to be rejected by any of the 43 mothers in a qualitative study [Rizvi, 1992], and in an evaluation of a vitamin A programme in Northern Bangladesh, 92% of mothers had given colostrum [Hassan *et al.*, 1994]. Misconceptions about colostrum rejection in the past might have occurred because of lack of precise definition of colostrum, and inadequate information provided to interviewers about the maximum time period for its secretion from the breasts.

2.5.2 Use of water and early complementary feeding

Mothers in Bangladesh rarely breastfeed their infants exclusively. Water is commonly given to all infants whether or not they are breastfed. This was not seen as an issue until the Breastfeeding Campaign started in 1989, nor was it discouraged by health professionals. The earlier rural studies referred to fully breastfed infants as those who received no regular supplementation in addition to breastmilk (and were probably predominantly breastfed), whereas partially breastfed infants were those who received foods other than breastmilk on a regular basis [Huffman *et al.*, 1980; Khan, 1980].

As the Breastfeeding Campaign began promoting exclusive breastfeeding, the concern voiced by mothers (and also health staff), was that babies fed only breastmilk might become excessively thirsty and dehydrated. Studies in hot tropical countries, however, have shown that it is safe for babies to breastfeed exclusively without additional water [Talukder and Kawser, 1986; Almroth and Bidinger, 1990; Sachdev *et al.*, 1991].

Babies in Bangladesh are often given other milk, usually fresh cow's milk or tinned powdered milk, or rice gruel, very early in life. This early complementation may be a traditional practice (in the case of cow's milk and rice gruel), or an effect of urbanisation and widespread advertising by the milk companies [Talukder, 1984]. Among children attending an outpatient department at a Dhaka hospital, 26% of 476 sick babies aged 3 months were already receiving complementary food [Nasirullah *et al.*, 1984]. In the rural areas, 30 out of 38 babies below 5 months of age were fed complementary food along with breastmilk [Islam, 1992]. A national cross-sectional survey (24-hour recall data) showed that among infants aged 2-3 months, 11% were fed infant formula and 19% fed other milk [Mitra *et al.*, 1994]. Among mothers of infants below 6 months attending a diarrhoeal disease hospital, the median age for starting complementary food was 27 days [Haider *et al.*, 1997]. The main reason stated for starting these foods was the mother's perception of having insufficient breastmilk. Other reasons were baby's illness, breast problems, and mother's employment, which were similar to other studies [Talukdar *et al.*, 1983; Nasirullah *et al.*, 1984; Haider *et al.*, 1998].

Complementary foods, when started early, are usually given by bottle, which can increase the risk of introducing pathogens to these infants. By the 1980s, bottle feeding had become a common practice in the urban areas. Concern about the rising trend was first voiced when a study of 282 affluent mothers in Dhaka showed that 23% combined breastfeeding with bottle feeding from birth, and that 59% and 88% mothers were bottle feeding when their infants were one and four months old respectively [Talukder *et al.*, 1983]. At the same time, another study from the same city commented on the high rates of bottle feeding from birth, 66% in clinic-delivered mothers, and 51% in those delivered at home [Muttalib *et al.*, 1983]. Mothers in the rural areas were not far behind regarding this practice. In 12 villages north of Dhaka, although all 110 mothers interviewed were still breastfeeding at one year, 80% had introduced the bottle by 5 months of age, and 100% by one year. Fluids fed by bottle included sugar water, fresh cow's or goat's milk, powdered milk, and rice, wheat and barley gruels [Das *et al.*, 1992].

From the studies described above, it can be seen that exclusive breastfeeding was rarely practised by mothers in Bangladesh. In 1983, the first study using WHO criteria in this country, reported 12% of affluent mothers attending a private clinic in Dhaka for consultation of their children had exclusively breastfed their infants until 4 months of age [Talukder *et al.*, 1983]. Eleven years later, in 1994, despite national breastfeeding promotion, only 10% of educated mothers attending a private paediatric hospital in Dhaka had exclusively breastfed their infants for three months [Amin and Mannan, 1995], which was similar to the rates of exclusive breastfeeding in the city's slums [El-Arifeen *et al.*, 1994].

2.6 Summary

The literature review has shown that exclusive breastfeeding is more protective compared to predominant and partial breastfeeding regarding diarrhoea morbidity, but there is insufficient evidence to say the same for respiratory infections. There are no studies comparing the growth of exclusively and predominantly breastfed infants, but most have shown that fully breastfed infants grow differently from the NCHS reference. The studies on contraception show no specific benefits in favour of exclusive breastfeeding over predominant breastfeeding as such, but provide sufficient evidence to support the promotion of full breastfeeding for the first six months to utilise the contraceptive potential of breastfeeding.

Although breastfeeding promotion programmes of all types have been effective to varying extents, most of the hospital-based promotion programmes with a postnatal support component have a significant benefit on sustaining improved breastfeeding practices. But programmes where community-based peer counsellors have been provided to help breastfeeding mothers at home, are scarce.

In Bangladesh, as a result of the breastfeeding promotion programme, considerable effort has been given to encourage mothers to feed their babies colostrum, whereas less emphasis has been given to initiate breastfeeding soon after delivery and to discourage the use of prelacteals [Greiner, 1997]. Exclusive breastfeeding is promoted nationally, mainly through the BFHI and to a limited extent, through the audio-visual media. But in a country where the vast majority of mothers do not attend health facilities for antenatal care, they do not receive the necessary information which will help them to start exclusive breastfeeding. For the minority who deliver in BFHI hospitals, and do manage to start exclusive breastfeeding, there is no follow-up system or knowledgeable support network, which can help them to sustain this practice. In addition, breastfeeding promotion should not be restricted to maternity hospitals and health facilities providing child care. If it is accepted that family planning programme policies should provide fertility regulation methods and services that are appropriate for lactating women [Jelliffe and Jelliffe, 1985], it is also time that health and family planning programmes cooperate to promote breastfeeding and the LAM, so that mothers do not receive conflicting messages.

Considering the deficit of health facilities, the existing burden on the health services, the growing population, the poor breastfeeding practices and the enormous proportions of malnourished children, there is an urgent need to act rapidly to correct this situation. An intervention where peer counsellors are trained in breastfeeding, and can help mothers achieve and sustain exclusive breastfeeding, might be one of the ways to start improving the situation at the community level.

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CHAPTER 3: THE INTERVENTION

The intervention was to encourage, help and support mothers to breastfeed exclusively until their infants were 5 months old. Parts of the Badda area were randomised as intervention and control clusters (details in chapter 4). In each of the twenty intervention clusters, a mother was selected, and trained as a peer counsellor (PC). A minimum of 10 counselling visits were scheduled (increased later to 15), starting with two visits in the last trimester of pregnancy, another within 48 hours of delivery, and then on the 5th day, between 10th and 14th days, and fortnightly thereafter until the infants completed 5 months (Table 3).

3.1 Peer counselling

Peer counselling, literally, is counselling conducted by peers. Peers are people whose background (socio-economic, educational, family) is similar to those with whom they interact. It is supposed that because of the similar backgrounds, peer counsellors find it easier to inform, encourage/discourage, help and support the people they are counselling, and become trusted friends [Fisher and Stremler, 1993]. As the intervention would focus on mothers and young infants, the peer counsellors for this project would also be mothers with breastfeeding experience. Their responsibilities would be to:

- Provide information about breastfeeding, address specific concerns of pregnant mothers, and correct misinformation.
- Counsel pregnant and lactating mothers on a one-to-one basis. Enable new mothers to avoid common breastfeeding problems.
- Support women during breastfeeding. Identify and refer breastfeeding problems that were beyond their competency to breastfeeding counsellors (BCs).
- Provide breastfeeding information and support to employed mothers.
- Record numbers of mothers enrolled, number of visits for each, problems encountered and solved, for evaluation purposes.

Since the term "peer counsellors" could not be explained in simple, easily understood Bangla words, they were called "*Ma o shishu jotno shohayok*". This term means that they were mother and child care facilitators.

Normally a peer counsellor would be allowed to visit when she thought it necessary, or according to her convenience, but for the purpose of achieving the main objective, the minimum number of visits required and the contents of each type of visit were standardised. The main contents of the counselling sessions during the different visits is provided below.

a) During the last trimester of pregnancy

The PCs were instructed to follow the guidelines for pregnancy visits (Annex 1). During the PC's first visit, the mother's intention to breastfeed was assessed, past problems in breastfeeding recorded, and influential family members identified. While informing about the benefits of exclusive breastfeeding, emphasis was given to the importance of mother-infant contact within 1/2 to 1 hour of birth, about feeding colostrum first, and discouraging prelacteal and postlacteal foods. This session would take approximately one hour on average.

The relevant information (Annex 2) was repeated again at the second visit. Efforts were made to include the husband/other family member if they had not been available during the first visit, and in their absence, a friendly neighbour was requested to attend this session. Since birth attendants (*dais*) were not provided with training on breastfeeding, relevant information for the post-delivery period (early initiation of breastfeeding, discouraging prelacteals and postlacteals) was explained to the pregnant mother and attending members, so that babies would be held and breastfed soon after birth, as well as exclusively breastfed. The family members were requested to contact the PC soon after birth of the baby. In addition, they were also encouraged to inform the PC, or the research team, directly at ICDDR,B (the Centre), if there were any problems during pregnancy or delivery (for which referral to another hospital could be required and arranged).

b) After delivery (within 2 weeks postpartum)

After being informed that one of her enrolled mothers was going into labour, or that a baby had been born, PCs were instructed to go to the house immediately, or as soon as possible within 48 hours. According to their guidelines (Annex 1 and 2), mothers were encouraged to breastfeed frequently and on demand, to stop prelacteals and postlacteals if these had been given, and helped with position and attachment of the baby at the breast, if required. The PCs were encouraged to visit the hospital or clinic if mothers delivered there, and if this was not possible, to visit them as soon as they returned home. They visited these mothers again between 10-14 days to further encourage exclusive breastfeeding and reinforce the messages given in pregnancy.

c) Fortnightly visits

PCs were instructed to visit mothers at least twice a month, and more frequently if required. These visits were mainly to support and encourage the mothers to continue exclusive breastfeeding until 5 months, and to remind them of its contraceptive potential if the LAM was used. Mothers were informed that combined oestrogen and progesterone pills could be detrimental to breastfeeding. So, if the LAM was not applicable, the PCs recommended condoms if menses had not resumed, and the injectable contraceptives if they had.

To mothers who could not/would not breastfeed exclusively, PCs were to suggest that they give infant formula or fresh cow's milk (1:1 dilution), not full cream milk, and to use the spoon and cup for feeding this. Gruels and other solid foods were discouraged before 5 months of age.

Daily or frequent visits were suggested if mothers had any problems (e.g.; engorged breasts, sore nipples or not enough milk). If there was no improvement after 2 days, PCs were advised to inform a BC for further help with management.

PCs were also to talk to mothers regarding personal cleanliness and domestic hygiene, handwashing before feeding, after going to the toilet, and after changing babies' diapers. If a baby or mother were sick, it was suggested that PCs visit them and do the needful, which in many cases meant advising the mother where to go for consultations, and/or accompanying them to a hospital or clinic if she wished.

Table 3. Schedule of PC visits compared to usual visits in the area

Visits and interactions common to C and I groups	Extra home visits by PC in the intervention group
PREGNANCY	
last trimester - FPW and *dai* antenatal checks (voluntary) with health staff	8th month 9th month
Delivered by - *dai* at home -or health staff in hospital	
POSTPARTUM in first 15 days, *dai* visits 1 or 2 times	within 48 hours, 5th day 10-14th day
1- 5 months 2-monthly - FPW	fortnightly PC to maintain schedule, even though may have seen mother last week
Total visits 3-4 *dai* visits 3-4 FPW visits	15 PC visits + as needed

C = control I = intervention
dai = midwife/birth attendant, FPW = family planning worker, PC = peer counsellor

3.2 Development and choice of relevant information to be provided in the counselling sessions

The relevant information available in the counselling manual (WHO/UNICEF, 1993) had earlier been modified for the local situation (by PI and co-trainers) when training health facility staff in Bangladesh. Since a limited number of messages can be retained at a time, the relevant information (Annex 2), required for promoting and supporting exclusive breastfeeding was distributed over the counselling visits and others added when required. Only during the pregnancy visits (Annex 2) did all the intervention mothers receive exactly the same standardised information which would be essential to motivate them for exclusive breastfeeding. The first set of information was related to mother's food and rest - encouraging her to eat more to produce more breastmilk and to maintain her body stores, and rest, so she would not get exhausted. The second set of information was provided for events immediately after the baby's birth, to encourage early contact with the baby and early initiation of breastfeeding, while discouraging prelacteals and postlacteals. The third set of information promoted exclusive breastfeeding for 5 months by highlighting its benefits. All this relevant information had been reviewed and approved by the external reviewers of the project (at WHO and LSHTM).

3.3 Selection and training of peer counsellors

Women who have breastfed their babies may be quite knowledgeable about breastfeeding. But to become peer counsellors, they need to know more for answering mothers' questions and concerns which are beyond their own personal experience. In order to increase mothers' confidence in breastfeeding, PCs must themselves be confident about the information that they are sharing and be able to explain the basics of how breastfeeding works and how to avoid common problems. Training would increase their knowledge about breastfeeding, and teach them counselling and communication skills to enhance their effectiveness.

Mothers with personal breastfeeding experience, a minimum of 4 years of school attendance, willing to help other mothers breastfeed, and residing in the intervention clusters, were identified by the FP workers. A list of such women was provided to the PI. These women, in turn, gave names of other women who were also interested to do this work. The BCs first met the potential candidates at home, gave them some idea about the work required, and requested them to discuss it with their husbands/guardians. If the latter agreed, the names of these women were added to the list. An average of 4-6 women from each intervention cluster were then interviewed formally at the Centre by the PI and two BCs, when they were asked about their educational and family backgrounds, and about their children's feeding histories. At the same time, they were assessed regarding their attitudes about exclusive breastfeeding, complementary and bottle feeding, and for helping mothers. Their responsibilities were clearly explained, and the most suitable candidates, based on their natural ability to communicate with mothers as peers, were then selected for training as PCs.

Training of the PCs was carried out at the Centre by the PI and the BCs (schedule in Annex 3). The BF Counselling Course, and other books were used during the 10-day training period [WHO/UNICEF, 1993; King, 1992; Renfrew, Fisher and Arms, 1990], which included benefits of exclusive and frequent breastfeeding, disadvantages of prelacteal feeds and bottle feeding, importance of early initiation of breastfeeding, how the LAM can be used for contraception, and contraceptives not detrimental to breastfeeding. Counselling skills were taught, using demonstrations and role play. The skills included; listening to mothers and learning about their problems, assessing position and attachment of babies during a breastfeed, duration of a breastfeed, building mother's confidence and giving support, providing relevant information and practical help when required. The importance of obtaining family support, especially from the baby's grandmothers, was stressed. In case of nuclear families, involvement of a neighbour for providing alternative family support was recommended. Classroom sessions included lectures, interactive discussions, role play (Plates 1 and 2), and counselling practice with mothers of hospitalised infants. The next phase of the training was conducted in the project area, to practise counselling with pregnant and newly delivered mothers (Plates 3 and 4), and with mothers of infants between 1-5 months of age.

The PCs worked part time and were paid an honorarium (Taka 1000 per month), for time spent away from their homes and to cover transport costs in the area. In the event that a PC fell sick, decided to stop working or left the area, an adjacent PC was requested to take on the mothers assigned to the former, in addition to her own, until a replacement PC could be trained (from the previous list).

3.4 Breastfeeding counsellors

Two breastfeeding counsellors (BCs) were employed full time for this project. They had an MSc in Home Economics and had been trained for breastfeeding counselling by the PI for two weeks, using the above course for an earlier research project [Haider *et al*,, 1996]. The BCs' had 24 months' experience in breastfeeding counselling in a hospital situation, both in research and service, with home follow-up. They also had experience of data entry in a personal computer for the same period. Although the BC's main responsibility was to supervise and monitor the PCs, they were also responsible for data entry. Considering that PCs in other countries are always linked to a nurse or midwife trained in breastfeeding, or to a lactation counsellor, the BCs would be the first referral point for the PCs. Initially, it was planned that one BC would be based at the family planning clinic, where permission for using a room in the morning hours had been obtained to facilitate referral from the PCs, every day except on holidays. But when referrals were required, both the PCs and the mothers preferred either to visit the Centre, because it was a hospital where doctors were always available, or for the BCs to visit their homes.

3.5 Criteria for referring to breastfeeding counsellors

A PC was instructed to refer a mother to a BC for problems which she might not be able to manage, such as:

1. When a mother had doubts about her baby not growing well or as expected. The PC would take the mother to the Centre, where the BC would weigh the baby, check the growth chart, demonstrate the baby's place on the curve, and accordingly counsel and reassure her.
2. If there was intensive and repeated family pressure to start other milk. The PC could request the BC to visit the mother at home and talk to the family members so that they could re-consider their decision.
3. If nipple sores recurred even after correction of baby's position and attachment at the breast, the BC would have to check for thrush and other reasons.

If there were referrals to a BC for situations which a PC should have been able to handle herself, her counselling ability was re-evaluated.

3.6 Criteria for referring from breastfeeding counsellors to principal investigator (PI)

The mother was to taken to the PI for diagnosis and treatment if:

1. nipple sores recurred after the baby's position and attachment were corrected, and if infection was suspected,
2. if breast infection (mastitis) did not improve with symptomatic management,
3. if there was suspected breast abscess,
4. or for any medical problems of the mothers and babies.

All consultations by the BC and PI were recorded.

3.7 Pre-testing the intervention

Due to time constraints, this part of the project was combined with continued training of the PCs in the project area. Since pre-testing was required for PCs and also for the interviewers involved in data collection (see section 4.3.2), it was decided that a BC would supervise 10 PCs each for 2 weeks, and the PI would supervise the interviewers. After 2 weeks, the PI accompanied the BCs to see how the PCs were counselling mothers. Ten mothers whose expected delivery dates were within the next 10 days, were "enrolled" for the pre-test and counselled, using the pregnancy guidelines. After birth of their babies, they were counselled again on the 5th day. For this visit, 4-5 PCs formed one group, to avoid overcrowding a room with a new-born. One PC counselled, while others observed and contributed when needed. A BC intervened only if a PC's counselling was incomplete. These mothers were not included in the actual study, although the PCs continued to counsel them. Practice counselling sessions for mothers of older infants were also held with other mothers in the project area.

The other members of the research team were 4 interviewers and their field assistants, and their roles are described in sections 4.3.2, 4.3.1 (no.6) and 4.1.6 respectively.

Plate 1. **Training of peer counsellors in the classroom**

Plate 2. **Two trainee peer counsellors perform a role play with a doll, while others observe**

Plate 3. **Trainee peer counsellor (seated right) counselling a pregnant mother and her mother observed by other trainees**

Plate 4. **Trainee peer counsellors with a mother after delivery**

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CHAPTER 4: STUDY DESIGN and METHODOLOGY

This chapter opens with a descrip ion of the study design and setting followed by the sampling technique, randomisat on procedure and sample size calculation. The inclusion and exclusion criteria for the study, the procedure for enrolment of mothers, and notification of births are explained next. The outcomes for the study and their measurement, are then described along with the procedures used for monitoring data quality. Methods used for the collection of qualitative data are also described in this chapter. Finally, the data management and analysis procedures are explained.

The research team consisted of twelve members, shown in Plate 5.

Plate 5. Members of the Research Team

Absent - Dr Iqbal Kabır

4.1 Study design

The study was a controlled, randomised intervention trial starting in the third trımester of pregnancy, and continuing until infants were 5 months old

4.1.1 Study setting

The study was undertaken in a section of Dhaka city within the coverage area of a non-government organisation (NGO), namely, "Unity Through Population Services" (UTPS). The reasons UTPS was selected for this study were;

- they are a relatively large NGO, working in Bangladesh for the last twenty years, presently providing Mother and Child Health and Family Planning (MCH-FP) services in Uttara, Banani and Badda areas of Dhaka city.
- they are funded by the United States Agency for International Development (USAID), which also funds other MCH-FP NGOs with similar service provision and staffing patterns.
- the administrator, medical and training officers are members of the Bangladesh Breastfeeding Foundation (BBF), and have provided breastfeeding orientation for their family planning workers.
- they are keen to see whether peer counsellors succeed and would consider incorporating them into their existing service programme.

Of the three UTPS service areas, the Badda area was selected for the proposed research because it was the largest and most densely populated area. Badda extends from Merul to Khilkhet (6-8 km south-east from ICDDR,B hospital), covering an area of 6 km by 2 km. In 1994, the census for the UTPS area in Badda showed a population of approximately 190,000 with 30,000 households and 28,717 couples of reproductive age eligible for contraception. Houses in the Badda area are very densely located. Half the streets are concrete surfaced, but most of the lanes are only mud paths. Shops of all types, and houses, line both sides of the main road which goes through the middle of the area (Plate 6 and 7). There are a number of primary and high schools, medical clinics run by other organisations and private clinics. Families living there are predominantly in the lower middle and low socio-economic groups, but there are some very rich and very poor families as well. In August 1995, when the study was being planned, 180 babies were born in this area.

Plate 6. **Semi-pucca houses and shops in the project area**

Plate 7. **Katcha houses in the project area**

4.1.2 Informing the community

Community leaders and NGO health facility and field staff were informed about what type of research was being planned and why, and the reasons for choosing their community. It was also explained that the respondents' participation in the research was voluntary. The leaders then informed other members of the community which ensured their co-operation and support. Additionally, it was made clear to NGO field staff that the researchers were working with them as their partners, and not as their evaluators.

After these meetings with the community leaders and NGO staff, all the houses within the jurisdiction of the UTPS Badda service area were numbered (with paint) by this research project's field assistants for future identification by the research team. For example, a house numbered 45/2/200 indicated that the area was covered by FP worker no. 45, the house was in block 2 and its number was 200. If new houses were built in the same compound after this numbering, they were given additional numbers from a-z, e.g.: 200b, 200c and so on.

4.1.3 Sampling technique and randomisation

The clusters designated the geographical coverage areas of individual PCs. A cluster sampling technique was used, assuming that members of each cluster would be similar to others in that cluster in terms of specified characteristics, for example number of household members, education of mothers and fathers, socio-economic status of the families, and infant feeding practices. More importantly, one must have a cluster rather than individual level of randomisation for this type of intervention.

The cluster demarcations were as follows: Twenty FP worker areas, each with 2 clusters or blocks (150 couples in each block), were randomised as control and intervention areas, using a random numbers table. Once designated as an intervention cluster, a PC was allocated to each of the 20 clusters (Fig. 4.1). There were no buffer areas between the 20 intervention and 20 control clusters.

Fig 4.1 Distribution of areas, clusters and peer counsellors

20 FP worker areas → 10 C areas → 20 C clusters

20 FP worker areas → 10 I areas → 20 I clusters → 20 PCs

FP = family planning, C = control, I = intervention, PC = peer counsellor

A small survey in mid-1995 showed that there were 6-8 women in the 8th and 9th month of pregnancy in each cluster. It was calculated that if 3-4 women would fit the selection criteria and provide consent for the study, one PC could be seeing 3-4 new mothers each month. So, by the 6th month, when the study was fully operational, a PC would be counselling approximately 18-24 mothers at different stages.

4.1.4 Sample size estimation

Recent data on urban breastfeeding practices in the Dhaka slums showed only 10% of women breastfed exclusively until 3 months (El-Arifeen *et al.*, 1994). A similar prevalence rate was expected in the Badda service area. In a previous study, mothers of partially breastfed infants hospitalised with diarrhoea, were counselled by breastfeeding counsellors. Among them, 60% reverted to exclusive breastfeeding before discharge from hospital and continued to do so at home when followed up after 2 weeks, compared to 6% of those who were not counselled individually (Haider *et al.*, 1996). With home counselling and home deliveries, the conservative assumption was that the numbers of mothers breastfeeding exclusively would be less than that achieved at the hospital (because babies there were very ill, and mothers could have been more inclined to change their feeding practices).

Using the formula below, sample sizes were calculated at 5% significance, 90% power and using a two-tailed test (Kirkwood 1990; Lwanga 1991) for three different baseline breastfeeding prevalences and differing intervention impacts.

$$n = \frac{\{u\sqrt{[\pi_1(1-\pi_1)+\pi_2(1-\pi_2)]}+v\sqrt{[2\bar{\pi}(1-\bar{\pi})]}\}^2}{(\pi_2-\pi_1)^2}$$

where n = required minimum sample size

π_1 = prevalence in uncounselled and π_2 = prevalence in counselled

and $\bar{\pi} = \dfrac{\pi_1 + \pi_2}{2}$

v = 1.96 (percentage of the normal distribution corresponding to the required (two-sided) significance level of 5%)

u = 1.28 (percentage point of the normal distribution corresponding to 90% power)

Starting from the prevalence and impact previously obtained (10:60), and then proceeding to more conservative estimates, the various calculated sample sizes were as follows:

uncounselled : counselled = n

10 : 60 = 14

10 : 50 = 26

10 : 40 = 52

20 : 50 = 52

20 : 40 = 65

5 : 40 = 28

5 : 30 = 47

A sample size of 52 would therefore be sufficient for all but one of these situations. Since the design effect was not known, arbitrarily 2-4 times the calculated sample would give the group size.

Selecting the upper value and increasing 4 times = 52 x 4= 208

calculating 20% loss for migration = 208 + 42= 250

and adding 25% for confounders = 250 + 62= 312

The calculations showed that a total of 312 mothers would be needed in each group.

According to data collected earlier in April 1995, there were an average of 6-8 women in the third trimester of pregnancy per cluster that month, of whom 3-4 women could be enrolled in the study. Therefore to recruit 312 mothers in each group over a period of 12 months, 20 clusters would be required for the intervention and 20 for control. These 40 clusters were drawn from the 60 available (excluding clusters which were flooded during monsoons, and those without FP workers).

4.1.5 Inclusion and Exclusion Criteria

Mothers were included if the following criteria were met:

Age between 16-35 years, with maximum parity 5 and 4 living children, intention to stay in the area for 6 months, written consent for the study and intention to deliver in Dhaka.

Exclusion criteria for the mother were:

- documented records of heart disease or insulin dependent diabetes mellitus which would require a mother to be hospitalised for > 7 days after delivery
- eclampsia in previous pregnancy, as this has a high recurrence rate
- *cytotoxic drugs, or antidepressants which make a baby drowsy and unable to breastfeed

Exclusion criteria for the infants were:

- *multiple births
- *visible congenital anomalies such as cleft palate (babies with other anomalies like Down's syndrome, cardiac problems, would be excluded if diagnosed by physician)
- *admission in intensive care unit
- birth weight <1800 g

(*These criteria were applied after delivery. In the event that infants were excluded, breastfeeding counsellors supported mothers to continue breastfeeding and data were collected but not analysed). The interviewers kept a record of the women who could not be included in the study and the reasons (shown in chapter 5).

4.1.6 Enrolment of mothers

Pregnant women in the area had been informed earlier by the FP workers that they would be visited by a research team member from the Centre. The field assistants (4), were each assigned to 10 clusters, 5 of each group, according to geographical proximity. They went from house to house, identified women who were in their last trimester of pregnancy, and wrote their names, parity and house numbers in a notebook. These entries were shown daily to the interviewer who was also allocated to the same clusters. The interviewers then compiled a list of the pregnant women who were in the 8th and 9th month of pregnancy. Pregnant women in their 9th month were prioritised for visiting first, so that they could get at least 2 counselling visits before delivery. At the first interview, the objectives of the research project were explained and the consent form read out in the presence of the husband and/or other influential family members such as the woman's mother or mother-in-law. If any of these household members were literate, they were given the form to read. If the husband was not at home, which was often the case, a smaller note explaining the objectives of the study and follow up schedule was left with the mother, so that he could read and sign it before the mother was enrolled. This was done to avoid any misunderstanding about the study and to minimise dropout after enrolment. Thus, two visits were commonly required before a mother could be enrolled. After obtaining signed consents, the pregnant women were interviewed using Questionnaire 1 (Annex 4). A birth notification slip was given and the parents were requested to send it to the Centre as soon as possible after the baby's birth, and in the intervention areas, to inform their PC who they would be meeting soon (often known to the family). The PCs were informed daily by the interviewers/field assistants about the women who had been enrolled, so that they could be visited within 2 days. This precluded blinding of the interviewers.

4.1.7 Birth notification

A box with "BADDA STUDY" written on it (in Bangla), was fixed to a pillar beside the hospital entrance leading to the registration desk. At the first enrolment visit, and after completing Questionnaire 1, the interviewer gave the mother a "referral slip" which included her name, identification number, block and house number with instructions to write the date, time and place of birth, before bringing it to the Centre. A sketch was given with the referral slip to show the location of the box mentioned above, so that the husband or other person bringing the slip would know where to drop it. The box was checked for referral slips daily, morning and afternoon. The birth notifier was reimbursed for travel expenses when an interviewer visited the home for the day 4 interview. In addition to the referral slips, husbands in the intervention group were requested to inform the PCs as soon as possible after delivery. In many instances, they also requested the PC to inform the study team, which she did from a telephone in the neighbourhood. As some late notifications were received from the control group at the onset of the project, it was decided to have the field assistants also check the houses of the mothers around the expected delivery date to enquire if a baby had been born, so the mothers could be interviewed on day 4.

4.2 Definitions of infant feeding categories and foods

The definitions which were used in the study are:

Exclusive breastfeeding	: only breastmilk (medicines, including oral rehydration solution (ORS) and vitamins are permitted by this definition, but not water, juices or teas).
Predominant breastfeeding	: breast milk and water/ sweetened water/ juices/teas.
Complementary foods	: milk, gruel, semi-solids or solids given in addition to breastmilk
Partial breastfeeding	: breastmilk and complementary foods
Non-breastfed	: no breastmilk
Colostrum	: the thick yellowish secretion which is secreted from the breast within the first week of life.
Prelacteal foods	: any fluid or food given before breastmilk
Postlacteal foods	: fluid or food given after breastfeeding has started, within 3 days of birth

4.3 Outcome variables and methods of measurement

Data were collected for the purpose of measuring the following outcomes, each of which was explained to the interviewers verbally and also printed in their training manual.

4.3.1 Outcomes of interest

These outcomes were, type of feeding in the first 3 days, the prevalence of exclusive, predominant, partial and non-breastfeeding, and of complementary feeding during 5 months. Other outcomes were, morbidity and anthropometric status of infants, and usage of contraceptives and LAM during the study period. Observations of breastfeeding practices, and opinions of mothers and PCs about the intervention, were additional qualitative outcomes.

1. Feeding colostrum, prelacteal and postlacteal foods

The outcomes were:

a) age (hours) when colostrum was first fed

b) types of first foods and reasons for feeding, and types of prelacteal foods

c) types of postlacteal foods and reasons for feeding

These were obtained through interview on day 4 (Questionnaire 2, Annex 5).

2. Breastfeeding prevalence in the first 5 months

Data were obtained first by 24 h recall at age 1, 2, 3, 4, 5 months, which was termed Method A (Questionnaire 3, Annex 6). Mothers were then asked if they had fed anything in addition to these reported foods, between the last visit and the present one. Exclusive breastfeeding was said to be terminated if any other liquid or solid was given for 2 successive days. Similarly, termination of predominant breastfeeding was recorded if other milk/gruel/solid was given for 2 successive days. The feeding status at the end of the month was recorded taking into account the change in practice between visits, and infants were accordingly classified as exclusively breastfed, predominant, partial or non-breastfed. This method was termed Method B. For example, a baby who had 2 successive days of other milk/food during the month, but was exclusively breastfed in the 24 hours preceding the monthly interview, would be classified as exclusive by Method A, and partially breastfed by Method B. If in the following month, he was exclusively breastfed throughout, he would be classified as exclusively breastfed by both methods. (The PC visited 2-3 days after the monthly interviews).

3. Duration of exclusive breastfeeding (EBF)

The duration of exclusive breastfeeding was defined as the period during which the baby was fed only breastmilk, and was obtained through interviews at 1, 2, 3, 4, 5 months (see Part II, Questionnaire 3).

4. Complementary feeding in the first 5 months

The pattern of complementary foods given by mothers in early infancy was recorded by 24 h recall at the monthly visits, along with the age of starting these foods. The type, frequency, dilution (if milk), and mode of feeding was also obtained (see Questionnaire 3). These variables helped to quantify the type and amount of partial breastfeeding. The reasons for first starting the complementary foods, and the persons influencing the mother's decision-making were noted for improving future breastfeeding promotion strategies in the area. The cost of additional milk fed to the babies was not recorded, because in most cases this was shared by other siblings, or family members (if powdered/fresh cow's milk was given).

5. Infant morbidity during the first 5 months

Morbidity was based on mother's perceptions. Twenty-four hour recall data for prevalence of diarrhoea, dysentery (mucous and/or blood) and cough and fever as individual symptoms, were collected, followed by "day by day" data for the previous 7 days. Instructions were given to record spontaneous responses first, and then the responses obtained by probing for the individual symptoms for 24 hours (Questionnaire 3). These provided crude prevalence estimates for the previous 24 hours, and preceding 7 days at each month, for infants in the two groups. Longer recall periods are generally not reliable for morbidity data, but maybe more acceptable for expenses. Thus to get an estimate of morbidity during the remaining 3 weeks in each month, the illness and the costs involved (related to treatment and for medicines) were recorded from prescriptions, medicine bottles and receipts. To obtain severity of illness, the treatment seeking behaviour was recorded for the whole month, reasoning that mothers would seek treatment only for severe illness.

6. Infants' and mothers' anthropometric status during first 5 months

Infants were weighed either nude or wearing light clothes (actual weight of clothes was deducted later) on a digital scale with a precision of 10 g (Seca model # 727, Germany). Two measurements were taken and recorded, re-positioning the infant between measurements, and the average was used. Lengths of infants were taken to the nearest mm, on a locally made wooden length-board. The board was placed on a flat surface (floor, table or wooden bed), and the infant laid on it with the head positioned firmly against the fixed headboard, eyes looking vertically (WHO, 1983). The knees were extended by the field assistant applying firm pressure, the upright sliding foot-piece was moved to obtain firm contact with the feet, which were flexed at right angles to the legs, and a reading taken by the interviewer. Two measurements were taken for all cases, repositioning the infant between the two, except for length on day 4 (because mothers had objected to this in the pre-test).

Weight, height and mid-upper arm circumference (MUAC) of the mothers were recorded at the enrolment visit during pregnancy. Weight and MUAC were repeated after delivery and monthly (Questionnaires 1, 2 and 3). Weight (kg) was taken on bathroom scales (100kg x 100g), wearing light clothes and no shoes. For height, mothers were asked to stand against a wall or pillar or door, with the file board on top of the head so that a point could be marked at the back, and the height (in cm) measured with a non-stretch measuring tape. MUAC (left arm), was recorded to the nearest mm, also using the same tape.

Standardisation procedures for collection of anthropometric data

Standardisation procedures (WHO, 1983), were carried out after the training was completed in August 1995 to pinpoint errors so that corrections could be made before sources of error became fixed, and repeated again before the onset of the intervention in February 1996. These procedures are described more fully in section 4.3.2.

Attained weight and length of the infants was recorded over 5 months (Questionnaire 3). Differences in growth velocity of babies in the intervention and control groups were compared in terms of monthly gain/loss in body weight and monthly length gains.
These were compared with the NCHS reference (US Dept. of Health, Education and Welfare, 1977) and the World Health Organization's breastfed pooled data set (WHO, 1994). Differences in Z-scores were calculated for the control and intervention infants at day 4 and month 5, and for the exclusively breastfed infants at each month, for 5 months.

Other data collected were for comparative and explanatory purposes and to identify possible confounding factors. These were demographic, socio-economic, and environmental data. Mothers' weight and height were taken to assess the comparability of weight and body mass index (BMI) in both groups, and also to give attention and importance to the mother, along with the baby, during the study period.

7. Usage and acceptability of contraceptive methods during the first 5 months
Contraceptives advised and actually used by the mothers were recorded monthly (see Questionnaire 3). Whether or not a mother met the Lactational Amenorrhoea Method (LAM) criteria was recorded monthly. The three criteria were: if she had not resumed periods, was exclusively or predominantly breastfeeding, with gaps between breastfeeds less than 4 hours during the day and 6 hours at night. Mothers were said to accept the LAM if they used it alone, without additional contraceptives.

Plate 8. Infant being weighed at home

Plate 9. Infant's length being measured

8. Observations of specific behaviours, and opinions of mothers and PCs about the intervention

Qualitative information was obtained from focus-group discussions (taped), and individual interviews with mothers in the intervention group, and from specific observations. These provided validation of quantitative data collected by interviewers, and operational data about practical problems which were not enquired about in the monthly interviews. Individual interviews during the final visit, which were mostly unstructured, provided opinions of mothers regarding the counselling service, whether they felt benefited by it, if they had any problems with the PCs, and if they wanted the programme to continue.

Opinions of PCs regarding their counselling work, were obtained through focus-group discussions. Attitudes, feeling of fulfilment (or absence of), time demands, and probability of long-term involvement and intentions were discussed at the end of the study.

4.3.2 Training of interviewers

The four female interviewers had an MSc in Home Economics which included nutrition, dietetics and biochemistry. They were recruited through written and oral tests, and further trained over three weeks to conduct interviews efficiently for collection of data, and to take precise anthropometric measurements of mothers and infants.

The trainers included the PI, and a Research Officer with an MSc in Home Economics, Diploma in Nutrition and experience in providing practical training on anthropometry in various national and international courses provided at the Centre.

The training included lectures with visual aids (overheads, slides, flip charts), demonstrations, role-play, practical training in the hospital and in the project area. They were taught how to use the map of the project area to locate houses. The training schedule is provided in Annex 7 and the training manual in Annex 8. Interviewers were trained by the PI on breastfeeding terminology, techniques for interviewing, filling questionnaires (closed and open-ended questions), and orientation on common causes of illness in infants, e.g., diarrhoea, respiratory illness, ear, mouth and skin infections. Before starting practical training on anthropometric measurements, a lecture on classification of protein energy malnutrition was given, including Gomez, Waterlow and Wellcome classifications. Calculations for weight-for-age, weight-for-height, and height-for-age using the NCHS references were explained. Initially, a trainer demonstrated how to take weight and length measurements in infants and adults, after which the trainees practised on infants and mothers in the hospital. Measurement of MUAC was also shown and practised on mothers, using standard techniques [Frisancho, 1990].

With the Research Officer as the gold standard, and including the PI as a participant (because she would be monitoring anthropometric measurements during interviews), precision, accuracy, and inter-observer error were measured by a standardised technique (Annex 9). Only 5 infants could be measured at one time by the 5 participants and trainer, because the infants could not stay away from the wards for long periods. These standardising techniques were repeated after 3 months of field work with 2 interviewers in each session because the other two had to cover the scheduled visits.

The training, including the anthropometry described above, was carried out in August 1995, before the baseline survey. Again, before the onset of the prospective part of the study, the interviewers were given a week's refresher training. The intervention was pre-tested and piloted during February 1996. The questionnaires were reviewed one month after the project had started and minor corrections made. During the peak phase of the project (October 1996) when each interviewer had more than 6-8 interviews per day, another interviewer had to be recruited for 6 months. A person was selected who had past experience of interviewing mothers at home (for the ICDDR,B Urban Project). Refresher training was provided for her which included anthropometric assessments, and then she accompanied the other interviewers for observing each type of interview (pregnancy, day 4, monthly). For her first set of interviews in each of the above category, she was accompanied by one of the BCs or the PI, who observed, guided and corrected her as required. It was observed that mothers preferred to have their original interviewer for the monthly interviews. So this fifth interviewer was given the responsibility for the remaining enrolments. She conducted the day 4 and month 1 interviews for the mothers she had enrolled, and replaced one of the other interviewers for monthly visits only if that interviewer had the day off, or had more than 5 interviews scheduled for that day.

Data Collection Methods

Interviewers were instructed how to conduct the interviews, and collect data during the three different types of visits; pregnancy, day 4 and monthly. Structured questionnaires which included both pre-coded closed and open-ended questions were used during the interviews. Interviews were always conducted in the homes of the mothers. Exceptions were made in the case of the day 4 interview if mothers and/or infants were hospitalised, or if the infant was hospitalised at the time of the monthly interview.

4.4 Pre-testing of questionnaires

This was done twice (for the feeding aspects), as mentioned before. First, when they were developed in August 1995, and tested during the baseline survey in the area (Sept-Dec 1995), and finally, in the pilot study in February 1996 before the prospective study started.

4.5 Monitoring and data quality control

Ten percent of the interviewers' scheduled visits were monitored by the BCs or the PI. Monitoring of the PCs was done as described in the next section.

4.5.1 Monitoring of interviewers

It was initially planned to revisit the mothers and repeat the questionnaire the day after the interview, but after a few of these repeat visits, the mothers grumbled about having to spend so much time again for the same information and some wanted to withdraw from the study. It was thus decided that for monitoring, the BC/PI would accompany the interviewer and only repeat the questions again if they felt that some questions or answers were inadequate, and record these separately (Plate 10 and 11). At these monitored interviews, the second readings for weight and length were taken and recorded by the BC/PI for comparison. Minimal differences were obtained in the long-term recall of feeding history of the previous child, and 24-hour recall frequencies (±1.5 feeds) of the present baby.

Each afternoon, the interviewers returned the questionnaires for checking by PI/BC for completeness and accuracy. If information was incomplete, or answers to open-ended questions were not clear, a BC went back the next day to complete and clarify. Meetings of the research team (PI, BCs, and interviewers) were held weekly at the Centre, to review progress and solve problems (Plate 12).

Plate 10. **Breastfeeding counsellor (standing), monitoring an interview with infant's parents**

Plate 11. **Principal investigator interviewing a mother for monitoring purpose**

Plate 12. Principal investigator checking questionnaires with the interviewers

4.5.2 Peer counsellor monitoring and performance scores

After the training, when the PCs became operational, a monitoring system was required. A system was developed to allow adequacy of counselling to be scored, and to evaluate breastfeeding outcomes against this PC score. Records of PC visits were obtained from the mothers at the monthly interviews. It was hoped that the frequency of PC visits would assist in interpreting any differences in feeding outcomes among the intervention clusters at 5 months (but the number of visits were similar for most PCs).

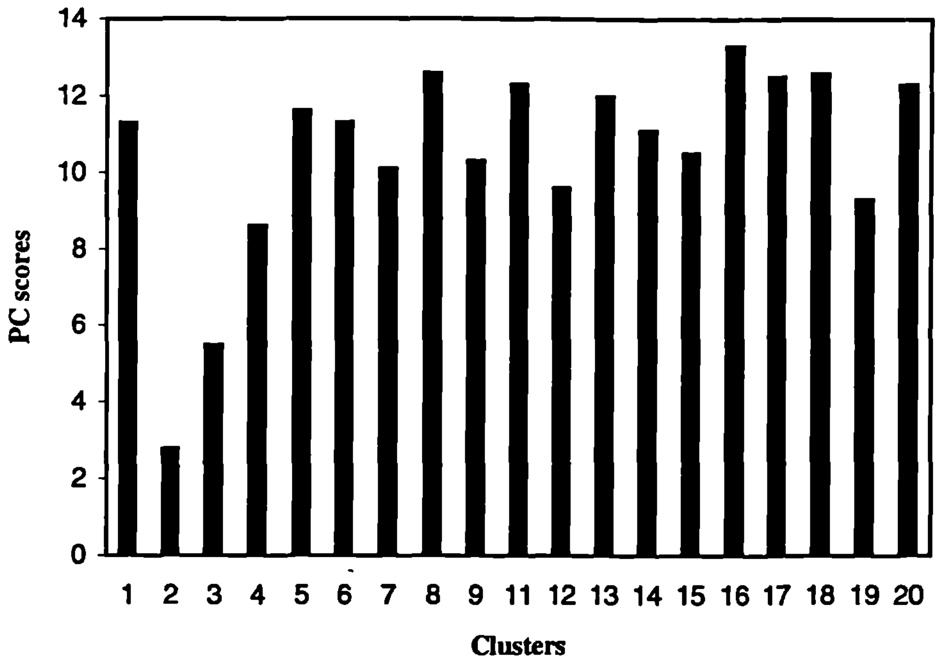
Monitoring forms were designed to check the following aspects:

- for overall attitude and behaviour of PC, listening and learning from what mother told her, for showing empathy, sharing relevant information, enquiring about baby's feeding, and providing practical help. These monitoring forms, the scores for each item, and their weighting, are given in Annex 10.

The basic/inherent characteristics of the PC were also scored, depending on her educational background, whether she was a "local" person or lived in a rented house, whether she was a full time PC, or had a part time job, which was respected or not (e.g., teachers, and seamstresses are respected, whereas one selling saris from house to house was not).

Monitoring was done on at least 3 occasions for each PC.
- during pregnancy, on the 5th day of delivery and around 2-3 months of baby's age (different babies), over the total study period. Most PCs were monitored twice within the first half of the project, and once more during the later half. The average scores were then taken for the final PC score, shown in Fig.4.5.2.

Fig 4.5.2 Average PC scores from monitoring visits



4.6 Qualitative data collection methods

Qualitative data can help the quantitative aspects of a study during the *design* by aiding conceptual development and instrumentation. They can help during *data collection* by making access and data collection easier, During *analysis*, they can help by validation, interpreting, clarifying, and illustrating quantitative findings, as well as through strengthening and revising theory (Miles and Huberman, 1994). In this research project, qualitative data helped the design, data collection, and analysis in a similar way. Qualitative methods had been incorporated at the planning phase for exploring infant feeding practices and needs in this area (Fig.4.6). Information gained from the focus group discussions (FGDs) with mothers at that stage, helped in designing the intervention. Qualitative methods were used again simultaneously with the quantitative data collection, as shown in the diagram below, to verify reported behaviours [Pope and Mays, 1995], and to provide new information.

Fig. 4.6 Use of qualitative and quantitative methods before and during the intervention

QUAL → design intervention project ——→ QUANT
(FGDs) (baseline cross-sectional survey, 1995)

Intervention Project (1996-97)

QUANT (questionnaires, prospective)

QUAL (observations, interviews, FGDs)

Qual = qualitative, Quant = quantitative

Qualitative information was collected during the intervention project by three methods, namely, specific observations, individual semi-structured interviews and FGDs with mothers, to provide a description and understanding of behaviours and explain findings [Hedges, 1985; Pope and Mays, 1995; Kitzinger, 1995]. The first two methods were started soon after the onset of this project, and the last one was conducted towards the end.

Methods for specific observations in households for behaviours of interest

Observations were conducted in households to verify and obtain new information about infant feeding practices at different ages in the control and intervention groups. These observations were carried out soon after birth, and at 1, 2, 3, 4 and 5 months. At each month, the homes of 2 control and 2 intervention infants were visited. An exception had to be made for the visit right after birth, when only 1 infant in each group was observed. This was for two reasons; first, because notification of birth was received on the second day at the earliest, and second, because families with new-born babies did not like anyone to sit in their houses for a long time. Infants to be visited were randomly selected. For two mothers in the intervention group, observations were carried out as a diagnostic method, when they had breastfeeding problems.

As it would not be possible for the PI to carry out these observations herself (firstly because of time constraints, and secondly, if known as a doctor, she would not be able to sit as a observer in their houses), the obvious choice for these observations, was the BCs. For this purpose, they were trained by a sociologist of another NGO who was experienced in research on child caring practices, including in-depth observations and interviews.

The BCs were known to some of the mothers (through counselling and monitoring). They were introduced to the mothers they had not met before by the interviewers, so there were no objections to their sitting in their houses and writing notes and observing feeding practices. Each mother-infant pair was observed for 4 hours in the morning one day, and four hours in the afternoon on the next day. On their first day, family members and neighbours found it strange that she was not asking any questions, but soon accepted her explanation that she was there to observe how the baby behaved while being fed, and carried on with their usual activities. The mothers would occasionally say something to them and, apart from requesting the BC to keep an eye on the baby when they went out of the house to wash clothes, dishes, or to bathe, she was allowed to sit and observe undisturbed.

Although the BCs would be observing and noting whatever events took place in a house during the time of their visit, they were instructed to focus particularly on the infant feeding, child caring and hygiene aspects of the mother and others who looked after the infant. Infant feeding practices required careful observation of factors associated with the quality of breastfeeding, namely, position and attachment of the baby, switching breasts, and duration and frequency of breastfeeds. At the same time the BCs noted what additional fluids or foods were given, if any, and how they were prepared, stored and fed. Also to be recorded were other people caring for the baby, and who could be undermining the mother's feeding practices. In addition to the breastfeeding practices, hygiene practices of the mother were considered to reflect PC performance.

The observation notes were recorded in Bangla by the BCs. They were then translated into English by the PI. The English versions were read by the PI and simultaneously the Bangla versions were read by the BCs to check if the translation was correct. Quotes from the mother and others were recorded in Bangla and also translated into English.

These written records were analysed for the specific themes mentioned previously, after all the data collection was completed. The 24 hour recall of breastfeeding frequencies as reported to the interviewers, were compared with the frequencies observed within the same time periods (Method A), and with feeding status recorded by Method B.

Individual semi-structured interviews

These interviews were held with the mothers in the intervention group when infants were 5 months old (after completing questionnaire 3). The purpose was to obtain individual feedback from mothers regarding the intervention and their PC. Mothers were encouraged to talk about whether and how they had benefited, which of the counselling visits had been most useful, if the PC had always been available or not, for what reasons they consulted her, and if someone from outside the community could be as, or more, helpful. Mothers were also asked if they would recommend the intervention for all mothers, and if they had any suggestions for improvement.

Focus-group discussions (FGD)

These were planned to include mothers living in one cluster, with infants of similar ages (2 adjoining clusters would be combined if enough mothers were not available). Two categories of mothers were studied, namely mothers who were partially breastfeeding (or had partially breastfed), for further in-depth information of their reasons for complementation, and mothers who were exclusively breastfeeding, to find out their views regarding the intervention, and of the benefits and problems faced.

Focus group discussions were held in the afternoons, so that the mothers could complete their housework for the day, either at a mother's house or in the PCs house. If the latter, the PC provided refreshments and left, so that the mothers would feel free to talk in her absence. The session started with introductions and conversation about the older children to make everyone feel relaxed. Permission was taken for taping the discussion. The PI was the moderator and a BC took additional written notes. Topics for guiding the discussion were prepared beforehand. For the partially breastfed group, these were; why mothers thought the babies needed additional foods, what pressures were being exerted to start them, was it a status issue or depended on work plans, and if they had learnt anything different about feeding this baby, compared to the previous one. For the exclusively fed group, these topics were; how they felt about having practised exclusive breastfeeding (EBF), could they have practised EBF without PC, if they could practise EBF for the next child, what benefits they got from EBF, when were PC visits most useful. Everyone was encouraged to speak and give their views on each topic. The following day, comments from the tape and from the notes were combined together to produce a report on that particular session.

Only one discussion group was held with partially breastfed mothers due to insufficient numbers. Because of time and personnel constraints, when two FGDs of exclusively breastfeeding mothers gave similar information, more discussion groups were not organised.

Analyses of the qualitative data focused on events and comments related to the themes mentioned previously, using techniques described by Mason [1996].

4.7 Data management and analysis

During the study, 7 visits to each mother were made by the interviewers for data collection. Every day, after they returned from the field in the afternoon (4.00-5.00 p.m.), the BCs and PI checked the completed questionnaire forms. Feeding and morbidity records were checked thoroughly and answers to open questions were coded by the PI before data entry. Each BC entered the same data separately into a personal computer the following day, using Epi-Info (Version 6.0, CDC Atlanta, and WHO, Geneva). Verification and cross checking of data were done by the PI at the end of each week, corrections made over the weekend, and re-entered the next week. All data files were checked for consistency and completeness in Epi-Info by the PI, and then analysed, using the Statistical Package for Social Sciences (SPSS for Windows, Version 6.1, SPSS Inc., Chicago, Illinois). The co-supervisor of the PhD project, who was a statistician, helped with the data analysis plans.

Frequency distributions of all the variables were produced. For continous variables, the frequency distributions were examined to see whether they followed the normal Gaussian distribution, or had extreme deviations from normality. In the latter case (such as income and costs), medians were used as a measure of the average.

Analysis plan

The outcome indicators were computed from the data using the definitions given in section 4.2. The following comparisons were made in order to assess the impact of the intervention from several perspectives.

1. Intervention vs. Control - data from the 20 intervention clusters were compared with those from the 20 control clusters. This comparison was made with the baseline data to assess pre-intervention comparability, and with the post-intervention data to assess impact. Comparisons were made with the cluster as the unit of analysis (20 vs. 20), for the primary outcome, namely exclusive breastfeeding at day 4 and 5 months, and with the individual as the level of analysis (312 vs. 312) for the other outcomes.

2. Intention vs. actual - this comparison was made both for the intervention and the control group, to assess pre-intervention breastfeeding plans versus actual activities to assess impact. If changes in the target indicators were found in the control group, these would be considered in the interpretation of any seen in the intervention group.

3. Dose response - dose response of PC visits in relation to exclusive breastfeeding at 5 months, was assessed both at the cluster-level and the individual-level. Using indicators of PC performance in each intervention cluster (PC score), would be possible (if there was sufficient variation in performance), to assess the impact at the cluster level by looking for trends in outcome variables correlated with performance.

Statistical tests

Chi-squared analyses were used to test differences in proportions and percentages.

T-test for means was done when data were distributed normally, and non-parametric (Mann Whitney Rank Sum) tests were used when data were skewed.

Comparisons of intent with practice were carried by using the McNemar test.

Differences in outcomes among the multiple feeding groups were compared using the tests for linear association.

4.8 Referral arrangements, research and ethical clearance

Collaborative arrangements were made with two hospitals for referrals during pregnancy and labour, and with a children's hospital, for referral of low birth weight infants (<1800g), infants with severe non-diarrhoeal illness or severe malnutrition (<60% weight-for-age of the NCHS reference median), requiring hospitalisation.

The research project had research and ethical clearance from the respective committees in ICDDR,B and from the Ethics Committee at LSHTM.

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RESULTS

The Results are presented in Chapters 5-10, starting with a comparison of the intervention and control groups at baseline. Any differences between the groups at baseline can be expected to have arisen by chance, as strict randomisation procedures were followed. In terms of the impact of the intervention, the four main outcomes of interest were infant feeding practices, infant morbidity and growth, and contraceptive practices. The results pertaining to each of these are presented separately in Chapters 6-9. In Chapter 10, excerpts from the observations of specific behaviours, and focus group discussions are presented, and include reflections of peer counsellors about their role, and by the intervention mothers about the services they received. Each chapter concludes with a discussion of the findings.

CHAPTER 5: ENROLMENT AND BASELINE COMPARISONS

5.1 Enrolment

The exclusion criteria have been given in Chapter 4, section 4.1.4, together with a description of the recruitment process. During this process, 726 eligible women were identified and enrolled. The total number of women contacted was 1265. Of the 383 (30%) excluded, the main reason was an intention to leave the study area either for the delivery or within 6 months (see Table 5.1). Apart from the planned exclusion criteria, *ad hoc* decisions for exclusion had to be taken as the study progressed. These are listed as "others" in Table 5.1, and reflect unforeseen circumstances such as babies given for adoption. A further 58 (5%) mothers refused to participate in the research when first contacted. The reasons they gave were either that they would not allow the baby to be weighed, had religious reasons for not talking about contraception, or that they did not want any one apart from their own doctor to see the baby. They had not been told whether or not they would be receiving the services of a peer counsellor at this stage.

Table 5.1 Reasons for exclusion of women from the study at enrolment

	Total
does not intend to deliver in Dhaka	173
does not intend to stay in the study area for 6 months	120
parity more than 5	61
age more than 35 years	5
age less than 16 years	1
medical conditions *which may require hospitalisation after delivery	5
eclampsia in previous pregnancy	4
twins seen on ultrasonogram	1
† others	13
	383

* medical conditions = hypertension, diabetes mellitus, uterine cyst/ tumour
† others = area flooded, high risk pregnancy, may leave baby in village, will give baby for adoption, mother dumb

5.2 Baseline comparisons of the control and intervention groups at enrolment

The comparison of the two groups at baseline focuses on their family and environmental characteristics and previous infant feeding practices. The comparisons also include the delivery details, and these are presented in section 5.3.

5.2.1 Socio-economic and demographic characteristics

Table 5.2.1 shows that household size and composition were similar in both groups. Family members living in the same house who could influence decisions about the infant were also comparable. If an influential family member was not mentioned as living in the house, a mother commonly indicated that such a member lived in the neighbourhood. Only 35% of mothers had children below five years, and 43% had no children.

Table 5.2. 1 Baseline comparability of household size and composition. Values are mean ± SD and numbers (%)

	Control n = 363	Intervention n=363
Total household members	4.2 ± 2.3	4.2 ± 2.3
1- 4	232 (64)	251 (69)
5 and more	131 (36)	112 (31)
Husband resides		
in same house	329 (91)	346 (95)
abroad/ visits	28 (7)	13 (3)
separated/ another wife	6 (2)	4 (1)
Influential family members at home (excluding husband)		
respondent's mother	42 (12)	25 (7)
mother-in-law	63 (17)	43 (12)
sister-in-law	35 (10)	28 (8)
others	41 (11)	33 (9)
Influential person in Badda area	251 (69)	227 (62)
Number of living children		
nil	165 (45)	144 (40)
one	122 (34)	128 (35)
two	56 (15)	74 (20)
three	20 (5)	17 (5)
Children below 5 years	114 (31)	141 (39)

5.2.2. Maternal characteristics and antenatal care

Table 5.2.2 shows that the two groups were similar for all the variables examined, except for parity. There were significantly more primiparous women in the control group compared to the intervention group (p <0.05). About two-thirds of the mothers had antenatal checks, and 74% had received full tetanus immunisation. Mothers' weights were low in both groups, especially considering they were taken during the seventh to ninth month of pregnancy.

Table 5.2.2 Maternal characteristics and antenatal care at enrolment during the last trimester of pregnancy. Values are mean ± SD and number (%)

	Control n = 363	Intervention n=363
Mothers' age in years	22.6 ± 4.3	22.9 ± 4.1
<18 years	40 (11)	34 (9)
Parity one	134 (37)	108 (30) *
two	103 (28)	117 (32)
three	77 (21)	76 (21)
four & five	49 (13)	62 (17)
Mothers' anthropometry		
weight (kg)	50.4 ± 7.4	51.5 ± 8.0
range	34.0-87.5	37.0-78.0
height (cm)	150.9 ± 5.5	151.1 ± 5.5
range	128.6-166.0	136.0-167.9
MUAC (cm)	23.2 ± 2.4	23.7 ± 2.6
range	18.2-33.0	18.4-32.1
body mass index	22.1 ± 2.6	22.5 ± 3.0
range	16.6-33.2	16.2-32.2
Antenatal checks		
mean number of visits	3.0 ± 2.2	2.9 ± 2.2
none	154 (42)	143 (39)
1 visit	74 (20)	82 (23)
2-4 visit	90 (25)	88 (24)
5 and above	45 (12)	50 (14)
Tetanus toxoid injection		
complete	264 (73)	273 (75)
partial	47 (13)	43 (12)
nil	52 (14)	47 (13)
Taking vitamins/ iron	86 (24)	80 (22)

* $p < 0.05$, Chi squared test for parity one

5.2.3 Parental education, occupation and income

The two groups were comparable in terms of education and occupation (Table 5.2.3). On average, mothers were less educated than the fathers, and few (20%) worked before pregnancy. Mothers who had been previously employed as factory workers had either stopped working at the time of the interview or were on leave without pay. Only the income of the mothers earning at the time of interview was recorded. The median education of the fathers was 8 years, few were unemployed (< 5%), and the majority earned 3,000-5,000 takas per month. Of the 40 high earners, 30 were in the intervention group, of whom many had multiple sources of income (e.g.: office employee + business/landlord). Thus while both the fathers' median income and the total family income were significantly higher in the intervention group, fathers with income below 3000 takas, were also significantly more in this group.

5.2.4 Living conditions

The living conditions of the families were comparable in the two groups (Table 5.2.4). About two-thirds of the families lived in semi-pucca houses with one room, and 95% had electricity. They all had access to safe drinking water and almost all had slab *(pucca)* latrines. Just under half of the families owned radios and/or television sets, so had access to messages transmitted by the audio-visual media.

Table 5.2.3 Parental education, occupation and income. Values are mean ± SD or number (%)

	CONTROL n = 363	INTERVENTION n= 363
Mothers' education (years)	4.2 ± 4.2	4.8 ± 4.1
Nil	137 (38)	108 (30)
1-5	87 (24)	114 (31)
6-10	111 (31)	116 (32)
11 and above	28 (8)	25 (7)
Mothers' occupation		
housewife	292 (80)	283 (78)
factory worker	44 (12)	49 (13)
others	27 (8)	21 (9)
Mothers' income (taka/ month)	n=24	n=38
<1000	10 (42)	16 (42)
1000-5000	14 (58)	22 (58)
Fathers' education (years)	6.8 ± 4.6	7.3 ± 4.9
median	8	8
Fathers' occupation		
office employee / professional	66 (18)	81 (22)
business (>5000 taka/mo)	58 (16)	74 (20)
labourer	43 (12)	35 (10)
driver (car, bus, scooter etc.)	41 (11)	47 (13)
rickshawpuller	40 (11)	28 (8)
technician	10 (3)	13 (4)
others	92 (25)	78 (21)
unemployed	13 (4)	6 (2)
unknown	-	1 (1)
Fathers' income (taka/month)		
median	3000	3500*
<3000	40 (11)	101 (28)†
3000-5000	172 (47)	164 (45)
5001-10,000	51 (14)	66 (18)
>10,000	10 (3)	30 (8)
nil	25 (7)	8 (2)
Total family income		
median	4000	4900*

other occupations for mothers = seamstress, teacher at home, labourer, student
other occupations for fathers = factory worker, small shop owner, salesman

£1 = 75 takas and US $1= 45 takas

*p < 0.02, Chi squared test

† p <0.0001 for fathers with income < 3000 takas, Chi squared test

Table 5.2.4 Type of house, water source, latrine and assets in the two groups. Values are numbers and (%)

	CONTROL n = 363	INTERVENTION n = 363
House type *		
katcha	127 (25)	106 (29)
semi-pucca	226 (62)	241 (66)
pucca	10 (3)	16 (4)
Number of rooms		
one	250 (69)	262 (72)
two	69 (19)	57 (16)
three and above	44 (12)	44 (12)
Electricity present	346 (95)	346 (95)
Water for drinking		
piped water, common tap	317 (87)	302 (83)
piped water, private tap	42 (12)	50 (14)
tubewell	4 (1)	11 (3)
Latrine†		
pucca, shared	292 (80)	278 (77)
pucca, private	53 (15)	57 (16)
katcha, common	12 (3)	23 (6)
katcha, private	5 (1)	1 (<1)
sanitary	1 (<1)	3 (1)
Assets		
bed	343 (94)	344 (95)
table and chair	211 (58)	228 (63)
fan	267 (74)	281 (77)
radio	170 (47)	167 (46)
rickshaw	9 (2)	23 (6)
television	143 (39)	151 (42)
sewing machine	43 (12)	39 (11)
refrigerator	46 (13)	39 (11)
video cassette player	23 (6)	19 (5)
owns house	73 (20)	67 (18)

*katcha house= bamboo walls, thatched roof, semi-pucca house = brick walls, tin roof, pucca house = all brick, cemented

†pucca latrine= slab latrine, katcha latrine = pit latrine/ fields, sanitary = flushing facility

5.2.5 Feeding history of previous baby

Table 5.2.5 shows that the previous infant feeding practices were comparable in both groups. Although breastfeeding was virtually universal and the majority of infants were fed colostrum, exclusive breastfeeding was rare as water was usually started in the first week, and complementary foods within five months of age.

Table 5.2.5 Feeding history of previous baby. Values are mean ± SD, median and number (%)

	CONTROL n=198	INTERVENTION n =219
Age of youngest baby (months)		
mean ± SD	58.0 ± 31.6	55.2 ± 30.8
median	54	51
. > 8 years	14 (7)	19 (9)
Breastfed youngest baby	196 (99)	216 (99)
Fed colostrum within first week	173 (89)	192 (88)
Age when water started (days)	(n=192)	(n=213)
median (range)	5 (1-366)	7 (1-365)
Complementary food (CF) given within first 5 months	157 (79)	178 (81)
Age when CF started	(n=157)	(n=178)
CF started within 1st month	53 (34)	45 (25)
CF started within 2nd month	27 (17)	27 (15)
Type of CF first given		
other milk	96 (61)	107 (60)
gruel	28 (18)	42 (24)
banana	12 (8)	4 (2)
others	21 (13)	25 (13)
Reason for giving CF		
insufficient milk	84 (53)	93 (53)
to accustom to other milk	14 (9)	12 (7)
better growth	21 (13)	29 (16)
given out of interest	11 (7)	10 (6)
others #	27 (17)	33 (19)
Person who advised CF		
no one (self)	42 (26)	32 (18)
baby's grandmother	39 (25)	37 (20)
friends/relative	29 (18)	29 (16)
doctor	20 (13)	35 (20)
nurse/midwife	3 (2)	2 (1)
husband	16 (10)	26 (15)
others #	8 (5)	16 (9)
Bottlefed within 6 m	111 (56)	133 (60)
Baby breastfed now	16 (8)	26 (12)

\# others (mother sick, employed, weak, baby refusing breastmilk)

These first complementary foods were mostly in the form of other milk, and those giving them had been advised by the baby's grandmothers, friends and relatives for 39% of cases. But in 34%, the parents of the infants had decided to start these foods themselves.

5.2.6 Breastfeeding advice and feeding intentions for the coming baby

The groups were comparable regarding these aspects (Table 5.2.6). Most mothers had heard some advice about breastfeeding, mainly from friends or neighbours and the audio-visual media. Similarly, many had also heard the term "exclusive breastfeeding" *(shudhoo matro buker dudh khawano),* but only 9 % of mothers in each group knew correctly that it meant feeding the baby only breastmilk, and not including water. All the mothers said they knew when to start complementary foods, which was around 3 months of age. Plans to breastfeed were universal, but many mothers said they would also give some thing either before or after starting breastmilk, in the first 3-4 days of the baby's life.

5.2.7 Plans for contraception and opinions about breastfeeding and child spacing

Both groups were comparable for all the variables examined (Table 5.2.7). Although the majority of mothers (87%) planned to use some family planning method after delivery, most could give no definite time for starting. Among those who did indicate a time, the majority said they would start in the second month.

When asked what they thought about breastfeeding helping to space pregnancies, more than half said they did not know anything about this, and only 5% agreed with the statement. Of those who disagreed, 62% did so because they had seen others become pregnant during breastfeeding. On probing, they added that in most cases, these mothers had babies older than 6 months at that time.

Table 5.2.6. Breastfeeding advice and intentions for feeding in early postpartum period. Values are numbers (%)

	CONTROL n= 363	INTERVENTION n= 363
Heard advice about breastfeeding (BF)	347 (96)	355 (98)
about EBF (correctly interpreted)	30 (9)	32 (9)
about > 2 benefits of BF	220 (63)	248 (70)
about how to hold and BF baby	18 (5)	27 (8)
about BF for 2 years	248 (71)	245 (69)
age (days) for starting CF (mean ±SD)	125.8 ± 51.6	132.1 ± 52.0
BF advice heard from #		
clinic staff	71 (20)	66 (19)
respondent's mother	101 (29)	103 (29)
mother-in-law	51 (15)	32 (9)
Family Planning worker	64 (18)	74 (21)
friends / neighbour	244 (70)	248 (70)
media (radio/TV)	204 (59)	205 (58)
printed material	43 (12)	46 (13)
others	9 (3)	8 (3)
Plan to start BF		
within 1 hour	66 (18)	93 (26)
after a few hours	71 (20)	56 (15)
after milk flows out	69 (19)	62 (19)
on 3rd day	38 (10)	36 (10)
on 2nd day	9 (2)	8 (2)
don't know	110 (30)	108 (30)
Plan to give other fluid /food in first 3-4 days #	335 (92)	324 (89)
Plan to give honey	262 (72)	260 (72)
sugar + water	239 (66)	243 (67)
honey + mustard oil	11 (3)	6 (2)
plain water	86 (24)	76 (21)
mustard oil	71 (19)	52 (14)
powder milk	23 (6)	13 (4)
cow's milk	46 (13)	50 (14)
others	9 (2)	3 (1)

more than 1 response and calculated for the whole sample

Table 5.2.7. Mothers' plans for family planning and opinions about breastfeeding and child spacing. Values are numbers (%)

	CONTROL n= 363	INTERVENTION n= 363
Plans for family planning (FP)		
no	12 (3)	9 (2)
yes	307 (85)	321 (88)
don't know	44 (12)	33 (9)
When plan to start FP	n = 307	n = 321
when periods start	188 (61)	159 (50)
between 3 wks - 3 months	64 (21)	98 (30)
between 6 months - 1 year	1 (<1)	3 (1)
at birth of baby/ husband's return	9 (3)	3 (1)
day of delivery	1 (<1)	-
don't know	44 (15)	58 (18)
Any preferred method		
no	149 (48)	152 (47)
contraceptive pill	94 (30)	93 (29)
injectable contraceptive.	36 (12)	33 (10)
condom	10 (3)	15 (5)
others	19 (6)	28 (8)
Opinion about BF & child spacing [a]		
disagree	81 (22)	113 (31)
not sure	29 (8)	31 (9)
agree	21 (6)	18 (5)
don't know	232 (64)	201 (55)
Disagree because		
has seen others become pregnant	55 (68)	65 (57)
has become pregnant herself	11 (14)	22 (19)
does not think it is possible	14 (17)	23 (21)
has not seen it herself	1 (1)	3 (3)

[a] The question asked was: "some people say that breastfeeding helps to space pregnancies. what do you think?"

5.2.8 Cluster comparisons in the intervention and control groups

In this chapter, the comparisons so far have been based on the 363 mothers in each group. The two groups were also compared on the basis of 40 component "clusters". Clusters had been randomly allocated between the two groups as described in chapter 4. While the two groups were expected to be similar because of randomisation, clusters were likely to differ within groups. This analysis was done to see whether the clusters differed markedly regarding six selected variables (out of 23). These were, the number of mothers in a cluster, their age, education, parity, family income, and total household family members. These were selected because they represent the variables most likely to facilitate/constrain a PC's performance. Annex 11 shows the results of this analysis.

The cluster comparisons show that individual clusters varied in size from 5-35 mothers. The mothers' ages, parity and number of household members were similar across clusters in both study groups. Some clusters had mothers with higher levels of education, notably clusters 5 and 10 in the intervention group (median values 8 and 7 years respectively) and clusters 23, 30 and 40 in the control group (median values 7, 7 and 7.5 years respectively).

There were some differences in income as well, but the high income clusters were equally distributed between intervention and control areas, namely cluster 10 and 15 in the intervention group (median income Tk 7300/month) and clusters 30 and 40 in the control group (median family incomes Tk 7000 and 5200/month).

5.3 Baseline comparisons at delivery of the intervention and control groups

The results so far have compared baseline data during pregnancy. The intervention started after the first enrolment visit, but was not expected to affect the delivery characteristics, so these are also included in the baseline comparisons.

Data were collected on day 4 (72 ± 12 hrs). Despite having said that they would be having their deliveries in Dhaka, 19 mothers delivered elsewhere, mostly in villages, either at the maternal or in-law's homes and did not return to the study area, so were excluded. Apart from stillbirths (n=13) and deaths within the first three days (n=8), 27 further cases were excluded (day 4 weight <1800g, multiple births, severely ill and hospitalised), and 6 refused. Also excluded from the day 4 data set were mothers who had delivered elsewhere but came back to the study area later, or informed us after day 4. Thus, mothers available for interview at day 4 were 330 and 323 in the control and intervention groups respectively.

Comparison of the delivery characteristics has shown the control and intervention groups to be similar (Table 5.3). Home deliveries were common (78%) for both groups, the majority being conducted by untrained women, 219 (66%) in the control group and 216 (67%) in the intervention group. The infants' body weights and lengths were also similar on day 4.

Table 5.3 **Delivery characteristics in the two groups. Values are mean ± SD, number (%)**

	Control n=330	Intervention n=323
Reported gestational age (weeks)	39.4 ± 1.4	39.5 ± 1.3
Baby's body weight on day 4 (kg)	2.67 ± 0.41	2.72 ± 0.6
Baby's length on day 4 (cm)	48.3 ± 2.0	48.5 ± 1.9
Baby delivered at		
Home	258 (78)	253 (78)
Hospital/ clinic	72 (22)	70 (22)
Type of delivery		
Vaginal	312 (94)	303 (94)
Caesarean section	18 (5)	20 (6)
Baby delivered by		
Untrained dai	140 (42)	168 (52)
Nurse/ doctor	85 (26)	82 (25)
Experienced relative	70 (21)	41 (13)
Trained birth attendant	26 (8)	25 (8)
Others	9 (3)	7 (2)
Baby's sex		
Male	142 (43)	156 (48)
Female	188 (57)	167 (52)
Baby sleeps at night		
in mother's bed	313 (95)	319 (99)
in same room, different bed	15 (4)	4 (1)
in different room	2 (1)	-

5.4 Cases available for follow up and selected characteristics of families at enrolment and those who completed follow-up

Enrolment of mothers in the study started in the last week of February 1996 and was highest in the months of March and June of the same year (Fig. 5.4). The number of deliveries varied from month to month, the maximum (79) occurring in September. Recruitment stopped in December 1996. Monthly visits peaked in December, with 429 visits in that month. Overall, 4904 visits were made.

Fig. 5.4 Subjects enrolled and followed up during 1996 - 97

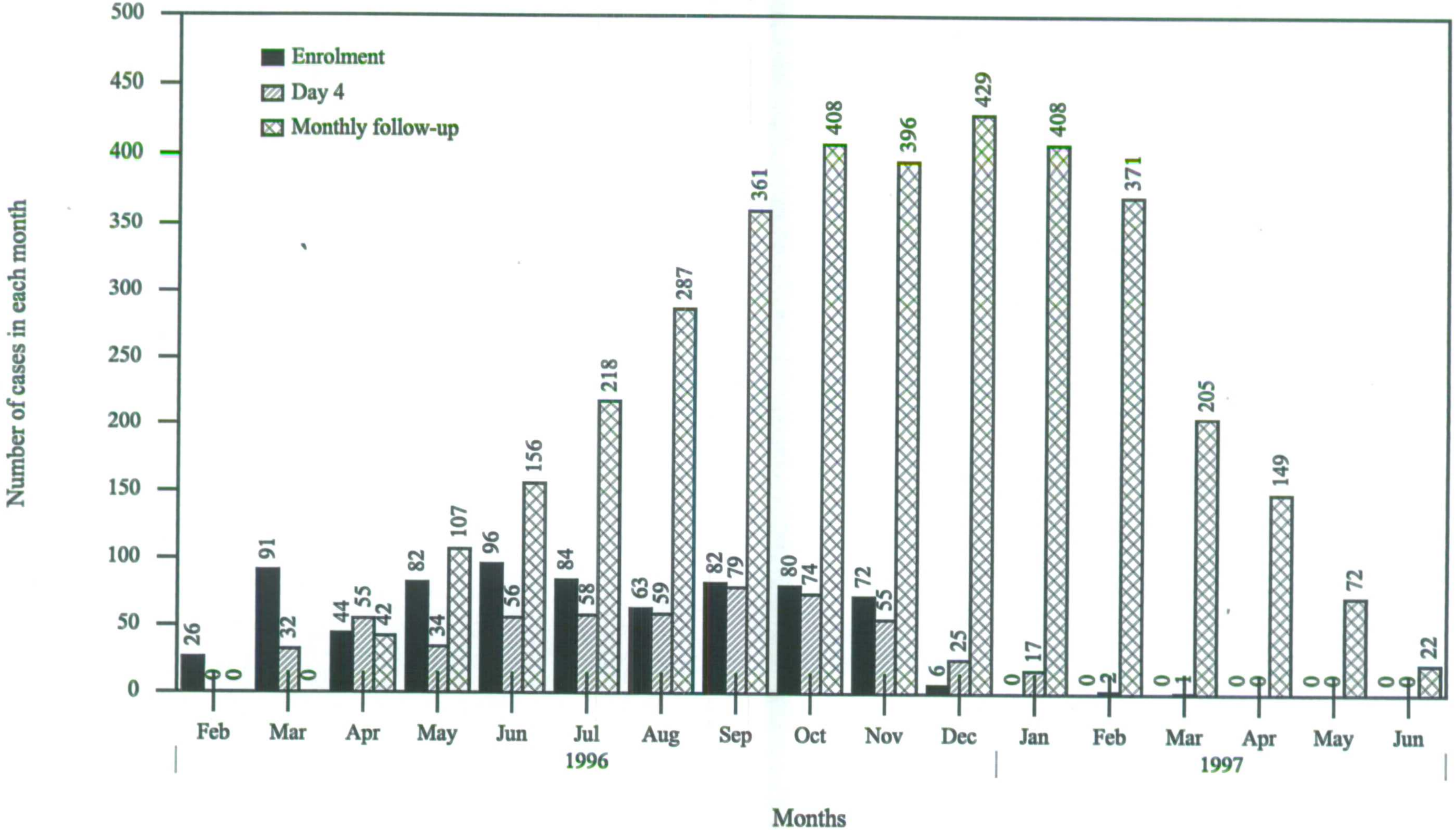

Table 5.4.1 shows the cases available for follow up over 5 months. The valid cases in the two groups were similar at day 4 and at month 1. More families either moved out of the study area, or went visiting in the control group in month 2, compared with the intervention group, but overall, the numbers were similar in both groups over the five months' follow-up period. Of the 726 enrolled cases, 573 (79%) were followed to 5 months. During the first month, the number of deaths in the control group was twice that in the intervention (8 vs. 4). After 1 month, there were no deaths in the intervention group, but 5 in the controls, three-fold more in total. There were more exclusions in the intervention group for sickness/congenital anomalies than in the controls, because they were brought to the doctor's notice through the peer counsellors, and could thus be excluded earlier. One baby in each group was given up for adoption in the first two months.

Table 5.4.1 Cases available for follow up over 5 months

	Day 4	Month 1	Month 2	Month 3	Month 4	Month 5	Total
Moved							
C	9	4	7	8	3	5	36
I	10	1	2	8	5	9	35
Stillbirth							
C	6	-	-	-	-	-	6
I	7	-	-	-	-	-	7
Death							
C	5	3	-	1	2	2	13
I	3	1	-	-	-	-	4
Refused							
C	2	2	3	1	-	-	8
I	4	2	-	1	-	-	7
Excluded <1800g/ twins sev ill/ other							
C	6+3+2	1 (adopt)	-		-	-	12
I	6+4+6	-	(1 adopt)	-	-	-	17
Late/ Absent (>5days)							
C	16	7	11	11	11	3	
I	12	4	3	10	11	5	
Total available cases							
C	330	314	299	289	284	285	
I	323	314	313	297	291	288	
Total	653	628	612	586	575	573	

C = control, I = intervention sev ill= severely ill or in intensive care

There were no significant differences in the socio-economic and demographic characteristics of the enrolled cases compared to those who completed 5 months follow-up (Table 5.4.2). There were also no differences in these characteristics both within, and between the control and intervention groups (enrolment and follow-up).

Table 5.4.2 Comparison of selected characteristics of families at enrolment and those completing follow up. Values are mean ± SD, number (%)

	All enrolled cases n = 726	Cases completing follow up n = 573
Total household members	4.2 ± 2.3	4. 3 ± 2.3
Husband resides		
in same house	675 (93)	536 (93)
abroad / visits	20 (3)	15 (3)
separated / another wife	10 (1)	6 (1)
Influential family member at home (except husband)		
respondent's mother	67 (9)	48 (8)
mother-in-law	106 (15)	91 (16)
sister- in -law	63 (9)	55 (10)
others	74 (10)	54 (9)
Influential member in Badda area	478 (66)	380 (66)
Parity		
one	242 (33)	180 (31)
two	220 (30)	177 (31)
three	153 (21)	123 (21)
four and five	111 (15)	68 (12)
Mother's age (years)	22.7 ± 4.2	22.8 ± 4.2
Mother's education (years)	4.5 ± 4.2	4.7 ± 4.1
Mother's occupation housewife	575 (79)	455 (79)
Father's education (years)	7.1 ± 4.8	7.2 ± 4.8
Husband's occupation		
office employee/ professional	147 (20)	118 (21)
business	132 (18)	109 (19)
labourer	78 (11)	57 (10)
driver	88 (12)	74 (13)
rickshaw puller	68 (9)	46 (8)
technician	23 (3)	21 (4)
others	170 (23)	133 (23)
unemployed	19 (3)	14 (2)
unknown	1 (<1)	1 (<1)
Total family income (taka)		
mean ± SEM	6847 ± 369.2	7247 ± 454.7
median	4200	4500

£1 = 75 takas, and US $1 = 45 takas

Discussion

The results comparing the demographic and socio-economic characteristics of the control and intervention groups at enrolment, show that they were quite similar in these respects. The only differences were by way of primiparity and income, which were likely to have occurred due to chance. As reported income is not considered a reliable indicator of socio-economic status, some researchers are now suggesting total monthly expenditure in its place [Baqui and Arifeen, personal communication]. This information, however, would have been even more time-consuming and difficult to collect, especially since fathers are usually responsible for buying groceries and other household items.

The lower middle-class urban area covered by this project is likely to be reasonably representative of other such urban areas elsewhere in Bangladesh as household size, household income, literacy rates, and past infant feeding practices were comparable to national data collected during the preceding year [BBS 1995; Akhter *et al.*, 1998]. Non-pregnant women in the national sample weigh on average 39-41 kg. The average weight gain during pregnancy is 4.7 kg in rural and 5.7 kg in urban areas [Ministry of Health and Family Welfare and Bangladesh National Nutrition Council, 1997]. The study mothers weighed about 51 kg in the last trimester of pregnancy, and were likely to be somewhat heavier than the national average. They were also taller than the national average (151 vs. 147 cm). The majority of mothers had their deliveries at home (78%), and 34% were conducted by trained personnel, similar to 39% quoted for urban areas in general [Akhter *et al.*, 1998].

The Bangladesh Demographic and Health Survey (DHS) data set for 1994 indicate that 56% of ever-married women prefer a two-child family and 24% consider a three-child family ideal, with only 1% preferring six or more children. In the Dhaka study, only 22% of the mothers already had two or more children, which is in keeping with the above information. As this research project was conducted in an area serviced by a Family Planning NGO, (UTPS), this could have accounted for the fact that the average age of the last child was 57 months and that 86% mothers planned to use some contraceptive method after the birth of the coming baby. But when it came to antenatal checks, despite the services offered by a number of NGOs in the area, 40% of the mothers had not been for any antenatal checks by the time of enrolment at 7-9 months of pregnancy. Of those who did attend, many went to a family planning and immunisation satellite clinic which checks mother's weight, sometimes the blood pressure, and ensures that she gets the tetanus vaccine. Most of the mothers had been exposed to breastfeeding information from multiple sources. However, only 20% had been the recipients of breastfeeding-related advice from clinic staff, even though 37% had gone for more than two antenatal visits. This gap indicates that the provision of breastfeeding information was not prioritised by the staff, unlike tetanus immunisations. Furthermore, only 9% of mothers had correct knowledge about exclusive breastfeeding, and so it is not surprising in this context, that exclusive breastfeeding had rarely been practised for the previous child. Surveys using correct definitions of feeding practices and reliable data, have shown exclusive breastfeeding rates of 31% for children aged 4-5 months at the national level [BBS and UNICEF, 1995] and 10% in the urban slums [El Arifeen *et al.*, 1984]. Our own cross-sectional survey of mothers with infants below 6 months of age in the same area a year before, recorded 15% of the mothers to be exclusively breastfeeding during the week of the interview. Of mothers of infants aged 5 months, only 5% were reported to be exclusively breastfeeding [Haider *et al.*, 1998].

Gaps identified

The results demonstrate that mothers in this area have good access to mother and child health and family planning workers and staff. However, various gaps still exist in these services, which can be rectified.

First, not only should there be some mechanism to encourage mothers to go for antenatal checks, but the quality of these checks should be standardised. All pregnant (and lactating) mothers must accordingly be informed about the benefits and techniques of breastfeeding, as suggested in the Ten Steps for Successful

Breastfeeding [WHO/UNICEF 1989]. Tetanus immunisation rates are good but no mother should remain unimmunised, so this also needs to be addressed.

Second, home deliveries should preferably be conducted or supervised by trained personnel. This is easier said than done in densely populated areas, but the Safe Motherhood Programme, co-ordinated by the Ministry of Health and Family Welfare and various NGOs, has recognised the importance of this need and various steps are reportedly being taken to improve the situation [Barkat-e-Khuda, personal communication]. Much effort was spent in the 1980s on training traditional birth attendants [Mirza *et al,*, 1993] but their low utilisation for home deliveries in the urban setting is surprising. The reasons for this should be re-evaluated and measures taken to improve their training and service delivery, including information and support for breastfeeding in the early postpartum period.

Third, steps should be taken not only for promoting breastfeeding at the community level, but also to provide breastfeeding information during pregnancy and about appropriate contraceptive usage during lactation. Despite residing in a family planning area, the mothers in this study did not know about breastfeeding as a contraceptive method and some disagreed that it was one. Family planning programme activities in Bangladesh do not promote breastfeeding for its contraceptive qualities. On the other hand, modern contraceptive methods are promoted during the early postpartum period, commonly after 40-45 days [Salway, 1996] and women in this study who could mention a time period in their plans for family planning, said they would start around that time. The present policies to actively encourage the adoption of contraceptive methods (preferably hormonal) may have influenced 94% of the mothers in either disagreeing with, or not being able to comment regarding the concept that breastfeeding helps to space pregnancies.

The next chapter describes the changes brought about by the intervention on breastfeeding practices.

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CHAPTER 6: IMPACT OF THE INTERVENTION ON BREASTFEEDING

The primary objective of the intervention was to encourage and help mothers to breastfeed their infants exclusively from birth until five months. In addition to motivating mothers for exclusive breastfeeding, counselling during pregnancy was essential to determine what mothers were planning to feed their infants during the first few days after birth and to influence these early practices.

In this chapter, the results will be presented as follows

1. Infant feeding intentions and associated practices during the first four days
2. Breastfeeding and associated practices over the first five months
3. Breastfeeding status according to PC clusters
4. Characteristics of intervention mothers who breastfed exclusively for five months and those who did not
5. Reasons and outcomes of referrals from PCs

6.1 Infant feeding intentions and associated practices in the first four days

This section will present mothers' intentions for feeding in the first four days, their actual practices, the types of fluids and foods fed to the babies, and whether they received any encouragement and support for breastfeeding during this period.

6.1.1 Infant feeding intentions and practices in the first four days

At enrolment, all the mothers had said they would breastfeed their babies. In addition, among mothers who were interviewed on day 4, 83% of control, and 100% of intervention mothers had stated that they would give some other fluid or food during the first 3-4 days (Table 6.1.1). In the control group, however, more mothers did so than had intended, whereas in the intervention group, significantly fewer did so. Thus the intervention was associated with a significant increase in the proportion who gave breastmilk alone during the first 4 days (56% versus 2%). Mothers in the intervention group started breastfeeding significantly earlier, 64% within one hour of birth, compared to only 15% of the controls ($p < 0.0001$).

Table 6.1.1 Comparison of infant feeding intentions and practices in the first four days. Values are number (%), mean ± SD

	Control		Intervention	
	Intentions n = 363	**Practice n = 330**	**Intentions n = 363**	**Practice n = 323**
Plan to start BF				
within 1 hour	66 (18)	51 (15)	93 (26)	206 (64)*
after few hours (2-4 h)	71 (20)	119 (36)	56 (15)	70 (22)
after milk flows out	69 (19)	-	62 (19)	-
on 3rd day	38 (10)	24 (7)	36 (10)	1 (<1)
on 2nd day	9 (2)	39 (12)	8 (2)	4 (1)
do not know	110 (30)	-	108 (30)	-
within 5-24 hours	-	74 (22)	-	42 (10)
after 4 days	-	21 (6)	-	-
Time first breastfed (hours)		15.9 ±17.3		3.0 ± 5.5 *
Plan to give other fluids and foods in 3-4 days (in available cases)	n= 330 275 (83)	322 (98)	n=323 323 (100)	142 (44)†

*p < 0.0001, Intervention vs. Control, Chi squared test
†p < 0.0001, practice of giving other fluids, McNemar's test
2 of the control mothers were non-breastfed in first 4 days,
2 put to breast, stopped on 1st day - restarted later

6.1.2 Types of fluids and foods fed to babies in the first four days

Since breastfeeding was initiated much later for the control babies (15.9 vs. 3.0 hours), most of them were given a prelacteal as their first food, soon after birth (Table 6.1.2.1). The commonest prelacteals were honey and mustard oil. Honey was given for sweet voice or to clean the mouth, throat or stomach, and mustard oil usually for the latter reason. Mothers, when citing these reasons, also mentioned that they were doing so in keeping with the traditional customs. Often, at least one more prelacteal was added before initiating breastfeeding. And even after breastfeeding had started, 72% of control mothers continued to give these fluids.

In the intervention group, only 31% of the mothers gave a prelacteal first, of whom 33% similarly gave more than one prelacteal, which was continued after initiating breastfeeding. In most cases, these prelacteals were given by other family members or health staff, against the mother's wishes.

Table 6.1.2.1 Types of foods given to babies in the first four days of life and reasons. Values are mean ± SD, numbers (%)

	Control	Intervention
First food given to baby	n=330	n=323
prelacteals	294 (89)	101 (31)
colostrum	36 (11)	222 (69)*
Type of prelacteal [a]	n=294	n=101
honey	125 (38)	26 (8)
mustard oil	84 (25)	29 (9)
sweetened water	49 (15)	21 (6)
honey + mustard oil	6 (2)	2 (1)
plain water	22 (7)	23 (7)
other milk	2 (1)	nil
others (honey+water/ herbal medicine)	6 (2)	nil
Reason for giving prelacteals [a]		
for sweet voice	78 (26)	11 (11)
to satisfy hunger	63 (21)	33 (33)
colostrum insufficient	7 (2)	3 (3)
to prevent cold, cough	15 (5)	3 (3)
to clean mouth, throat or stomach	102 (35)	35 (35)
to stop baby crying	17 (6)	11 (11)
given traditionally	66 (22)	15 (15)
mother sick	4 (1)	7 (7)
others (Dr/nurse's advice, BM does not come down/ baby weak/ substitute for honey/ good for baby/ to keep baby warm)	11 (4)	8 (8)
Two or more prelacteals given before BF	239 (81)	33 (33)*
Prelacteal continued after BF started	211 (72)	32 (32)*
Colostrum fed within 4 days	328 (99)	323 (100)
feeding frequency #	14.8 ± 5.8	19.7 ± 6.0 †

BM = breastmilk, BF = breastfeeding

*p < 0.0001, chi squared test, †p <0.0001 test for means

[a] may be multiple fluids and multiple reasons

sweetened water = water + sugar/glucose/ *misri* (sugar processed differently)

excluding 16 cases in control and 12 in intervention group who were interviewed after 5 days

Table 6.1.2.2 shows that significantly more of the control mothers (47%) also added another food after starting breastfeeding (postlacteal), usually other milk or sweetened water for satisfying hunger, or because they thought breastmilk did not come down within three days.

In the intervention group, 23% of babies were fed a postlacteal, of which sugar water was the commonest, followed by other milk, either because colostrum was insufficient, or to satisfy baby's hunger. Spoon, finger, medicine dropper, cloth dipped in fluids, were the usual mode of feeding pre or postlacteals, and very few babies were bottle fed in the early postpartum days.

By day 4 (Table 6.1.2.2 and Fig.6.1.2), significantly more babies in the control group were still receiving some fluids (sweetened or plain water) and were thus classified as predominantly breastfed (48%), whereas those in the intervention group were mostly exclusively breastfed (84%), having stopped the other fluids ($p < 0.001$).

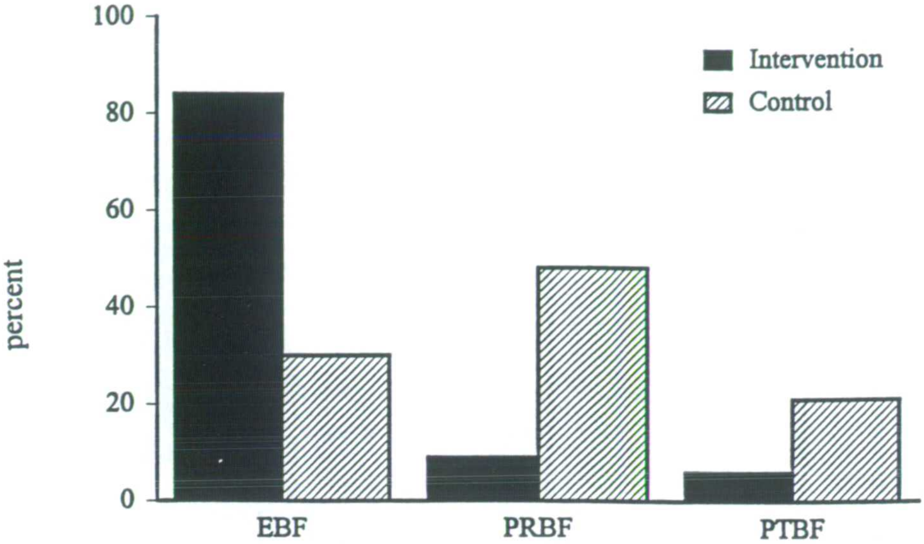
Table 6.1.2.2 Postlacteal foods during four days and breastfeeding status on day 4

	Control n=330	**Intervention n=323**
Postlacteal given	156 (47)	75 (23)*
Type of post lacteal [a]		
honey	19 (12)	12 (16)
sweetened water	48 (31)	36 (48)
Plain water	45 (29)	19 (25)
mustard oil	6 (4)	2 (3)
other milk	74 (47)	29 (37)
others (honey/dextrose+water/homeo/barley)	7 (4)	4 (5)
Reason for giving postlacteals [a]		
to satisfy hunger	93 (60)	39 (52)
breastmilk has not come down/ colostrum insufficient	75 (48)	45 (60)
traditional practice	16 (10)	9 (12)
to stop baby's crying	27 (17)	18 (24)
for sweet voice	9 (6)	4 (5)
to prevent cough, cold	11 (7)	4 (5)
to clean baby's stomach	11 (7)	2 (3)
mother sick	6 (4)	3 (4)
baby did not suckle	7 (4)	2 (3)
others [#]	15 (10)	14 (19)
Bottle fed during this period	51 (15)	18 (6)
Feeding status on Day 4		
EBF	99 (30)	273 (84)*
PRBF	158 (48)	30 (9)
PTBF	69 (21)	20 (6)
NBF	4 (1)	nil

* $p < 0.0001$, Chi squared test [a] multiple responses,

[#] others = Dr/ nurse advised, to pass urine, prevent constipation, accustom, out of interest, to prevent jaundice or hiccups, satisfy thirst, prevent evil spirits, for nipple problem, and good for health

Fig. 6.1.2
Comparison of breastfeeding status of infants on day 4



EBF = exclusively breastfed, PRBF = predominantly breastfed,
PTBF = partially breastfed.

p<0.0001, for feeding status comparisons between Intervention and Control groups

4 infants were non-breastfed on day 4 in the control group
(not shown in the figure)

6.1.3 Encouragement for breastfeeding during the first four days

Another difference was that mothers in the intervention group held their babies significantly earlier than in the control group ($p < 0.0001$) (Table 6.1.3). The PCs had explained the importance of early mother-baby contact to the intervention mothers in pregnancy, and suggested that they inform their midwife/relatives in advance, so that their babies could be given to them soon after delivery. For 68 (21%) mothers, the presence of the PC at the time of delivery, further facilitated the early contact.

Significantly more mothers in the intervention group (93% versus 42%) were helped with positioning and attachment of the baby at the breast ($p < 0.0001$), 86% by a PC, whereas the majority of control mothers were assisted by their mother or mother-in-law. Mothers in both groups had similar help with housework, often having more than one helper, who were mostly female relatives such as the mother's own mother, sister, or sister-in-law.

Table 6.1.3 Encouragement and support for breastfeeding during the first 4 days. Values are numbers (%)

	Control (n= 330)	Intervention (n= 323)
Recommended to start BF by no one	105 (32)	219 (68) *
by dai	21 (6)	19 (6)
baby's grandmothers	103 (32)	32 (10)
nurse/ doctor	42 (11)	28 (8)
others	63 (19)	25 (8)
Baby held by mother after (hours)	5.2 ± 8.8	2.1 ± 3.3*
range	1-60	1-33
Within 1 hour	143 (43)	229 (71)
Within 2 hours	55 (17)	46 (14)
Helped with position & attachment	139 (42)	300 (93)*
by dai /TBA[a]	15 (4)	8 (2)
by baby's grandmothers	61 (18)	22 (7)
by nurse/ doctor	31 (9)	19 (6)
by PC	NA	278 (86)
by others	44 (13)	24 (7)
Helped with house work [a]	327 (99)	313 (97)
by baby's maternal grandmother	150 (46)	122 (38)
by baby's paternal grandmother	83 (25)	76 (23)
by baby's aunt	146 (45)	141 (44)
by servant	60 (18)	65 (20)
by neighbour	39 (12)	35 (11)
by others	78 (24)	86 (27)

* $p < 0.0001$ Chi squared test a multiple response TBA= traditional birth attendant

Plate 13. A pregnant mother being counselled by a peer counsellor

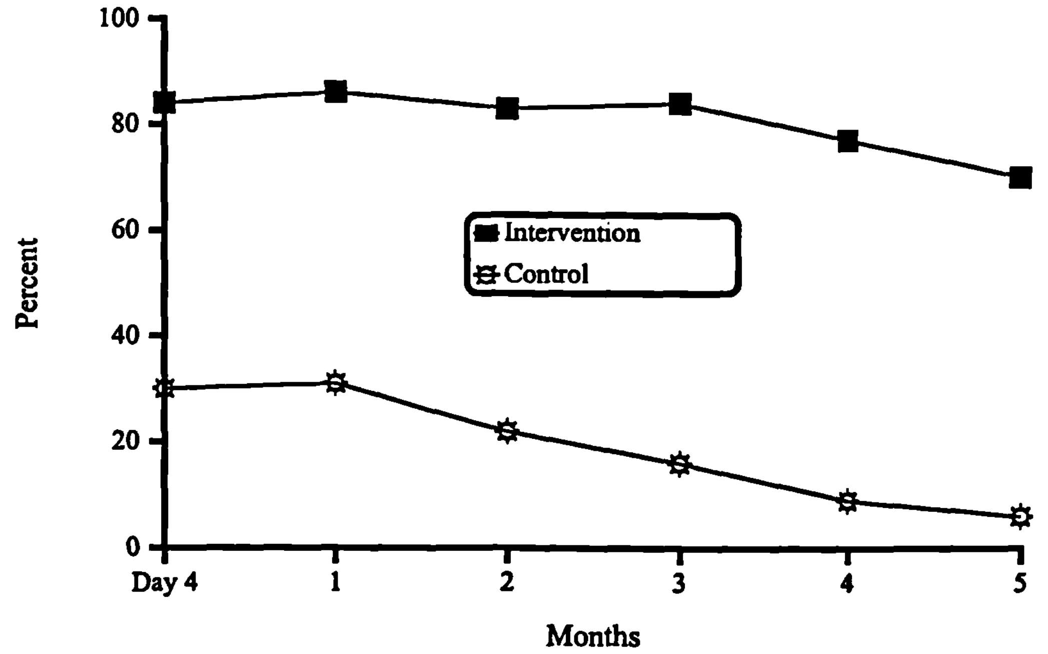
Plate 14. Peer counsellor helping the same mother with position and attachment after delivery

6.2 Breastfeeding and associated practices over the first five months

This section will describe the breastfeeding practices over five months along with the results of using Methods A and B. Feeding frequencies during the past 24 hours prior to the monthly interviews, the introduction of additional foods, usage of bottles and the reasons for both, will also be presented here.

The intervention continued to have a significant impact on breastfeeding practices of mothers after the initial postpartum period. The proportion of mothers breastfeeding exclusively remained significantly higher in the intervention group all through the 5 months of follow up, and those predominantly and partially breastfeeding remained significantly lower, as seen in Fig. 6.2 and Table 6.2.1 ($p<0.0001$).

Fig. 6.2
Prevalence of infants breastfed exclusively during first five months in the intervention and control groups



6.2.1 Comparison of infant feeding status by two methods

In this study, two approaches were used to categorise breastfeeding status at the time of the interview. Method A - gave the infant feeding status in the 24 hours preceding the interview. Method B - gave the infant feeding status while taking account of changes in breastfeeding pattern during the previous month, if fluids and foods were fed for successive 2 days or more. Since any change in status among exclusively breastfed mothers is unidirectional, fewer mothers were categorised as such by Method B, but the results were broadly similar by both methods. In Table 6.2.1 the results by both methods are presented, but the text and statistical analyses will be restricted to the results from Method B (unless specified otherwise), as this provides a more conservative estimate.

Table 6.2.1 Comparison of breastfeeding practices from month 1 to 5, obtained by Method A and Method B. Values are percentages

	Mo 1		Mo 2		Mo 3		Mo 4		Mo 5	
	C	I*	C	I*	C	I*	C	I*	C	I*
(n)	(314)	(314)	(299)	(313)	(289)	(297)	(284)	(291)	(285)	(288)
Method A										
EBF	32	89	23	85	17	84	11	78	6	70
PRBF	39	5	33	4	28	5	21	6	13	7
PTBF	26	5	42	11	53	10	64	14	77	21
NBF	1	-	2	<1	3	1	3	2	4	2
Method B										
EBF	31	86	22	83	16	84	9	77	6	70
PRBF	41	9	33	3	27	3	21	5	14	6
PTBF	27	6	43	13	55	11	66	16	76	22
NBF	1	-	2	<1	3	1	3	2	4	2

Mo = months

* $p < 0.0001$, Chi squared test for differences in feeding status between Control (C) and Intervention (I) groups

There were no significant differences between feeding status obtained by Method A or B

In the intervention group, although 69% of mothers gave only breastmilk to start with, many later stopped the pre and postlacteals, so 84% were exclusively breastfeeding by day 4. These rates were maintained until month 3, decreased to 77% at month 4, and then to 70% at month 5. In the control group in contrast, only 11% were breastfed initially, 30% were exclusively breastfed by day 4, 31% at month 1, declining progressively thereafter to only 6% at month 5. Thus the intervention had a significant impact not only in initiating, but also in sustaining exclusive breastfeeding in the first 5 months.

In the control group, at month 1, the majority of mothers were predominantly breastfeeding (41%) but a substantial number were partially breastfeeding (27%). The latter increased progressively to 76% at month 5, whereas only 22% were partially breastfeeding in the intervention group.

6.2.2 Frequency of feeding during past 24 hours

Table 6.2.2 shows that the frequencies of feeding breastmilk were high in both groups. The frequencies of feeding other fluids or foods to infants who were not exclusively breastfeeding were also similar in both groups, although the number of infants was much less in the intervention group. For infants who were predominantly breastfed, water or juice was usually given 2-3 times per day. Partially breastfed infants were given other milk (type of other milk is shown in section 6.2.4) and/or gruel between 4-6 times a day, depending on the age, and this was similar in the two groups.

Table 6.2.2 Frequency of feeding (mean ± SD) during past 24 hours (recall) [a]

	Control		Intervention	
Month 1	n=314		n=314	
BM	312	13.3 ± 3.9	314	16.1 ± 4.0
water	133	1.8 ± 1.3	16	1.7 ± 1.0
s.water/juice	34	2.6 ± 1.8	3	1.3 ± 0.6
CM	16	3.7 ± 2.3	3	3.2 ± 2.2
PM	52	4.5 ± 3.2	12	3.6 ± 1.8
gruel-milk	8	2.4 ± 1.3	1	1.0
gruel+milk	5	4.8 ± 3.0	-	-
miscellaneous	50	2.1 ± 1.1	8	2.6 ± 0.6
Month 2	n= 299		n=315	
BM	294	11.8 ± 3.9	313	14.0 ± 3.6
water	151	1.7 ± 1.3	15	2.0 ± 1.8
s.water/ juice	23	1.9 ± 1.6	1	1.0
CM	9	3.6 ± 1.7	7	2.1 ± 1.5
PM	75	3.8 ± 3.1	28	4.0 ±3.2
gruel-milk	18	3.3 ± 1.9	2	3.5
gruel+milk	29	4.6 ± 3.1	1	4.0
miscellaneous	30	2.0 ± 1.1	14	2.9 ± 2.8
Month 3	n= 289		n= 297	
BM	281	10.9 ± 3.5	293	13.2 ± 3.3
water	169	2.1 ± 1.4	15	1.8 ± 1.5
sugar water	8	1.7 ± 0.9	nil	-
CM	14	3.0 ± 1.8	5	4.2 ± 3.1
PM	69	4.2 ± 3.5	22	4.1 ± 2.4
gruel-milk	30	2.9 ± 1.8	nil	-
gruel+milk	38	5.5 ± 3.0	7	6.0 ± 3.2
miscellaneous	41	1.9 ± 1.0	17	1.9 ± 0.9
Month 4	n= 284		n= 291	
BM	274	10.3 ± 3.6	286	12.8 ± 3.4
water	188	2.5 ± 1.7	28	2.2 ± 1.6
s.water/ juice	7	2.7 ± 2.4	1	1.0
CM	12	2.8 ± 2.0	3	5.0 ± 3.5
PM	75	3.4 ± 2.3	26	4.5 ± 3.2
gruel-milk	31	3.5 ± 2.4	2	2.5
gruel+milk	74	4.4 ± 3.0	14	4.9 ± 3.8
miscellaneous	31	2.3 ± 2.9	12	4.0 ± 5.1
Month 5	n = 285		n= 288	
BM	273	9.8 ± 3.5	283	12.0 ± 3.2
water	221	3.1 ± 2.1	41	2.4 ± 1.6
s.water/juice	5	1.6 ± 0.9	1	1.0
CM	11	3.4 ± 4.5	9	2.9 ± 2.6
PM	60	3.2 ± 2.2	31	3.7 ± 3.2
gruel-milk	47	3.1 ± 2.3	6	2.5 ± 1.4
gruel+milk	122	4.0 ± 2.9	20	3.7 ± 2.5
miscellaneous	70	1.6 ± 1.4	15	1.5 ± 0.8

[a] multiple foods may be given BM= breastmilk, CM= cow's milk, PM= powdered milk
s.water= sweetened water, miscellaneous = honey, fruit, rice or rice products, biscuits etc.

6.2.3 Age for introduction of other milk and foods, and reasons

In Table 6.2.3.1, the new foods offered to babies when they first became partially breastfed, using Method B (i.e. two consecutive days of nutritive fluid/food), is presented. It was seen that powdered milk was the first choice for mothers during the first month. Fresh cow's milk was the second most common new food in this period in both groups. The difference between the mothers was more marked for gruel, from the first month onwards, because it was actively discouraged by the PCs, and mothers were told that if they must feed, to give powdered milk.

Table 6.2.3.1 Proportion of mothers who started new foods over the months using Method B. Values are numbers (%)

New Food started	Mo 0-1 C (n=53) I (n=12)	Mo 1-2 C(n=63) I (n=30)	Mo 2-3 C (n=51) I (n=13)	Mo 3-4 C (n=50) I (n=21)	Mo 4-5 C (n=41) I (n=28)
cows's milk					
control	12 (23)	7 (11)	11 (22)	7 (14)	3 (7)
intervention	4 (33)	4 (13)	nil	4 (19)	7 (25)
powdered milk					
control	33 (62)	38 (60)	23 (45)	20 (40)	3 (7)
intervention	8 (67)	22 (73)	11 (85)	12 (57)	11 (39)
gruel					
control	7 (15)	17 (27)	14 (27)	19 (38)	26 (63)
intervention	1 (8)	4 (13)	2 (15)	5 (24)	7 (25)
fruit					
control	1 (2)	5 (8)	3 (6)	1 (2)	3 (7)
intervention	nil	nil	nil	nil	2 (7)
other food					
control	nil	3 (5)	2 (4)	5 (10)	10 (24)
intervention	nil	nil	nil	1 (5)	1 (4)

Mo = months, C = control group, I = intervention group

'n' represents mothers who start a new food and continue for 2 days in this time period (they are not included in the next time interval)

Multiple foods could be given by each mother

To see what proportion of mothers were giving either milk or food, all types of milk and all types of foods (including gruel and other foods), were combined in two groups and the data analysed again. Table 6.2.3.2 confirms, that whereas before 4 months mothers in both the groups gave milk, at 4-5 months, those in the control group were more likely to introduce other food.

Table 6.2.3.2 Proportion of mothers introducing other milk or food in the two groups using Method B. Values are numbers (percentages)

	Mo 0-1 C (n =53) I (n = 12)	Mo 1-2 C (n = 63) I (n = 30)	Mo 2-3 C (n = 51) I (n = 13)	Mo 3-4 C (n = 50) I (n = 21)	Mo 4-5 C (n = 41) I (n = 28)
Milk					
Control	45 (85)	43 (68)	35 (69)	27 (54)	5 (12)
Intervention	11 (92)	26 (87)	11 (85)	16 (76)	18 (64)
Food					
Control	8 (15)	20 (32)	16 (31)	23 (46)	36 (88)
Intervention	1 (8)	4 (13)	2 (15)	5 (24)	10 (36)

'n' represents mothers who start a new food and continue for 2 days in this time period (they are not included in the next time interval)

Milk includes : any milk other than breastmilk
Food includes : gruel with or without milk, fruit, biscuit, rice products etc.

Until 4 months, about 70% of the control mothers who had started complementary foods, said they had done so because they did not have enough breastmilk (Table 6.2.3.3). This was the same reason given by 31-54% of intervention mothers as well, although they were supposed to have received counselling to explain how more suckling by the baby would increase their production of breastmilk. Interestingly, a large number of intervention mothers gave work as the second commonest reason in months 2-3, whereas for the control mothers, it was "to accustom the baby to the bottle". From the 3rd month onwards, many of the control mothers said it was time for the baby to be given extra food, which could be because they were still following the infant feeding messages prior to the Breastfeeding Campaign, advising addition of complementary foods about the fourth month. In both groups (except month 5 for controls), a surprisingly low proportion of mothers were the decision makers for starting complementary food, particularly in the intervention group.

Table 6.2.3.3 Reasons for introducing a new food during day 5 to month 5 and proportion of mothers who were the decision makers. Values are shown as percentages

	Mo 0-1		Mo 1-2		Mo 2-3		Mo 3-4		Mo 4-5	
(total n)	C (53)	I (12)	C (63)	I (30)	C (51)	I (13)	C (50)	I (21)	C (41)	I (41)
not enough BM	72	54	76	43	72	31	68	52	39	46
needs more food	-	-	3	3	4	-	16	9	51	11
working mother	6	-	3	20	6	31	2	-	-	4
accustom baby	11	7	13	3	14	23	4	24	7	14
baby sick	-	6	-	-	4	8	4	9	2	-
mother sick	6	6	-	20	-	-			-	11
others +	3	23	3	10	1	8			-	
Mother decided to start new food	54	38	49	57	65	46	54	48	71	46

+ others = mother anxious, nipple problems, engorged breast, baby refused

6.2.4 Types of other milk fed to babies within the first five months

Table 6.2.4 shows that infant formula was the commonest type of additional milk fed to babies in both control and intervention groups throughout the 5 months. Cow's milk, commonly given in a 1:1 dilution, was the next most common type of milk in month one for both groups, and then its usage declined over the following months. Full cream milk was used by both groups, including a few mothers in the intervention group, although they had been advised by the PC not to use this type of milk before 5 months of age. Condensed milk was fed to only one baby in the whole cohort (data not shown).

Table 6.2.4 Types of milk given by infant age. Figures are numbers (percentages)

Type of milk	Month 1 C (n=53) I (n=12)	Month 2 C (n=63) I (n=30)	Month 3 C (n=51) I (n=13)	Month 4 C (n=50) I (n=21)	Month 5 C (n=41) I (n=28)
Infant formula					
C	30 (57)	28 (44)	17 (33)	15 (30)	3 (7)
I	4 (33)	18 (60)	7 (54)	7 (33)	7 (25)
Half cream					
C	nil	nil	2 (2)	1 (2)	nil
I	2 (16)	nil	1 (8)	1 (4)	1 (3)
Full cream					
C	3 (5)	10 (15)	5 (10)	4 (8)	nil
I	1 (8)	4 (13)	3 (23)	4 (19)	3 (10)
Cow's milk					
C	12 (23)	7 (11)	11 (22)	7 (14)	3 (7)
I	4 (33)	4 (13)	nil	4 (19)	7 (25)

6.2.5 Usage of bottles and reasons

During the monthly interviews, the first time when a mother was recorded as not exclusively breastfeeding her baby, she was asked what she was using to feed other fluids/foods. If a bottle was used, her reasons for using it were recorded. Table 6.2.5.1 shows that as a whole, there were significantly fewer mothers who were bottle feeding in the intervention group all through 5 months ($p < 0.001$).

Table 6.2.5.1 Proportion of mothers using bottles for feeding in the two groups. Values are numbers (%)

	Month 1*	Month 2*	Month 3*	Month 4*	Month 5*
Control	n= 314 104 (33)	n= 299 136 (45)	n= 289 137 (47)	n= 284 137 (48)	n= 285 131 (46)
Intervention	n= 314 17 (5)	n= 313 36 (11)	n= 297 33 (11)	n= 291 39 (13)	n= 288 49 (17)

* $p < 0.0001$, difference between control and intervention groups during all the months

But the above table would reflect differences in the prevalence of exclusive breastfeeding. The message provided to the intervention mothers was that if they wanted to feed their babies other fluids or foods, they should use spoons and cups instead of bottles. So when mothers who were not exclusively breastfeeding were compared, approximately half were bottle feeding in both groups (Table 6.2.5.2) and the differences were not significant. This result demonstrated that mothers who started complementary feeding were reluctant to accept the suggestion to avoid bottles for feeding infants.

Table 6.2.5.2 Proportion of non-EBF mothers who were using bottles in the two groups. Values are numbers (%)

	Mo 0-1	Mo 1-2	Mo 2-3	Mo 3-4	Mo 4-5
Control	n= 218 104 (48)	n= 233 134 (57)	n= 244 137 (56)	n= 257 137 (53)	n= 269 131 (49)
Intervention	n= 45 17 (38)	n= 53 36 (68)	n= 48 33 (69)	n= 67 38 (57)	n= 87 49 (56)

The commonest reason given by control mothers all through 5 months was that it was easy to feed with a bottle (Table 6.2.5.3). For the intervention mothers, it was because they could not feed with a spoon (as suggested by their PC). In months 0-1 and 4-5, an equal number of intervention mothers also said that they used bottles because it was easy to feed. In month 2-3, resumption of employment outside became the decisive factor for choosing bottles (as well as for starting complementary foods), because it was easier for others to feed babies by bottle, than with a spoon.

Table 6.2.5.3 Commonest reason for choosing bottles for feeding infants at different ages

	Mo 0-1 reason	Mo 1-2 reason	Mo 2-3 reason	Mo 3-4 reason	Mo 4-5 reason
Control	easy to feed	easy to feed	easy to feed	easy to feed	easy to feed
Intervention	easy to feed & cannot feed with spoon- baby cries or may get hurt	cannot feed with spoon- baby cries or may get hurt	started going for work outside the home - easier for others to feed	cannot feed with spoon- baby cries or may get hurt	easy to feed & cannot feed with spoon- baby cries or may get hurt

6.3 Impact of individual PCs on feeding practices in intervention and control clusters at day 4 and month 5

Breastfeeding practices are shown in each of the intervention and control clusters in Table 6.3, but only the status in intervention clusters are discussed because they reflect individual PC's impact on mothers' breastfeeding practices. Some mothers had left the area, or been excluded, so there was some decrease in the number of mothers from day 4 to month 5 in nearly all the clusters. On day 4, three clusters had 100% mothers breastfeeding exclusively (#3,15,16). The lowest proportion of mothers in this category was 67%, in one cluster (#17).

Over the 5 months follow-up period, there was a gradual decrease in the proportion of exclusively breastfeeding mothers, except in two clusters (#6,18), but overall, these proportions varied from 50% to 100% at the end of 5 months.

Table 6.3 Feeding status comparisons by cluster, in the intervention group

	C # 1 n=17	C# 2 n=10	C# 3 n=17	C# 4 n=23	C# 5 n=24	C# 6 n=12	C# 7 n=19	C# 8 n=20	C# 9 n=15	C# 10 n=5
Day 4										
EBF	14 (82)	7 (70)	17 (100)	21 (91)	17 (71)	8 (68)	13 (68)	17 (85)	13 (87)	4 (80)
PRBF	1 (6)	3 (30)	-	2 (9)	2 (8)	2 (17)	4 (21)	2 (10)	2 (13)	1 (20)
PTBF	2 (12)	-	-	-	5 (21)	2 (17)	2 (10)	1 (5)	-	-
NBF	-	-		-	-	-	-	-	-	-
Month 5	n = 17	n = 6	n = 14	n = 11	n = 19	n = 13	n = 14	n = 17	n = 11	n = 4
EBF	12 (71)	4 (67)	11 (79)	8 (73)	12 (63)	11 (85)	7 (50)	10 (59)	9 (82)	1 (25)
PRBF	2 (12)	1 (17)	1 (7)	2 (18)	2 (10)	1 (8)	1 (7)	1 (6)	2 (18)	1 (25)
PTBF	3 (18)	1 (17)	2 (14)	1 (9)	5 (26)	1 (8)	6 (43)	5 (29)	-	2 (50)
NBF	-	-	-	-	-	-	-	1 (6)	-	-
	C # 11 n= 28	**C# 12 n = 24**	**C# 13 n = 18**	**C# 14 n = 19**	**C# 15 n=16**	**C# 16 n=16**	**C# 17 n=18**	**C# 18 n=13**	**C# 19 n=16**	**C# 20 n=10**
Day 4										
EBF	21 (75)	21 (87)	17 (94)	18 (95)	16 (100)	16 (100)	12 (67)	12 (92)	15 (94)	8 (80)
PRBF	5 (18)	3 (12)	1 (6)	1 (5)	-	-	4 (22)	1 (8)	1 (6)	2 (20)
PTBF	2 (7)		-	-	-	-	2 (11)	-	-	-
NBF	1 (3)		-	-	-	-	-	-	-	-
Month 5	n=27	n=20	n=15	n=16	n = 13	n = 13	n = 17	n = 10	n = 13	n = 10
EBF	14 (52)	12 (60)	13 (87)	13 (81)	9 (69)	11 (85)	12 (71)	10 (100)	12 (92)	8 (80)
PRBF	3 (11)	1 (5)	· 1 (7)	1 (6)	4 (31)	2 (15)	1 (6)	-	1 (8)	2 (20)
PTBF	9 (33)	7 (35)	1 (7)	2 (12)	-	-	4 (23)	-	-	-
NBF	1 (4)	-	-	-	-	-	-	-	-	-

C# = cluster number, EBF = exclusively breastfed, PRBF= predominantly breastfed, PTBF = partially breastfed, NBF= non-breastfed

Table 6.3 contd .... Feeding status comparisons by cluster, in the control group

	C # 21 n=17	C# 22 n=7	C# 23 n=20	C# 24 n=13	C# 25 n=15	C#26 n=13	C# 27 n=13	C# 28 n=25	C# 29 n=31	C# 30 n=36
Day 4										
EBF	3 (18)	2 (29)	9 (45)	3 (23)	4 (27)	4 (31)	4 (31)	5 (20)	10 (32)	8 (22)
PRBF	7 (41)	4 (57)	7 (35)	8 (61)	6 (40)	6 (46)	4 (31)	10 (40)	16 (52)	18 (50)
PTBF	7 (41)	1 (14)	4 (20)	2 (15)	5 (33)	2 (15)	5 (38)	10 (40)	5 (16)	8 (22)
NBF	-	-	-	-	-	1 (8)	-	-	-	2 (6)
Month 5	n = 13	n = 5	n = 18	n = 9	n = 15	n = 9	n = 11	n = 20	n = 29	n = 31
EBF	1 (8)	-	2 (11)	-	-	-	1 (9)	1 (5)	1 (3)	3 (10)
PRBF	2 (15)	1 (20)	2 (11)	2 (11)	4 (27)	1 (11)	3 (27)	3 (15)	4 (14)	3 (10)
PTBF	10 (77)	3 (60)	13 (72)	3 (89)	10 (67)	8 (89)	7 (64)	16 (80)	23 (79)	23 (74)
NBF	-	1 (20)	1 (6)	-	1 (7)	-	-	-	1 (3)	2 (6)

	C # 31 n=14	C# 32 n =6	C# 33 n =13	C# 34 n = 13	C# 35 n=33	C# 36 n=22	C# 37 n=11	C# 38 n=9	C# 39 n=13	C# 40 n=4
Day 4										
EBF	5 (36)	3 (50)	2 (15)	2 (15)	14 (42)	8 (36)	3 (27)	4 (44)	2 (15)	3 (75)
PRBF	7 (50)	3 (50)	8 (61)	6 (46)	15 (45)	11 (50)	7 (64)	5 (56)	8 (61)	1 (25)
PTBF	2 (14)	-	3 (23)	5 (38)	4 (12)	2 (9)	1 (9)	-	3 (23)	-
NBF	-	-	-	-	-	1 (4)	-	-	-	-
Month 5	n=12	n=5	n=12	n=10	n = 30	n =15	n = 10	n = 8	n = 11	n =4
EBF	2 (17)	-	-	1 (10)	1 (3)	1 (7)	1 (10)	1 (12)	-	-
PRBF	2 (17)	-	3 (25)	1 (10)	4 (13)	2 (13)	1 (10)	-	-	1 (25)
PTBF	7 (58)	4 (80)	8 (67)	8 (80)	25 (83)	12 (80)	8 (80)	6 (75)	10 (91)	2 (50)
NBF	1 (8)	1 (20)	1 (8)	-	-	-	-	1 (12)	1 (9)	1 (25)

C# = cluster number, EBF = exclusively breastfed, PRBF= predominantly breastfed, PTBF = partially breastfed, NBF= non-breastfed

Since the unit of intervention was the cluster, cluster-level analyses were conducted for the primary outcome, namely prevalence of exclusive breastfeeding. The average prevalence of exclusive breastfeeding in the twenty intervention and twenty control clusters were calculated at day 4 and month 5, and the difference in means tested (Table. 6.3.2).

Table 6.3.2 Comparison of average prevalence (%) of exclusive breastfeeding in control and intervention clusters

	Intervention n = 20	Control n= 20
Day 4	84.3 ± 11.5	31.6 ± 14.6 *
Month 5	71.6 ± 17.1	5.2 ± 5.3†

* $p < 0.0001$, t-test for means,

† $p < 0.0001$, Mann Whitney or Wilcoxon two-sample test

Based on the results shown in the above table, which were so similar to those obtained from analyses at the individual level (Table 6.2.1), it was decided to conduct all future analyses only at the individual level.

It has been mentioned earlier in section 5.2.8, that except for total number of mothers, the clusters did not differ markedly regarding certain variables which could affect or constrain a PC's performance.

PC scores, described in section 4.5.2, were also similar, except for three PCs. So the PC scores cannot explain the variation in exclusive breastfeeding among the clusters. Characteristics of the mothers themselves may have accounted for some of the differences in exclusive breastfeeding rates, and these are compared in the following section.

6.4 Characteristics of intervention mothers exclusively and not exclusively breastfeeding at 5 months

A number of variables were examined to see whether there were any maternal or family characteristics at enrolment that determined whether or not mothers were still exclusively breastfeeding at 5 months, but none showed any difference (Table 6.4).

Table 6.4 Characteristics of intervention mothers at enrolment, who breastfed exclusively for 5 months versus those who did not. Values are numbers (%).

	total n	EBF	Not EBF
Mother's age (years)			
14 - 19	64	37 (58)	27 (42)
20 - 25	141	108 (76)	33 (23)
26 and above	83	56 (67)	27 (32)
Mother's education (yrs)			
nil	82	59 (72)	23 (28)
1-5	96	68 (71)	28 (29)
6-9	68	43 (63)	25 (37)
10 and above	42	31 (74)	11 (26)
Parity			
one	80	52 (65)	28 (35)
more than one	208	149 (72)	59 (28)
BMI			
< 18.5	9	9 (100)	nil
18.6-22	146	89 (61)	57 (39)
> 22	152	103 (51)	49 (56)
MUAC (cm)			
< 23	119	89 (75)	30 (25)
> 23	89	32 (36)	57 (64)
Mother present in house	18	12 (75)	6 (33)
Mother-in-law present	37	26 (36)	11 (30)
Family income (taka)			
0-3000	85	59 (69)	26 (30)
3001- 5000	82	58 (71)	24 (29)
5001- 10,000	74	52 (70)	22 (30)
10,001 and above	47	32 (68)	15 (32)
Occupation			
not employed	223	160 (72)	63 (28)
employed	65	41 (63)	24 (37)

BMI = body mass index, MUAC = mid-upper arm circumference
Taka 75 = £1, and taka 45 = US $1

6.5 Referrals from peer counsellors, reasons and outcomes

PCs had been given certain criteria (during training) for referring mothers to Breastfeeding Counsellors (BCs) (chapter 3, section 3.3). These were briefly, if a mother thought she did not have enough milk because her baby was not growing well, if there was excessive family pressure to give additional milk, if sore nipples could not be managed, or if medicines were required for treatment of mastitis or suspected breast abscess. In addition to these criteria, during the course of the study, PCs referred some mothers for other breastfeeding problems which they could not manage, which are mentioned on the following page. In most cases, once any of these other problems were managed by the BC, the PC did not have to refer a similar case again.

The number of referrals varied (Table 6.5), with more at the onset of the study. On average, a PC had 10-15 mothers during the study period, and the median number of referrals was 3, although PC #11 had 10 referrals. Two PCs did not refer any mothers to the BCs.

Table 6.5 Referrals from peer counsellors in each cluster

Cluster no	Number of referrals
1	4
3	2
4	1
5	3
6	3
7	3
8	3
9	4
11	10
12	0
13	4
14	3
15	0
16	2
17	3
18	1
19	2
20	2
Total referrals	50

Referrals to BC within the first month of delivery

Two mothers were referred for "not enough milk" and two for "excessive family pressure to start other milk". The other reasons for (and numbers) for referral were: baby sick (1), baby not suckling/not suckling properly (3), mother sick (2), big nipple/ inverted nipple (3), baby does not breastfeed while sleeping at night (1).

Referrals between 1 and 5 months

There were eighteen referrals for "not enough breastmilk" and one for treatment of thrush. In 11 of the former cases, BCs could convince the mothers that breastmilk was sufficient for the baby, and they reverted to exclusive breastfeeding if other feeds had been started. The other 7 went on to partial breastfeeding. The baby with thrush continued to breastfeed exclusively.

In some cases, suspicions that mothers were partially breastfeeding, or that they had problems, were reported by the interviewers but since these mothers were not referred by the PCs, the BCs could not intervene.

Referrals from BC to PI

Only six mothers were referred from the BC to the PI during the total duration of the project, three within the first month and three later. The first three cases were within a few days of delivery; one because the mother had high fever (and sore nipples), and one because the baby was lethargic and not suckling properly. Another mother was referred because she had a big nipple, which caused the baby to vomit and cry when he tried to breastfeed. All these problems could be solved and the mothers went on to breastfeed exclusively for 5 months.

After the first month, three mothers were referred because the BC could not convince them that they had sufficient breastmilk. Only one of these mothers could be reassured by the PI, and she continued to breastfeed exclusively until month 4.

Discussion

While the main objective of the intervention was to help mothers to breastfeed exclusively for five months, to achieve this, certain other steps and objectives were also important. These included; early initiation of breastfeeding, not giving anything else in the first four days of life, and continuing exclusive breastfeeding for five months by breastfeeding frequently and on demand. It was not expected that all the mothers would be able to breastfeed exclusively, and those who may not be able to do so, would be advised to feed adequately diluted cow's milk or properly prepared infant formula, with a spoon or cup, avoiding bottles.

How far the intervention could achieve each of the above outcomes will now be discussed. Breastfeeding was initiated significantly earlier by the intervention mothers ($p<0.0001$), and although some fed their infants prelacteals and postlacteals, the proportions were significantly lower than in the control group ($p<0.0001$). Compared to their intentions for giving some fluid or foods to their infants in the first four days, the control mothers' practices were significantly worse than their plans and the intervention mothers' were significantly better ($p<0.0001$). The intervention mothers who gave these first fluids or foods, did so following advice of health staff or at the insistence of family members. The fact that some continued them even after breastfeeding had started, indicates that mothers had either come to rely on these additional fluids for feeding their babies, because they thought colostrum was insufficient, or because they might have been under continuing pressure to do so. By the fourth day, despite these earlier diversions from recommendations by the PCs, the proportion of mothers breastfeeding exclusively in the intervention group had risen to 84%, compared to only 30% in the controls. The control mothers' early infant feeding practices were very similar to those of other mothers in Bangladesh, who delay the initiation of breastfeeding, commonly give prelacteals, with about 11% feeding colostrum as the first food, start complementary foods early, and commonly bottle feed [Mitra *et al.,* 1994; Talukder *et al.,* 1997; Akhter *et al.*, 1998].

As the study progressed, differences in the proportions of mothers exclusively breastfeeding increased between the two groups, and were significant at each month ($p<0.0001$). Starting with an absolute difference of 55% at month 1 between the two groups, the maximum difference was 68% at months 3 and 4, tapering down to 64% at month 5. Mothers' practices regarding infant feeding have been known to fluctuate, which causes a substantial change in their classification status [Zahoori *et al.,* 1993]. This study in Dhaka has also shown similar fluctuations. Twenty-one percent of the intervention mothers exclusively breastfeeding at month 5 had, at least once in the previous months, moved away from exclusive breastfeeding for two or more days, and then reverted back. This raises the question of which methodologies would be the most reliable, or most useful for classifying infant feeding status. Using Method B to probe and assess if the practice had changed in the preceding interval, took much more time than Method A, and did not produce significant differences in the classification of infant feeding status for that month.

Where breastmilk feeding frequencies were concerned, the intervention mothers always had higher frequencies in the 24 hour recall, but were not significantly different from the controls. For the predominantly and partially breastfed infants, the number of breastfeeds were usually much more than the number of other fluids or foods fed to the infants, so they were mostly "high breastfeeders", using the classification of Labbok and Krasovec [1990]. This may be an important factor regarding the overall low prevalence of diarrhoea morbidity which is presented in chapter 7.

Of the control mothers who started giving their infants additional foods, the proportions giving gruel were 15% at month 1, which increased over the remaining months, and was significantly different from the intervention mothers ($p<0.0001$). The latter, when they decided to give complementary foods, more commonly gave infant formula or cow's milk. The feeding utensils/mode, however, showed no difference between the two groups as bottles were used by similar proportions of mothers. There could be a number of reasons for not complying with the message to use cup and spoon, including i) the mothers who chose not to breastfeed exclusively did not listen to the PC for any other advice regarding infant feeding. ii) the PC herself may have thought that since she had failed in keeping a mother breastfeeding exclusively, this mother would not listen to any further advice. iii) a mother may have tried spoon feeding as suggested by the PC, but could not manage effectively because she had not been shown how to feed a small baby milk with a spoon or cup. The latter may have happened because the PC was mistaken in thinking that the right time to demonstrate was after 5 months.

Despite some variability among the PCs in helping their mothers achieve and sustain exclusive breastfeeding, the results were quite similar among most of the clusters. Clusters with fewer mothers and fewer employed mothers, achieved higher exclusive breastfeeding rates. Many of the PCs managed to help the mothers on their own, with very few referrals. Thus, except for discouraging the use of bottles, the intervention managed to achieve all its objectives regarding infant feeding, to produce a significant difference in the proportions of mothers who breastfed exclusively over 5 months.

There have been few interventions using PCs or community-based breastfeeding promoters to increase exclusive breastfeeding. Those that have done so have not shown such remarkable results as these. In Chicago, PCs were assigned to a limited number of new mothers, whom they helped in hospital after delivery, and thereafter contacted at home by telephone. A 22% difference in exclusive breastfeeding between counselled and non-counselled mothers was shown at about 12 weeks (29% vs. 7%) [Kistin *et al.,* 1994]. In Chile, a 42% difference at 6 months was achieved where promoters visited at home during pregnancy, and after delivery in the hospital, and thereafter, mothers went to the health centre and were seen by a midwife and a physician, [Alvarado *et al.,* 1996]. A recent project in Pakistan, using health education at home on a one-to-one basis [Akram *et al.,* 1998], has shown significant reduction in prelacteal feeding, and very high rates of exclusive breastfeeding at 5 months (93%). But the methodology was not clear, the percentage of dropouts not mentioned, and a reporting bias may have occurred because the health educators also collected the infant feeding data for the project. One of the reasons which enabled the PCs in this study in Dhaka to achieve much higher rates of exclusive breastfeeding than other studies, was probably because of the frequent number of home visits, which were a major factor for encouragement and support, as mentioned by the mothers themselves (chapter 10).

Not much research has been published regarding the determinants of exclusive breastfeeding, unlike those for breastfeeding in general. In the latter, researchers have studied a cohort and examined variables indicating which mothers choose to breastfeed exclusively. Perez-Escamilla *et al.,* [1995], studied low-income mothers delivering in hospitals in three Latin American countries. They reported that planned duration of exclusive breastfeeding, having a female infant, not being employed, lower socio-economic status and higher birthweight were positively associated with exclusive breastfeeding. Other factors were, mother being older than 18 years, and having a partner. In an earlier Indian study, no measurable characteristic could be identified [Jeeson and Richard, 1989]. Researchers from other countries have not as yet studied why, among exclusively breastfeeding mothers, some continue the practice and others do not. In an earlier study in Bangladesh, during follow-up of mothers who had been counselled in a hospital during treatment of their infant's diarrhoea, the factors associated with not breastfeeding exclusively were; domineering grandmothers, lack of financial support by husbands, too much housework, or disinterest in exclusive breastfeeding [Haider *et al.,* 1997]. Some of these reasons were common for this project, as obtained from focus-group discussions with mothers (presented in chapter 10).

So far, the impact of the intervention on breastfeeding practices have been discussed. The next question would obviously be, did these differences in feeding practices affect morbidity from diarrhoea and respiratory tract infections in the control and intervention infants? Chapter 7 will present the results related to this question.

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CHAPTER 7: IMPACT ON MORBIDITY FROM DIARRHOEAL DISEASE, COUGH AND FEVER

In chapter 6, the significant impact of the intervention in increasing exclusive breastfeeding and decreasing partial breastfeeding practices of mothers of infants in the first five months of life has been shown. This chapter will describe the effect of the intervention on the morbidity of infants during the same period.

The results will be presented in the following way:

1. Comparisons between the control and intervention groups regarding morbidity in a) the 24 hours previous to each monthly interview, and b) during the preceding week
2. Comparisons between the two study groups regarding treatment-seeking behaviour for morbidity in the preceding month, as an indicator for severe illness
3. Comparisons of prevalence of morbidity according to feeding status in the combined groups using,
   a) four categories of feeding status (EBF, PRBF, PTBF and NBF)
   b) two categories of feeding status (FBF and PTBF/NBF)
4. Comparison of costs, as a measure of morbidity for the whole month, and for assessing severity of illness
   - comparison of treatment costs in the control and intervention groups in the week preceding the interview
   - comparison of medicine costs in the control and intervention groups over 5 months

As described in chapter 4, during the interviews at 1, 2, 3, 4 and 5 months, each mother was asked first how her baby had been during the last 24 hours and her spontaneous response was noted along with the symptoms. Then regardless of whether she answered that the baby had been well or unwell, specific enquiries (probes) were made for symptoms of diarrhoea, dysentery, cough and fever during the previous 24 hours and the preceding week. The symptoms presented in the following tables are a combination of spontaneous and probed responses during the previous 24 hours, and probed responses for the week before the interview.

7.1 Morbidity during the previous 24 hours and week preceding each interview

At each interview, the proportion of infants who were spontaneously reported "not well" in the previous 24 hours by their mothers, was lower in the intervention group (Table 7.1). When prompted, the number of mothers reporting symptoms increased in both control and intervention groups, the most common being cough, for which often no treatment was sought (data not shown).

The spontaneous and probed responses were combined for each of the 4 target symptoms, namely diarrhoea, dysentery, cough and fever. Diarrhoea and dysentery were later analysed as diarrhoeal illness. Queries for illness in the previous 24 hours revealed no significant differences between the two groups for diarrhoeal illness or cough, but the prevalence of fever was lower in the intervention group at all weeks.

Illness in the preceding week again showed a similar pattern as for the previous 24 hr morbidity, with a slightly lower prevalence in the intervention group in all months except month 5. The differences, however, were not significant. The reported prevalence of diarrhoeal disease and cough in the preceding week were also similar in the two groups, but prevalence of fever was significantly less in the intervention group at months 3 and 4 ($p < 0.05$ in each case).

In summary, Table 7.1 shows a trend for less morbidity in the intervention group in most of the months, and lower prevalence of fever in all the months.

Table 7.1 **Prevalence of diarrhoeal disease, cough and fever in the previous 24 hours and preceding week in the control and intervention groups. Values are numbers (%)**

	Mo 1		Mo 2		Mo 3		Mo 4		Mo 5	
	C 314	I 314	C 299	I 313	C 289	I 297	C 284	I 291	C 285	I 288
S response **Mother's perception that baby was not well in last 24 h**	89 (28)	76 (24)	100 (33)	91 (29)	90 (31)	84 (28)	103 (36)	100 (34)	111 (39)	84 (29)*
S +P response **Illness in 24 h**	145 (46)	143 (45)	153 (51)	162 (52)	154 (53)	147 (49)	165 (58)	158 (53)	163 (57)	167 (58)
(target symptoms) +										
Diarrhoeal disease	16 (5)	18 (6)	22 (7)	25 (8)	22 (8)	28 (9)	32 (11)	38 (13)	30 (10)	28 (10)
Cough	114 (36)	107 (34)	127 (42)	141 (45)	138 (48)	138 (46)	148 (52)	137 (47)	136 (48)	142 (49)
Fever	44 (14)	31 (10)	49 (16)	37 (12)	43 (15)	27 (9)†	36 (13)	24 (8)	52 (18)	36 (12)
P response **Illness in past week**	179 (57)	157 (50)	183 (61)	186 (59)	181 (63)	174 (59)	185 (65)	171 (59)	180 (63)	185 (64)
(target symptoms)										
Diarrhoeal disease	25 (8)	20 (6)	30 (10)	29 (9)	28 (10)	36 (12)	50 (18)	50 (17)	42 (15)	38 (13)
Cough	137 (44)	116 (37)	145 (48)	159 (51)	159 (55)	152 (51)	159 (56)	142 (49)	152 (53)	156 (54)
Fever	63 (20)	50 (16)	80 (27)	62 (21)	76 (26)	50 (17)†	76 (27)	50 (17)†	79 (28)	63 (22)

Mo = month, C= control, I = intervention, S = spontaneous response, P = probed response
+ = multiple symptoms may have been reported

* $p < 0.02$, Chi squared test, †$p < 0.05$, Chi Squared test

7.2 Treatment-seeking behaviour

After obtaining information about morbidity in the previous 24 hours and preceding week, mothers were asked if they had sought treatment for any illness in their babies during the preceding month. Although the reason for enquiring about treatment was to distinguish severe illness, this proved unsuccessful as mothers in both groups consulted various people/ health facilities for all sorts of ailments, regardless of the severity. Each month, however, fewer babies in the intervention group were taken for consultations, compared to the control group (Table 7.2.1).

Table 7.2.1 Pattern of treatment-seeking behaviour for morbidity between monthly interviews. Values are numbers (%)

	Mo 1		Mo 2		Mo 3		Mo 4		Mo 5	
Group	C	I	C	I	C	I	C	I	C	I
n	314	314	299	313	289	297	284	291	285	288
Taken for treatment	157 (50)	133 (42) *	138 (46)	135 (43)	152 (53)	144 (48)	157 (55)	135 (46)*	162 (57)	150 (52)
Taken to #										
homeopath	71 (45)	59 (44)	63 (47)	57 (42)	56 (37)	62 (43)	50 (32)	49 (36)	55 (34)	48 (32)
doctor's chamber	45 (29)	20 (15)[a]	38 (28)	26 (19)[a]	50 (33)	30 (21)[a]	52 (33)	30 (22)[a]	59 (36)	31 (21)[a]
pharmacy	13 (8)	9 (7)	11 (8)	9 (7)	23 (15)	19 (13)	31 (20)	16 (12)	28 (17)	30 (20)
hospital	3 (2)	20 (15)[b]	8 (6)	32 (24)[b]	9 (6)	17 (12)[b]	5 (3)	21 (16)[b]	7 (4)	23 (15)[b]
others	25 (16)	25 (19)	18 (13)	11 (8)	14 (9)	16 (11)	21 (13)	19 (14)	13 (8)	18 (12)

Mo = month, C = control, I = intervention

treatment-seeking behaviour is shown for visit 1 only (almost similar pattern at visits 2 and 3)

* $p < 0.005$, [a] $p < 0.02$ and [b] $p < 0.0001$, Chi squared test

maybe multiple responses

others = *kabiraj* (ayurvedic/ herbalist), *pir* (religious leader), *fakir* (holy man), or in combination with one of the above

Among those mothers who went for consultations, homeopaths were consulted most commonly in both groups. Doctors in private practice were more frequently consulted for infants in the control group ($p < 0.02$), while the hospitals were consulted for the intervention group ($p < 0.0001$), either the children's hospital or the Centre, as suggested by the PCs.

Table 7.2.2 presents the patterns of consultations for diarrhoea, dysentery, cough and fever. In each month, during the five months, about half the infants were taken for at least one consultation. The proportions going for 2 and 3 visits, was also similar in each group. The most common reason for seeking treatment throughout the 5 months was cough, in both the groups.

In the first month, many consultations were for charms, special prayers etc. During each month, in all three visits, a large number of infants in both control and intervention groups were taken for consulting about other ailments, such as for skin, ear, eye problems etc. But as these ailments were not the focus of this study, they have not been shown in the table.

Table 7.2.2 Reasons for consultations for morbidity between monthly interviews. Values are numbers (%)

	Mo 0-1		Mo 1-2		Mo 2-3		Mo 3-4		Mo 4-5	
	C 314	I 314	C 299	I 313	C 289	I 297	C 284	I 291	C 285	I 288
Visit 1	n 157	n 133	n 138	n 135	n 152	n 144	n 157	n 135	n 162	n 150
diarrhoea	5 (3)	8 (6)	14 (10)	10 (7)	20 (13)	12 (8)	22 (14)	18 (13)	23 (14)	19 (13)
dysentery	5 (3)	4 (3)	5 (4)	5 (4)	8 (5)	13 (9)	13 (8)	16 (12)	14 (9)	14 (9)
cough	73 (46)	40 (30)	86 (63)	80 (58)	103 (68)	90 (62)	105 (67)	84 (62)	101 (62)	102 (68)
fever	29 (18)	18 (13)	33 (24)	32 (23)	42 (28)	34 (24)	52 (33)	30 (22)	50 (31)	42 (28)
Visit 2	n 71	n 53	n 61	n 54	n 53	n 54	n 66	n 63	n 73	n 71
diarrhoea	4 (6)	3 (6)	4 (7)	8 (14)	9 (17)	6 (11)	11 (18)	17 (27)	11 (15)	10 (14)
dysentery	4 (6)	1 (2)	5 (8)	2 (4)	4 (7)	6 (11)	8 (12)	8 (13)	11 (15)	8 (11)
cough	32 (45)	29 (55)	38 (62)	31 (57)	31 (58)	26 (48)	36 (54)	39 (62)	45 (62)	39 (55)
fever	10 (14)	6 (11)	13 (21)	13 (24)	13 (24)	7 (13)	15 (23)	13 (21)	21 (29)	20 (28)
Visit 3	n 23	n 20	n 17	n 16	n 23	n 20	n 15	n 21	n 29	n 26
diarrhoea	1 (4)	1 (5)	1 (6)	3 (19)	3 (13)	3 (15)	6 (40)	4 (19)	3 (10)	5 (19)
dysentery	1 (4)	2 (10)	nil	nil	2 (9)	3 (15)	2 (20)	1 (5)	10 (34)	2 (8)
cough	9 (37)	6 (30)	11 (65)	8 (50)	16 (70)	6 (30)	5 (33)	14 (67)	17 (59)	18 (69)
fever	1 (4)	2 (10)	4 (23)	3 (19)	4 (17)	2 (10)	4 (27)	9 (43)	8 (28)	6 (23)

Mo= month, C= control, I = intervention

Note: number (%) of babies who were taken for consultation for other illness (excluding diarrhoea, dysentery, cough and fever), are not shown in any of the tables, but percentages are based on the total numbers of consultations.

7.3 Comparisons of morbidity in the combined groups according to different feeding categories

In this chapter so far, the prevalence of reported morbidity in the control and intervention groups has been compared. These data also provided an opportunity to explore the association between morbidity and feeding mode. Although not a primary focus of the study, this analysis was undertaken out of interest and to provide some indication as to whether there were any striking differences in morbidity among different feeding categories. So according to each infant's feeding status in any given month (using Method B as discussed in chapter 5), the prevalence of diarrhoeal disease, and cough and fever were computed. As fever was more likely to be associated with cough than with diarrhoea, these two symptoms were combined to give the variable "cough + fever" as an indicator for respiratory illness. The data from all 5 months were then summated. Since the interest in this analysis was morbidity by feeding status, the control and intervention groups were combined. There were no striking differences in the prevalence of diarrhoeal disease and cough with fever among infants in the 4 feeding categories. The data show a trend for less illness in the exclusively breastfed compared to the partial and the non-breastfed. The numbers of non-breastfed infants are too small, however, to make firm conclusions.

Table 7.3.1 Comparison of prevalence of diarrhoea and cough with fever by feeding categories. n= numbers of child-observations (%)

	Excl BF n= 1455	Predom BF n= 483	Partial BF n= 984	Non-BF n=52
Diarrhoeal disease in previous 24 hrs	58 (4)	17 (3)	50 (5)	4 (8)
Diarrhoeal disease in preceding week	65 (4)	25 (5)	60 (6)	5 (10)
Cough + fever in previous 24 hrs	139 (10)	53 (11)	102 (10)	8 (15)
Cough + fever in preceding week	229 (16)	89 (18)	205 (21)	10 (19)

BF = breastfed, excl = exclusive, predom= predominant

In an attempt to overcome the problem of small numbers, the feeding categories were collapsed into two broad categories, fully breastfed and partial/non-breastfed. When these two groupings were compared (Table 7.3.2), no significant difference in morbidity was found.

Table 7.3.2 Comparison of prevalence of morbidity in fully breastfed and partial/non-breastfed infants per month. Values are numbers (%/)

	Month 1 FBF= 522 Partial/ NBF =106	Month 2 FBF=437 Partial/ NBF =175	Month 3 FBF= 381 Partial/ NBF =205	Month 4 FBF= 326 Partial/ NBF =249	Month 5 FBF= 272 Partial/ NBF =301
In previous 24 h					
Diarrhoeal disease					
FBF	17 (3)	8 (2)	12 (3)	24 (7)	14 (5)
Partial/NBF	nil	5 (3)	11 (5)	19 (8)	19 (6)
Cough & fever					
FBF	43 (8)	44 (10)	45 (12)	27 (8)	33 (12)
Partial/NBF	9 (8)	23 (13)	15 (7)	22 (9)	41 (14)
In preceding week					
Diarrhoeal disease					
FBF	18 (3)	13 (3)	16 (4)	28 (9)	15 (5)
Partial/NBF	nil	7 (4)	12(6)	25 (10)	21 (7)
Cough & fever					
FBF	65 (12)	78 (18)	66 (17)	54 (17)	55 (20)
Partial/NBF	17 (16)	37 (21)	41 (20)	52 (21)	68 (23)

FBF = exclusive + predominant BF NBF = non-breastfed

Another surprise was that whereas fully breastfed infants had diarrhoea in the previous 24 hours and preceding week at month 1, none of those partially or non-breastfed had diarrhoea. It could be that the frequent stools in exclusively breastfed babies were at first reported as diarrhoea by the mothers. In the following months, the trend changed towards more diarrhoea and more cough with fever in the partial/non-breastfed group. For neither morbidity variables however, was there a significant difference, when controlled for the age of the infants (Mantel-Haentzel chi square=0.51, p=0.48).

7.4 Comparison of treatment costs in the control and intervention groups

For morbidity data to be reliable, visits should be conducted at least weekly. It was not possible to visit weekly in this study because resources were limited, and because the morbidity comparisons were a secondary objective. To overcome the limitation of having morbidity prevalence available only for the week preceding each monthly interview, it was assumed that estimations of the medicine costs during the whole month would provide a crude measure of morbidity during this period. Data were thus collected on a) treatment costs (medicines, consultations, travel and related expenses) in the week preceding the monthly interview, and b) medicine costs over the whole month.

7.4.1 Treatment costs during the week preceding the monthly interviews

Average treatment costs for diarrhoeal illness in the week preceding the monthly interview were lower in the intervention group through all 5 months, but were not significantly different (Table 7.4.1). For treatment of cough and fever, the costs were higher in the intervention group in months 1, 3 and 5, but not significantly so.

Table 7.4.1 Comparison of treatment costs (in taka) for episodes of diarrhoeal illness, cough and fever during the week preceding the monthly interviews. Values are mean ± SD

	Control	Intervention
At Month 1	(n=7)	(n=7)
Diarrhoeal illness	75.4 ± 85.3	24.3 ± 23.5
	(n=46)	(n=26)
Cough and fever	121.4 ± 257.4	146.2 ± 459.5
At Month 2	(n=12)	(n-6)
Diarrhoeal illness	38.2 ± 42.2	31.0 ± 24.1
	(n=40)	(n=41)
Cough and fever	51.6 ± 66.7	50.6 ± 39.1
At Month 3	(n=14)	(n=16)
Diarrhoeal illness	60.8 ± 77.3	31.3 ± 41.2
	(n=44)	(n=36)
Cough and fever	62.3 ± 57.6	69.4 ± 74.1
At Month 4	(n= 21)	(n= 16)
Diarrhoeal illness	29.7 ± 24.5	21.5 ± 33.8
	(n= 61)	(n= 38)
Cough and fever	70.9 ± 83.3	53.7 ± 43.2
At Month 5	(n=13)	(n=11)
Diarrhoeal illness	56.7 ± 88.0	45.2 ± 28.8
	(n= 51)	(n= 43)
Cough and fever	49.7 ± 44.4	60.1 ± 57.5

No significant differences on Mann Whitney U-Wilcoxon Rank Sum Test

7.4.2 Medicine costs for treatment of diarrhoeal illness, cough and fever

Consultation fees may have differed in the control and intervention groups because more of the control mothers visited doctors in private practice, and the intervention mothers visited hospitals. The cost of medicines (which had to be bought by both groups) for the target illnesses, diarrhoea, cough and fever over the whole study period, were therefore calculated separately. Table 7.4.2 shows that medicine costs for treatment of an episode of diarrhoeal illness where money was spent, were significantly lower in the intervention group compared to the controls ($p<0.005$). As the numbers of mothers who went for consultations, and those who spent money on medicines for treatment of a diarrhoeal episode, were similar in both the groups, the lower amount spent on medicines in the intervention group suggests that either they were less sick and required fewer antimicrobials, or that they were more appropriately treated, without unnecessary medicines. The median amount spent on medicines for treatment of cough and fever were also lower, but the difference was not statistically significant.

Table 7.4.2 Comparison of medicine costs (in taka) per episode in the control and intervention groups over 5 months

	Control	Intervention
Diarrhoeal illness	(n = 36)	(n = 38)
mean ± SD	103.6 ± 201.3	45 ± 84*
median	64	30
Cough and fever	(n =250)	(n =179)
mean ± SD	84.3 ± 237.7	78.8 ± 172.1
median	53	46

* $p < 0.005$, Mann Whitney U Wilcoxon Rank Sum Test

Discussion

The results presented in this chapter, show that there was no significant impact of the intervention on morbidity despite the striking changes in feeding practices. There are two possible reasons for this. The morbidity data collected for one week during each month in this study provided a limited measurement of morbidity. Additionally, the power used for sample size calculation for the primary (feeding) objective, was only reasonable for detecting quite large differences (RR of 3 or more for diarrhoea), and insufficient to detect a significance in morbidity in the sample size studied.

This discussion will focus on the diarrhoeal part first, followed by that on respiratory infections. As regards the impact of previous breastfeeding promotions, a study conducted in Costa Rica reported a 36% lower incidence of diarrhoea among infants aged 0-5 months whose mothers had received intense breastfeeding promotion, compared to a population receiving less intense promotion [Mata, cited by Feachem and Koblinsky, 1984]. Data on mild illness not requiring hospitalisation were not collected in that study. Since then, there have been no community-based breastfeeding promotion interventions that have studied the impact on morbidity, except for a recent study of Navajo Indians in the USA. The investigators described rates of infant illness (gastro-enteritis and pneumonia) in a community, before, and after an intervention promoting breastfeeding. Their main objective was to encourage the women to delay the addition of infant formula for one month. They reported that as the proportion of women exclusively breastfeeding for any period of time increased after the intervention, (from 16% to 55%), the percent change in incidence of diarrhoeal illness declined significantly from 42% to 36% ($p<0.05$) [Wright *et al.*, 1998]. The study had certain methodological weaknesses, e.g., no probing for breastfeeding status, extraction of morbidity from medical records, and unexplained reductions in other morbidity outcomes unrelated to the intervention, suggesting some changes over time.

Diarrhoea prevalence was not significantly different when the feeding categories were compared. The results obtained are different from those in Peru [Brown *et al.*, 1989;] and in the Philippines [Popkin *et al.*, 1990], where predominantly breastfed infants had twice, and double or triple the rates of diarrhoea respectively, compared to exclusively breastfed infants. The environmental conditions of the study populations in Peru and the Philippines, however, differed in several respects from those in Dhaka. For example, i) the piped water supply in Dhaka is considered safe, whereas water had to be bought from tankers in Peru and stored in cement tanks or metal drums [de Romana, *et al.*, 1989], ii) only tastes of water were given in Dhaka, but probably more was fed in Peru, iii) water was given by spoon or hand in Dhaka, while it was given by bottle in Peru, and iv) generally better sanitation and sewerage facilities prevail in Dhaka, compared to poor sewerage in Peru. These factors could have led to less risk of acquiring diarrhoeal pathogens from water in Dhaka. The importance of clean water has been demonstrated in studies from Malaysia and the Philippines. In Malaysia, full breastfeeding had the strongest protective effect on mortality when piped water was absent [Butz *et al.*, 1984]. In the Philippines, the protective effect of full breastfeeding on diarrhoeal morbidity was greatest when water was contaminated [VanDerSlice *et al.*, 1990]. As regards sanitation, urban Filipino infants benefited most from exclusive breastfeeding where environments were crowded and excreta disposal was poor [Popkin *et al.*, 1990].

Despite being exclusively breastfed, some of these infants had diarrhoea in the Dhaka study. At least two factors could account for this occurrence. Infants were commonly carried around by older children (own or neighbour's), who often put things in babies' mouths. Also, some infants lived in extremely unhygienic conditions (information obtained from the interviewers comments during monthly visits, and confirmed by observations described in chapter 10).

Difference in prevalence of diarrhoeal morbidity in the Peru, Philippines and Dhaka studies might also be explained further by methodological differences between these studies. For example, i) extremely strict criteria were followed in Dhaka for defining exclusive breastfeeding, thus even a sip of water during bathing, or after receiving medicines, led to infants being classified as predominantly breastfed. ii) methods for classifying infant feeding status were different, feeding a food for two consecutive days was the basis for a change in feeding status in Dhaka, whereas administration of foods more than two times a week were the criteria for change in Peru.

Another aspect of classification relates to the designation of partial breastfeeding. Sauls [1979] has argued that classifying infants as partially breast fed is meaningless, unless the types and quantities of liquid and solid foods are taken into consideration. This view is supported by Labbok and Krasovec [1990], who propose three categories of partial breastfeeders, high (>80%), medium (20-80%) and low (<20%). They maintain that high partially breastfed infants may receive benefits similar to those of fully breastfed infants. As yet, however, there have been no analyses of morbidity prevalence using the definitions of Labbok and Krasovec, perhaps because the practical calculations for obtaining these percentages are not easy.

In Dhaka, the majority of infants were "high" breastfeeders (as shown in chapter 6), which may explain the lack of difference in morbidity. An earlier study from rural India also reported no differences in morbidity between "exclusively" and partially breastfed infants (total 74 infants) [Sathian *et al.*, 1983]. Probably these infants were also "high" breastfeeders, as they were reported to have been breastfed on demand, and received 10-30% of caloric intake from other foods.

Turning next to respiratory illness, the study by Wright *et al.,* [1998], had also shown a significant decrease in the change in incidence of pneumonia, from 12% in infants born before the intervention, to 9% after the intervention ($p<0.05$). In the Dhaka study, where prevalences were recorded, there was no significant difference in the prevalence of cough between the intervention and control groups, although the power was sufficient to detect significant differences in the later months (4 and 5). Infants were not examined clinically, and cough and fever were recorded as separate symptoms, according to mothers' reports. It was seen that most of the mothers reported cough, but did not consider the infants to be ill. The overall prevalence of cough and fever, however, was similar to the prevalence of upper respiratory tract infections in rural Bangladesh where infants had been examined clinically by trained field workers [Zaman *et al.,*1997]. The prevalence of fever showed a lower trend in the intervention group during the 5 months, and may have been an indicator of less severe illness in this group.

Decreased risk of upper and lower respiratory tract infections has been documented with exclusive breastfeeding compared to predominant and partial breastfeeding in Peru [Brown *et al.*, 1989], but was not found in Dhaka. Methodological differences between the studies conducted in Peru and Dhaka make comparisons difficult. Surveillance for morbidity was three times per week in Peru, and all the infants were examined by a study physician when they were febrile in order to classify them as having upper or lower respiratory infections.

One conclusion from this study is that infants in the intervention group may have been less severely ill than the controls because the prevalence of fever was lower.

In Bangladesh, the major non-allopathic systems of medicine include *ayurveda, unani,* and homeopathy, which are practised by kabirajs, hakims and homeopaths

[Bhardwaj and Paul, 1986]. Treatment-seeking behaviour of mothers in this community showed that most went to homeopaths for treatment of their young infants. They did so because they thought "their medicines are not strong like the allopathic ones and do not cause any harm". But they also consulted allopathic doctors for all types of ailments, and not only for severe illness, so an assessment of severity of illness could not be made from the type of treatment they sought. More frequent attendance at hospitals by the intervention group resulted from the PCs encouragement to go there, because private doctors had undermined exclusive breastfeeding in some cases.

Treatment and medicine costs related to morbidity were compared in an attempt to capture morbidity patterns over the 4 weeks, and to assess if any differences could be determined from the overall costs during each month, but these did not differ in the two groups. It was expected that if the infants' illness was less severe, the cost of medicines would also be less. Mothers in the intervention group who bought medicines for treatment of an episode of illness, spent significantly less for episodes of diarrhoeal illness over 5 months as compared to mothers in the control group ($p<0.005$). This lower expenditure, however, may have resulted from more rational use of medicines in hospitals. Medicine costs for treatment of cough and fever episodes were similar in both the groups. Thus the original plan to obtain morbidity differences from health facility visits and treatment costs, proved to be unreliable.

Only 4 infants died in the intervention group compared to 13 in the control group. This is important to note, although the total number of deaths were too few to draw any firm conclusions.

Finally, as morbidity can affect growth of infants, the results presented in this chapter need to be appraised in the context of growth of these infants, which will be done in the following chapter (chapter 8).

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CHAPTER 8: IMPACT OF THE INTERVENTION ON GROWTH

The third objective of this study was to assess the effect of the intervention on the growth of infants. For this purpose, infants' weights and lengths were first measured at 72 hrs (± 12 hrs) i.e. on day 4 (day of birth being counted as day 1). For 28 infants, whose mothers were late for this interview (between day 5-10), the weights and lengths were not recorded on the first visit. Subsequently, the measurements were repeated at monthly intervals. These were obtained within 1 day of the infants' birth dates for 98% of the infants. Infants measured within the first 15 days of their birthday were included in that month, and those measured after 15 days, in the following month. In this chapter, the growth outcomes will be presented first for the control and intervention groups, then compared with current reference populations in the following way:

1. In the control and intervention groups
    - as control and intervention
    - according to 4 feeding categories
    - with the NCHS reference
2. Comparison of FBF infants with the NCHS reference
3. Comparison of FBF infants with the WHO-BF pooled data set
4. Growth of EBF infants compared with the WHO-BF pooled data set, and their Z scores relative to the NCHS reference

8.1 Impact on growth in the control and intervention groups

For this section, weights and lengths of the boys and girls combined together, were analysed, first as control and intervention groups, then according to feeding status within these groups.

8.1.1 Growth comparisons in the control and intervention groups

Although infants in the control and intervention groups had similar mean body weights at day 4, from 1 month onwards, those in the intervention group consistently and significantly weighed more than those in the control group (Table 8.1.1.1). For length, there were no significant differences between the two groups.

Table 8.1.1.1 Body weights (kg) and lengths (cm) of infants over 5 months. Values are mean ± SD

	Day 4	Month 1	Month 2	Month 3	Month 4	Month 5
Wt C	n = 308 2.70 ± 0.38	n = 311 3.67 ± 0.49	n = 294 4.57 ±0.60	n = 281 5.30 ± 0.70	n= 278 5.88 ± 0.76	n= 285 6.39 ± 0.83
I	n = 307 2.75 ± 0.37	n = 312 3.75 ± 0.45*	n = 312 4.71 ± 0.54†	n = 295 5.45 ± 0.63*	n = 291 6.07 ± 0.70†	n = 287 6.58 ±0.75†
Lng C	n = 303 48.3 ± 2.0	n = 305 52.5 ± 2.0	n = 292 55.9 ± 2.1	n= 281 58.7 ± 2.2	n = 277 60.9 ± 2.2	n = 283 62.9 ± 2.3
I	n = 307 48.5 ± 1.2	n = 311 52.6 ± 2.0	n = 311 56.1 ± 2.2	n = 294 58.8 ± 2.1	n = 290 61.2 ± 2.2	n = 287 63.1 ± 2.2

Wt = weight, Lng = length C= control, I = intervention
* $p < 0.05$, t-test for means † $p < 0.005$, t-test for means

Numbers of infants differ for weight and length measurements, since some mothers did not allow length to be measured

Comparisons of weight-for-age Z-scores (WAZ), weight-for-height Z-scores (WHZ) and height-for-age Z-scores (HAZ) at day 4 and month 5 are shown in Table 8.1.1.2. Since the lengths of about half the infants were below 49 cm at day 4, their WHZ scores could not be calculated. Although the mean Z scores of the groups were similar at day 4, the mean WAZ and WHZ of the intervention group were significantly higher than in the control group at month 5 ($p<0.02$ and $p<0.0001$ respectively), and there were significantly fewer infants in the intervention group (2% vs. 6%) with WAZ below -2SD ($p<0.02$). Between day 4 and month 5, the WHZ of the intervention infants had moved up one SD, -0.9 to +0.1, whereas the control infants remained virtually unchanged.

Table 8.1.1.2 Comparison of weight-for-age (WAZ), weight-for-length (WHZ), and length-for-age Z (HAZ) scores at day 4 and month 5 in the control and intervention groups. Values are mean ± SD, and percentages

		Control	Intervention
	Day 4		
WAZ		(n = 315)	(n= 312)
		-1.2 ± 0.8	- 1.1 ± 0.8
	<-3SD	2 %	1 %
	< -2SD	15 %	15 %
WHZ		(n = 112)	(n = 128)
		-1.0 ± 0.6	-0.9 ± 0.6
	<-3SD	nil	nil
	< -2SD	4 %	nil
HAZ		(n=311)	(n=312)
		-0.8 ± 0.9	-0.8 ± 0.9
	<-3SD	1 %	1%
	< -2SD	11%	8%
	Month 5		
WAZ		(n=285)	(n=287)
		-0.6 ± 0.9	-0.4 ± 0.8 *
	<-3SD	nil	nil
	< -2SD	6%	2% †
WHZ		(n=283)	(n=287)
		-0.9 ± 0.8	+0.1 ± 0.8 #
	<-3SD	nil	nil
	< -2SD	1%	nil
HAZ		(n=283)	(n=287)
		-0.7 ± 0.8	-0.7 ± 0.8
	<-3SD	1%	1%
	< -2SD	7%	6%

* $p < 0.02$, t-test of means, † $p < 0.02$, Chi sq. test, # $p < 0.0001$, t-test of means

Note: only infants > 49 cm in length could be analysed for WHZ at day 4

8.1.2 Growth comparisons in the control and intervention groups according to 4 feeding categories

The previous section looked at the impact of the intervention. This section looks at the effect of feeding status in each group. Table 8.1.2.1 shows that in the control group, the exclusively breastfed infants weighed the most, and the non-breastfed infants the least, at 5 months, compared to the other feeding groups.

In the intervention group (Table 8.1.2.1), the predominantly breastfed infants were the heaviest group at months 1, 3, and 5, and the exclusively breastfed at months 2 and 4. The non-breastfed infants were few and weighed the least all through 5 months. No significant differences in weights of infants with different feeding status were found in the intervention group.

Table 8.1.2.1 Body weight (kg) of infants in the two groups according to 4 feeding categories (mean ± SD)

On day 4 weight (kg)	Feeding status	Month 1	Month 2	Month 3	Month 4	Month 5
CONTROL total n = 308	EBF	n = 96 3.63 ± 0.5	n = 66 4.54 ± 0.6	n = 43 5.40 ± 0.7	n = 26 5.97 ± 0.7	n = 16 6.88 ± 0.7 *
mean ± SD 2.70 ± 0.4	PRBF	n = 127 3.67 ± 0.5	n = 97 4.68 ± 0.6	n = 77 5.36 ± 0.6	n = 59 5.89 ± 0.7	n = 40 6.34 ± 0.7
	PTBF	n = 86 3.68 ± 0.5	n = 126 4.51 ± 0.6	n = 153 5.27 ± 0.7	n = 183 5.90 ± 0.8	n = 216 6.39 ± 0.8
	NBF	n = 2 3.83	n=5 4.23 ± 0.7	n = 8 4.90 ± 0 8	n = 10 5.05 ± 1.0	n = 13 6.05 ± 0.8
INTERVEN-TION total n = 307	EBF	n = 267 3.73 ± 0.4	n = 259 4.72 ± 0.5	n = 248 5.45 ± 0.6	n = 224 6.08 ± 0.7	n = 201 6.59 ± 0.7
mean (SD) 2.75 ± 0.4	PRBF	n= 27 3.85 ± 0.5	n = 11 4.67 ± 0.4	n = 9 5.58 ± 0.5	n = 16 6.06 ± 0.7	n = 16 6.73 ± 0.8
	PTBF	n = 19 3.9 ±0.6	n = 41 4.67 ± 0.5	n = 34 5.47 ± 0.7	n = 46 6.08 ± 0.8	n = 65 6.52 ± 0.8
	NBF	nil	n=1 4.34	n = 4 5.14 ± 0.8	n = 5 5.60 ± 1.0	n = 5 6.50 ± 1.0

EBF = exclusively breastfed PRBF = predominantly breastfed
PTBF = partially breastfed NBF = non-breastfed

Note: Anthropometric measurements are missing in day 4 for infants whose mothers were interviewed later (within 5-10 days), but other data were collected. The number of cases thus available at day 4 are less than the total number available for interviews as shown in the other data sets (chapters 5 & 6).

Table 8.1.2.2 shows that in the control group, the exclusively breastfed infants were the tallest in months 3 and 5. In the intervention group, infants who were predominantly breastfed were the tallest from months 1-5. None of the differences was statistically significant.

Table 8.1.2.2 Body lengths (cm) of infants according to feeding status. Values are mean ± SD

Day 4 length (cm)	Feeding status	Month 1	Month 2	Month 3	Month 4	Month 5
CONTROL	EBF	n = 92 52.4 ± 2.0	n = 66 55.7 ± 2.0	n = 43 59.1 ± 2.1	n = 25 60.9 ± 1.8	n = 16 63.9 ± 1.8
Total n = 303	PRBF	n = 126 52.4 ± 1.9	n = 96 56.2 ± 2.2	n = 76 58.6 ± 2.1	n = 59 60.7 ± 1.9	n = 40 62.7 ± 1.9
mean ± SD 48.3 ± 2.0	PTBF	n = 85 52.7 ± 2.0	n = 125 55.8 ± 2.2	n = 153 58.6 ± 2.2	n = 18 2 61.0 ± 2.3	n = 216 62.9 ± 2.4
	NBF	n=2 54.1	n=5 56.1 ± 2.0	n = 8 59.0 ± 2.1	n = 10 60.1 ± 2.7	n = 13 63.1 ± 2.3
INTERVE- NTION	EBF	n = 267 52.5 ± 2.1	n = 259 56.1 ± 2.2	n = 248 58.8 ± 2.1	n = 224 61.1 ± 2.2	n = 201 63.1 ± 2.2
total n = 307	PRBF	n = 26 53.4 ± 1.9	n = 11 56.2 ± 1.1	n = 9 60.1 ± 1.6	n = 16 61.4 ± 1.5	n= 16 63.6 ± 2.1
mean ± SD 48.5 ± 2.0.	PTBF	n = 18 53.0 ± 1.9	n = 41 55.9 ± 2.2	n = 34 58.6 ± 2.4	n = 46 61.3 ± 2.1	n = 65 62.9 ± 2.1
	NBF	nil	n=1 54.2	n = 4 57.7 ± 1.5	n = 5 59.6 ± 2.0	n= 5 62.1 ± 1.5

EBF = exclusively breastfed PRBF = predominantly breastfed
PTBF = partially breastfed NBF= non-breastfed

8.1.3 Comparison of growth of control and intervention infants with NCHS

Fig. 8.1.3.1 shows the weights of boys and Fig. 8.1.3.2 shows those of girls compared with the NCHS reference. Starting at -1SD at birth (day 4), the boys in both control and intervention groups grew closer to the median curve of the NCHS until 3 months and then the distance widened. By 2 months, the girls in the intervention group were tracking slightly higher than the control group, and this difference continued until 5 months.

Fig. 8.1.3.3 shows the length of the boys, and Fig.8.1.3.4 that of the girls in the control and intervention groups was similar throughout the follow up period, and remained at about -0.8 SD without showing any catch-up.

Fig. 8.1.3.1
Body weight of boys in intervention and control groups in comparison with NCHS median and -2SD

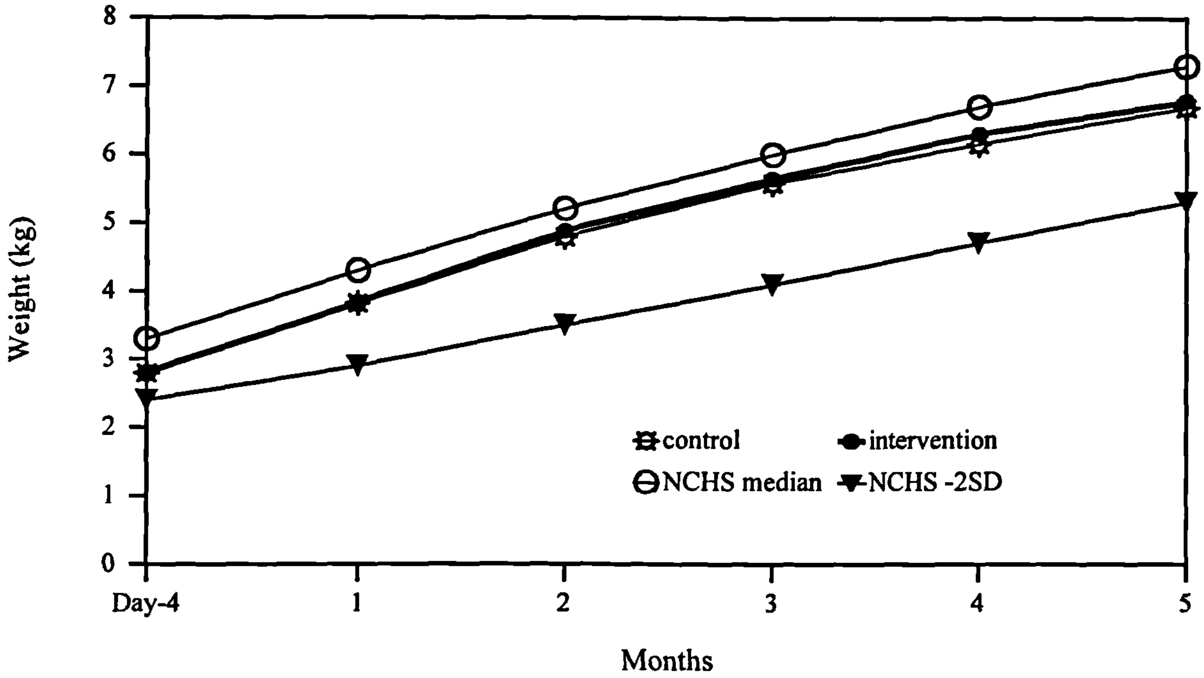


Fig. 8.1.3.2
Body weight of girls in intervention and control groups in comparison with NCHS median and - 2SD

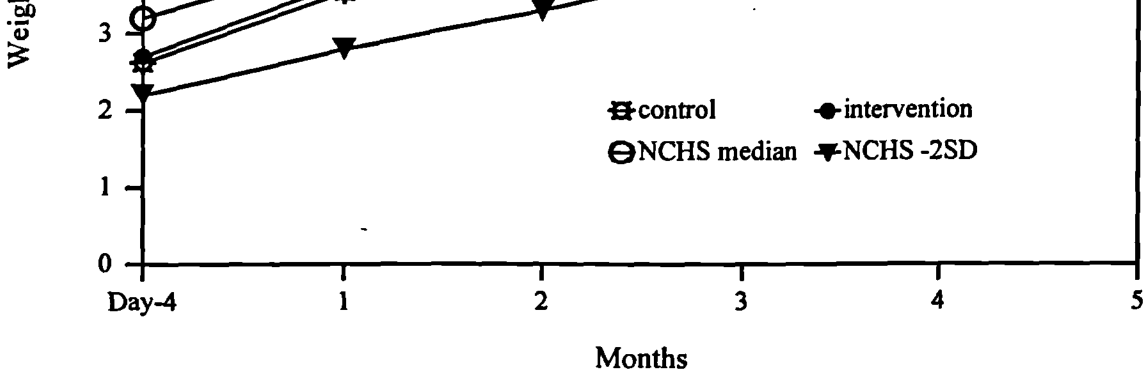


Fig. 8.1.3.3
Length of boys in intervention and control groups in comparison with NCHS median and - 2SD

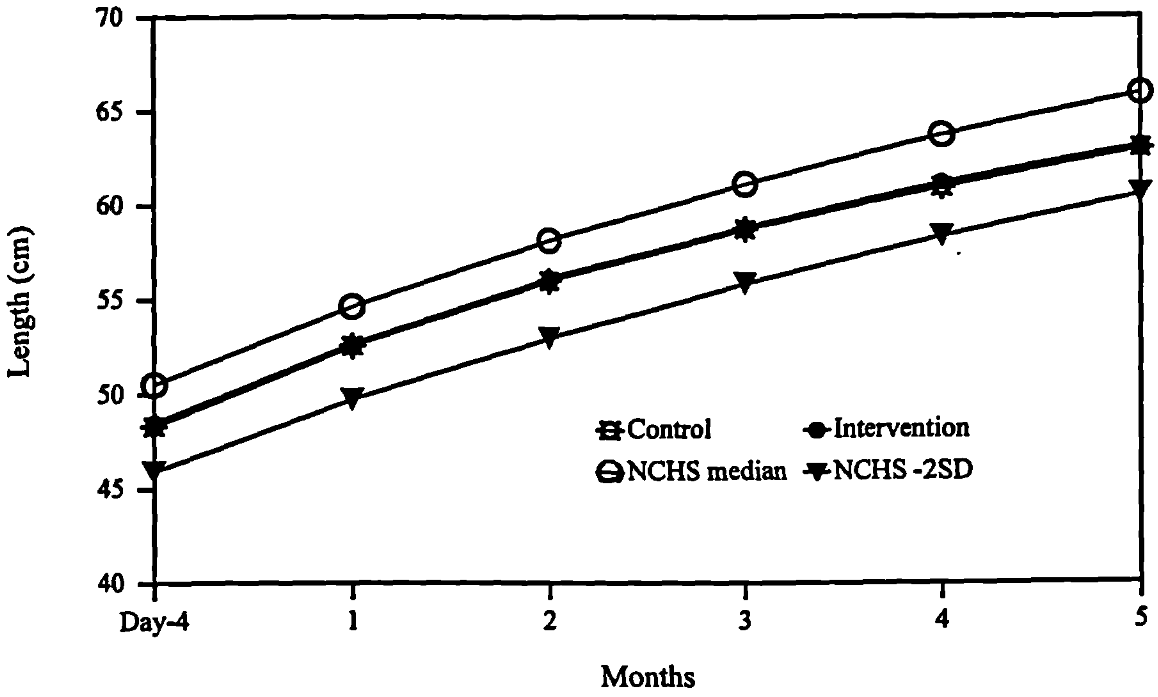
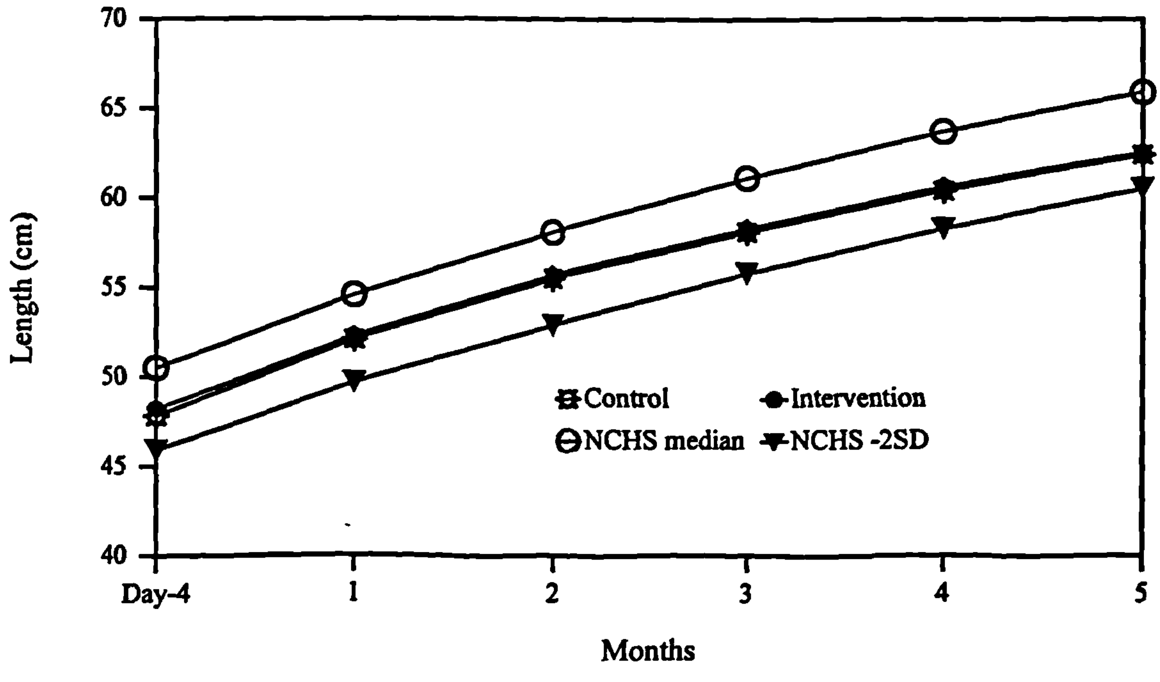


Fig. 8.1.3.4
Length of girls in intervention and control groups in comparison with NCHS median and -2SD



8.2 Weight and length of fully breastfed and partial/non-breastfed infants compared to the NCHS data set

The NCHS reference is commonly used to assess the growth of infants in Bangladesh, as in other countries. Infants in the control and intervention groups were then combined according to feeding status. Two categories were used; fully breastfed in one group, and partial/non-breastfed in another group. This was done as a parallel analysis to link with morbidity (chapter 7) and contraception (chapter 9) in these groups.

Initially, the partial/non-breastfed boys weighed significantly more than the fully breastfed boys, but from month 2, the latter weighed more (Table 8.2.1). The maximum difference in mean weight, excluding day 4, was (120 g), seen at month 2. There were no significant differences in lengths between the two groups.

Table 8.2.1 Weights and lengths of fully breastfed boys over the study period (mean ± SD)

	Day 4	Month 1	Month 2	Month 3	Month 4	Month 5
Weight (kg) Full BF	n= 243 2.77 ±0.37	n=242 3.82 ±0.48	n=201 4.87±0.57	n=169 5.65 ±0.57	n=142 6.26 ±0.64	n=127 6.78 ±0.67
Partial/ non-BF	n=38 2.95 ±0.42*	n=43 3.85 ±0.57	n=78 4.75±0.60	n=94 5.54 ±0.71	n=113 6.19 ±0.76	n=135 6.69 ±0.83
Length (cm) Full BF	48.7 ±2.0	52.9 ±2.1	56.6 ±2.3	59.5 ±2.2	61.7 ±2.3	63.8 ±2.2
Partial/ non-BF	49.2 ±1.8	53.5 ±2.0	56.4 ±2.1	59.2 ±2.1	61.8 ±2.3	63.4 ±2.2

Full BF = exclusive + predominant BF Partial/non-BF = partial +non-breastfed

* $p < 0.05$, t-test of means

In the case of the girls, however, there were significant differences ($p < 0.02$) in the weights of the fully breastfed girls as compared to the partial/non-breastfed girls from month 2 to month 5 as shown in Table 8.2.2. The difference in mean weights was 50g at day 4, increasing each month, to attain a difference in means of 230 g at month 5.

There were however, no significant differences in lengths between these two groups of girls.

Table 8.2.2 Weights and lengths of fully breastfed girls over the study period (mean ± SD)

	Day 4	Month 1	Month 2	Month 3	Month 4	Month 5
Weight (kg) Full BF	n=282 2.67±0.36	n=275 3.61±0.42	n=232 4.52±0.50*	n=208 5.25±0.62*	n=183 5.86±0.67*	n=146 6.40±0.74*
Partial +non	n= 52 2.62± 0.34	n=63 3.63± 0.48	n=95 4.36 ± 0.57	n=105 5.06 ± 0.66	n=131 5.64 ± 0.76	n=164 6.17±0.78
Length (cm) Full BF	48.08± 1.9	52.2 ± 1.8	55.7 ± 1.9	58.3 ± 1.9	60.6 ± 1.9	62.6 ± 2.0
Partial + non	47.69± 1.8	52.4 ± 1.9	55.4 ± 2.0	58.1 ± 2.1	60.4 ± 2.0	62.3 ± 2.1

* $p < 0.02$ between the 2 groups from month 2 to 5, comparison of means by analysis of variance

The figures illustrating the growth of these two groups of infants in comparison with the NCHS data set, are provided in Figs. 8.2.1-4. They show that whereas the fully and partial/non-breastfed boys grew similarly as compared to the NCHS, the fully breastfed girls were closer to the NCHS median compared to the partial/non-breastfed girls.

Fig. 8.2.1
Body weight of fully breastfed and partial/non-breastfed boys in comparison with NCHS median and -2 SD

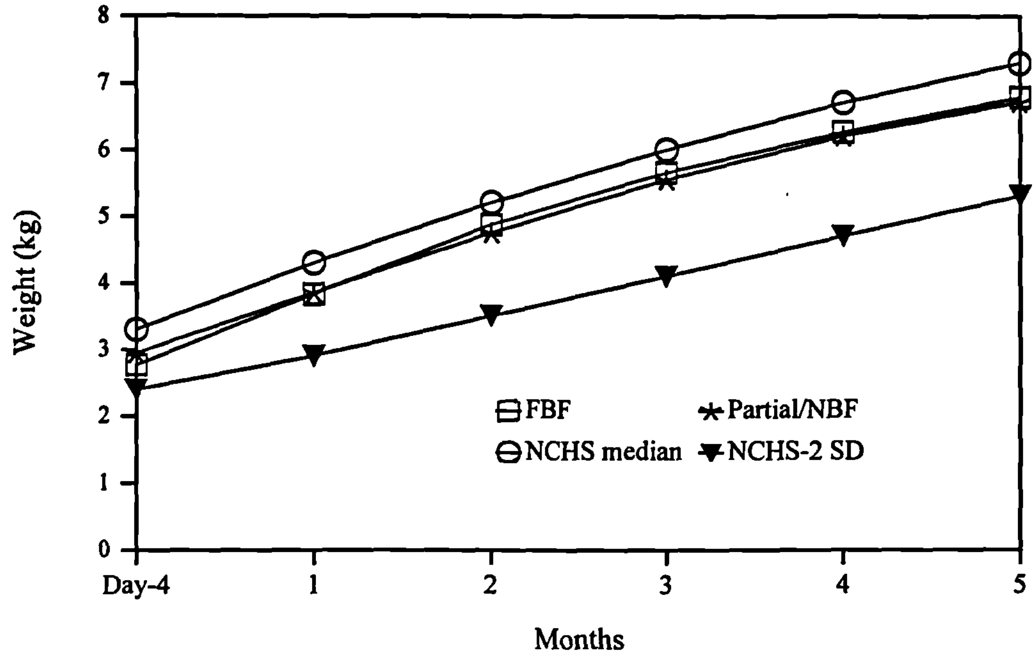


Fig. 8.2.2
Body weight of fully breastfed and partial/non-breastfed girls in comparison with NCHS median and -2 SD

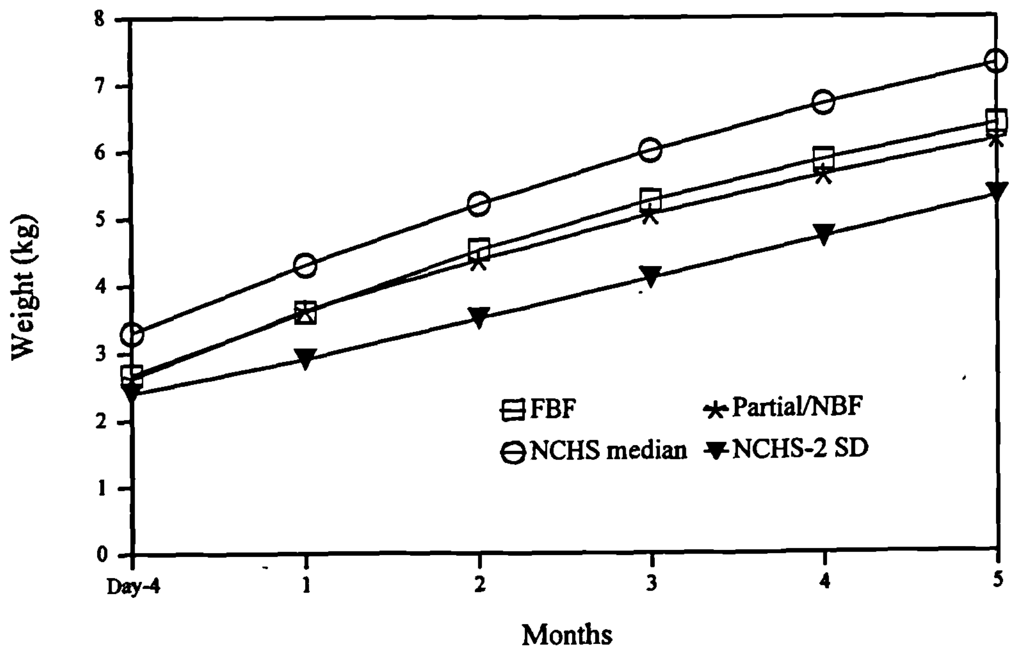


Fig. 8.2.3
Length of fully breastfed and partial/non-breastfed boys in comparison with NCHS median and -2 SD

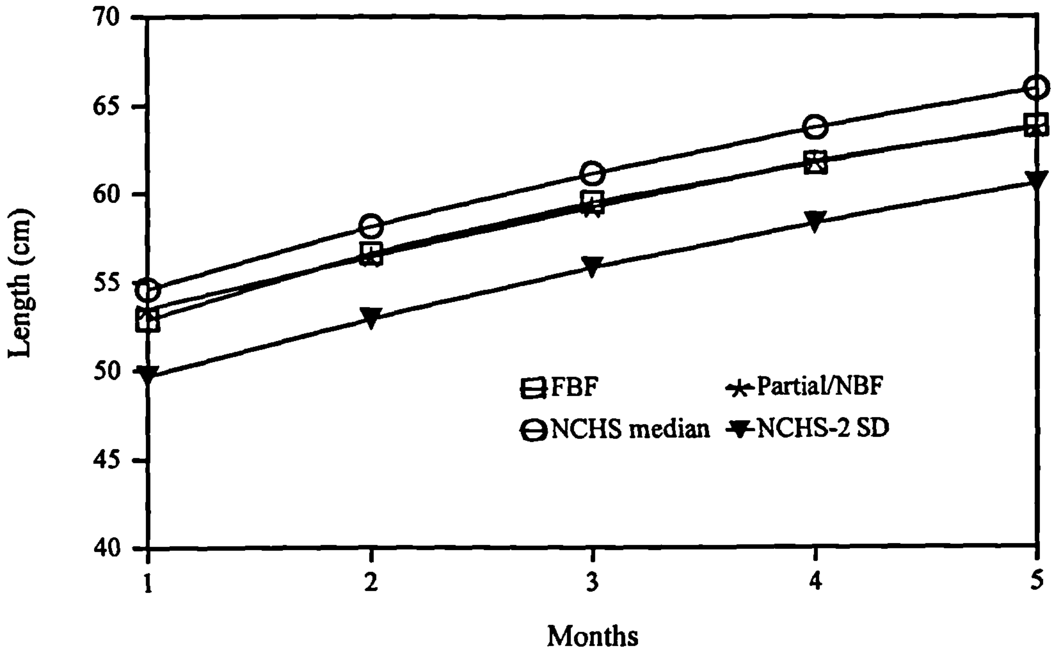
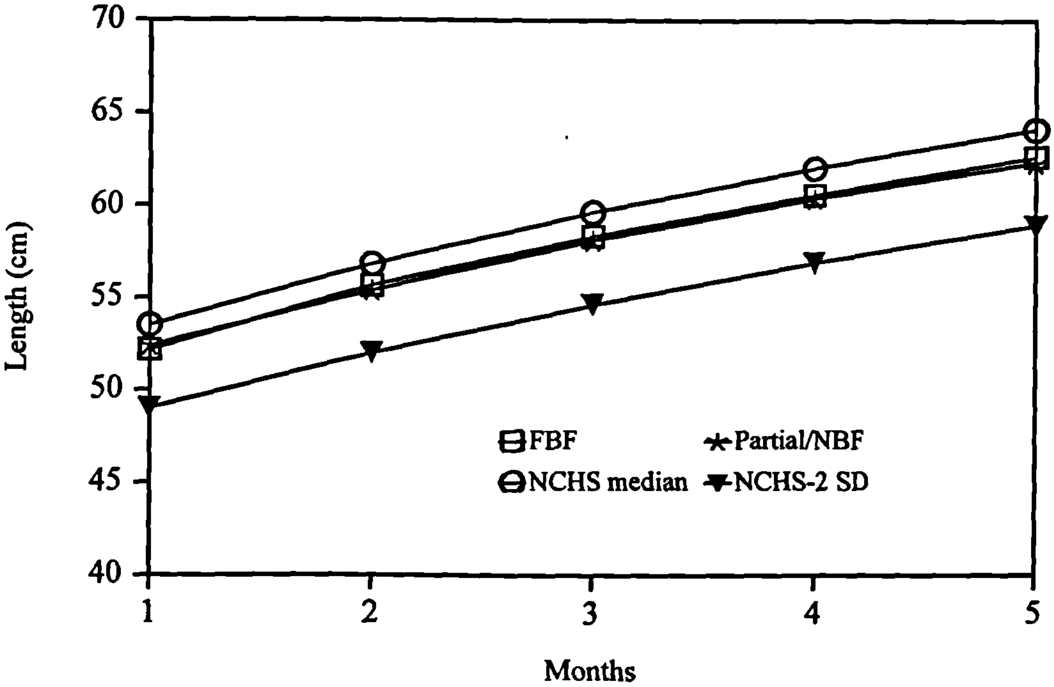


Fig. 8.2.4
Length of fully breastfed and partial/non-breastfed girls in comparison with NCHS median and -2 SD



8.3 Comparison of fully breastfed and partial/non-breastfed infants with the WHO breastfed-pooled data set

The NCHS data set includes data from non-breastfed and breastfed infants. Since there is a breastfed pooled data set available now (WHO-BF pooled data), weights and lengths were compared with the latter data set as well. As figure 8.3.1 shows, fully breastfed boys started at -1SD of the WHO-BF data, moved upwards at month 1 and from month 2 onwards remained close to the median centile.

Girls too, followed a similar pattern of growth as the boys, and again, the fully breastfed girls, tracked closer to the median after month 1, compared to the partial/non-breastfed girls.

As the WHO-BF data set does not have the length data at birth, comparisons were plotted from month 1. These show that length measurements were similar for both boys and girls in both the fully breastfed and the partial and non-breastfed groups when compared with the WHO breastfed pooled data set, and showed no catch-up towards the WHO-BF median (fig 8.3.3 and 8.3.4).

Fig. 8.3.1
Body weight of fully breastfed and partial/non-breastfed boys in comparison with WHO-BF median and -2 SD

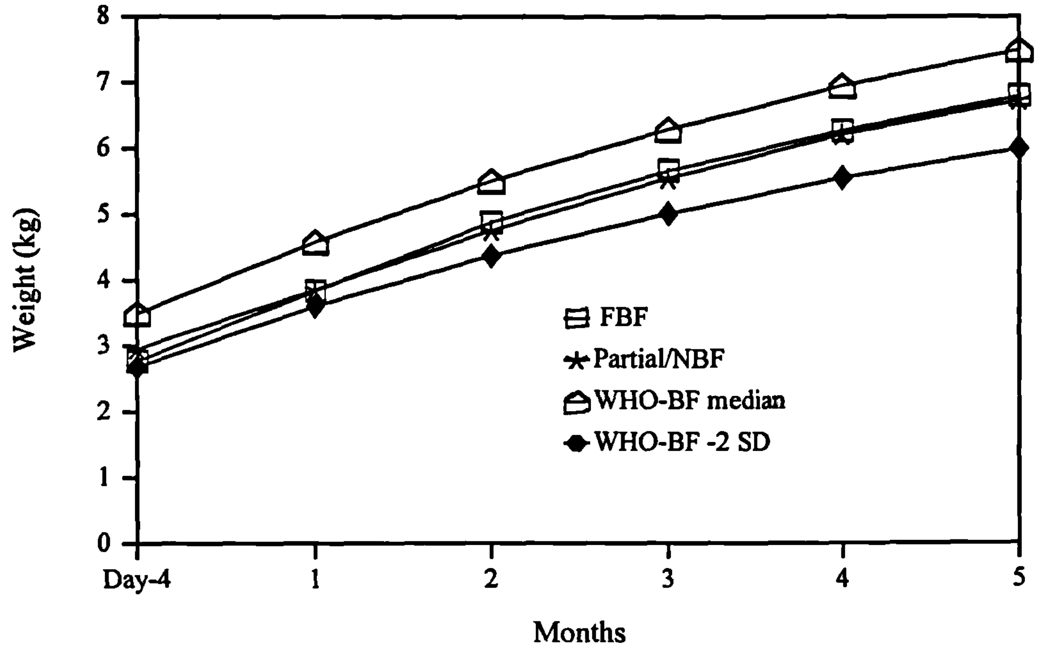


Fig. 8.3.2
Body weight of fully breastfed and partial/non-breastfed girls in comparison with WHO-BF median and -2 SD

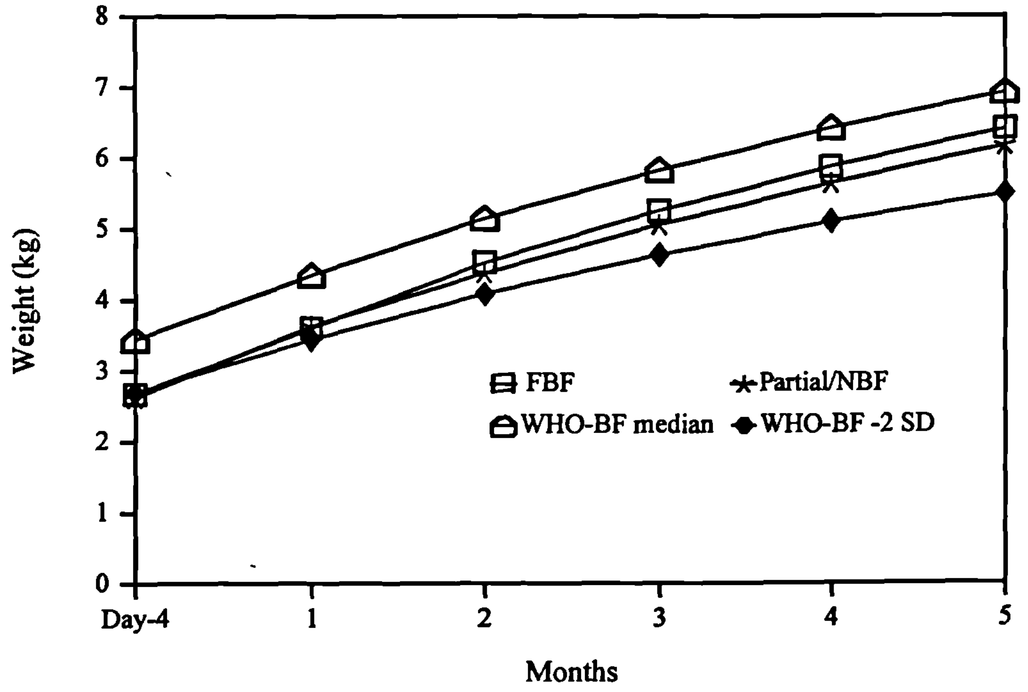


Fig. 8.3.3
Length of fully breastfed and partial/non- breastfed boys in comparison with WHO-BF median and -2 SD

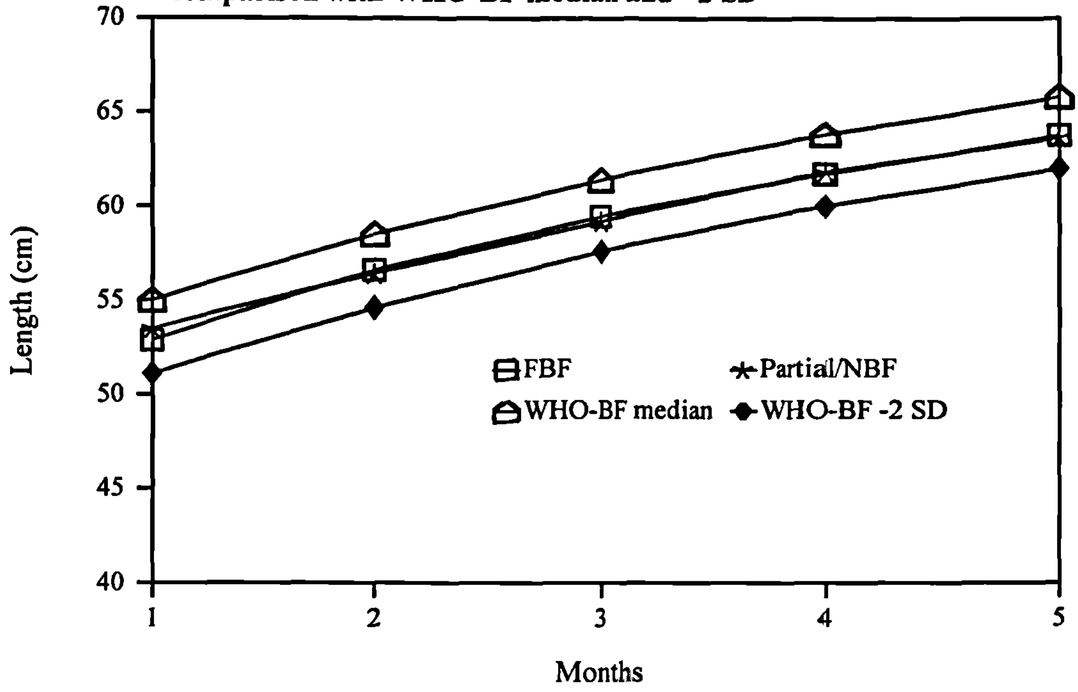
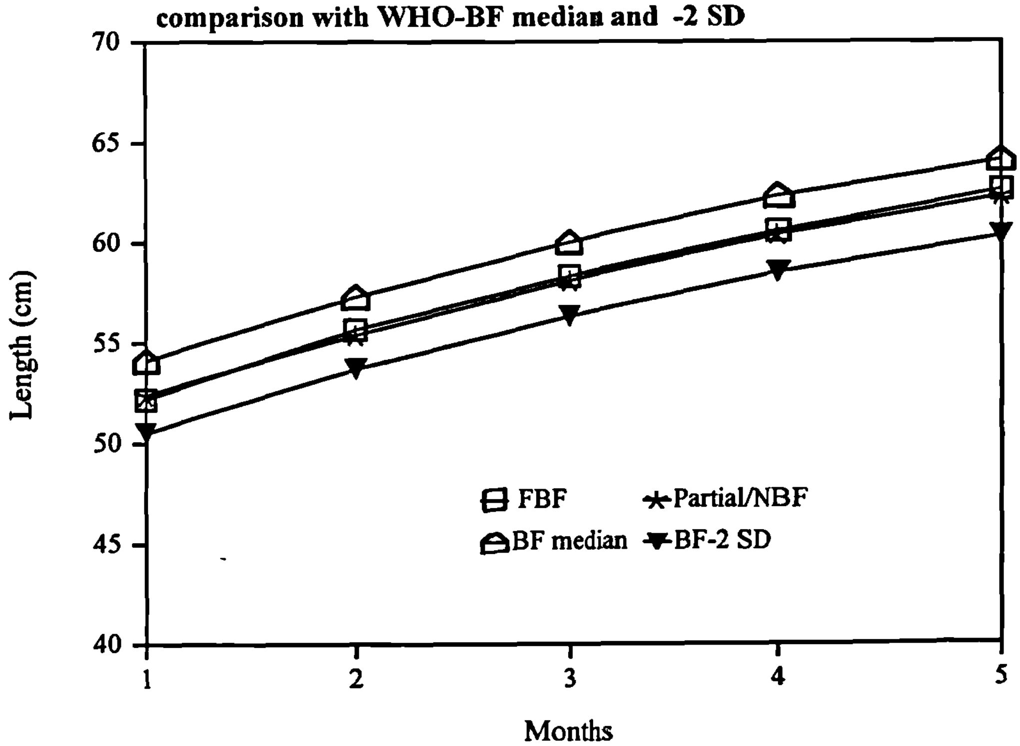


Fig. 8.3.4
Length of fully breastfed and partial/non- breastfed girls in comparison with WHO-BF median and -2 SD



The previous sections have first compared growth between the intervention and control groups, and then compared fully breastfed and partial/non-breastfed infants from both groups with the NCHS and WHO-BF pooled data sets. Although not an objective of this study, since a large proportion of the cohort was exclusively breastfed, it provided an opportunity to study their growth pattern over the 5 months of follow up. These data are presented in the next section.

8.4 Weights and lengths of exclusively breastfed infants

Tables 8.4.1 shows the weights and lengths of the exclusively breastfed boys and girls over 5 months. Plates 15 and 16 present portions of the growth charts of a boy and a girl who had day 4 weights above and below 3 kg respectively, and were exclusively breastfed for 5 months.

Table 8.4.1 Weights and lengths of exclusively breastfed boys and girls over 5 months (mean ± SD)

	Day 4	Month 1	Month 2	Month 3	Month 4	Month 5
Wt (kg) boys	n= 166 2.77 ± 0.37	n = 167 3.82 ± 0.47	n = 165 4.84 ± 0.55	n = 155 5.59 ± 0.59	n = 152 6.24 ± 0.65	n = 154 6.72 ± 0.70
girls	n=188 2.66 ± 0.37	n = 196 3.62 ± 0.43	n =187 4.50 ± 0.48	n= 180 5.21 ± 0.60	n = 183 5.81 ± 0.68	n = 181 6.30 ± 0.75
Lng (cm) boys	48.6 ± 2.0	52.8 ± 2.1	56.4 ± 2.2	59.1 ± 2.2	61.7 ± 2.3	63.6 ± 2.2
girls	48.0 ± 1.9	52.2 ± 1.9	55.5 ± 1.9	58.2 ± 1.9	60.4 ± 1.9	62.4 ± 2.0

8.4.1-4 Comparison of exclusively breastfed infants with the WHO-BF pooled data

The weights of the exclusively breastfed infants when compared with the WHO breastfed pooled data set in Fig. 8.4.1 and 8.4.2 shows that although boys and girls had started near the -2SD, by month 1 both had moved upwards, and grew approximately midway between the median and -2SD curves, the girls being closer to the former.

Again, since length measurements at birth are not available for the WHO breastfed pooled data set, we have compared them from month 1 onwards. The infants in our data set followed a track midway between the median and the -2SD curves.

8.4.5-6 Z scores of exclusively breastfed infants, relative to the NCHS reference

The WAZ, WHZ and HAZ scores were calculated to see their distributions at each month, relative to the NCHS median, and these are shown in Fig.8.4.5 and 6.

Fig. 8.4.1
Body weight of exclusively breastfed boys in comparison with WHO-BF median and -2 SD

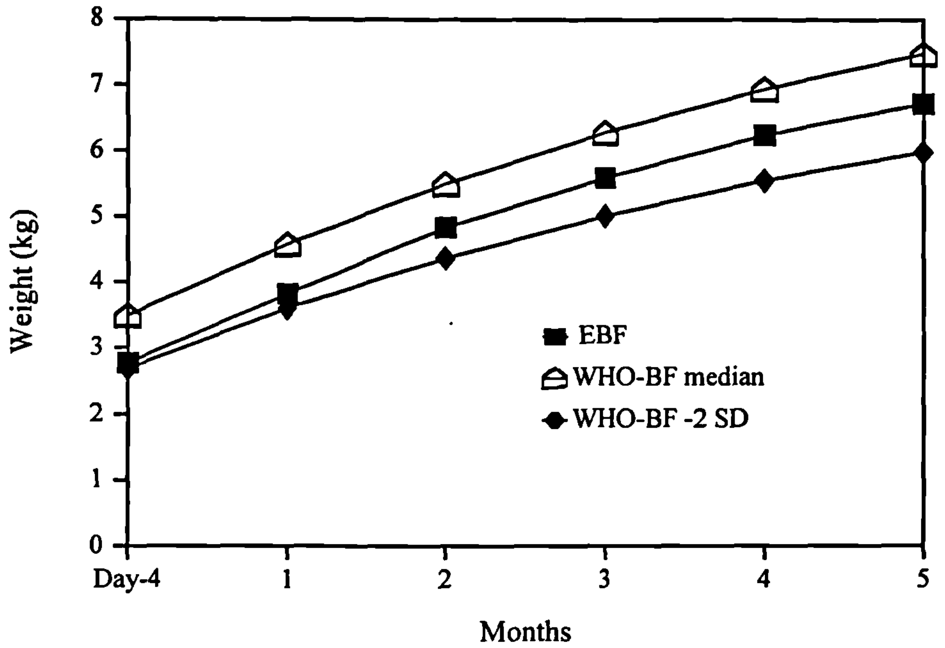


Fig. 8.4.2
Body weight of exclusively breastfed girls in comparison with WHO-BF median and -2 SD

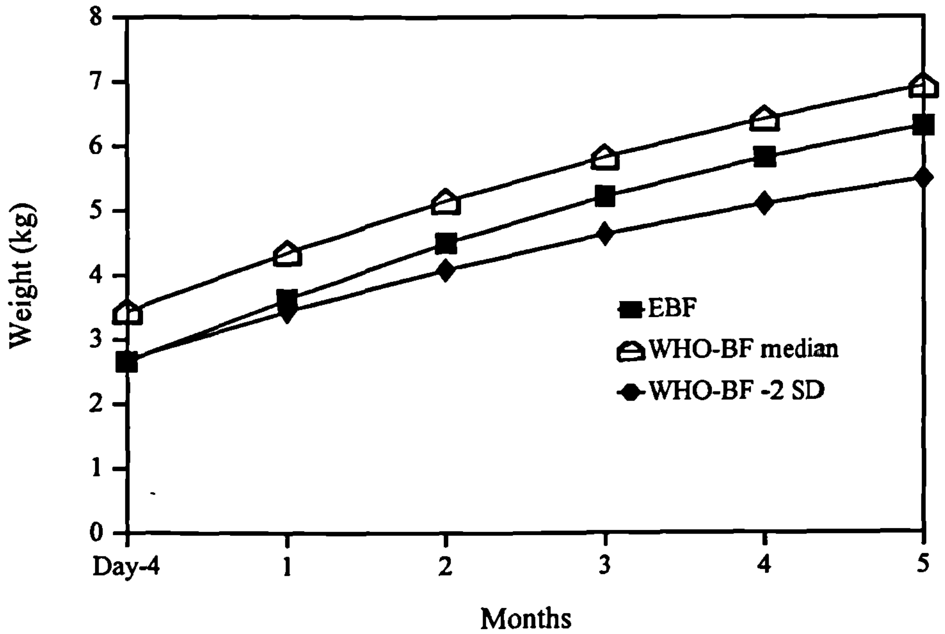


Fig. 8.4.3
Length of exclusively breastfed boys in comparison with WHO-BF median and -2 SD

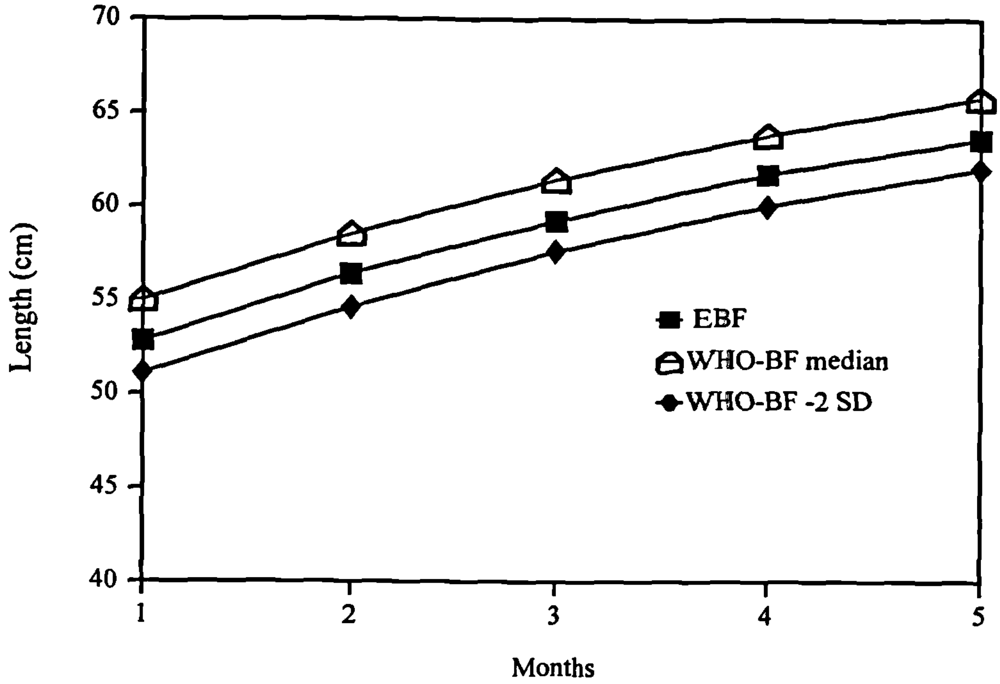


Fig. 8.4.4
Length of exclusively breastfed girls in comparison with WHO-BF median and -2 SD

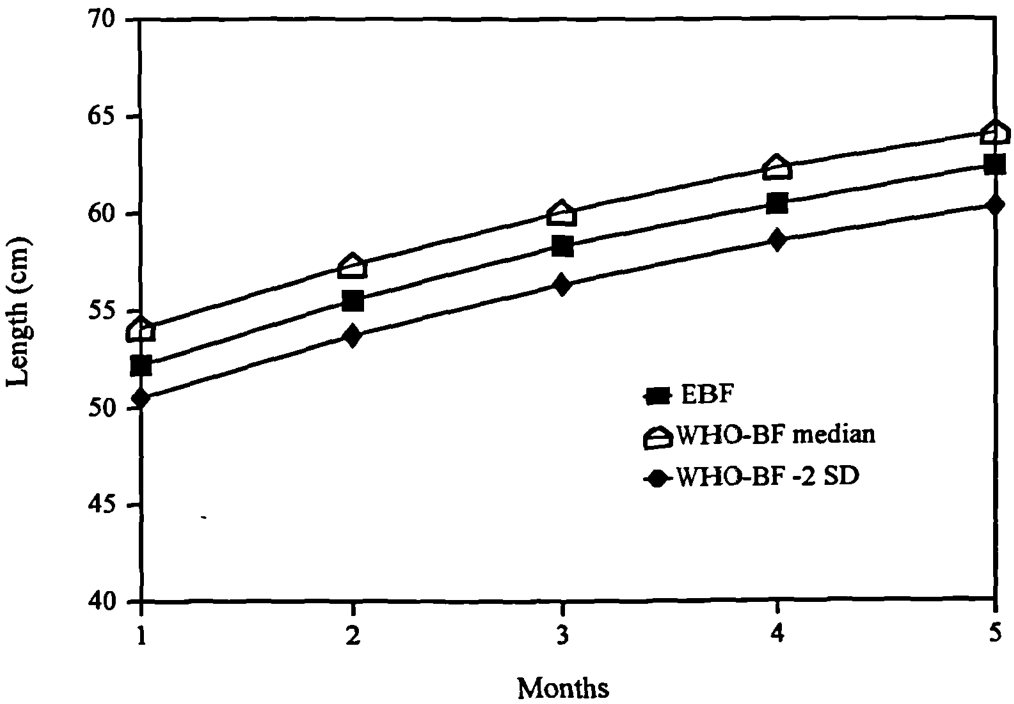


Fig. 8.4.4
Mean Z-scores of exclusively breastfed boys in comparison with NCHS median

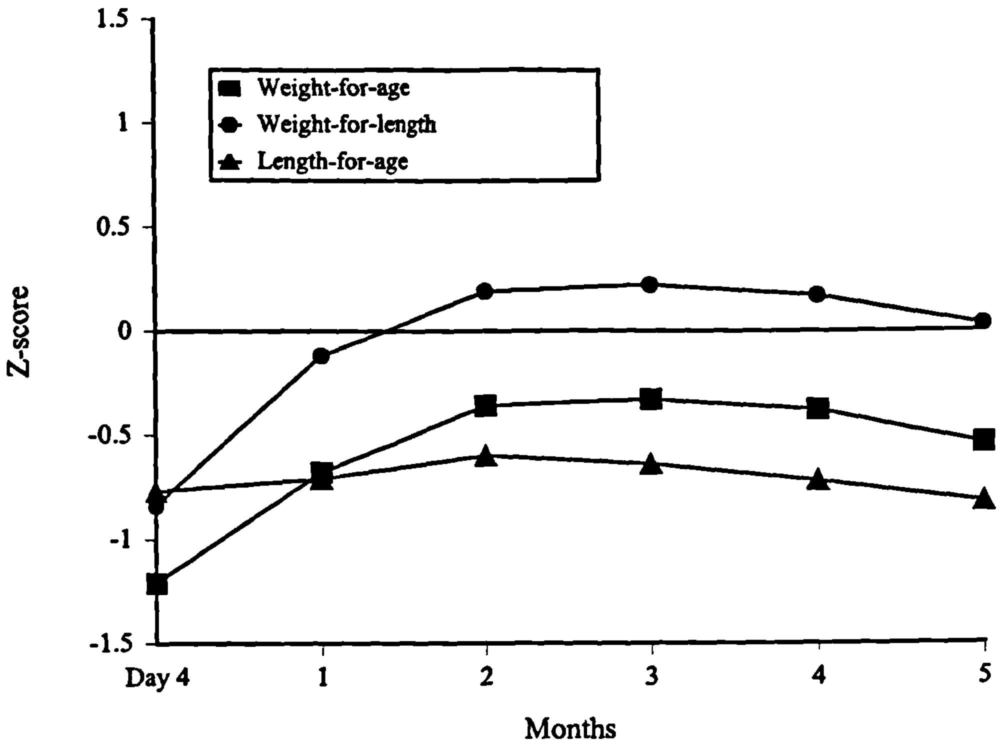


Fig. 8.4.5
Mean Z-scores of exclusively breastfed girls in comparison with NCHS median

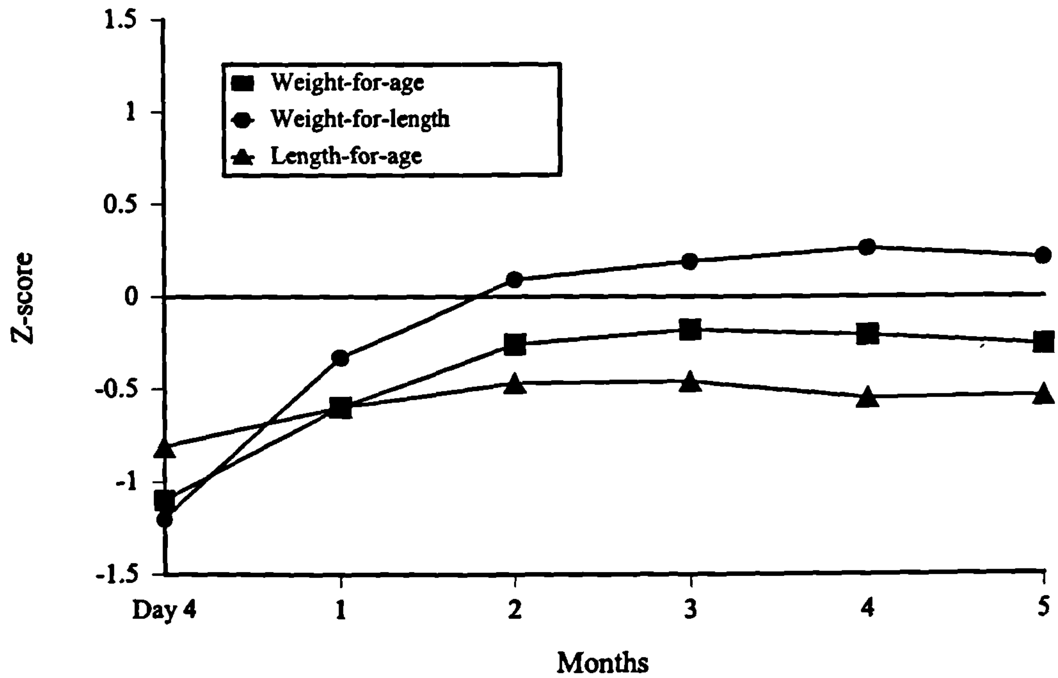
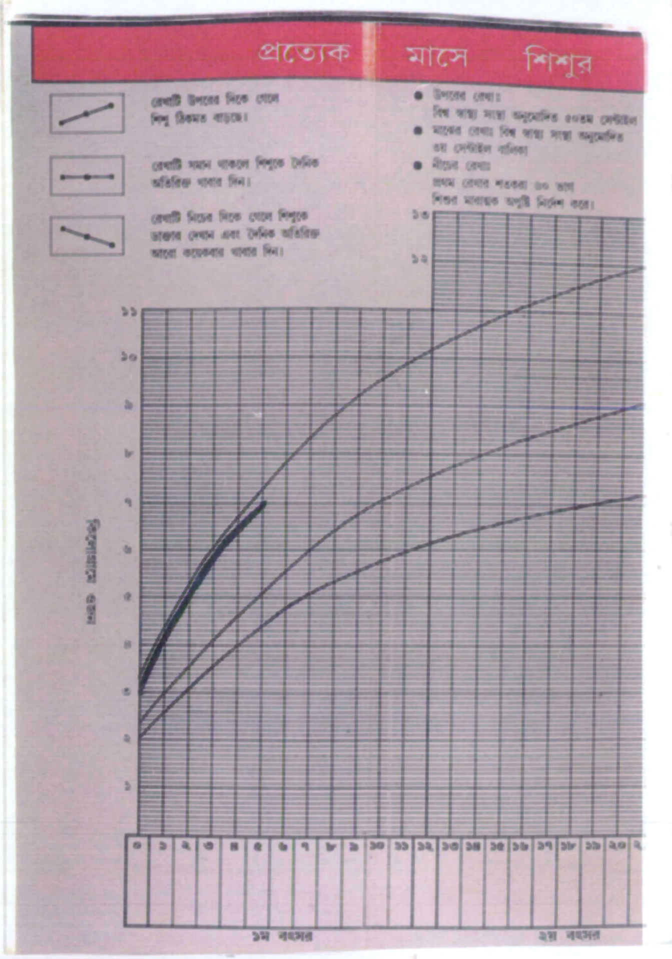


Plate 15.
Growth chart of an exclusively breastfed boy with day 4 weight at 3 kg



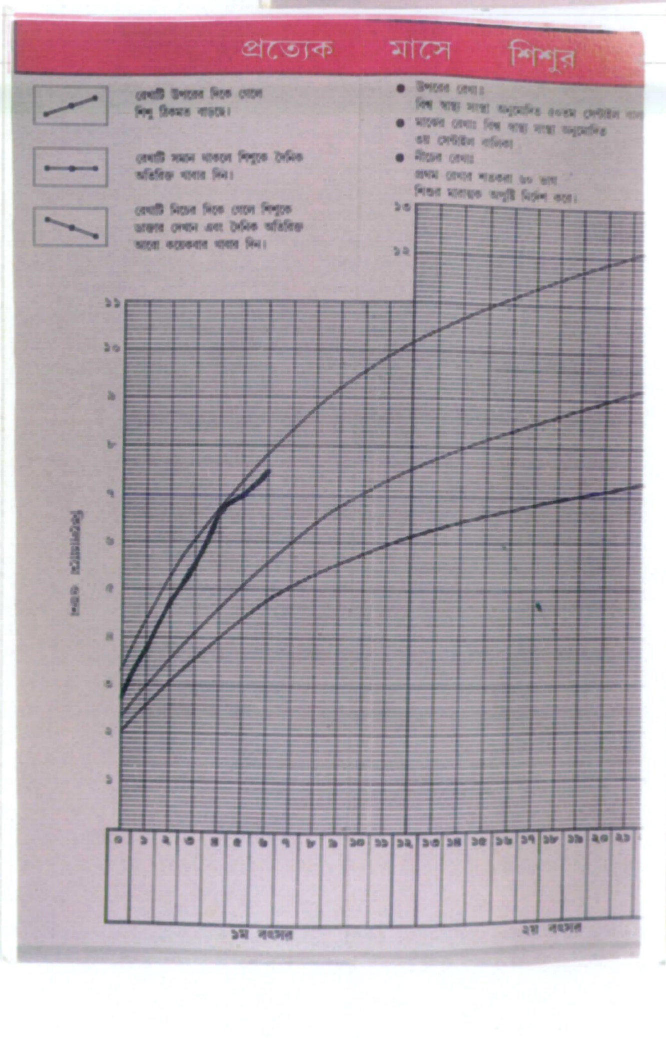


Plate 16.
Growth chart of an exclusively breastfed girl with day 4 weight below 3 kg

Discussion

This chapter has shown that infants in the intervention group were significantly heavier than in the control group ($p<0.05$ at month 1 and $p<0.005$ from months 2-5), but were similar in length. The mean WAZ and WHZ scores at 5 months were also significantly higher in the intervention group ($p<0.05$). Taken together, these results demonstrate that the nutritional status of this group was significantly better than the controls. Since 25% of infants weighed <2500 g at day 4, it may be argued that initial weight gains in the first 2-4 months is due to catch-up growth, but as low-birth-weight infants were similarly distributed in both study groups (29% in C vs. 22% in I), this would not explain why the intervention group infants gained more weight. Another community-based intervention programme for promoting exclusive breastfeeding in Chile has also reported an improvement in nutritional status. They showed significant differences in weight, and also differences in length between 4-6 months of age, after the intervention [Alvarado *et al.,* 1996]. The baseline anthropometric data in this study were similar to those reported earlier from Bangladesh. The mean birth weight in 2489 normal deliveries of singleton births in Dhaka was 2.67 kg and 27% were below 2500g [Ahmed *et al.*, 1992]. Another urban study in the same year, reported a mean birth weight of 2.6 kg and length 48.3 cm [Das and Khanum, 1997].

Considering that the prevalence of morbidity was similar in the two groups, the growth patterns might also be expected to be similar. But the results in chapter 7 (lower prevalence of fever, reduced medicine costs) indicate that morbidity may have been less severe in the intervention group, and this might explain their better growth. Better growth in this group of infants could also be explained by higher energy intake (consistently more breastfeeds/24 hours in the intervention group shown in chapter 6) overcoming any setback due to mild illness.

Comparisons of infants' weights at the end of 5 months showed the exclusively breastfed control infants weighed more than those in the other feeding categories, and raises the question of a selection bias for heavier infants who continued to be exclusively breastfed by their mothers. But in the intervention group, heavier infants alternated between the exclusively breastfed and the predominantly breastfed categories during the 5 months. This is not surprising, because some of the infants fluctuated between these two categories, as had been seen in chapter 6. Although the measurements were reported cross-sectionally, these results were similar to those from Brazil, where there were virtually no weight or length differences between the exclusively and the predominantly breastfed infants during the first 6 months [Victora *et al.,* 1998]. Thus, these findings from the Dhaka study agree with the suggestion that growth of fully breastfed infants could be used for constructing new growth references [Victora *et al.,* 1998].

Early complementary feeding did not improve infants' weights in Dhaka, as demonstrated by the finding that the partially breastfed infants weighed less than the exclusively breastfed infants in both the control and intervention groups, and the non-breastfed, the least. In contrast, in Brazil, from 1 to 3 months, partially breastfed infants gained the most weight. From 3 to 6 months, however, fully weaned infants had the maximum weight and length gains, and exclusively breastfed infants the least [Victora *et al.,* 1998].

Attained lengths were not significantly different in any of the feeding categories in the two groups. An explanation for this finding could be that genetic potential may be a limiting factor for length. Other investigators have found that although weights of breastfed infants in developing countries in the first 6 months were similar to those in developed countries, they were generally shorter, because of difference in size at birth, as were their mothers [Dewey *et al.*,1992, Cohen *et al.*, 1995].

In the Dhaka study, the weights of the fully breastfed boys were close to the NCHS median until 3 months, and those of the girls, until 5 months. But accepting that the NCHS reference is probably inappropriate for comparing the growth of healthy breastfed infants [de Onis and Habicht, 1997], comparisons were also made with the WHO-BF pooled data sets. These comparisons showed that the infants' weights, relative to this set, despite starting lower, continued to increase upwards, as did the

Huascar and Davis breastfed infants [Dewey *et al.*, 1992]. Considering that the fully and exclusively breastfed infants grew better than the partially breastfed infants in Dhaka, there should be no further delay in intensifying the promotion and support of exclusive breastfeeding in Bangladesh.

Thus, in summary, the results from this chapter have demonstrated that the intervention infants were heavier compared to the control infants (and this was more evident in the girls than in the boys). The percentage of malnourished infants at 5 months was significantly lower in the intervention group, and their WHZ scores had improved 1SD over 5 months. Finally, the exclusively breastfed infants, despite the inclusion of low-birth-weight infants, and having started at a lower track, continued upwards until 5 months, without showing any signs of growth faltering.

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CHAPTER 9: IMPACT OF THE INTERVENTION ON CONTRACEPTIVE PRACTICES

The previous chapters dealt with the effect of the intervention on infant feeding practices, morbidity and growth. This chapter will focus on the effect the intervention had on contraceptive practices of the mothers. Since the project was carried out in a family planning programme area, mothers in both groups were supposed to be visited at home by family planning workers, at least twice during the study period. But in order to further promote and support exclusive breastfeeding, mothers in the intervention group were also counselled to use the Lactational Amenorrhoea Method (LAM), and the pre-conditions for this method to be relied upon as a contraceptive were explained. Although the LAM is applicable in the predominant as well as exclusive breastfeeding states, mothers were told that exclusive breastfeeding was essential. This was done intentionally so that there would not be any conflict about the primary objective of the intervention, which was to promote exclusive breastfeeding. Additionally, if the intervention mothers wished, or needed to use some other contraceptive method, they were encouraged to use the condom if menstruation had not resumed, and the progesterone-containing injectable contraceptive after resumption. Peer counsellors discouraged the combined oestrogen-progesterone oral contraceptive (OC) pill during the total period of lactation.

Comparisons of contraceptive practices and outcomes will be presented here as follows:

1. Resumption of menses and types of contraceptives used by mothers in control and intervention groups over 5 months
2. LAM applicability and usage
3. Contraceptive usage by fully breastfeeding and partial/non-breastfeeding mothers in the intervention group
4. Pregnancies in the control and intervention groups

9.1 Comparison of resumption of menses, and types of contraceptive methods used by mothers over 5 months

In response to a question asked during enrolment, whether the mothers had any plans for family planning after the birth of the coming baby (not specifying any time period), similar proportions of control and intervention mothers had said they would use a method (85% and 88%). In actual practice, the usage of family planning methods was significantly higher in the intervention group compared to the control group in all the months ($p<0.0001$), although fewer intervention mothers had resumed menses in months 3-5 ($p <0.05$) (Table 9.1).

Because of the limited number of mothers using contraceptive methods in month 1 (68 in intervention, 7 in control), and also because they are not required during this period, Table 9.1 (and tables in other sections) will present data from month 2 onwards.

The methods used, as reported by the two groups, showed significant differences all through 5 months. In month 1 (not shown in the table), amongst the intervention mothers using contraceptives, 63 used LAM, 4 used condoms and 1 abstinence. Of the 7 in the control group, 1 used condoms, 1 OC, 1 injectable contraceptive, 1 herbal *(kabiraji)* medicine, 1 abstinence, and 2 mothers had undergone ligation. For months 2-5, the LAM remained the most common method used by the intervention mothers, followed by the condom, whereas in the control group, the condom was generally the most common, followed by the OC pill. During the enrolment visit in pregnancy, mothers had also been asked their opinion about breastfeeding and child spacing (the statement was, "some people say that breastfeeding helps in child spacing", what is your opinion?). Whereas only 6% in the controls and 5% in the intervention group had agreed that breastfeeding can help in child spacing, the majority of mothers had been uncertain about it. After counselling, however, most of the intervention mothers went on to use the LAM (Table 9.1).

The advisers of the contraceptive method in the majority of cases thus differed significantly in the two groups, those in the intervention group were PCs, and those in the control group were the husbands (who may have been advised by someone else).

Table 9.1 Comparison of proportions of women resuming menses, using a family planning method, and types and advisers of contraceptives. Values are percentages

	Month 2		Month 3		Month 4		Month 5	
	C n=299	I n=313	C n=289	I n=297	C n=284	I n=291	C n=285	I n=288
Having menses	8	3	27	17*	39	27*	45	33*
Using FPM	21	61†	8	73†	40	81†	42	80†
Method [a]								
pill	13	3	11	1	22	3	27	3
injectable	6	4	5	5	8	6	10	8
Norplant	-	1	-	<1	-	<1	-	<1
condom	51	10	9	16	47	21	38	21
IUD	2	-	1	-	1	-	1	-
withdrawal	11	2	10	1	9	3	10	3
abs/ safe	13	4	7	2	4	3	9	5
LAM	-	77	-	74	-	63	-	59
kabiraj	2	-	2		2	-	-	-
ligation	3	-	4	-	3	-	2	< 1
Advised by †				-				
FPW	5	3	4	4	8	3	6	5
HF staff	13	1	10	1	8	3	8	2
husband	58	8	55	11	49	14	44	11
others	8	2	7	<1	4	<1	7	2
PC	-	81	-	79	-	72	-	71
no one	16	5	24	5	30	8	35	9

FPM = family planning method

* $p < 0.05$, Chi squared test
†$p < 0.0001$, Chi squared test, differences between control (C) and intervention (I)

[a] only 1 method was recorded, the primary method, so if a mother said they were using a condom, but she was also exclusively breastfeeding, condom was recorded as the contraceptive used.

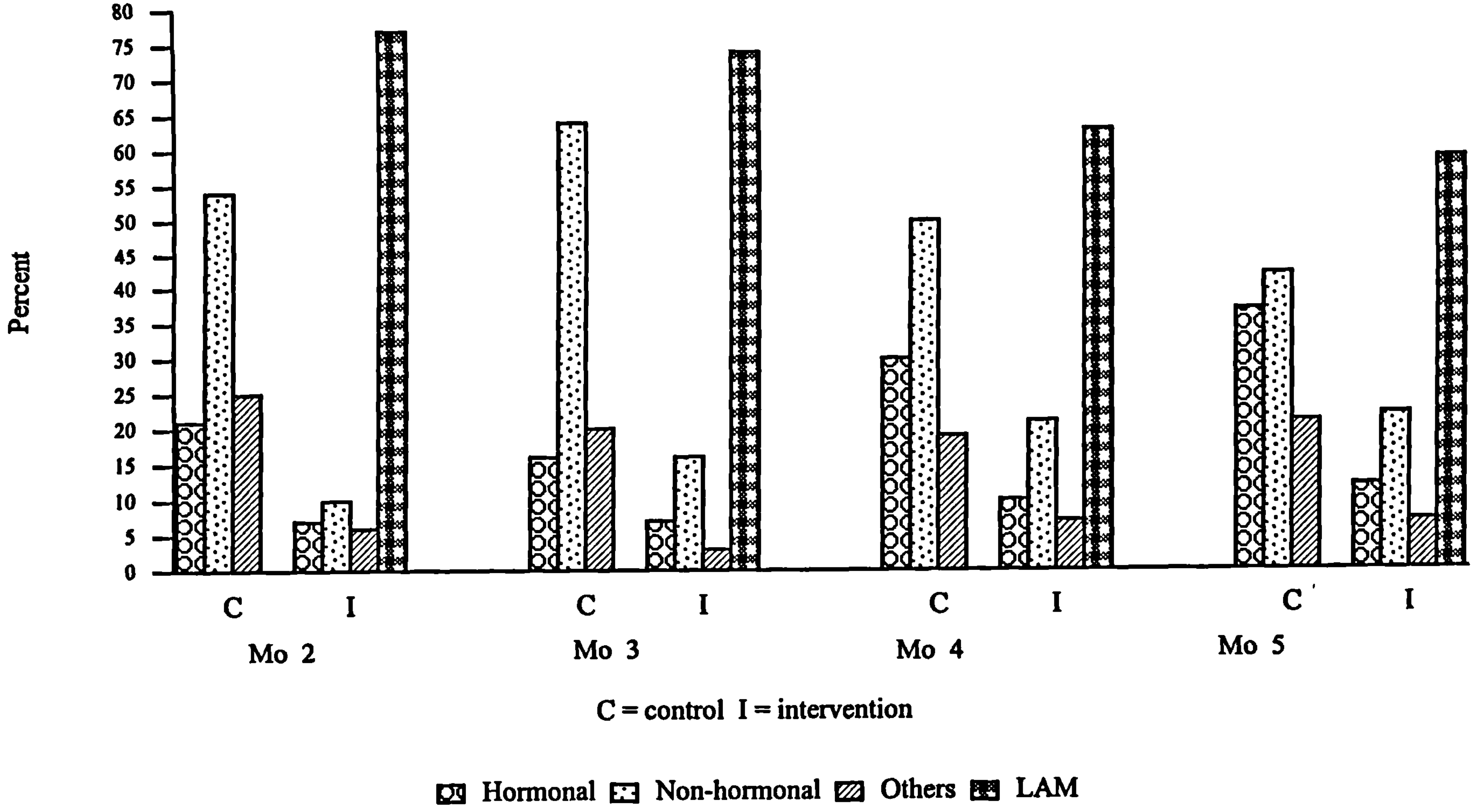
IUD = intrauterine device, abs/ safe = abstinence/ safe period,
LAM = lactational amenorrhoea method, FPW = family planning worker,
HF staff = health facility staff PC = peer counsellor
others = relatives, friends, neighbours

Generic groups of contraceptives used

For interpreting the generic type of contraceptive used, as well as for facilitating analysis (to overcome the problem of having small numbers in each cell), the contraceptives were grouped as hormonal (OC, injectable contraceptive and Norplant), non-hormonal contraceptives (condom, IUD, ligation), other traditionally used contraceptive methods (withdrawal, abstinence, safe period, homeopathic, kabiraj), and the LAM. More of the intervention mothers used the LAM, and usage of hormonal, non-hormonal and other contraceptive methods was lower in this group, compared to the control mothers ($p < 0.0001$).

Fig 9.1 illustrates the LAM as the main contraceptive method in the intervention group, declining gradually over the period. In the control group, the non-hormonal methods were the most used contraceptive group, but as their usage declined (from 54% at month 2 to 42% at month 5), the usage of hormonal methods increased (from 21% at month 2 to 37% at month 5).

Fig. 9.1
Comparison of generic groups of contraceptives used in the two groups



9.2 Comparison of women who fulfilled the LAM applicability criteria and used this method

In the control group, 55% of mothers in month 2, and 43% in month 3, were fully breastfeeding (Table 9.2), but not being aware of, and not having been advised about LAM, none of them reported using this method. In the intervention group, significantly more mothers were fully breastfeeding than the control mothers ($p<0.0001$). If mothers are fully breastfeeding, they should theoretically all have the LAM criteria applicable, but this was not the case in either group. One of the reasons for this decrease in applicability was the gap between breastfeeds. Another reason was that when a mother gave complementary foods to her infant for 2 days, and then stopped, she was classified as partially breastfeeding (Method B), and the LAM criteria were no longer said to be applicable.

The last row of Table 9.2 shows that among the mothers in the intervention group for whom the LAM criteria were applicable, fewer reported using the LAM method. Although the proportions using LAM increased from 54% at month 2 to 83% in month 5, the results show that it could have been used by more mothers.

Table 9.2 Comparison of women who were fully breastfeeding, LAM applicable, and using the method. Values are numbers (%)

	Month 2		Month 3		Month 4		Month 5	
	C n= 299	I n= 313	C n=289	I n=297	C n = 284	I n = 291	C n = 285	I n = 288
Fully BF	166 (55)	271 (86)	122 (43)	259 (87)	76 (30)	240 (82)	43 (19)	222 (77)
LAM criteria applicable	138 (46)	244 (78)*	83 (29)	200 (67)*	49 (17)	166 (57)*	27 (9)	140 (49)*
Using LAM when criteria applicable	n=138 nil	n=244 132 (54)	n=83 nil	n=200 141 (70)	n=49 nil	n=166 125 (75)	n=27 nil	n=140 116 (83)

Fully BF = exclusive + predominant breastfeeding

* $p < 0.0001$, Chi squared test, differences between control and intervention groups

LAM is applicable if: periods have not started, baby is below 6 months of age, is exclusively or predominantly breastfed, and gap between breastfeeds is not more than 4 hours during the day, and 6 hours during the night (and if no hormonal or permanent contraceptive is used).

9.3 Comparison of usage of contraceptives according to full breastfeeding, partial/non-breastfeeding status

LAM was applicable only for mothers who were fully breastfeeding, but as seen in the previous table, some did not use it. This analysis was done to see which groups of contraceptives the fully breastfeeding mothers were using, apart from the LAM. As the control mothers were not informed about the LAM, they were excluded from this analysis. Table 9.3 shows the numbers of mothers who were fully and partial/non-breastfeeding, and illustrates that although the large majority of FBF mothers were using LAM as advised, some of the remainder were unnecessarily using other methods. These were mainly the condoms, used by the husbands, as reported earlier. When compared with Table 9.2, it was seen that some mothers (about 10%) reported using LAM even when the LAM criteria were not met.

Table 9.3 Reported usage of types of contraceptive methods in the intervention group according to full breastfeeding and partial/non-breastfeeding status. Values are numbers.

	n	Hormonal	Non-hormonal	Others	LAM	Nil
Month 2						
FBF	271	10	15	8	142	96
PTBF/NBF	42	3	4	2	6	27
Month 3						
FBF	259	13	30	6	155	55
PTBF/NBF	37	2	5	1	5	24
Month 4						
FBF	240	13	42	10	141	34
PTBF/NBF	50	10	7	5	6	22
Month 5						
FBF	222	18	34	13	126	31
PTBF/NBF	70	9	18	6	11	26

Hormonal = combined OCs, injectable contraceptive and Norplant
Non-hormonal = condom, IUD, ligation
Others = safe period, withdrawal, abstinence, homeopathic, kabiraj
LAM = the lactation amenorrhoea method

FBF = fully breastfed (exclusive + predominant breastfeeding)
PTBF/NBF = partial/ non-breastfed

9.4 Pregnancies in the control and intervention groups

Despite the efforts of family planning workers and PCs, a few mothers became pregnant within 5 months. These were six in the control group (2.1%), and four in the intervention group (1.4%). In the control group, one mother had stopped breastfeeding in the second month, another had irregular feeding at various months, and the others were partially breastfeeding (Table 9.4.1). Three of them reported using condoms, but still became pregnant.

In the intervention group, although all four mothers who became pregnant were exclusively breastfeeding their babies, none of them actually mentioned using the LAM as a contraceptive method (Table 9.4.2). All the mothers had long gaps between breastfeeds recorded during various weeks, in spite of being reminded repeatedly by the PCs that they should breastfeed more frequently, while one of the mothers had earlier expressed her desire for becoming pregnant soon if she had another daughter (because she wanted a son).

Table 9.4.1 Pregnancies in the control group of mothers

Pregnancy recorded at	Menses started	Contraceptive method	Feeding status
3 months	80 days	withdrawal (from 40 days)	NBF - 2 months
3 months	75 days	condom (from 31 days)	PTBF - 3 months
4 months	75 days	condom (from 50 days)	PTBF - 4 months
5 months	108 days	condom (from 41 days)	PTBF from 3 months
2 months	57 days	no method	PTBF - 1 month
4 months	66 days	safe period (from 66 days)	PTBF - 1 month EBF - 2 months PRBF - 3 months

Table 9.4.2 Pregnancies in the intervention group of mothers

Pregnant from	Menses started	Cont method	Feeding status	BF gap	Comments
4 months	61 days	nil	EBF - 1,2,3 months	7 hrs during day > 6 hrs at night	During pregnancy, said if girl born, she would not take any contraceptive, because wanted a boy. Contraceptive benefit of EBF not mentioned at 5 months interview
4 months	113 days	nil	EBF 1-4 months	> 6 hrs at night	First baby. During pregnancy, said she did not know when she would start contraceptive. Contraceptive benefit of EBF not mentioned at 5 months interview.
3 months	89 days	nil	EBF	seen during monitoring - baby mostly kept by others	PC advised condom before periods started because of the gap, but husband refused
3 months	67 days	pill for few days	EBF	gap during day - baby kept with MGM	Did not tell PC about gap or pill. Unreliable history.

Cont method = contraceptive method, MGM = maternal grandmother

Discussion

The results of this chapter show that the intervention led to significant changes in contraceptive practices of mothers, and to a delay in resumption of menses; 67% of the intervention group mothers were amenorrhoeic at 5 months compared to 55% of the controls. In addition, the intervention increased the reported family planning usage (80% in the intervention, versus 42% in the controls at 5 months). These changes were possible because of the acceptance of LAM by the intervention mothers, which was in contrast to their opinions during enrolment, when 95% had either said they disagreed, were unsure, or did not know about the contraceptive potential of breastfeeding. Plans for contraception were similar in both groups at this stage, but their subsequent practices were quite different. While the majority of mothers in the intervention group took the responsibility for contraception by practising LAM, it was the husband's responsibility in the control group. The usage of OCs was lower in both the groups than had been planned during pregnancy. As research in rural Bangladesh and the Dhaka slums has shown, women and FP workers are aware that OCs may have negative effects on breastmilk production [Salway and Nurani, 1998], and they may have influenced the use of these methods after childbirth in the control group.

Counselling helped the majority of intervention mothers to breastfeed exclusively. These mothers also accepted and followed PCs advice about the LAM, which 59% were using at 5 months. Similar results were obtained in a breastfeeding and LAM promotion project in Santiago, Chile, where 67% mothers had continued exclusive breastfeeding for 6 months [Perez *et al.*, 1992]. Despite counselling about the LAM, some of the fully breastfeeding mothers in the Dhaka study, however, used other methods, specifically the condoms, which were unnecessary at this stage. This indicates that the PCs could not convince them, or more likely their husbands, about the reliability of LAM. In the control group as well, there were a large number of fully breastfeeding mothers in the first 3 months who used other contraceptives. Studies from rural Bangladesh have shown that women who accepted OCs early during lactational amenorrhoea, had high discontinuation rates and shorter birth intervals than non-acceptors [Bhatia and Kim, 1984; Bhatia *et al.*, 1987]. There are similar reports from Zimbabwe, where fertility was high despite a high contraceptive prevalence. This was because of an extensive overlap between contraceptive use and amenorrhoea following childbirth, resulting in the duplication of protection, and lack of protection when it was required later [Adamchak and Mbizo, cited by Winikoff and Mensch, 1991].

In this study, some mothers reported using the LAM although they did not meet the LAM criteria as they had long gaps between breastfeeds. Others had given complementary foods for short periods and stopped. The latter were recorded as partially breastfed and thus not applicable for LAM, but whether such a short duration of complementary feeding actually puts women at risk is not known.

The pregnancy rate was low in both groups. In the intervention group, at first glance, it was surprising that the mothers who became pregnant were exclusively breastfeeding. But further examination of the associated factors showed that none had mentioned using the LAM for contraception, or followed it as recommended. Each of the pregnant mothers had long breastfeeding gaps. For breastfeeding to provide protection from pregnancy by maintenance of ovarian suppression, frequent and intense suckling are important [Gray *et al.* 1990; Labbok and Krasovec, 1990]. The mother who wanted a son may have intentionally been breastfeeding her daughter less frequently in order to conceive again. Findings from rural Bangladesh demonstrate that gender preference represents a significant barrier to fertility regulation [Rahman *et al.*, 1992].

Although exclusive breastfeeding has been promoted since 1989 in Bangladesh, the LAM has not been included as a contraceptive method by the health or family planning sectors. The fact that the contraceptive potential of breastfeeding is grossly neglected has been recognised [Salway *et al.*, 1997], but no active steps have yet been taken to make amends. In Honduras, promotion of LAM was associated with an increase in exclusive breastfeeding from 4.3 weeks to 9.6 weeks [Rivera *et al.*, 1992]. Also in Honduras, the proportion of mothers amenorrhoeic at 6 months postpartum tended to be lower among those who had started complementary foods at 4 months (64%) than those who fully breastfed until 6 months (76%), or supplemented at 4 months with the same frequency of breastfeeding as before (81%), but the differences were not significant [Dewey *et al.*, 1997].

There has been a considerable decline in the duration of postpartum amenorrhoea in rural Bangladesh from an average of 18 months to 11 months over twelve years (1975-87), which has been associated with a decrease in the practice of full breastfeeding [Salway *et al.,* 1993]. The following statement by two researchers [Huffman and Labbok, 1994], applies to Bangladesh as well as to other developing countries, "If breastfeeding levels were to decline further, the increase in family planning services that would be required to replace the fertility impact would be prohibitive, both in terms of cost and difficulty". The Bellagio consensus, and the LAM guidelines were designed to prevent this decline, while facilitating contraception. Bracher [1992], however, using microsimulation to quantify the implication of this recommendation, concluded that the LAM would not produce better birth spacing than a simpler strategy of introducing contraceptives in early postpartum, and might be worse unless implemented perfectly. His statements were refuted by some members of the Bellagio consensus group, who argued that his findings were based on an inappropriate data set and biased comparison groups, resulting in misleading conclusions [Laukaran and Labbok, 1993]. Others reported positive results of LAM usage [Wade *et al.*, 1994; Kazi, 1995]. Recently the results of a multicentre trial in 10 countries show that mothers' overall satisfaction with LAM was 84% and at 9 months, 68% reported to be continuing contraception with another method, which in most cases exceeded usage of contraceptives prior to that of LAM [Laukaran *et al.,* 1997].

These findings, in Bangladesh and elsewhere, support the view [Winikoff and Mensch 1991], that LAM should be incorporated into family planning programmes, which would not only help the promotion and support of breastfeeding, but also give women a chance to start contraception in early postpartum.

In the next chapter, mothers opinions about the knowledge and help they received from the PCs, and the opinions of the PCs themselves about the intervention, will be discussed.

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CHAPTER 10: OBSERVATIONS AND OPINIONS ABOUT THE INTERVENTION

The results compiled in this chapter were those obtained by three qualitative methods, namely specific observations, individual interviews and focus group discussions. As explained in chapter 4, the main purpose for using these additional methods was to gain new information, validate some of the feeding results obtained by quantitative methods, and to deepen understanding of issues and topics which were important from the intervention aspect.

Observations for specific behaviours were carried out in the homes of control and intervention group infants, who had been randomly selected at different ages. One mother-infant pair in each group was observed within three days of delivery. Thereafter, different mother-infant pairs, two in the control group, and two in the intervention group, were observed at each month of age (total 22 infants). These specific behaviours were related to breastfeeding, child caring and hygiene practices of the mothers. Focus group discussions and individual semi-structured interviews were held only with the intervention group mothers, to understand what problems they may have faced during breastfeeding, if and how they had benefited from the PCs, and what they thought about the services provided.

The information obtained will be combined according to themes common to the observations and enquiries, with mothers' and other individuals' comments quoted verbatim* within these themes, and presented in three sections:

1. Observations related to factors affecting breastfeeding
2. Opinions of mothers about the PCs and the intervention
3. Opinions of PCs about their role and the intervention

* Names of mothers and babies have been changed, quotes are provided in italics, with original language in parentheses.

10.1 Observations related to factors affecting breastfeeding and hygiene aspects of mothers

In this section, specific factors that can affect breastfeeding will be described. Hygiene aspects do not directly affect breastfeeding, but as they may indirectly affect the related outcomes of morbidity and growth, they *(these aspects)* have also been included in this section.

The monthly interviews had provided information about the type of breastfeeding practised by mothers (exclusive, predominant or partial), and the frequency of breastfeeds. Also obtained in these interviews, were the timing of initiation of breastfeeding, the type of additional fluids and foods fed to the babies, and the mode of feeding. This information, however, was not enough to explain whether there were any differences in breastfeeding "quality", which can be affected by certain factors, namely, technique (position and attachment) during breastfeeding, duration of breastfeeds, and mother's perceptions about breastmilk production and adequacy of breastfeeds. While trying to assess these factors, the observers attempted to note the social factors which in turn, may affect the above. Mothers can be influenced by attitudes of others, and since the opinions of other family members and neighbours involved in baby-care could support or undermine good breastfeeding practices, their opinions were also noted.

The PCs' primary objective was to encourage mothers to start breastfeeding soon after babies were born and then to help them breastfeed exclusively until 5 months. For this purpose, in addition to the benefits, they had to explain the mechanics of breastfeeding and show mothers the correct techniques for the babies' position and attachment at the breast. The importance of feeding mainly from one breast during a breastfeed, optimum duration of breastfeeds, and of feeding on demand, was also explained. As a PC was supposed to become a mother's good and trusted friend, it was expected that by listening to a mother's concerns, she could reassure and help her to feel more confident regarding feeding issues, but would not be expected to solve other problems.

10.1.1 Initiation of breastfeeding

Breastfeeding initiation is often delayed from a few hours to a few days after delivery, as was seen in chapter 5. Most of the reasons for this delay centre around certain beliefs. This project did not plan to go into details about these beliefs, but as much has been written about the practice of "discarding colostrum", opinions of several mothers regarding this practice, were sought. These mothers said that women generally discarded the first few drops of colostrum because it was old, stale milk, which had been in the breasts before the baby was born. Colostrum which came from the breasts after the baby was born, was all right. Another belief for the delay in initiating breastfeeding, was that there was no breastmilk in the early days after birth. This statement was heard during observation of a control mother, Sharmin, who had delivered a baby a few hours ago. The BC happened to be in the same area at that time, and hearing about the birth from another mother, went over to observe the early feeding practices. Sharmin's sister told the BC,

> *"for 3 days, the mother will not have any breastmilk, so we will have to feed the baby sugar water and other milk (teen deenayr jonno maer buker doodh hobay na, ayejonno amra baccha kay cheeni pani ebong alga doodh khawabo)".*

Another view, less commonly heard, was that the baby did not need anything in the first few days;

> *"your baby does not want to have any food as she has already eaten a lot while she was in your stomach*
> *(maer patay thekay jonmer khaye bayr hoaychay - tai prithibee tay eshay aar khawa lagay na tor bacchar)".*

Sharmin's neighbour, who had heard the breastfeeding messages promoting colostrum (*shal doodh*) feeding, enquired if colostrum had been fed.

> *"nowadays, it's necessary for the babies to have colostrum. It is said that colostrum has many benefits for new born babies and should not be thrown away (shal doodh baccha kay diyecho kay na? Ekhon bacchader*

> *shal doodh khawatay hoy. Shal doodh ekhon pheltay na koray, aar bolay jai shal doodher onek upokar)".*

Interestingly, she did not mention anything about feeding prelacteals or postlacteals. Another reason for the delay in breastfeeding, was that a mother needed to rest after delivery. When Sharmin's sister mentioned that she had lost a lot of blood, a neighbour said,

> *"Sharmin is very weak now, how can she breast feed the baby? Sharminer shoreer ayto durbol, ayee shoreeray shay ki bhabay buker doodh deebay?)".*

In contrast, on the third day, a mother in the intervention group had so much breastmilk that she was having breast engorgement in spite of breastfeeding frequently. This mother said,

> *"now my breast is soft. In the morning I had to express milk from both breasts because they were paining (ekhon amar bukta onek norom hoyachay. shokalay, dui buk galaychi karon buk khub betha korchilo)".*

Comparison of these two cases showed that whereas the control mother was still being influenced by prevailing beliefs, the intervention mother had been influenced by her PC, and had plenty of breastmilk. Thus, despite the common perceptions about women having no milk, or scanty milk, in the first postpartum days, the PCs could demonstrate that babies could get plenty of milk if breastfeeding was commenced soon after delivery. Mothers probably need to be warned beforehand that insufficient breastfeeding, or "sudden coming down of milk" may lead to breast engorgement, and be taught how to express milk to prevent this.

Among the mothers who followed PCs recommendations for initiating breastfeeding soon, many reported that *"milk had come down fast"*, or *"faster"*, when they compared their present experience with their past experience of breastfeeding a baby.

10.1.2 Technique of breastfeeding

Mothers, whether they are primaparous or multiparous, often need to be informed about optimal techniques for breastfeeding and helped accordingly. Although other women may try to help, if they lack the skills, they will be unlikely to succeed, as this example shows. When a neighbour suggested they feed the baby colostrum, Sharmin (control mother)'s sister replied,

> *"after the baby's birth we have tried to feed colostrum, but the baby could not suck and the mother also could not hold* (position) *the baby".*

Help with technique would have been helpful at this stage for Sharmin, as it was for the intervention group mothers. When asked in a focus group discussion, which visit of the PC was most useful, a mother answered that they were the visits soon after delivery, and the reason was, *"because she helped me put the baby properly to the breast".* Other mothers agreed with this statement.

In reply to the question, "But some of you had babies previously, didn't you know how to breastfeed?", mothers answered,

> *"Yes, but we just put the baby to the breast - didn't know things like holding her/ him against my stomach, and about the black part having to go into the baby's mouth. Breastfeeding feels much better now."*

Although there were problems with positions of the mothers, and position and attachment of the babies at the breast in both the groups, these were much less in the intervention group. These problems were more obvious in the first two months, after which, mothers either overcame them, or started other foods. This account of Nasima (control) mother of one-month old Tariq, describes her difficulty to breastfeed due to faulty technique.

> Nasima lifted her maxi, spat on her right breast and started breastfeeding. The baby's position was poor, and she was scissoring (holding nipple between the index and middle fingers). Only the nipple was inside the baby's mouth, and he was making a smacking noise. When put to the left

> breast after 2 minutes, the position and attachment were still poor. She removed him from this breast after about 2 minutes and started preparing for his bath.

Later the same day, the BC wrote,

> Nasima was lying down and trying to feed him from the upper breast, which was not big enough to reach the baby's mouth, neither could the baby reach it. He tried a few times, then gave up and started crying.

Mothers sat on chairs, beds, stools *(peeras),* or lay down to breastfeed. But wherever they sat, or lay, their own position was important because the baby had to be able to reach the breast and attach properly to the areola. Apart from position and attachment, the clothes worn by the mothers should be conducive to breastfeeding, but often were not. Either the blouse was buttoned and tight over a mother's breasts, or she wore a maxi (long night dress), partly open in front, so had to lift the whole maxi up to breastfeed, which was not convenient in front of others.

This example shows that despite the PC having shown how to position and attach the baby to the breast, some mothers repeatedly had to be helped in this respect.

> Rumpa was sitting on a chair and breastfeeding 2-month old Mita (left breast). She was not holding the baby properly. Her mother-in-law said,
> *"bring the baby closer to you (tumar deekay tanay now)"*
> and told the BC, *"Dipa's mother (PC) has shown her several times how to hold the baby, but she still cannot hold her properly (Dipar ma koto baar dekhiyay deeyae jaye, kintu ma ekhono thik moto dhortay paray na)".*

10.1.3 Duration and adequacy of breastfeeds, and breastmilk production

Babies are commonly allowed to suckle for a very short duration, with mothers often removing them from the breast before they had received enough milk. They also switched babies from one breast to another, before they reached the hindmilk. This generally causes babies to become hungry sooner than they would have otherwise, which then leads a mother to doubt her capability to produce enough breastmilk for the baby. The PCs informed mothers that the baby should be breastfed from one breast until s/he stopped herself or himself, which would indicate that his/her stomach was full, rather than the mother stopping herself. One of the intervention mothers was seen to follow this advice.

> Rumpa breastfed for about 20 minutes, and when the baby stopped breastfeeding and moved away, happily told her niece, *"look, the girl has left the breast herself" (dekho mae neej thekay charay deechay)* and then placed her in her cousin's lap and resumed housework.

If a baby is breastfed for a short time, s/he will remain hungry, and will not sleep properly, which can also influence a mother to think of adding other foods.

> Mehnaz, (control) mother of 4 week-old Shumon told the BC, *" the baby stays awake during the night, so sleeps during the day. Breastmilk does not fill her stomach. My older baby also breastfed for 40 days, then I had to start rice powder gruel with cow's milk. I want to do the same for this one. But since good cow's milk is not available now, I am wondering what I will feed her. (baccha shara raat kanna koray, buker doodhay payt bhoray na. Amar agayr baccha o cholish deen buker doodh khayachay, tar por suji deeye gorur doodh khawaichi. Aita kay o deetay hobay - ki deebo theek kori nae)".*

In the intervention group, in contrast, two mothers complained of oversupply of milk when their babies were one and two months' old respectively. The mothers added that the PCs had explained that whereas they usually discouraged scissoring (pressing the areola with the index and middle fingers), which would decrease the flow of breastmilk by pressing on the milk ducts, in their case, because the milk flow was excessive, they had recommended scissoring. These mothers had also been taught by their PC to express breastmilk before putting the baby to the breast. And yet, one of them, Shama, was finding it hard to cope in this situation.

> Shama was sitting on the bed. When she started to breastfeed her 2-month old daughter Meena, milk gushed out. She placed her hand on her breast to slow the flow, but breastmilk kept on dripping. Shama breastfed for 4 minutes and told the BC *"my baby does not feed for long - my breast still feels heavy. She takes breastmilk from one breast, but less in amount, because this breast still feels heavy - and milk is drying from the other breast (baccha amar khub beshi khai na. Buk amar ekhono bhar. Ek bukay olpo khai. Jai buk khaylo, shay buko bhar howay achay aar ono buk thekay to doodh poray)"*.

During an earlier breastfeed, the BC had seen that the baby's attachment at the breast was not good, and smacking sounds could be heard during breastfeeding. It is important that babies should feed adequately from both breasts, while position and attachment are crucial factors.

It was not surprising that short, inadequate breastfeeds left babies hungry. They would not sleep, and would start crying within half an hour. Many mothers did not understand why they were crying so soon after breastfeeding, and would either try to ignore their crying, or rock them to put to sleep again, or give them to neighbours or older children to take out of the house.

10.1.4 Social and other factors

Women can be very sensitive to social factors when they are breastfeeding. Anxiety and depression, family problems, pressure by other family members, successive pregnancies, migration and much housework, were some of the factors identified in this project. Mother's illness, although not a social factor, is also included here. The factors mentioned could, through affecting the breastmilk production and ejection reflexes, contribute to feelings of inadequacy, and ultimately, decrease breastmilk production altogether.

Family problems

Mothers talked about family problems whenever they were given a chance to do so. These feelings were expressed during one of the observation sessions.

> Mehnaz (control) mother of 1 month old Shumon who had earlier told the BC she was thinking of feeding her baby gruel, added later on, *" I don't know whether I will stay in this house with this man. Before he married me, his previous two wives had left him. They have 3 kids and I have 2. After marrying me, he got married again. That wife also has a baby, 15 days younger to mine. Then he also brought two girls who work in a garment factory, to this house. Maybe he wants to marry them too. He has a bad character. I don't want to have a family life with him. I can spend my life with my 2 children (Babar shobhab kharap, shudhoo maeder peechonay ghooray. Amar ayee shami'r shathay shongshar korar eccha nai. Dui baccha neeye ami jeebon katabo)".*

Mothers were quite at ease during focus group discussions. In one group of partially breastfeeding mothers, one ascribed her reasons for resorting to complementary feeding, to periods of anxiety. Another said it was because she was influenced by other family members, while a third said it was because she had to resume work. Their statements are given below.

> *"The baby's father was jobless and I was very worried. I felt my breastmilk had decreased ----".*

Responding to why she did not consult her PC at that time, she said,

> *"because I felt ashamed to tell her my family problem (lojja) at first. Then I thought that the baby might be harmed by this food, so I did ask her, and she asked me to stop it, and I listened to her".*

This mother had fed the gruel for only 2 days. The PC informed the BC later, that her husband had actually gone off without providing for her. Luckily, he managed to get a job again later, and came back to her.

Mother's illness

Mothers often think their illness affects her capacity to produce breastmilk, where the reason may be more psychological than physical. One of the mothers' explained why her illness had made her start additional milk.

> *"I was sick and was being treated by the village doctor with many medicines. I thought my breastmilk had decreased because of the medicines, so added Lactogen which the older baby was still having".*

(The infant formula was stopped later, following her PCs advice).

Family member's influence

In the monthly interviews, mothers often mentioned they had started complementary foods for their infants because someone in the family had suggested it. As reported by this mother below, in her case, this was not because she had any problems with breastfeeding.

> *"I gave cow's milk from the milk bought for us (family), because the baby's maternal grandfather advised me. It was just given out of interest (showkay dawa hoyay cheelo), but the PC advised me to stop, so I stopped after 3 days".*

A reason for complementary feeding in the absence of any breastfeeding problems, was to prevent future problems of acceptance of complementary foods. A mother said she had given other milk in a bottle when the baby was 3 months old. This was at the insistence of her in-laws, who had seen that their other daughter-in-law's baby who had also exclusively breastfed for 5 months, did not want to take other food.

> *"They told me not to spoil this child, but give her the habit of other milk too, because I was planning to go for work (tumi ekhon thekay*

baccha kay alga khawar dawr obhash koro - naholay tumar bhabi'r baccha'r moto o buker doodh chara onno kichu khabay na!)".

So this mother tried bottle feeding for one day, saw the baby readily accepted the milk, then stopped it, convinced there would be no problem later on.

Started working outside the home

A mother who had started complementary foods very early, said,

> *"I was in my sister's house in Hatirpul (so PC could not go). I thought my breastmilk was less, so started other milk on the first day, and continued it. I also started working part time after 28 days so could not feed my baby only breastmilk".*

This example showed that more effort has to be spent in counselling working mothers during pregnancy, and after delivery.

Attitude towards exclusive breastfeeding

Breastfeeding outcomes depend much upon whether a mother's attitude towards exclusive breastfeeding is positive or negative. A negative attitude was not easy for most of the PCs to assess at first, but after a few visits, they could understand that although a mother blamed certain difficulties, she was actually not interested in practising exclusive breastfeeding. During a focus group discussion, a mother's attitude could easily be gauged by the others present. One of the mothers who said she was partially breastfeeding, said,

> *"I had an operation - a Caesar. I was sick for one month so did not breastfeed"*

On asking how many days she had stayed in the hospital, she said,

> *"I went in the morning and came back in the evening"*
>
> (so it was probably an episiotomy).

At this point the BC reminded her that when the baby had pneumonia and she had taken him to the hospital, she had said she was partially breastfeeding, and that was before the baby was one month old. Hearing this, another mother intercepted, and remarked,

> *"your statements are not clear - there is "no consistency" - you make different statements at different times - but anyway, even now if you want to, you can try feeding only breastmilk".*

(The mother in question had said she breastfed the baby 2-3 times at night, but it seemed doubtful because the baby was crying and she was rocking him, but he did not suckle. Some of the mothers then commented that it was obvious she did not really want to breastfeed).

A positive attitude towards exclusive breastfeeding was evident in the mother who said,

> *"My first baby was given water in addition to breastmilk for a long time while we were in the village. My second baby was born in Dhaka and was started bottle feeding from the first day. So for my third baby, my wish was that if I could bring this baby up on breastmilk only, I would try it".*

The information (given by PC) that she could eat all types of foods as none would harm her or the baby, gave this mother more confidence, because then she thought she could eat the foods which are reputed to increase breastmilk.

10.1.5 Predominant and complementary feeding

None of the intervention mothers fed their babies water or juices during the observation period, and had been recorded to be exclusively breastfeeding at that month by Method B. It could also be that being conscious of the BC observing, they were more careful not to do so even if they did give water occasionally.

Two of the control mothers were partially breastfeeding during one of the observation days. This had been noted after probing during the monthly interview, but since the practice had not continued for 2 consecutive days, were recorded to be predominantly breastfeeding by Method B. All the control mothers who were classified to be predominantly breastfeeding, gave water at least once during the four hours of observation, from a few drops to a few spoons, either by hand or spoon, usually during, or before bathing the babies.

Frequent problems with breastfeeding, perception of insufficient breastmilk, or just wanting to do what everyone else seems to be doing, can encourage mothers to start complementary feeding in early infancy. Complementary foods prepared inadequately, and in unhygienic conditions, can be a source of pathogens, and are commonly associated with diarrhoeal morbidity. For these reasons, attempts were made to observe the preparation and feeding of complementary feeds whenever possible (without advance notice). Observations for one control mother are described below.

> Najmun placed full cream milk (milk vita) over the stove to warm. There was 250 ml of milk, of which she drank half (125 ml) and diluted the remainder with 125 ml of water and added two spoons of sugar. At 9:30 am, Najmun fixed a teat on a medicine bottle and added two more spoons of sugar to the milk, and fed Rahim (3 months old), after which he fell asleep. Najmun removed the teat and kept it on the wooden shelf above the stove, and the bottle, which had a little bit of milk remaining, she covered with a glass. Two women from next door came and started talking with the mother. One of the two women combed her hair and looked for lice. The room was very dirty with many scraps of paper and onion peelings near the stove.

Further observation showed that bottle feeding may have started interfering with breastfeeding.

> At 10:45 am, Rahim woke up and Najmun sat on the bed with him on her lap and started to breastfeed. Rahim sucked one or two times and started crying loudly. Najmun again put him to her breast, but he kept crying. At 10:55 am Najmun put him to the other breast. Rahim sucked 2 or 3 times and continued

> crying. Najmun removed him from her breast and started shaking him, but he did not stop crying. Najmun said Rahim always cried, so they had brought a talisman (*tabiz)* from the ayurvedic physician (*kabiraj).* She tried to breastfeed him again, and after a few sucks, he went off to sleep. When he woke up after a few minutes, she bathed him outside in a bowl of water which she had previously left to warm in the sun. At 12:05 p.m., she tried to breastfeed again, but gave up 5 minutes later, as he refused to suckle. She laid him back on her legs while shaking him. Najmun asked a neighbour who had come in, to put the saucepan containing milk on the stove to warm. When Rahim started crying again, the neighbour picked him up and put the bottle in his mouth. The baby went back to sleep while drinking. The neighbour took out the bottle from Rahim's mouth when he finished, put him in his mother's lap and went out. Najmun laid Rahim on the bed and wiped his mouth. The bottle was left uncovered on the bed.

Addition of other milk soon leads to addition of gruels or solids. Next day, a gruel was prepared for the baby.

> Najmun had her meal earlier but the utensils were lying around and the cooking area was dirty. Like she had done the day before, she mixed 125 ml of milk, with 125 ml of water, but then added 2 tablespoons of rice powder (parboiled rice which she had ground before), and 1 teaspoon of sugar. While cooking this *milk-suji*, it became so thick that she had to add water and mix it again with the *suji*. Meanwhile Rahim had fallen asleep, and the neighbour laid him down beside his father on the bed. Najmun removed the *suji* from the stove, and left the saucepan uncovered. She rinsed the bottle with water, put some *suji* into a glass first and then into the bottle, filling only half the bottle (about 62 ml). She fixed the teat on the bottle and put it in a glass of water to cool. Seeing the BC, Rahim's father went and sat in his mother's house next door, where Najmun took him his lunch. At 3:00 pm Rahim woke up and was playful, moving his legs and hands. Najmun took out the bottle from the glass of water, felt it to check if had cooled down, and then put it in the baby's mouth. Rahim's father went out with his rickshaw. Rahim slept while having the milk *suji*, and Najmun laid down beside him, fanning him. She left the bottle uncovered when he had finished. At 3:30 p.m. Rahim woke up crying.

Najmun added some suji in the bottle, put it in Rahim's mouth, and propping the bottle with a pillow, moved away. A neighbour came and stood outside the door. The baby was turned on his side and still trying to suck the bottle. Najmun told the neighbour, *"See? after giving suji, the baby cannot suck easily. He used to drink fast before (dekhaychayn, suji dawatay baccha beshi tanay khatay paray na - agay gop gop koray khayto)"*. Rahim finished the milk *suji* and started crying again. This time Najmun took him on her lap and rocked him till he quietened down. He burped, brought up some *suji*, which she wiped with her hand. The bottle was again lying uncovered on the bed. While trying to lay him down, the bottle dropped from her hand. Najmun picked it up, rinsed it with water from a jug. removed the teat, and turned it upside down. Rahim went back to asleep, and Najmun continued to fan him.

10.1.6 Baby care and interaction

Observations in the control and intervention areas showed that during the day, babies, apart from being fed by the mothers, were carried around outside the house and to other houses. They were cared for by family members, older siblings, neighbours and their children. Caressing, rocking the baby while crying, or to put him/ her to sleep, was more often done by the other family members, even neighbours, than the mothers who would breastfeed the babies and then get back to housework. However, more caressing and talking was seen in the intervention mothers, probably because it was encouraged by the PCs. Only one of the eleven control mothers openly scolded her baby, not breastfeeding her two-month old baby long enough and ignoring her when she wanted more.

10:45 am: Nahid now put the baby on the left breast to feed her. The baby again took only the nipple in her mouth and made the same "tutt tutt" sound while feeding, so Nahid pressed the head of the baby against her breast. Baby suckled fast and some breast milk could be seen dripping from the sides of her mouth, but 2 minutes later, Nahid removed her from the breast. She fixed her eyeliner *(kajol)*, and gave a black dot *(kajol teep)* underneath the baby's foot (to avoid the evil eye). When Nahid brought the baby in front, and put on her panties, the baby tried to breastfeed again. But her mother said, *"how much more milk will you drink? (aar koto doodh khaba?)"*, and putting on her panty, she laid her on the floor, which made her cry. Nahid did not bother. Because the baby started crying again, she picked her up, scolded her *saying "dog's baby, I'm giving --- (kutar baccha, dicchi --)"* and laid down with her to breastfeed.

10.1.7 Hygiene aspects - mother and house

Spitting on the breast before starting breastfeeding, was seen in two of the control and one of the intervention mothers. This was to avoid the bad winds (*batash)*, or evil eye if mother had gone out of the house, or the baby was seen by outsiders. Other unhygienic aspects were noted in the intervention mothers. Three mothers were observed to wipe babies bottom with soiled diapers, and then go on to breastfeeding without washing hands. One mother encouraged her baby pass urine while standing near the stove (making a hissing sound), another went and emptied the contents of a potty at the washing area, although there was a toilet nearby. Babies were often carried around, outside the house, by older siblings or neighbour's children. In two cases, babies were seen to be licking/sucking these children's cheeks. These unhygienic practices might facilitate transmission of pathogens.

The findings so far have shown that mistaken beliefs about breastfeeding in the first few days after delivery could be overcome by the PCs and that mothers needed help with breastfeeding technique. Other factors, social, psychological, and sometimes physical, commonly affected breastfeeding, among which attitude of the mother herself towards exclusive breastfeeding was very important. Multiple baby-carers, poor complementary feeding and unhygienic practices were observed, which may be associated with morbidity in both partially and exclusively breastfed infants.

10.1.8 Comparisons between observations and monthly interview data

Breastfeeding frequency during the 4-hour observation periods was compared with the frequency reported in the nearest monthly interview. Although the timing of the interview and observation could have differed by 1-2 weeks, the number of breastfeeds were similar (± 1 breastfeed), giving validity to mothers' reports. Feeding status was also consistent by observation and interview.

10.2 Opinions of the mothers about peer counsellor's role and the intervention

Although quantitative data obtained from the monthly interviews showed the impact of PCs on breastfeeding practices, it was important to know what mothers themselves thought about the PC and about the intervention (services). This question was thus purposely asked in the individual semi-structured interviews and in focus group discussions.

10.2.1 Individual interviews with intervention mothers at the end of 5 months

As Table 10 shows, the majority of mothers (95%) liked the PC visits and felt benefited by them. Only 5% of mothers said they had mixed feelings about the PC visits, and were partially benefited. These were mothers who could not breastfeed exclusively, or did not receive PCs visits regularly because they had gone to their villages/parent's homes for varying periods.

Eighty percent of the mothers who reported being benefited by PC visits, said it was because they had learnt about the importance of exclusive breastfeeding from them, and 74% said it was because PCs enabled them to practise it for 5 months.

The question "at which times were PC's visits most useful?" was answered in different ways by the mothers. Some gave one response, most gave two (after delivery and pregnancy), and some gave more than two responses, or said they were useful all through 5 months. For 91% of the mothers, the visits within a few days of delivery were the most important, 79% said it was the pregnancy visits, and 65% said all the visits were useful. Table 10 shows how the mothers thought they were benefited by the PCs. Some of the benefits shown in the table were also repeated later in the group discussions.

Whereas many of the mothers said that it was better if the PC was from their own neighbourhood, some said this did not matter, as long as they were adequately trained and sincere. The majority of mothers (97%) recommended that the PC programme should be continued in their area, and started in others.

Plate 17. Breastfeeding counsellor recording observations, while mother's relations pose for the camera

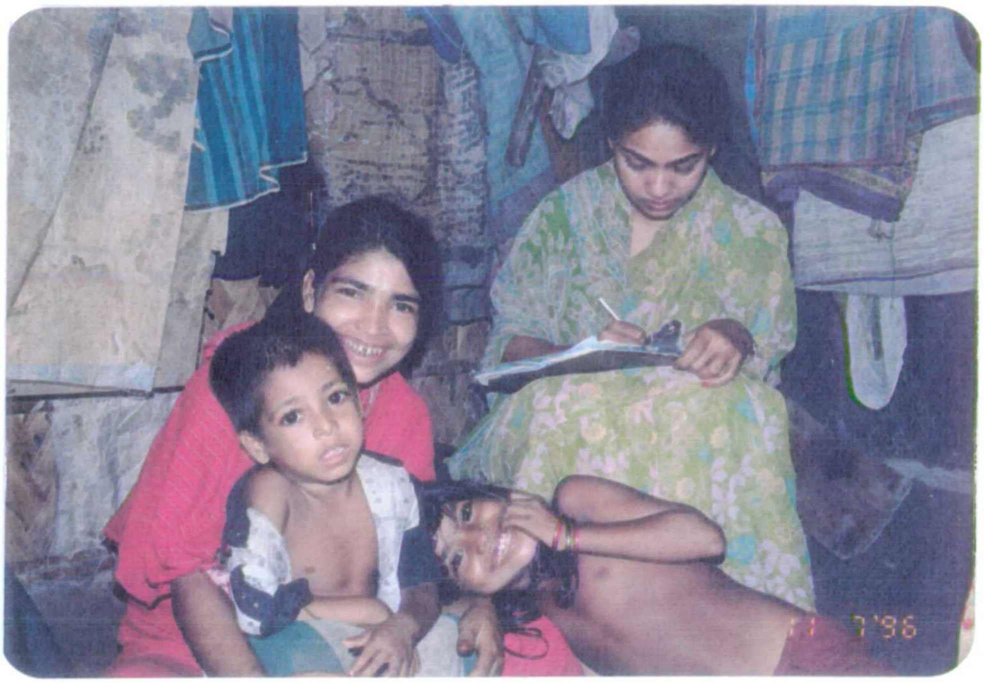

Plate 18. Mothers in a focus group discussion and breastfeeding counsellor on the left taking notes

Table 10. Responses of mothers regarding peer counsellors visits, benefits and suggestions. Values are number (%)

Feeling about PC visits	n = 285
liked it	270 (95)
mixed feelings	15 (5)
Benefited by PC visits	270 (95)
partially benefited	15 (5)
Benefited because #	n= 270
learnt about care for baby	84 (31)
about importance of EBF	217 (80)
how to hold and BF baby	168 (62)
could practise EBF for 5 months	199 (74)
knowledge about BF increased	145 (54)
baby remained well	107 (40)
no contraceptive was needed	105 (40)
Was PC available when called [a]	n= 270
yes	145 (51)
did not need to call	125 (44)
Visits were useful #	n=285
during pregnancy	230 (81)
after delivery	260 (91)
when baby was sick	122 (43)
at all times (pregnancy till now)	184 (65)
Better to have a community person [a]	265/278 (95)
Recommend the PC programme	n=285 276 (97)

\# may be multiple responses
[a] information missing for some mothers

10.2.2 Extracts from focus group discussions

All the mothers in the focus group discussions, except one, said they had benefited by having the PCs, not only because they had increased their knowledge about exclusive breastfeeding and its benefits, but also because they had helped and supported them to practise it for varying periods.

When asked if they had known about exclusive breastfeeding from before, and if yes, could they have practised it on their own (without PC), 4 out of 6 mothers in one group, and 5 out of 6 in another, said they did not know exactly what exclusive breastfeeding meant before the PC explained. They said,

> *"we thought that shudhu matro buker doodh meant that we could also give water with breast milk".*

A mother said she had heard from a television programme that colostrum should be fed to the baby and that nothing else like honey, sugar water etc. should be given. She had also heard about exclusive breastfeeding for 5 months, but without her PC, would not have been able to practise it for so long. All mothers who had exclusively breastfed, agreed when she said this, saying

> *"we could breastfeed exclusively from beginning (birth) until now (5 months), only because of the PC (PC'r jonno e tokhon (jonmo) thekay ayee porjonto baccha kay shudhu matro buker doodhay rakhtay paraychi."*

The opinion of the second group of mothers was also similar,

> *"probably it would not have been possible - the PCs have helped us at different times, with different problems. That's why we could breastfeed our babies exclusively" (monay hoy shombhob hoito na. Ora bibhinno shomoy, bibhino oshobidhai shajjo koraychay, aye jonno amra bachader kay shudho matro buker doodhay rakhtay payraychi).*

Mothers could continue exclusive breastfeeding because while their PC encouraged them for this practice, she constantly discouraged complementary foods at this time. A mother said,

> *I also wanted to give rice gruel to the baby before 5 months, but did not because the PC discouraged it".*

To determine if PC visits at any particular stage were more useful, and to assess if fewer visits could be planned, mothers were asked which visits had been most useful to them.

> *"after delivery, because she helped me put the baby properly to the breast, but pregnancy visits were also important - they gave me confidence" (shahosh payechi).*

PCs had influenced working mothers too. Some mothers who were planning to resume work, had delayed it. In one of the discussion groups, none of the mothers was employed, although three would have to start later on. They had not resumed work because their PC had explained the importance of younger babies to be exclusively breastfed. A mother who planned to resume work soon, said she had learnt from the PC about how to express breastmilk at work, how to feed it after coming home, that it stays well for about 8 hours, and about breastfeeding more at night. Previously she had thought that milk accumulated in the breast cannot be fed to the baby, so has to be thrown away.

As a result of the intervention, mothers who had failed to breastfeed before, reported they could breastfeed their babies this time.

> *Jamila said, "this time I am able to breastfeed the baby (4-month old Bijli). When I breastfeed from one side, milk drips from the other breast and the milk is also thick. Last time I had a lump in the breast, but not this time (ayee bar ami baccha kay buker dudh deetay parchi. ek bukay khai aar ek bukay doodh poray, ebong doodh o khoob ghono. agay amar bukay jai chaka cheelo, shayta ekhon nai) ".*

Explanations for frequent consultations and diarrhoea

Most of the benefits mentioned in individual interviews, were repeated by the mothers in the group discussions. Some explanations were obtained for the babies who were taken for frequent consultations, or had diarrhoea, despite being exclusively breastfed.

In one group, 4 out of 5 mothers said, "babies remained well".

> *One mother said, "my baby had only breastmilk, but was often sick" (amar baccha shudhoo matro buker doodh khaye o oshustho hoito).*

To which another mother who knew her, responded, *"for any little thing which happens to your baby, you go to the doctor"*

(apnar bacchar ektu kichu hoilay, apni daktar kachay jaan).

[At the end of the group discussion, the anxious mother was reassured when her baby's growth card was shown and explained that her baby was growing well (almost same as the NCHS median) in spite of these minor illnesses].

One of the other mothers said her baby had frequent diarrhoea, but she could not say why (BC and interviewers had reported her house was very dirty). Yet she was happy because she always could consult with the PC *(oshuk bishukay PC kay shob shomai kacchay pawa tay bhorosha paito).* She was not worried at any time.

Another mother said her baby had diarrhoea once. She had discovered later that her elder daughter was occasionally giving the baby some water from a salt shaker.

Other benefits

Mothers said they had learnt something new about contraceptive methods, that a contraceptive was not needed in the first 5 months if breastfed exclusively *(shudhoo bukayr doodh khawalay jai onno kono baybostha neetay hoyna).* All the mothers present who had exclusively breastfed had also practised the LAM and found it very convenient not having to worry about another contraceptive when the babies were so young. When asked when they would start another contraceptive, all the mothers answered they would do so after getting their periods. (PI and BC emphasised the importance of starting another method after commencing complementary foods).

They had also learnt, *that the first milk which comes from the breast is thin, and that a baby should be fed from one breast during one feed when young, so s/he could get the thick milk which is at the back (prothom doodh panir moto patla hoy, ayee jonno baccha kay onek khon porjonto ek buk thakay khawano uchit, taholay shay peechoner ghonno dudh pabay)".*

Some said that *"no prelacteals should be given. If sweet things were given, the baby would not suckle breastmilk and would fall sick (mishti jeenesh deelay baccha doodh tanbay na aar oshuk hobay)".*

Another said *'I learnt that more suckling by the baby produces more milk' (ghonno ghonno doodh tanailay, doodh baray).*

Some misconceptions had been cleared by the PC. One mother said,

> *"I thought before that babies should be breastfed when they cried for it, or after waking up from sleep. Now I know that babies should be fed within 2-3 hours, and if necessary to wake them up".*

A question was asked to assess whether mothers thought 5 months was the right duration for exclusive breastfeeding breastfeeding, or whether it should be less, or more. None of the mothers who were exclusively breastfeeding for the 5th month, had any problems in the earlier months, but thought that 5 months was probably the maximum for this purpose. One mother whose baby had recently completed five months, but had not started complementary foods, said,

> *"now that the baby is getting older, he wants to feed more, cries more - it seems something else is needed now - before he used to eat and sleep (ekhon baccha boro hochhay, beshi beshi khatay chai, kanna kati beshi koray - monay hoy aar kichu proyojon - agay khayto aar ghumaito--)".*

Since there was interest in knowing if anyone else, such as *dais,* who were community-based, could do the PC's job if trained, mothers were asked their opinion about this. They did not agree, saying that even if *dais* were taught, they would not be able to do it, because they do not want to learn anything new. And also because everyone is not delivered by professional dais - mostly by relatives, so it would not be useful.

In summary, the majority of the mothers' opinions were that they had benefited from the PC's visits, and that the visits soon after delivery, and during pregnancy were the most useful. Those who had breastfed exclusively for 5 months, said it would have been impossible without the PCs. Most mothers said their babies had remained well, many mentioned that they had learnt new things about breastfeeding, particularly about the LAM which many had practised, and they felt that all mothers should have PCs to help them.

10.3 Opinions of the peer counsellors about their work and the intervention

Along with obtaining mothers' opinions about the intervention, it was also essential to determine what the PCs themselves thought about their work, and so they were similarly asked for their views towards the end of the project. Discussions were held with the PCs (in two groups, with their BC) after the completion of the study to obtain their opinions about their work and about the intervention. All the PCs, except two (one pregnant and another who had started another job), attended the meeting. With each group, the discussions lasted for about two hours. Certain questions were asked first to get specific answers from everyone, followed by requests for additional comments and suggestions. The specific issues were: What the PCs thought about their work, whether it brought them respect, time required for the work, whether they could work part time and if it was worthwhile to work as a PC, both with and without remuneration, and for how long. They were also asked their opinion about the number of mothers who could be handled efficiently at one time, about the optimum coverage area and number of visits required, and what to do if a PC had to be replaced.

What the PCs thought about their work

All the PCs present unanimously said that they had liked and enjoyed their work. When asked "why" and "what was nice about it", the following answers were received.

"The work produces satisfaction", "mothers listen to our suggestions", "mothers respect us", "mothers come and call us for consultation about other matters too, like baby's or children's illness and various other problems", "we feel proud to do this

work", "by being able to increase mother's confidence in breastfeeding, our confidence has also increased". "this training (as a peer counsellor) has been good for us, our families and also we think, for our country".

Respect from community members

Where they had not been familiar with many families before the project, following the intervention, the PCs said, *"all the families living in our area now know about our work and respect us"*. Those who were already known and respected as teachers, said *"our respect has increased further as a result of this work"*. Many mothers called them 'Doctor apa' (since they worked with doctors) - a token of great respect.

Time required for the work

PCs in one group said that *"the time and input required was variable"*, and the other group said that they *"had to visit mothers more often than what had been suggested"*, otherwise they would not have been able to convince mothers to continue exclusive breastfeeding until 5 months. So they actually had to give much more effort than they had thought initially. They explained, *"Some mothers need less time for counselling, whereas some have to be explained again and again - and of course it is more difficult with those who don't want to listen or to understand"*.

Work as part time

All those who continued to work part time from the beginning of the study (7), or started later on (2), said there was no problem in carrying out PC responsibilities in addition to their other jobs. *"If responsibility is taken, everything is possible", "if it is my responsibility, I am always concerned and thinking about those babies (nijer daito holay, shob shomoy bacchar chinta thakay ---)"*.

Future of a PC

Some said that it would be worthwhile life-long, whereas some said that an honorarium would be a factor in deciding this issue, because then they would have to prioritise accordingly. (Some admitted that when the honorarium stopped at the end of the study, they were not actively going out to counsel mothers as before, but counselled those who came to their houses, or requested them to visit).

Number of mothers who can be handled efficiently at one time

All the PCs agreed that at different stages (pregnancy, immediately after delivery, from 1- 5 months), the maximum number of mothers they could handle comfortably and efficiently, was 20-25. If mothers exceeded this number, they would not be able to give enough time to each mother. Besides, they often had to wait for mothers to finish their tasks, or mothers would like to discuss other problems with them, so they could not just talk about infant feeding and run off. All this took additional time than planned for.

Coverage area

The PCs' consensus was that it was easier for them to visit mothers who lived within comfortable walking distance (although their honorarium was meant to cover rickshaw fare), and that if the houses were too spread out, or far off, much time was wasted in walking to and fro. Besides, there was also less likelihood of the baby's family members coming and calling them. Some said that if the mothers lived close by, they could visit them at night as well. This was especially important if husbands were not available for counselling during the day.

Optimum number of visits

Counselling visits in pregnancy were considered very important to sensitise the mother and family members about exclusive breastfeeding and its benefits and to explain the disadvantages of prelacteal and postlacteal foods. At least 2-3 visits were essential at this stage. But the most crucial time was said to be the visit immediately after delivery, for discouraging other fluids/other milk, and for correcting position and attachment. Some said that daily visits for the first 3-5 days or till the "milk came down" was essential, whereas few thought that 2 visits would be the minimum required. Although it had been expected that the number of visits required would decrease after the first 2 months, when mothers had mastered exclusive breastfeeding, many of the PCs said, *"a lot of mothers can easily practise exclusive breastfeeding for the first two months, but are very keen to start additional milk/ gruel after this time. So the number of visits cannot really be decreased"*. A visit after 7-10 days was the minimum, but often more were required. It was not necessary to give full counselling sessions each time, but just to visit the mother so that she felt her PC cared for her.

If a PC has to be replaced

If this was required, either for the PC's own reasons, or by the administrators of the project, if she was ineffective, it would be acceptable. The conditions for replacement should be made clear at the onset of the training, as in this project, so that there were no hard feelings later on. The PCs suggested to train a few extra PCs so that they could be called upon if and when required, also if someone had to be replaced. The other suggestion was to do what had been done in this project; one PC covered the extra area which was her colleague's until another woman could be identified and trained up as a PC.

Other comments

In spite of giving them maximum independence/freedom regarding counselling the mothers in their clusters, all the PCs felt that if the BCs had not been available for referrals/consultation, they would not have felt so confident. So it was extremely important that if they continued as PCs, even without an honorarium, they should be linked to a BC.

Apart from infant feeding, many other demands were made on a PC, including, suggesting a contraceptive method (after periods started), to act as mediators in fights between husband and wife, for advice when mother or baby fell sick, and to ask about immunisation. So they had to be quite resourceful in general.

When asked why in spite of their intervention, many babies fell ill in their clusters, as in the control clusters, the PCs were quick to reply, *"yes, that may be so. Although* *exclusively breastfed babies may have some illness, it is mild and not as severe, as those who are partially or non-breastfed. Also they need less medicines, so they spend less on treatment".*

PCs added they had faced problems when mothers delivered in clinics, and were advised other milk - then they could not convert those mothers to exclusive breastfeeding. Another problem was that when a mother moved away from her area/cluster, and was assigned another PC, she still wanted her previous PC to go and visit and counsel her, which required extra time.

Will you continue this work without the honorarium? If yes, for how long?

There were mixed responses to this question. Some said,

"we have become used to going out of our houses every day and like our work, so we will continue, especially if we are called".

Others said *" without money, we will not be able to continue as before - but we could counsel those who live close by or are well known to us".*

"It will be difficult to work in the same way if the honorarium is omitted",

"it will not be possible if the BC apas do not support us for referrals and consultations".

Suggestions

Occasional monitoring by the BCs was considered to be a good idea. The PCs however felt that weighing and measuring the babies and mothers was an important aspect for assuring mothers that their babies were growing well while exclusively breastfed. They reported that mothers were asking them why the programme had been stopped. The PCs suggested that counselling mothers and measuring babies should be continued, even if it required to be based at a family planning and immunisation satellite clinic. They added that if they were certified as "peer counsellors", it would help them in their future work. Certificates were awarded to them at a simple ceremony on completion of the project (Plate 19).

Plate 19. Peer counsellors after receiving certificates at the end of the project, with breastfeeding counsellors and principal investigator

Discussion

There have been numerous ethnographic studies on infant feeding, focusing mainly on reasons for mother's choices regarding breastfeeding, bottle feeding and weaning [Ryan and Gussler, 1985; Castle,1988; O'Gara, 1989]. But no reports are available about breastfeeding promotion interventions which have collected qualitative data about the intervention. The findings obtained during this study thus provide valuable information.

The methods used for this chapter initially set out to validate some of the quantitative data, and to obtain information on aspects that could not be obtained from the monthly structured interviews. In the process of obtaining this information, and during analysis, new insight was provided about breastfeeding in this community, and about the usefulness of the intervention itself. There was a high degree of congruency regarding data obtained by multiple methods during the study. Observations and comments of mothers, both control and intervention, supported the quantitative data and also gave some indication of the PCs' activities. Information and opinions obtained in the individual interviews were repeated by mothers during the focus group discussions, but the former gave an insight into individual PC's sincerity, and helped in modifying selection criteria for future programmes (to be discussed in chapter 11).

Observations in the homes for long hours was a rather difficult and demanding procedure for the BCs because, as stated earlier, it is a complex process of interweaving the activities of listening, learning and asking [Lofland, 1971]. The BCs tried to keep the asking to a minimum, because they wanted to be more observer than interviewer, and to allow the observed families to relax and volunteer information on their own. That they succeeded in doing so, could be judged from all the information assimilated. There was concern that mothers might be more conscious about feeding frequencies and practices in the presence of an observer [Hammersley and Atkinson, 1995], but observations on the second day, when they were more used to the observer in their homes, were similar to those on the first day.

Observations of mothers and infants served to demonstrate and confirm how the control and intervention mothers differed in their practices regarding breastfeeding. The most noticeable, apart from the fact that mothers in the intervention group were exclusively breastfeeding, was that most of the control mothers had problems with position and attachment of the baby during breastfeeding. This, together with the short duration of breastfeeds, incomplete emptying, and not getting the rich hindmilk, resulted in babies crying, with brief periods of sleep, which could all have ultimately led to mothers' perception of not having enough breastmilk and starting complementary foods. Research has shown that clearing the breast (adequate drainage of breastmilk), is the stimulus for the production of a good milk supply [Carvalho, 1983: Salariya, 1978]. Although rates of milk synthesis vary between breasts and between interfeed intervals, it is positively related to the degree of milk removal [Daly *et al.*, 1993]. Additionally, if milk removal is inadequate, an inhibitory factor for milk production increases in the breasts, which reduces further production [Wilde *et al.*, 1995].

A problem which only the intervention mothers complained of during the observation periods, and mentioned to the BCs, was overproduction of breastmilk. Although they had been shown how to overcome this problem by the PCs, they might have benefited from more help. The PCs probably thought that insufficient milk was what they needed to spend time upon, not excess milk.

Breastfeeding frequencies reported in monthly interviews by mothers in both control and intervention groups, were similar to those observed (±1 breastfeed), indicating no systemic bias. Long breastfeeding gaps were also observed, in addition to short suckling time, and provided an explanation for mothers resuming menses despite exclusive and predominant breastfeeding.

Poor hygiene practices could be responsible for diarrhoeal morbidity even if babies were exclusively breastfed. In Brazil, in an intervention to improve weaning food hygiene practices, most mothers did not remember to wash hands after changing baby's diapers, despite having heard these messages [Monte, 1992]. Hygiene practices were poor in both the groups in the Dhaka study. PCs were supposed to give mothers some basic instructions regarding cleanliness, but seemed not to have spent much time on this. This could explain similar prevalence of morbidity in both the groups. Only one control mother was observed while she prepared complementary foods for her baby. Others prepared them either before, or after the BC's visit. If the process followed by her is common for other mothers, it shows that more attention is required for promoting appropriate complementary feeding practices, in addition to promotion of exclusive breastfeeding.

Maternal care is important for child growth in poor environments, which has been demonstrated in studies of positive deviance [Zeitlin, 1991]. In this community, a noticeable aspect was that mothers, whether control or intervention, were busy with household chores and apart from breastfeeding the babies, did not spend much time talking or playing with them. More caressing and talking to babies during breastfeeding was observed in the intervention group, possibly because of earlier contact, and encouragement by the PCs. Also observed was that family members, neighbours and siblings seemed responsible for taking care of the babies most of the time, and although they were quite affectionate, also had more chances to introduce other fluids or foods.

It was interesting that the discussions held with two groups of exclusively breastfeeding mothers, provided almost the same information about the benefits they received from the PCs, which were again similar to what had been heard in the individual interviews. Although only 5% of the mothers had mixed feelings regarding the PCs, ideally, the reasons for these should have been investigated soon after the interview. Some mothers had indicated that since they were partially breastfeeding, they did not need the PC as much as the other mothers, and some commented that the PC had come frequently before, but later did not give them sufficient time. Further analysis demonstrated that the PC whose mothers had made the above statements, had the maximum number of mothers and referrals, as well as having among the lowest number of exclusively breastfed mothers at 5 months. This raises various questions, regarding selection criteria for PCs, and the number of mothers allocated to them, issues which will be discussed in chapter 11.

Group discussions with a few mothers who had breastfed partially, provided insight about some of the reasons why they could not continue exclusive breastfeeding. Two of these reasons, namely, anxiety associated with lack of financial support and disinterest by the mothers, were similar to those obtained from a previous study in Dhaka [Haider *et al.*, 1997]. It has been suggested that motivation, attitudes and support are important influencing factors [Losch *et al.*, 1995].

In conclusion, even though the qualitative data collected were limited, this provided validity to the study, and presented a picture from the mothers' and providers' perspectives. As pointed out in chapter 4, mothers living in this urban community had similar socio-economic and feeding practices to those in other parts of Bangladesh. So if the PCs could produce such major changes in breastfeeding practices in this community, they could do so in other areas of Bangladesh as well. Other implications about replication and sustainability of the intervention will be discussed in chapter 11.

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CHAPTER 11: CONCLUSIONS AND RECOMMENDATIONS

The results of each objective of the study have been presented, summarised and discussed earlier in chapters 5-10. This final chapter presents an overview of the results relating to different features of the intervention, and addresses aspects that have not been discussed before. The chapter is divided into four sections. The first section summarises what the intervention achieved and the key points for this achievement. Also included in this section are suggestions for replicating this intervention, options for sustainability, and a discussion of the need for cost evaluations of peer counsellor programmes. The second section explains the methodological limitations of research in this area, and the third, the operational difficulties experienced. The fourth section concludes with recommendations for policy makers and for future research.

11.1 Achievements of the intervention and related aspects

The intervention proved to be highly successful in achieving exclusive breastfeeding for five months. This achievement was brought about by a change from predominant to exclusive breastfeeding, and a change from partial to exclusive breastfeeding (the prevalence of non-breastfed infants in Bangladesh is extremely low in the early months). The feeding practices of the intervention and control mothers started showing significant differences right after the birth of the babies, as mothers in the intervention group initiated breastfeeding earlier, and fed colostrum as the first food, with fewer giving prelacteals and postlacteals. The proportion of babies breastfeeding exclusively was significantly higher in the intervention group all through the study period, and at the end of five months, 70% of mothers were breastfeeding exclusively versus only 6% in the control area. Comparing results from breastfeeding promotion programmes in other countries, this study achieved the largest change in exclusive breastfeeding rates. The maximum change in exclusive breastfeeding rates achieved before this study, was 46% (46% vs. none) at 6 months, in Chile. There, however, community promoters visited mothers at home during pregnancy and after delivery in the hospital, but subsequent breastfeeding support was provided by a midwife and physician, when mothers attended a health centre for monthly follow-up [Alvarado *et* *al.,* 1996]. A 35% change (67% vs. 32%) also achieved in Chile, was brought about after a breastfeeding promotion programme in a maternal and child health facility [Valdes *et al.,* 1995]. In both these studies, mothers attended the health centres monthly, where all the staff were involved, supported breastfeeding and provided consistent information. In the Dhaka study, mothers were visited at the PC's initiative at least twice a month, but often received conflicting advice from health staff. If this had not occurred, the rates of exclusive breastfeeding achieved might have been even higher.

The likely key factors for the success of this intervention were the selection, training and above all, the sincerity of the PCs. Certain basic characteristics were looked for during their selection. These required the PCs to have breastfed their own children, be interested in helping mothers breastfeed their babies, to be a resident of the area for a number of years, and to have attended school for a minimum of 4 years. She could have a part-time job, provided it would not prevent her from visiting mothers as and when required. For future interventions, modification of certain criteria are suggested, namely;

i) increase the minimum educational requirement to 8 years, because while PCs with 4 years of schooling were able to repeat messages, they could not respond to the mothers' questions to their satisfaction. This explanation was given by some mothers, as their reason for not being convinced by a PC.

ii) add the proviso that part-time jobs would be acceptable, provided they are respectable, such as teaching and stitching clothes.

From the PCs' perspective, the crucial factors for their success were their training, the option for referral to the BCs, the manageable number of mothers allocated to each, and the limited size of the area they were covering.

Steps for replication of the intervention

Experience gained from this intervention suggests that the steps required for replication of the intervention are to:

i) Assess the prevalence of exclusive breastfeeding in the community, and the need for a similar intervention.

ii) Determine the acceptability of the PC concept.

iii) Select women for PCs according to the criteria mentioned previously. As assessment of sincerity can be very subjective, it would be important to have people experienced in selection and who are good judges of character, on the interview board.

iv) Train the PCs and BCs (or staff who will be engaged in these activities)

v) Adapt the information provided in the counselling sessions, so that it is relevant and appropriate both culturally and for the present time.

vi) Arrange a referral and ongoing monitoring system to be provided by the BCs.

vii) Evaluate at intervals the proportion of mothers breastfeeding exclusively for 4, 5, or 6 months, according to national guidelines (5 months for Bangladesh). This information could be obtained during a health and population related local or national survey.

Suggestions for sustainabilty

The first point which favours the sustainability of a PC intervention is, that the PCs enjoyed their work, as it brought them respect from the community, and increased their own self-esteem.

But the PCs in this intervention were given an honorarium. Although the amount was very small ($22/month), it gave them an incentive, and probably helped in getting their families' approval for this type of work which required house-to-house visiting. The importance of the honorarium was demonstrated after completion of the project. The PCs were encouraged to continue counselling mothers in their clusters unpaid, as this was a form of social and humanitarian work. The PCs agreed to this suggestion and reason, adding that their work would ultimately be rewarded by God. Their activities were loosely monitored for 6 months after the honorarium was withdrawn. Within 2 months, among 18 PCs, 2 (11%) had found other jobs, 5 (28%) were continuing counselling, either with groups of mothers in their own (PCs) homes, or visiting individual houses, but the frequency and duration of their visits was much shorter, as reported by the mothers. The remaining 11 (61%) PCs had stopped counselling altogether.

With the purpose of sustainability in mind, the project had hoped to get some estimate of cost-effectiveness from the amount of money saved if morbidity was decreased in the intervention area, and if attendance at health facilities was lower. This was not successful, however, as mothers in both groups would frequently visit doctors and health facilities even for trivial symptoms. Moreover, encouragement given by the PCs to the intervention group to attend ICDDR,B or a children's hospital in order to avoid others who might undermine breastfeeding, could have resulted in different prescribing practices and hence treatment costs. Any calculations of cost-effectiveness would also need to include savings on contraceptives as a result of using the LAM, data which this project had not planned to collect. This is an area which immediately requires further exploration.

For a PC programme to be effective and sustainable in Bangladesh, it needs to be linked with a primary health care facility, or a mother and child health and family planning programme. In other countries, where mothers deliver in hospitals, linkage with a maternity hospital should be considered. This would facilitate implementation of Step 10 for hospitals in the BFHI (foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic). A linkage with any of the above would be necessary firstly for financial support, secondly, for health personnel at these sites to be aware of the PCs activities and reinforce the messages which the PCs would be promoting, and thirdly as a base for the BCs.

Inclusion of PCs and BCs would mean employment of a new cadre of personnel for the programmes mentioned above. If this is not feasible, re-training and re-allocation of existing personnel for breastfeeding counselling would be another option. These personnel may be community health workers, trained for peer counselling, and nurses or dieticians trained as breastfeeding counsellors. For an average primary health care facility, mother and child health and family planning clinic, or hospital, at least two staff would be required to do the latter job. The number of PCs/community workers required would depend upon the number of mothers, and the coverage area.

As regards the health benefits of the intervention, one was that the intervention group infants were significantly heavier than the controls at each month. Even though both groups of infants had started at -1SD WHZ score at day 4, by the age of 5 months the mean WHZ score of the intervention group had increased by one standard deviation, indicating a highly significant effect in biological terms. There were no differences in the lengths of infants in the two groups, and no differences in morbidity apart from a lower trend for fever. Interestingly, PCs and mothers whose previous babies had been partially breastfed, said illness in exclusively breastfed babies was milder and of shorter duration. Reasons for increased weight gains could be less severe illness, a higher number of breastfeeds, and more importantly, the better quality of breastfeeding in the intervention group, as these infants were more likely to receive the rich hindmilk as they spent longer at one breast during a feed. Thin babies, surprisingly, were not a source of concern for either the mothers, who were often thin themselves, or the PCs. It is probable, however, that mothers of some of the thinner and smaller exclusively breastfed babies who were not gaining weight adequately, might have benefited if they had been shown the growth cards, either to increase breastfeeding, or to seek appropriate health care, especially if they suffered from repeated morbidity.

Feachem and Koblinsky [1984] made theoretical estimates of reductions in diarrhoea morbidity following breastfeeding promotion in countries with different feeding patterns. The population in the Dhaka study would fall into their group C, namely communities with "traditional" feeding patterns. Diarrhoea rates assumed for this group were 233 episodes per 100 children under 5 years old, per year. Following a breastfeeding promotion of high impact, they estimated a reduction of only 7% in diarrhoea morbidity. Such a small reduction would not be detected in the Dhaka study, because of lower diarrhoea prevalence rates and small sample size, but may have occurred. For respiratory infections, there was sufficient power to detect a difference, but they were not significant.

The prevalence of diarrhoea and respiratory infections in this trial were similar to those obtained in a national [Mitra *et al.*,1994], and a rural survey in Bangladesh [Zaman *et al.*, 1997]. Thus replication of this intervention in similar settings may not show significant differences in morbidity. Differences in diarrhoea prevalence may be seen in the urban slums, where there is increased morbidity and poorer water supply.

When the infants were ill, the PCs commonly referred, or accompanied mothers to a hospital. Although the PCs were not trained to deal with sick children, the majority of mothers consulted them first for any illness, and declared this as an extra benefit. Although there were three-fold more deaths in the control group (13 vs. 4), the total number of deaths in the study were too few to draw any firm conclusions. Of these, 12 deaths occurred within the first month of life (8 in control, 4 in intervention). Apart from the neonatal deaths, there were 5 deaths in the control group over the remaining months, and none in the intervention group. These differences may be explained by the timely referrals arranged by the PCs, both for the mothers during labour, and for the infant after birth. So the intervention may have been associated with a lower mortality rate either because of increased breastfeeding, as shown by others [Victora, *et al.*, 1987], or because of timely referrals by the PCs, or both.

In addition to being the first study in Bangladesh to promote and support exclusive breastfeeding in the community, it was also the first to promote the LAM. Compared to mothers in the control group, those in the intervention group resumed menses later, and as most were using the LAM, they initiated family planning earlier. The majority of mothers readily accepted and used the LAM, because they could avoid using other modern methods during this period. Many mothers said they considered the contraceptive effect of exclusive breastfeeding to be a major benefit for them, as have Turkish mothers. These findings confirm those of Kocturk [1988], that mother-centred advantages, such as the contraceptive effect of breastfeeding, may be more important motivators than infant-centred ones for women in less advantaged social conditions to continue exclusive breastfeeding. Although it was not possible to assess whether these practices would influence later contraceptive practices, it is hoped that once mothers have used an introductory family planning method, they would be likely to adopt other appropriate contraceptives after the period of exclusive breastfeeding. To what extent this will occur, cannot be answered now. But in Bangladesh, as in many developing countries, women can be pressured by husbands and elders to avoid contraceptive methods, or may themselves avoid them for possible harmful effects. Particularly for such women, a 5-6 month period of LAM can provide a period of adjustment to the idea of using a contraceptive, receive relevant family planning education, and possibly empower them to have some control over the timing of the next pregnancy [Kennedy *et al.*, 1993].

Although discussions about the intervention were mainly held with mothers, whenever men were found at home, they were asked for their impressions about the services. It was extremely encouraging to hear that the men were very satisfied with the information, attention and help that families had received from the PCs. One of them suggested that this type of programme should be provided nationally, to help all women and children. The intervention created a demand for peer counselling (as women requested PCs to visit), and also identified a need for good medical personnel in each community who would provide rational treatment and keep a record of the children's nutritional status.

Breastfeeding promotion programmes and cost evaluations

While breastfeeding promotion programmes have reported an impact on breastfeeding practices, the costs of such programmes have rarely been measured. The cost-effectiveness of promoting breastfeeding and preventing diarrhoea morbidity and mortality were calculated by Feachem [1986]. He estimated that for breastfeeding promotion activities costing $5 per mother-infant pair exposed, by reducing 0-59 months diarrhoea morbidity and mortality rates by 1% and 8%, the cost-effectiveness would be $45 per diarrhoea episode averted and $890 per diarrhoea death averted.

Researchers have looked at the cost-effectiveness of maternity hospitals promoting breastfeeding in Brazil, Honduras and Mexico compared to control hospitals in the same countries. In hospitals where formula had been eliminated previously, they reported that by investing $2 to $3 per birth on breastfeeding guidance and support, they could prevent diarrhoea cases and deaths for $3.50 to 6.75 per case, and $550 to 800 per death, and gain disability-adjusted life years (DALYs) for $12-19 respectively [Horton *et al.*, 1996].

For developing countries such as Bangladesh, where the majority of mothers deliver at home, evaluation of costs of community-based programmes is more relevant. These calculations would also need to take into account all the benefits (nutritional, developmental, morbidity, growth and contraceptive) that an infant and mother can receive from exclusive breastfeeding for 5 months. No researcher has as yet studied these costs in community-based breastfeeding promotion programmes.

11.2 Methodological difficulties

A number of methodological problems were noted regarding some aspects of feeding and morbidity data collection, which made it difficult for comparisons across studies.

i) Regarding collection of feeding data

a) *Definition of colostrum*: this was lacking in all the pre-Breastfeeding Campaign studies and most of those published later, as mentioned in Chapter 2, section 2.5. It was thus difficult to state whether or not feeding of colostrum within the first four days of life has increased over time.

b) *Classification of feeding status:* The easiest way to classify feeding status is by 24 hours recall (Method A), but this does not provide information about fluctuations that therefore used to capture a change in feeding practices during the preceding month. Most studies related to breastfeeding practices, rarely probe for such fluctuations in infant feeding. Even though classifications of feeding status using Method A or B were not significantly different, temporary shifts in feeding practices could affect morbidity.

Prior to the WHO definitions, there were many interpretations of the terms exclusive, predominant and partial breastfeeding. By using the WHO classification, it is possible to compare prevalences for exclusive and predominant breastfeeding practices world-wide. But "partial" breastfeeding covers a wide range, from one breastfeed/day, to all except one. Labbok and Krasovec [1990] suggested defining partial breastfeeding as "high", if more than 80% of feeds were breastfeeds, "medium", if 20-80% were breastfeeds, and "low", if less than 20% of feeds were breastfeeds. This classification also suggests the duration of breastfeeds to be recorded for further assessing the amount of breastmilk obtained in these categories, but this was not possible in this study, and would also be difficult for others.

ii) Regarding collection of morbidity data

a) *Frequency of data collection:* It is generally accepted that for morbidity prevalence to be reliable, data should be collected at least two times per week. This was not possible in the Dhaka project due to financial and time limitations. So data were collected for 7 days previous to each monthly interview. Not only was this amount of data insufficient for comparisons with other studies where data had been collected more frequently and longitudinally, the sample size and power calculations were not adequate to detect any differences in diarrhoea between the control and intervention groups.

b) Spontaneous versus probed responses: In general, there was good agreement between spontaneous and probed responses, and probing did not reveal the prevalence of additional symptoms except for cough. This often happened even though mothers may have reported the infant to be well in the previous 24 hours. This discordance indicates the need for ethnographic studies on mothers' perceptions regarding symptoms of respiratory illness in each community, to enable meaningful interpretations of such data.

c) *Diagnosis of illness:* In the absence of physicians/health facilities designated for treatment of illness specifically for the study infants, mothers consulted various types of healers. It was thus not possible to confirm diagnosis of diarrhoea, dysentery, upper and lower respiratory infections, as in the Peru study.

11.3 Operational difficulties

There were very few operational difficulties. Where difficulties were encountered, these concerned the PC and the family planning personnel.

i) Regarding PC related aspects

a) *PC performance:* The majority of the PCs did very well. But as the study progressed, it became clear that four of them were not quite appropriate for this type of work. The weakness of these particular PCs had become evident to some extent during the training period, and they had been given extra attention during the practical sessions and pre-testing of the intervention. A suitable replacement was found for one who had been working part time, but not for the other three PCs - as none was available who satisfied the selection criteria and was willing to take on the responsibilities. Despite their low performance scores, more than 60% of the mothers attended by these 3 PCs continued exclusive breastfeeding for five months. On the other hand, some of the PCs who did well during training and had high performance scores, did not subsequently achieve high exclusive breastfeeding rates among their mothers. This could be attributed to various factors, the notable ones being; more mothers in the group, larger area to cover, mothers more educated or having a higher socio-economic status than the PC, and more employed mothers. Some PCs had to face various kinds of family and financial problems, and their performance was seen to deteriorate during these periods.

b) *Variation in cluster size and number of mothers:* Clusters varied considerably in size, but because the study was designed to allocate 2 PCs to one FP worker area, no changes could be made. But size of clusters affected the number of mothers to be served. If a PC was responsible for twice the number of mothers than another PC, she could obviously not spend the same amount of time with each mother. The problem was amplified when the PC who had the maximum number of mothers, also worked part time. It was not surprising that she also made the maximum referrals to BCs.

ii) Conflict with FP personnel

Some of the LAM applicability criteria were not clear and caused conflict and confusion at various levels.

a) *regarding definition of menses:* The LAM guidelines state that bleeding before 56 days is not menses. But most family planning and health facility staff are not aware of this, so if a mother reports some spotting within this time, it is considered as menses and a contraceptive method, usually hormonal, is started. This happened in the control group for 2 of the 7 mothers who had started hormonal contraceptives in month 1, although menses could not have possibly started within 30 days. In the intervention group, two mothers were given the injectable contraceptive before they resumed menses. One mother mentioned that she was using exclusive breastfeeding as a contraceptive method when she went for the baby's immunisation, but was told by the doctor that exclusive breastfeeding was not reliable for preventing contraception. When six of the intervention mothers had been given the injectable contraceptive before 56 days, and others reported receiving conflicting recommendations for OC pills, an emergency meeting had to be held with the FP staff, and the LAM explained. It was apparent that the problem lay with the newly appointed physician, and the FP workers in the field, who were worried that not promoting contraceptives soon after delivery would decrease the contraceptive prevalence rate in their programme area, and would reflect negatively upon their performance. They were reassured by the administrative staff, that the main objective of the family planning programme was to decrease the number of births and increase child spacing, which could be achieved to some extent by supporting breastfeeding.

c) *Breastfeeding gaps*: Mothers who were exclusively breastfeeding had to be constantly reminded by the PCs that a gap between breastfeeds should not exceed more than 4 hours during the day, and 6 hours during the night for the LAM to be effective. This gap was calculated from the 24 hour feeding recall at each monthly visit, but it was recognised that 1 day's feeding pattern was not representative of mothers' usual feeding practices, and that there might have been more gaps, especially as the infants grew older. So, there was a possibility that more mothers than were applicable for the LAM, were recorded as such, but were actually at risk for pregnancy. The reverse had also occurred - mothers who had given complementary foods for a few days and then discontinued, were labelled as not being LAM applicable, while in fact they were. An extended LAM algorithm now allows mothers to continue using the method after 6 months of full breastfeeding, until infants are 9 months old, provided that at each feed they breastfeed before giving the complementary food [Cooney *et al.,* 1996]. To avoid confusion, individual countries will have to decide for how many months the LAM can be safely promoted and whether the criteria for applicability will be fully breastfeeding or high partial breastfeeding.

There were no practical difficulties regarding data collection. Only a few mothers (maximum 2-3) refused to allow their infants to be weighed, and their lengths to be measured at various visits, which was similar to many other studies in Bangladesh. Mothers specifically disliked length measurements on day 4, because pressure has to be applied to straighten the legs and keep them in contact with the footboard. Sometimes, when infants were ill, mothers refused to allow any measurements. Another reason for refusals was a myth which, the interviewers had to counter constantly, that "*babies do not grow if they are measured*".

11.4 Recommendations

Two sets of recommendations evolve from this study, one for policy makers, and the other for future research.

11.4.1 Recommendations for policy makers

There were three questions from UNICEF, the Ministry of Health and Family Welfare (Government of Bangladesh), and concerned agencies, which prompted the undertaking of this research.

First, how can mothers who deliver at home, be informed to improve breastfeeding practices?

Second, how can infants' growth be improved so that malnutrition rates can be decreased?

Third, how can the contraceptive effect of breastfeeding be promoted and utilised effectively?

This project has been able to demonstrate that utilisation of trained peer counsellors can answer some aspects of all these questions. Thus a recommendation for policy makers is that relevant programmes include peer counsellors to promote and support exclusive breastfeeding and LAM where:

1. mothers have deliveries at home
2. mothers deliver in hospitals, to facilitate implementation of Step 10
3. mothers are encouraged to use contraception.

The peer counsellors would need an honorarium for their services. The amount, however, would be much smaller than paying a health worker, and options for this provision have been discussed in the previous section. If decreasing child malnutrition, improving their survival, and decreasing fertility are urgent needs, it should be possible for government and non-government organisations to allocate part of their relevant health and family planning programme budget to achieve these goals. Despite a small budgetary requirement, the benefits from breastfeeding promotion and support are likely to be large.

Although there were only a small proportion of working women in this study, it was almost impossible for them to breastfeed exclusively. With rapid urbanisation in Bangladesh, increasingly more women will be joining the labour force. The promotion of exclusive breastfeeding and LAM should not be overlooked for this group of women. In addition to changes in maternity legislation, this will require employers' considerations for facilities to support breastfeeding at the workplace, by provision of a creche for babies or a room for expression and storage of breastmilk, and breastfeeding breaks.

11.4.2 Recommendations for future research

Future research includes further analysis from this study, analyses of data collected during follow-up of this study until infants were one year old, and new research. Individual topics for research are listed below under the appropriate headings.

A. Further analysis from this study

- Compare the growth patterns of exclusively breastfed low-birth-weight (<2500 g) and appropriate birth-weight infants in the first year of life, to see if and when they catch up with the latter.
- Compare the growth patterns of exclusively breastfed infants of mothers with low and adequate BMI.
- Compare the growth patterns of exclusively breastfed infants in the Dhaka study with those from other countries included in the WHO-BF data set.

B. Follow-up of mothers and infants until infants are one year old

- Determine if mothers who used the LAM continued contraceptives after 5 months, as opposed to those who used other methods.
- Compare complementary feeding practices of intervention and control mothers.
- Compare growth of intervention and control infants until one year of age.

C. New research

- Undertake in-depth ethnographic research to understand why mothers who have received breastfeeding counselling, fail to breastfeed exclusively for five months, so that steps can be taken to develop alternate strategies for their support.
- Replicate the PC programme in rural areas. One option would be to base the PCs at a satellite-clinic of a family planning programme, with limited home follow-ups and compare with individual home visits as in the Dhaka study. The other option would be to train and allocate some community nutrition workers for breastfeeding counselling.
- Calculate the cost-effectiveness of a PC programme.

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ANNEXES

ANNEX 1. GUIDELINES FOR PEER COUNSELLORS VISITS

During 8th month of pregnancy

- introduction with family members and explain own responsibilities
- enquire how mother is feeling - about her health and about the coming baby (empathise)
- past feeding history and /or intention about feeding - note any misconceptions, but clarify later (when giving messages)
- note previous problems if any (for focused help)
- among the family members, identify who are the decision makers for infant feeding, involve them in the discussion, give them importance so that ultimately they can support the mother and ensure exclusive breastfeeding
- find out how much mother has learnt from antenatal checks or family about breastfeeding
- explain benefits of breastfeeding
- make sure you explain to the mother (and influential family members) about the relevant information required at this stage

During 9th month of pregnancy

- enquire about mother's health
- check arrangements for delivery (home/ hospital)
- answer mothers' and families' questions regarding breastfeeding
- ensure that father receives the breast feeding information so that he can support the mother for breastfeeding
- remind family that they should call her (PC) as soon as possible after delivery so that she can help the mother and the baby.

After delivery

- congratulate mother and family members
- enquire how are mother and baby, especially how breastfeeding is going on
- try to note baby's mother, father, grandmother's reactions (regarding baby's sex)
- check positioning of the baby and the mother and attachment of the baby at the breast - correct only if necessary, and after taking permission
- discourage administration of any other food (honey, plain water, sugar water etc.) and explain how they may cause harm
- recommend that baby sleep with mother in the same bed and encourage frequent and demand breastfeeding day and night
- answer any questions about breastfeeding
- encourage mother to breastfeed exclusively for 5 months

10th-14th day

- empathise (for good progress as well as for problems)
- enquire about infant feeding status
- check position and attachment
- give practical help if needed
- thank family members for supporting mother
- encourage frequent and demand breastfeeding
- counselling messages -

  mothers' food - mother should try to eat more of the usual food and also rest more

  benefits if baby is EBF for 5 months, for baby, mother and family

  contraceptive effect -

Monthly visits

- empathise (for good progress as well as for problems)
- enquire about infant feeding status
- check position and attachment (first 3 months)
- give practical help if needed
- thank family members for supporting mother
- encourage frequent and demand breastfeeding
- answer family's queries, reassure accordingly
- counselling messages -

  mothers' food - mother should try to eat more of the usual food and also rest more

  benefits if baby is EBF for 5 months, for baby, mother and family

  contraceptive effect -
- identify problems which may require referral to BC

3-4 month visit

- congratulate mother for breastfeeding baby - good growth and activity
- remind about benefits of EBF and encourage it for 5 months
- remind/convince mother and family members that complementary foods are not required before 6 months and may be harmful

5 month visit

- first activity as above
- suggest initiation of complementary foods now but emphasise continuation of breastfeeding until baby is 2 years old.
- counselling to include messages about complementary foods [which foods and what ingredients, how to prepare, store, heat, feed how many times (and after breastfeeding), how to feed (to wash hands, use clean hands or clean spoon for feeding, and use clean water).

৮ মাসের গর্ভাবস্থায় মাকে যা বলবেন এবং করবেন –

১। প্রথমে মায়ের এবং তার পরিবারের সদস্যদের সাথে পরিচিত হবেন এবং আপনার কাজের দায়িত্ব বুঝিয়ে বলবেন।
২। মা'র স্বাস্থ্য এবং নতুন বাচ্চা সম্পর্কে ওনার মনের অবস্থা কি তা বুঝতে চেষ্টা করবেন।
(যদি কষ্ট থাকে তাহলে সহানুভূতি দেখাবেন)
৩। মা'র আগের, কোন বাচ্চা থাকলে সে বাচ্চাকে কি খাইয়েছেন, কিভাবে খাইয়েছেন এবং এই বাচ্চা হবার পর, তাকে কি খাওয়াবেন, তা জেনে নিবেন। মার যদি কোন ভুল ধারণা থাকে, সেটা মনে রাখবেন এবং শেষে যখন তথ্যগুলি বলবেন, তা ঠিক করে দিবেন।
৪। আগের বাচ্চার সময় মায়ের কোন সমস্যা ছিল কিনা তা লিখে রাখবেন যাতে করে পরবর্তী সময় এই সমস্যা প্রতিরোধ করতে পারেন।
৫। মা যেই পরিবারে থাকেন, সেই পরিবারের মধ্যে কে প্রধান বা কে এই বাচ্চার খাওয়ার ব্যাপারে পরামর্শ দিবেন, সেটা বুঝতে চেষ্টা করবেন এবং তাদেরকে সহ সবাইকে এক সাথে করে নিয়ে আলাপ করবেন, যাতে করে বাচ্চা শুধুমাত্র বুকের দুধ খাওয়ানোর ব্যাপারে সাহায্য পেতে পারে।
৬। পরিবার থেকে অথবা গর্ভাবস্থায় যেখানে দেখাতেন, সেখান থেকে বুকের দুধ খাওয়ানো সম্পর্কে মা নিজে কতটুকু শিখেছেন তা জেনে নিবেন।
৭। সর্বশেষে এই সময়ের জন্য উপযোগী তথ্য মা ও পরিবারের অন্যান্যদের বুঝিয়ে বলবেন।

৯ মাসের গর্ভাবস্থায় যা বলবেন এবং করবেন-

১। মায়ের স্বাস্থ্য সম্পর্কে জেনে নিবেন।
২। মা ডেলিভারির ব্যাপারে কি ব্যবস্থা নিচ্ছেন তা (বাড়ি বা হাসপাতালে) খোঁজ নিবেন।
৩। বুকের দুধের ব্যাপারে মা বা পরিবারের অন্যান্যদের কোন প্রশ্ন থাকলে তার সঠিক উত্তর দিবেন।
৪। বাচ্চার বাবার সাথে কথা বলবেন যাতে বাবা বুকের দুধ খাওয়ানোর ব্যাপারে মাকে সহযোগিতা করতে পারেন।
৫। পরিবারের সবাইকে আবার একটু মনে করিয়ে দিবেন যে, বাচ্চা হওয়ার পর যত তাড়াতাড়ি সম্ভব যেন আপনাকে খবর দেন। যাতে করে আপনি বাচ্চা এবং মাকে সাহায্য সহযোগিতা করতে পারেন।

ডেলিভারি হওয়ার পর যা বলবেন এবং করবেন-

১। মাকে এবং পরিবারকে (বাচ্চা হওয়ার ব্যাপারে) অভিনন্দন জানাবেন।
২। মা এবং বাচ্চা কেমন আছে এবং বুকের দুধ খাওয়ানো কেমন চলছে, সে ব্যাপারে জিজ্ঞেস করবেন।
৩। নতুন যে বাচ্চা হলো তা ছেলে না মেয়ে যেটাই হোক, সে ব্যাপারে মায়ের, বাবার এবং পরিবারের অন্যান্য সদস্যদের মনের অবস্থা বুঝতে চেষ্টা করবেন।
৪। বুকের দুধ খাওয়ানোর সময় মা বাচ্চাকে কিভাবে ধরেন এবং বুকে লাগান তা দেখবেন। যদি প্রয়োজন হয় তাহলে মা'র অনুমতি নিয়ে বাচ্চার অবস্থান ঠিক করে দিবেন।
৫। বাচ্চাকে যাতে করে চিনির পানি, মধু, সাদা পানি, অন্য দুধ ইত্যাদি না দেয়া হয় এবং এইগুলি দিলে কি ক্ষতি হয় তা বুঝিয়ে বলবেন।
৬। বাচ্চা যাতে মায়ের সাথে একই বিছানায় থাকে বা ঘুমায় এবং বাচ্চাকে রাতে ও দিনে বাচ্চার চাহিদা অনুযায়ী ও ঘন ঘন বুকের দুধ খাওয়ান সেই ব্যাপারে মাকে উৎসাহ দিবেন।
৭। মা'র বুকের দুধ খাওয়ানোর ব্যাপারে কোন প্রশ্ন থাকলে তার উত্তর দিবেন।
৮। মা বাচ্চাকে যাতে ৫ মাস পর্যন্ত শুধুমাত্র বুকের দুধ খাওয়ান, সেই ব্যাপারে উৎসাহ দিবেন।

বাচ্চার বয়স ৫ দিনের/১০-১৪ দিনের মধ্যে মাকে যা বলবেন এবং করবেন-

১। মা যদি বলে বাচ্চা ভালভাবে বুকের দুধ খাচ্ছে, তাহলে তাকে সেই ব্যাপারে উৎসাহ দিবেন এবং কোন সমস্যা থাকলে সহানুভূতি দেখাবেন।
২। বাচ্চা কি খাচ্ছে তা জেনে নিবেন।
৩। মা বাচ্চাকে কিভাবে ধরেছেন এবং বুকে লাগিয়েছেন তা দেখবেন।
৪। প্রয়োজন হলে মাকে সাহায্য করবেন।
৫। মাকে পরিবারের যারা সাহায্য করছেন তাদেরকে ধন্যবাদ জানাবেন।
৬। মা বাচ্চাকে যাতে বারেবারে এবং চাহিদা অনুযায়ী বুকের দুধ খাওয়ান, সে ব্যাপারে ওনাকে উৎসাহ দিবেন।
৭। সব শেষে মাকে মনে করিয়ে দিবেন যে ওনাকে সাধারণ খাবারের চেয়ে একটু বেশী খেতে হবে এবং বিশ্রাম করতে হবে।

প্রতি মাসে যা বলবেন এবং করবেন

১। মা যে ভাল কাজটুকু করছেন, সেই ব্যাপারে ওনাকে উৎসাহ দিবেন এবং মায়ের কোন সমস্যা থাকলে সেই ব্যাপারে ওনাকে সহানুভূতি দেখাবেন।
২। প্রত্যেক মাসেই বাচ্চার খাওয়ার ব্যাপারে খোঁজ নিবেন।
৩। বাচ্চা কিভাবে বুক মুখে নিয়েছে, মা কিভাবে কোলে নিয়েছেন তা দেখাবেন।
৪। প্রয়োজনবোধে মাকে সাহায্য করবেন।
৫। মাকে যে পরিবারের অন্যান্য সদস্যরা সাহায্য করছেন সেই ব্যাপারে আবারও ধন্যবাদ দিবেন।
৬। বাচ্চাকে যাতে বারেবারে এবং চাহিদা অনুযায়ী বুকের দুধ খাওয়ান সেই ব্যাপারে মাকে উৎসাহ দিবেন।
৭। মাকে মনে করিয়ে দিতে হবে যে ওনাকে সাধারণ খাবারের চেয়ে একটু বেশী খেতে হবে এবং বিশ্রাম করতে হবে।
৮। মা বাচ্চাকে যাতে ৫ মাস পর্যন্ত শুধুমাত্র বুকের দুধ খাওয়ান, সেই ব্যাপারে উৎসাহ দিবেন।
৯। মায়ের বা বাচ্চার যেই সমস্যার সমাধান আপনি দিতে পারবেন না সে ব্যাপারে ব্রেস্টফিডিং কাউন্সিলারদের সাথে যোগাযোগ করবেন।

ANNEX 2. RELEVANT INFORMATION DURING COUNSELLING

Relevant information to be provided during pregnancy counselling

1st set

Pregnant mothers need to eat more of usual food during pregnancy; this food helps in production of breastmilk later on, and maintains your body stores. More breastmilk will help your baby grow well and strong. During pregnancy, you (mother) also need to rest more than usual.

2nd set

After your baby is born, first hold him/her close and then start breastfeeding within half to one hour. Colostrum, which is secreted in the first 3-5 days, is sufficient for the baby's requirements during this period. So you will not have to give the baby anything such as water, sugar water, honey, mustard oil, other milk etc. before or after giving colostrum.

The earlier the baby starts suckling, sooner will be the milk flow.

*After delivery also, you should eat more food, to improve your own health, and to produce more breastmilk for your baby.

3rd set

*Breastmilk alone is all that the baby needs until 5 months of age.

*Breastmilk is safe, protects against illness, makes babies intelligent, is easy for mother to feed and saves money. Breastfed babies have closer bonding with their mothers.

*If you give your baby only breastmilk for the first 5 months, and do not get menstrual periods, you do not need any contraceptives. But you may use any contraceptive if you or your husband wish (except the pill).

* *repeated at all the counselling sessions*

Relevant information within first 5 days of delivery

Colostrum is sufficient for the baby's requirements during this period. So you do not have to give the baby anything else now. Water, sugar water, honey, mustard oil and other milk which many mothers give, are not required, and may actually be harmful for the baby.

The baby's stomach is small, and if it is filled up with these other fluids, s/he will not want to suckle breastmilk. If fluids sweeter than breastmilk are given, then the baby may not want to have breastmilk afterwards.

Feeding the baby only colostrum will make the milk come down sooner.

While breastfeeding, you should be in a comfortable position, whether you are lying down or sitting up. Bring the baby close to your breast (not breast to the baby), placing a pillow or folded covers *(khata)* to raise him up. The baby's head, shoulders and body should be in a straight line, his tummy in contact with yours. Put him on the breast from below, when he opens his mouth wide, with his nose pointing upwards to the nipple, so that he can get a good amount of the dark part around the nipple (areola), in his mouth. This is important because the baby will have to press on the milk sinuses which lie below this area, to get a good flow of breastmilk. Sucking only the nipple, will not provide a good flow of breastmilk - and will make them sore. So you must make sure that he has a good part of the breast in his mouth, and is actually breastfeeding, not nipple feeding.

You should breastfeed whenever the baby wants, during the day and also at night. Keep him in the same bed with you, so you will know when he wants to feed, and it will also be easier for you because you will not have to get up to feed him.

Relevant information every month

About contraception

If you give your baby only breastmilk for the first 5 months, and do not get menstrual periods, you do not need any other contraceptive. To use breastfeeding as a contraceptive method, in addition to breastfeeding exclusively, you have to make sure that you do not have a gap between breastfeeds of more than 4 hours during the day, and 6 hours during the night. This method will not protect you from pregnancy when you start giving the baby other milk/foods.

If you/your husband still want to use another contraceptive, you may use any other method, except the pill. We suggest that you use condoms if your menses have not resumed. And if you have resumed menses, it would be beneficial, and more convenient for you too, to take the injectable contraceptive.

Relevant information if mother decides to start complementary feeding

If, for whatever reason, you have to give additional food to your baby before he/she is 5 months old, you should give other milk, not gruel or solid foods. You can give either give infant formula or fresh cow's milk (1:1 dilution). To feed this milk, you should use a spoon or cup, not bottles. Bottle feeding often causes diarrhoea and other problems.

Relevant information about expressing and feeding breastmilk

If you are planning to go back to your job, or to start work after some time, you should practise how to express your breastmilk and feed it to your baby with a cup and spoon. If you are a housewife, you should also learn how to do this so that someone else can feed your exclusively breastfed baby if you are in the bathroom, or are busy with some work, or have to go out for a few hours. I will show you how to express your milk (process described during training). Breastmilk can be stored at room temperature for about 8 hours, and in the refrigerator for 24 hours.

For working mothers: You should express your breastmilk at your workplace at least twice during 8 hours, even if you do not feed this to your baby later on. Expressing breastmilk will increase your breastmilk production, just like suckling a baby increases it.

পরামর্শ দেওয়ার সময় প্রয়োজনীয় তথ্য

গর্ভাবস্থায় প্রয়োজনীয় তথ্যঃ

প্রথম অধ্যায়ঃ

গর্ভবতী মায়েদের স্বাভাবিক খাবারের চেয়ে একটু বেশী খাবার খাওয়ার দরকার হয় ; এই বাড়তি খাবার মায়ের শরীরে জমা থাকে যা পরবর্তীতে বুকের দুধ তৈরীতে সাহায্য করে। বাচ্চা যতবেশী বুকের দুধ খাবে তত তাড়াতাড়ি বেড়ে উঠবে এবং শক্তিশালী হবে। গর্ভবতী অবস্থায় আপনার (মায়ের) স্বাভাবিকের চেয়ে বেশী বিশ্রামের দরকার।

দ্বিতীয় অধ্যায়ঃ

বাচ্চা জন্মের পর প্রথমে ওকে কোলে নিবেন এবং আধা থেকে এক ঘন্টার মধ্যে বাচ্চাকে বুকের দুধ খাওয়ানো শুরু করবেন।

বাচ্চা জন্মের প্রথম তিন থেকে পাঁচ দিন পর্যন্ত যে দুধ বের হয় সেটাই শাল দুধ। এই সময় এটাই বাচ্চার জন্য যথেষ্ট সুতরাং শাল দুধ খাওয়ানোর আগে এবং পরে বাচ্চাকে আর অন্য কোন খাবার যেমন পানি, চিনির পানি, মধু, সরিষার তেল, অন্য কোন দুধ ইত্যাদি দেয়ার প্রয়োজন নেই।

বাচ্চা যত তাড়াতাড়ি বুকের দুধ টানা শুরু করবে তত তাড়াতাড়ি বুকের দুধ নামবে।

- বাচ্চা জন্মের পরেও, আপনি বাড়তি খাবার খাবেন, এতে করে আপনার নিজের স্বাস্থ্যের উন্নতি হবে এবং বাচ্চার জন্যও বেশী দুধ তৈরী হবে।

তৃতীয় অধ্যায়ঃ

- বাচ্চার বয়স ৫ মাস পর্যন্ত শুধু মাত্র বুকের দুধই যথেষ্ট।
- বুকের দুধ নিরাপদ, বিভিন্ন অসুখ থেকে রক্ষা করে, বাচ্চা বুদ্ধিমান হয়, মা সহজেই খাওয়াতে পারে এবং সংসারের পয়সা বাঁচায়। বুকের দুধ খাওয়ালে মা ও বাচ্চার মধ্যে বন্ধন ভাল হয়।
- আপনি যদি বাচ্চাকে প্রথম ৫ মাস শুধুমাত্র বুকের দুধ খাওয়ান, (এমনকি পানিও না) এবং আপনার মাসিক যদি না হয়, তাহলে জন্ম নিয়ন্ত্রনের জন্য কোন ব্যবস্থা নেওয়ার প্রয়োজন হবে না। কিন্তু আপনি এবং আপনার স্বামী যদি কোন ব্যবস্থা নিতে চান তাহলে বড়ি ছাড়া যে কোন ব্যবস্থা নিতে পারেন।

* আবার মনে করিয়ে দিতে হবে।

বাচ্চা জন্মের পর প্রথম পাঁচ দিনের মধ্যে প্রয়োজনীয় তথ্যঃ

এই সময় আপনার বাচ্চা যতটুকু শালদুধ পায় ততোটুকুই তার জন্য যথেষ্ট। তাই এখন তাকে অন্য কিছু দেওয়ার প্রয়োজন নেই। এই সময় অনেক মায়েরা পানি, চিনির পানি, মধু, সরিষার তেল এবং আলগা দুধ দিয়ে থাকেন যার কোন প্রয়োজন হয় না। বরং এই খাবারগুলো বাচ্চার আরও ক্ষতি করতে পারে।

বাচ্চার পেট ছোট থাকে, আর যদি এই খাবারগুলো দিয়ে ভরা হয় তাহলে সে বুকের দুধ টেনে খেতে চাইবে না। এ ছাড়াও বুকের দুধের চেয়েও যদি মিষ্টি কোন খাবার বাচ্চাকে দেয়া হয় তাহলেও সে বুকের দুধ খেতে চাইবে না। বাচ্চাকে শুধুমাত্র শালদুধ খাওয়ালে বুকের দুধ তাড়াতাড়ি নামবে।

বসে অথবা শুয়ে যেভাবেই আপনি বাচ্চাকে বুকের দুধ খাওয়ান আপনি নিজে আরামদায়ক অবস্থায় থাকবেন। বাচ্চাকে আপনি বুকের কাছে টেনে নিন (আপনি বাচ্চার দিকে ঝুঁকে বুক দিবেন না)। প্রয়োজনে বাচ্চার নীচে বালিশ অথবা কাঁথা দিয়ে বাচ্চাকে একটু উঁচু করে নিন। বাচ্চার মাথা, ঘাড় এবং শরীর একই লাইনে থাকবে, বাচ্চার পেট আপনার পেটের সাথে লেগে থাকবে। বাচ্চা যখন বড় করে হা করবে তখন তাকে নীচের দিক থেকে বুকে দিন। এই সময় বাচ্চার নাক, বুকের বোঁটার দিকে ফিরানো থাকা উচিৎ, যাতে করে সে বুকের কালো অংশের বেশীর ভাগ মুখে নিতে পারে। এটা খুবই গুরুত্বপূর্ণ, কারণ কালো অংশের নীচে দুধের নালীগুলো থাকে। তাই বাচ্চা যখন এখানে চাপ দিবে তখন সে বেশী দুধ পাবে। শুধু মাত্র বুকের বোঁটা চুষলে বাচ্চা ভালভাবে দুধ পাবে না এবং বোঁটাতে ঘা হওয়ার সম্ভাবনা থাকে। এই ব্যাপারে আপনাকে নিশ্চিত হতে হবে যে বাচ্চা বুকের কালো অংশের বেশীর ভাগ মুখে নিচ্ছে এবং বুকের দুধ খাচ্ছে, শুধুমাত্র বোঁটা চুষছে না।

আপনার বাচ্চা দিনে ও রাত্রে যখনই বুকের দুধ খেতে চাইবে তখনই খেতে দিবেন। আপনার বিছানায় বাচ্চাকে রাখবেন, তাহলে সে যখন চাইবে তখনই বুকের দুধ দিতে পারবেন। এছাড়াও দুধ খাওয়ানোর জন্য আপনার সুবিধা হবে, কেননা বার বার উঠতে হবে না।

প্রত্যেক মাসে জন্ম নিয়ন্ত্রণের ব্যাপারে প্রয়োজনীয় পরামর্শঃ

যদি আপনি আপনার বাচ্চাকে প্রথম ৫ মাস শুধুমাত্র বুকের দুধ খাওয়ান এবং এর মধ্যে আপনার মাসিক না হয় তাহলে জন্মনিয়ন্ত্রণের কোন ব্যবস্থা নেয়ার প্রয়োজন নেই। কিন্তু আপনি যদি বুকের দুধ খাওয়ানোকে জন্মনিয়ন্ত্রণের ব্যবস্থা হিসাবে নিতে চান তাহলে লক্ষ্য রাখতে হবে যে বাচ্চা যেন শুধুমাত্র বুকের দুধ পান করে এবং খাওয়ানোর মধ্যে দিনে ৪ ঘন্টা ও রাত্রে ৬ ঘন্টার বেশী ফাঁক যেন না হয়।

বাচ্চা যখন থেকে আলগা খাবার শুরু করবে তখন থেকে এই পদ্ধতি আর কার্যকরী হবে না, তবে আপনি এবং আপনার স্বামী যদি কোন ব্যবস্থা নিতে চান তাহলে বড়ি ছাড়া যে কোন ব্যবস্থা নিতে পারেন। আমাদের মতে, আপনার যদি মাসিক না হয় তাহলে আপনার স্বামী কনডম ব্যবহার করতে পারেন। যদি মাসিক শুরু হয় তাহলে আপনি ইনজেকশন নিতে পারেন। ইনজেকশন নিলে আপনার জন্য সুবিধা এবং উপকার হবে।

মা যদি বাচ্চাকে আলগা খাবার দেওয়ার সিদ্ধান্ত নেন তাহলে তার জন্য তথ্য :

যে কোন কারণেই হউক না কেন আপনি যদি আপনার বাচ্চাকে ৫ মাসের আগে আলগা খাবার দেওয়ার প্রয়োজন মনে করেন, তাহলে তাকে আলগা দুধ দিবেন, সুজি বা অন্য কোন শক্ত খাবার না। আপনি আপনার বাচ্চাকে তার উপযোগী এবং বিশেষভাবে তৈরী করা দুধ অথবা গরুর দুধ (১ ভাগ দুধে ১ ভাগ পানি মিশিয়ে) খাওয়াবেন। এই দুধ খাওয়ানোর জন্য আপনি বোতলের পরিবর্তে অবশ্যই বাটি ও চামচ ব্যবহার করবেন। কারণ শিশুকে বোতলে খাওয়ালে তার ডায়রিয়া এবং নানা ধরণের সমস্যা দেখা দিতে পারে।

বুকের দুধ গেলে খাওয়ানোর ব্যাপারে কিছু তথ্যঃ

যদি আপনি কর্মস্থলে ফিরে যাওয়ার চিন্তা করেন অথবা নতুন করে কাজে যোগদানের ইচ্ছা থাকে, তাহলে আপনাকে বুকের দুধ গালানো এবং বাচ্চাকে কাপে চামচে খাওয়ানোর অভ্যাস করা উচিৎ। আপনি যদি ঘরেও থাকেন তবুও আপনি এটা শিখে রাখবেন, কারণ আপনি ঘরের কোন কাজে ব্যস্ত থাকলে অথবা ২/১ ঘন্টার জন্য বাইরে গেলেও অন্য যে কেউ আপনার বাচ্চাকে এই গালানো দুধ খাওয়াতে পারবে। আমি আপনাকে দেখিয়ে দিব কিভাবে বুকের দুধ গালতে হয়। বুকের গালানো দুধ ঘরের তাপমাত্রায় ৮ ঘন্টা এবং ফ্রিজে ২৪ ঘন্টা ভাল থাকে।

চাকুরীজীবি মায়েদের জন্যঃ

আপনি আপনার কর্মস্থলে ৮ ঘন্টার মধ্যে কমপক্ষে ২ বার বুকের দুধ গালবেন। গালানো দুধ যদি বাচ্চাকে নাও খাওয়ান তবুও গালতে হবে। বাচ্চা বুকের দুধ খেলে যেমন বুকের দুধ বাড়ে ঠিক তেমনিভাবে বুকের দুধ গাললে পরবর্তীতে বুকের দুধ তৈরীতে সাহায্য করবে।

ANNEX 3. TRAINING SCHEDULE FOR PEER COUNSELLORS

DAY	9.00-9.30	9.30-10.30	11.00 - 11.30	11.35 - 12.30
1	Introductions Study objectives	Why BF is imp and contents of human milk	- Feedback from participants about local BF situation - national situation	Individual expected targets
2	Review	How BF works	Assessing a breastfeed (role play)	BF observation form
3	Review	Observing BF (slides)	Listening and Learning (L & L)- Demonstration and	L & L Exercises
4	Review	L & L exercises	Positioning - Demonstration and video	Expression of breastmilk
5	Review	Building confidence and giving support	Role play in 2 groups	Role play
6			HOLIDAY	
7	Review	Not enough milk and crying	BF history	Role play
8	Review	Women's nutrition, health and fertility	Feeding LBW and sick babies	Practice with real mothers
9	Review	Crying and refusal to BF	Role play	Working women and BF (video)
10	Review	PC responsibilities	Role play - from pregnancy to follow up counselling at 1 month	Role play - common BF problems

ANNEX 4. **QUESTIONNAIRE - 1**

PREGNANCY DATA FORMS (To be filled during 8th month of pregnancy)

Interviewer's name:

1. Interview code __/
   1-4 = interviewer 5-6 = BC 7= PI
2. ID no. __/__/__/
3. FP code no. __/__/
4. Cluster no. __/__/
5. Block and House no. __/__/__/__/__/
6. Date of interview __/__/__/__/__/__/

ASK MOTHER these questions

What is your name? ------------------

7. How many of your children were born alive __/
8. How many children are surviving __/
9. How many children are below 5 years of age __/
10. How many people live in this house (household members) __/__/
    (eating from the same pot at present)
11. Does your husband live in this house __/
    1= no, separated 2= no, lives abroad 3= no, dead
    4= no, has another wife 5= yes 6= comes and goes
12. Besides your husband, do any of the following family members live in this house, who can influence decisions about baby's feeding
    (1= no, 2=yes)

    your mother __/
    your husband's mother __/
    your sister-in-law __/
    others (specify) __/
13. How many months have you lived in this house __/__/__/
14. What is your age (years) __/__/
15. How many grades/classes have you studied __/__/

(Q.16-21 for SE status, maternity leave and workplan)

16. What has been your occupation **during** current pregnancy __/
    1= housewife 2= maid 3= factory worker
    4= office employee 5= professional 6= business
    7= others (specify)

If housewife, go to Q.21

17. Are you employed **at present?** 1= no 2= yes __/

18. Are you entitled to paid leave 1= no 2= yes 3= partially paid __/

19. Will you get leave after delivery (no. of weeks) __/
1=no 2=yes

20. If yes, for how many weeks __/__/
01= 1 week 04= 4 weeks 06= 6 weeks 12= 12 weeks and so on

21. Do you intend to continue/ start work after __/
the baby is born 1= no 2 = yes

22. If yes, how many weeks later __/__/

23. Have you had any antenatal checks (ANC) during this pregnancy __/
1= no 2= yes **If no, go to Q.26**

24. How many ANC have you had so far? __/

25. ANC where? __/
1= UTPS Badda clinic 2= UTPS satellite clinic
3= other clinic in Badda 4= other clinic elsewhere (name)
5= hospital (give name)

26. Have you had Tetanus Toxoid (TT) injections __/
1= no 2= partial 3= all complete

27. Are you taking any medicines now? __/
1= no 2= vitamins and/ or iron tablets
•3= cytotoxic drugs 4= others (specify)

• **exclusion criteria**

ASK HUSBAND (as far as possible), the following questions:
IF HUSBAND IS NOT AVAILABLE, ask mother to check with husband and inform

28. What is your (husband's) occupation __/
1= unemployed 2= labourer (sk/unsk) 3= rickshawpuller
4= technician 5= business 6= office employee
7= professional 8= driver 9= other (specify)

29. How many grades/classes have you (husband) studied __/__/

30. What is the monthly income (in takas) of people living in this house

a)	of husband	_/_/_/_/_/_/
b)	of wife	_/_/_/_/_/
c)	of other person # 1 (specify)	_/_/_/_/_/
d)	of other person # 2 (specify)	_/_/_/_/_/
e)	of other person # 3 (specify)	_/_/_/_/_/

31. How much is contributed by other family members to your monthly family income (those NOT living in this house) _/_/_/_/_/

If there is previous living child, ask MOTHER the following questions, If not, go to Q.44

What is the name of your youngest baby ------------------------

33. How old is s/he? (months) _/_/

33. Did you breastfeed (name)? _/
1= no 2= yes

34. Did you give (name) colostrum? _/
[Explain that colostrum is the thick, yellowish secretion produced from the breast in the first week of life]
1= no 2= yes

35. How old was (name) when you started to give her/him plain water? (in days) _/_/_/

Ask for complementary feeds

36. Did you give him/her any additional food along with breastmilk (not prelacteals) when s/he was a small baby (before 6 months) _/
1= no 2= yes

If no go to Q.42. If yes, ask Q.37

37. What additional food did you start first? _/
1= cow's milk 2= powder milk 3= gruel
4= rice 5= banana 6= others (specify)

38. How old was (name) when you started to give her/him _____ (days)? _/_/_/

39. Why did you give this _____? _/_/

1= insufficient milk	2= to accustom baby to other milk
3= mother sick	4= for better growth
5= mother employed	6= too much house work
7= baby not growing	8= baby sick
9=	10=

40. Did anyone advise you to start these (complementary) feeds?
(1= no 2= yes)

mother	__/
mother-in-law	__/
friend/relative	__/
doctor	__/
husband	__/
nurse/midwife	__/
others (specify)	__/

41. Did you use a bottle to feed the baby at any time? 1= no 2= yes __/
(esp. within 6m)

42. Are you still breastfeeding her/him? 1= no 2= yes __/
If answer is yes, go to Q.44, if no, ask Q.43

43. So what was (name)'s age when you stopped breastfeeding her/him (in days)? __/__/__/

44. Have you heard any advice about infant feeding? __/
(EBF, how to breastfeed, BF benefits, BF duration & start of CF)
1= no 2 = yes
If no, go to Q.47, if yes, ask Q.45

45. If "yes", what? __/__/
__/
__/

____

46. From whom did you hear this advice? (1= no 2= yes)

clinic staff	__/
mother	__/
m-in-law	__/
FP worker	__/
friends/ neighbours /relatives	__/
media (radio and/TV)	__/
printed material	__/
others (specify)	__/

47i). Do you plan to breastfeed the coming baby? __/
1= no 2= yes

ii) If no, why not? __/

____

48. How soon after delivery do you plan to start breastfeeding? __/
1= within 1 hour 2= after few hours 3= after milk flows out
4= on 3rd day 5= don't know 6=

49. Do you plan to give your baby anything else in the first 3-4 days? 1=no 2= yes __/

50. If yes, ask what other fluids do you plan to give? (1=no 2=yes)
honey __/
misri water/sugar water __/
mustard oil & honey __/
plain water __/
mustard oil __/
powder milk __/
fresh cow's milk __/
other food (specify) __/

51. Do you plan to use any family planning method after this baby __/
1= no 2= yes 3= don't know

If no or don't know, go to Q.54. If yes, ask Q.52 & 53

52. When do you plan to start __/__/__/
(when baby is how old? - days)
001 = on day of birth
002 = when periods start
003= when husband comes back

53. Do you have a preferred method? (if necessary, prompt for pill, condom, inj.) __/__/
1= no 2= combined pill 3= prog only pill 4= condom
5= IUD 6= inj 7= ligation 8= homeo
9= kabiraj 10= withdrawal 11= safe period 12= foam tablet
13=Norplant 20= combination of 2 or more methods (specify)

54. Some people say that breastfeeding helps to space pregnancies. __/
What do you think?
1= disagree 2= agree 3= don't know

55. If "disagree", why? __/

----

56. If "agree" why?" __/

----

57. And for how long does BF help space pregnancies (months) __/__/

OBSERVATIONS + RELATED QUESTIONS (for SE status)

58. Type of house __/
1= katcha 2= semi-pucca (brick with tin roof) 3= pucca (brick and cement)

59. Number of rooms __/

60. Electricity 1= no 2= yes __/

(Assets to be coded 1= no 2= yes)

61.	Bed	__/
62.	Table and chair	__/
63.	Fan present	__/
64.	Radio	__/
65.	Rickshaw	__/
66.	TV	__/
67.	Sewing machine	__/
68.	Refrigerator	__/
69.	Video cassette player	__/
70.	Own house	__/
71.	Type of latrine 1= none 2= common latrine katcha 3= common latrine pucca 4= private latrine katcha 5= private latrine pucca 6= common sanitary (flush) 7= private sanitary (flush)	__/
72.	Water source for washing 1= pond/river 2= tubewell 3= piped water (common) 4= piped water (private)	__/
73.	Water source for drinking (code as above)	__/
74.	Mother's weight (kg)	__/__/.__/
75.	Mother's height (cm)	__/__/__/.__/
76.	Mother's MUAC (cm)	__/__/.__/
77.	Parity	__/

COMMENTS

ANNEX 5. **QUESTIONNAIRE - 2**
(for DAY 4) **Interviewer's name:**

Respondent : Mother ________ or other ______

1. Interview code __/
   1-4= interviewers 5-6= BCs 7= PI
2. ID NO. __/__/__/

3. FP Code no. __/__/
4. Cluster no. __/__/
5. Block and House no. __/__/__/__/__/

6. Date of interview __/__/__/__/__/__/

7. Date of birth of baby __/__/__/__/__/__/

8. Mother's reporting of gestation age (weeks) __/__/

9. Where was the baby delivered? __/
   1= home 2= hospital 3= clinic

10. Type of delivery __/
    1=normal vaginal 2= vaginal assisted 3=caesarean section

11. Who delivered the baby __/
    1=TBA (identify by kit box/ bag with an organization logo)
    2=untrained dai 3=experienced relative
    4=nurse 5=doctor 6= others (specify)

12. Baby born __/
    0=stillborn 1= singleton 2= twins/ triplets

13. Gender of baby 1=male 2=female __/

14. Were there any problems after the delivery (1=no 2= yes)
    (write from hospital records in case of hospital delivery) __/

*15. What problems
    mother given antidepressants __/
    baby was/is in intensive care __/
    visible congenital anomalies such as cleft palate __/
    (babies with other cong. anomalies eg. Down's syndrome, cardiac problems, to be excluded when diagnosed)
    other problems (specify) __/

16. Are you taking any medicines now (1=no 2=yes) __/

17. If yes, what medicines __/
    2= vitamins and/or iron tablets 3= cytotoxic drugs 4= others (specify)
    5= antibiotics 6= multiple 7= multiple
    * for exclusion from study

18. How soon after delivery did you hold the baby (hours) __/__/

19. What was the first food given to the baby __/
1=colostrum 2=honey 3=misri/sugar/glucose water
4=honey + mustard oil 5=pl water 6= mustard oil
7=cow's milk 8=powder milk 9= others

If colostrum was given, go to Q.24
If colostrum was NOT the first feed, ask Q. 20

20. Why was this food given (code 1=no, 2= yes)
for sweet voice __/
to satisfy hunger __/
to prevent cold, cough __/
to clean stomach, mouth or throat __/
to stop baby's crying __/
given traditionally __/
colostrum insufficient __/
mother sick __/
baby did not suckle __/
other reason (specify) __/

21. Was any other fluid/ milk given in the first 3 days __/
before colostrum (1=no 2=yes)

22. What other food/ fluids (prelacteals) were given? (1=no 2=yes)
honey __/
sugar/misri water __/
honey + mustard oil __/
plain water __/
mustard oil __/
cow's milk __/
powder milk __/
other food __/

23. Have you given your baby colostrum as yet __/
(definition as in Questionnaire 1)
1= no 2= yes

If no, go to Q.29. If yes, ask Q.24 onwards

24. Within how many hours after delivery did the baby first suckle from the breast __/__/

25. Did you continue other (prelacteal) fluids/ milk AFTER __/
giving colostrum 1=no 2= yes

26. Did you start new food (postlacteal) after giving colostrum? __/

27. If new food started, what was it? (1=no, 2= yes)
honey __/
sugar/misri water __/
honey + mustard oil __/
plain water __/
mustard oil __/
cow's milk __/
powder milk __/
other food __/

28. Why were these other feeds continued or given in addition to colostrum (1=no, 2= yes)

for sweet voice	__/
to satisfy hunger	__/
to prevent cold, cough	__/
to clean stomach, mouth or throat	__/
to stop baby's crying	__/
given traditionally	__/
colostrum insufficient	__/
mother sick	__/
baby did not suckle	__/
other reason (specify)	__/

29. After delivery, did anyone tell you when to start breastfeeding, or did you start yourself __/

1=started myself   2= dai   3= baby's maternal grandmother
4=baby's paternal grandmother   5= nurse   6=doctor
7=PC   8= others

30. Did anyone actually help you to hold your baby correctly put her/ him at the breast   1=no   2=yes __/

31. If "yes", who helped you?

dai/TBA	__/
baby's maternal grandmother	__/
baby's paternal grandmother	__/
nurse	__/
doctor	__/
PC	__/
others	__/

32. Since sunrise yesterday till sunrise today, what have you fed the baby
(Prompt for water and other food in addition to breastmilk)

time	FOOD	time	FOOD		TOTAL NO. OF FEEDS
	_______		_______	colostrum	___
	_______		_______	honey	___
	_______		_______	sugar water	___
	_______		_______	honey+ m.oil	___
	_______		_______	plain water	___
	_______		_______	mustard oil	___
	_______		_______	cow's milk	___
	_______		_______	powder milk	___
	_______		_______	other (specify)	___

33. Did you use a bottle for feeding?   1= no 2= yes __/

34. Where does the baby sleep at night __/

1=same bed as mother 2=same room, but different bed
3=different room

35. Is any one helping with mother's share of housework (1=no 2=yes) __/

36. If helped, by whom?

baby's maternal grandmother	__/
baby's paternal grandmother	__/
baby's aunt	__/
servant	__/
neighbour	__/
other (specify)	__/

37a.	Baby's weight in kg (1st reading) *	__/.__/__/
b.	Baby's weight in kg (2nd reading) *	__/.__/__/

* **(To be referred if wt <1800 g)**

38.	Baby's length in cm (1 reading)	__/__/.__/
39.	Mother's weight (kg)	__/__/.__/
40.	Mother's MUAC (cm)	__/__/.__/

OTHER OBSERVATIONS and COMMENTS

ANNEX 6. **QUESTIONNAIRE 3 (weeks)** Interviewer's name:

1a.	Interview code 1-4 = interviewers 5-6= BCs 7= PI	__/
1b.	Respondent mother __/ maternal GM __/ paternal GM __/ aunt __/ others __/	
2.	ID no.	__/__/__/
3.	FP code no.	__/__/
4.	Cluster no.	__/__/
5.	Block and House no.	__/__/__/__/__/
6a.	Date of interview	__/__/__/__/__/__/
b.	Visit week no	__/__/

Ask mother, how are you?

7. Are you taking any medicines now? 1= no 2= and /iron __/
   *3= cytotoxic drugs 4= others 5= antibiotics *6= antidepressants 7= multiple

* exclusion criteria

8. Do you stay at home all the time OR __/
   (if employed), have you resumed paid work?
   1= at home 2= resumed work 3= planning to join

PART I MORBIDITY

Now I am going to ask you how ________(baby's name) was during the last 7 days.
I will start by asking about the last 24 h from sunrise yesterday to sunrise today - and then about the day before - then the previous day and so on.

9. From, sunrise yesterday until sunrise today, how has _____ been? __/
   1= well 2= not well

LAST 24 HOURS (please fill boxes below)

9a). Did ____ have any symptom or illness from sunrise yesterday until sunrise today: __/
1= no, 2= yes, (prompt for specific illness if not mentioned spontaneously), 3= not known
(If YES, also CODE 2= YES in past week for same illness)

PAST WEEK (please fill boxes below)

10a) Did ______ have any other illness in the past week __/
Code 1= no 2= Yes 3= don't know (IGNORING ANY WHICH HAVE ALREADY BEEN MENTIONED AS PRESENT IN PAST 24 HOURS)

No	SYMPTOM or ILLNESS	LAST 24 HRS	PAST WEEK
b	diarrhoea		
c	dysentery		
d	cough		
e	fever		
f	thrush		
g	ear infection		

If the baby **DID NOT** have DIARRHOEA, DYSENTERY, COUGH OR FEVER, **GO TO Q.13**

If the baby **DID NOT** HAVE DIARRHOEA OR DYSENTERY, but **HAD** COUGH OR FEVER, **GO TO Q.12)**

If the baby **HAD** DIARRHOEA OR DYSENTERY, **ASK Q.11 (fill appropriate boxes)**

11) ASK whether any **TREATMENT** was given (including ORT) & **COST** OF EACH ONE

1= no treatment required   2=ORS   3= kabiraji med (herbal)

4=homeopathic med   5= local healer   6=allopathic med   7= 2+6

No	NAME	CODE	11a. COST (taka)
1			
2			
3			

b) When ______ had diarrhoea/dysentery, did you go anywhere outside the home to get treatment for him/her? - 1=no 2=yes __/

c) If yes, how much did you spend on travel (takas)? __/__/

d) How much did you spend on service/doctor/healer's fees __/__/__/__/__/

e) Besides treatment and travel, did you spend anything else in connection with this illness? (special food, tips etc.)

If yes, specify on what, --------------------

and how much __/__/__/__/__/

(For cough)

If the baby **DID NOT have** COUGH <u>OR</u> FEVER, **go to Q.13**

12) If the baby had cough and fever, ASK WHETHER ANY TREATMENT WAS GIVEN AND THE COST OF EACH ONE

1= no treatment required   2=liniments applied locally

3= kabiraji med (herbal)   4=homeopathic med

5= local healer   6=allopathic med

No	NAME	CODE	12a. COST (taka)
1			
2			
3			

b) When ______ had cough and fever, did you go anywhere outside the home to get treatment for him/her? 1= no 2=yes

c) If yes, how much did you spend on travel (takas)? __/__/

d) How much did you spend on service/doctor/healer's fees __/__/__/__/__/

e) Besides treatment and travel, did you spend anything else in connection with this illness? (special food, tips etc.)

If yes, specify on what, --------------------

and how much __/__/__/__/__/

For severe illness

13. Since your last interview, has ______ had any illness for which s/he had to be taken to a health facility/clinic/hospital or others for treatment? (1= no, 2=yes) **IF NO, GO TO Q.14** __/

If yes, specify illness and give name of clinic also
1= UTPS or other NGO clinic 2= govt. health facility
3= govt hospital 4= other hospital/ ICDDR,B
5= private clinic 6= doctor's chamber
7= from pharmacy 8= homeopath
9= kabiraj 10= allopath + homeopath

	Visit 1	Visit 2	Visit 3
Type of health facility Codes:			
Date (approx.) -- dd/mm/yy			
Reason Codes:			
Medicine given (1)			
Cost (1)			
Medicine given (2)			
Cost (2)			
Medicine given (3)			
Cost (3)			
Total medicine costs			
Total travel costs			
Service fees			
Other expenditure			
If admitted, no. days			
Total expenditure			

OTHER COSTS

14a. Did you lose any wages because you stayed at home (1=no, 2=yes) __/
b. If yes, how much __/__/__/__/__/
x. Did your husband lose any wages because baby was sick __/
c. If yes, how much __/__/__/__/__/
d. Were there any other costs __/__/__/__/__/
(because baby was BF & mother had to stay at home - specify)

PART II **FEEDING FOLLOW UP**

15. **24 h recall** - Since sunrise yesterday till sunrise today, please describe exactly what you have fed the baby
(Prompt for water and other feeds in addition to breastmilk)

time	food	time	food	Total feeds in 24 h	For office use ON LAST VISIT, BABY WAS
_____		_____	breastmilk (BM)	_/_/	Excl BF (EBF)
_____		_____	water	_/_/	Predom BF (PRBF)
_____		_____	sugar water	_/_/	Partial BF (PTBF)
_____		_____	cow's milk	_/_/	Non-breastfed (NBF)
_____		_____	powder milk	_/_/	
_____		_____	gruel - milk	_/_/	
_____		_____	gruel + milk	_/_/	
_____		_____	any other fluid/food (each to code)	_/_/	

15y. If breastfed, did you use anything for feeding BM _/
1= bottle 2= spoon 8= not applicable (always suckled from breast)

15z. What did you use to feed other named fluids/food _/
1= bottle 2= spoon 3= hand 4= other

Depending on the reporting on last visit, and 24 hrs, follow appropriate instructions below:

LAST VISIT	24 HR	GO TO	CLASSIFICATION
EBF	EBF	16 (Section I)	EBF PRBF PTBF
EBF	PRBF	17 for 1st info & chk PTBF IN 22 (Sec II)	PRBF PTBF
EBF	PTBF	17 to chk PRBF, then 22	PTBF
PRBF	PRBF	21	PRBF PTBF
PRBF	PTBF	22	PTBF
PRBF	EBF	35 (Special group)	EBF
PTBF	PTBF PRBF or EBF	26 35 (Special group)	PTBF PRBF or EBF
PTBF	NBF	27, 34	NBF
NBF	NBF PTBF PRBF EBF	27, 38 27, 35 (Special group)	NBF PTBF PRBF EBF

SECTION II
for termination of ebf- (anything on 2 successive days)

16. Since my last visit, is there anything besides breastmilk that you have fed your baby? (prompt for water) __/
1=no 2=yes

If no, and only BM reported, ask Q. 35. If yes, ask Q. 17A

17A. What did you feed him/her at that time (or when you started giving something in addition to BM
1=no 2=yes *Enter column 2*
1) water __/ 2) sugar water __/ 3) juice __/ 4) other mil k __/
5) gruel __/ 6) fruit __/ 7) other food__/ 8) medicines __/
9) ORS

17B. What was baby's age (in days) when ---(name food) was first started __/__/__/

17C. Did you give this food/other food on the next day as well? __/
1= no 2= yes *Enter column 3* **If no, go to Q.35 If yes, ask Q 17D & 18 onwards**

17D. What did you use for feeding this food __/
1=bottle 2= spoon 3=both 4= hand 5= dropper

24 hours recall	day 1 food	day 2 food	after term.def
EBF			

18. After applying termination definition, the baby is __/
1= EBF 2= PRBF 3= PTBF 4= non-BF

19A. And why did you think baby needed this/these fluids? __/__/
(write in mother's words)

20. Did anyone advise you to start this fluid?
a) no one __/ b) mother __/ c) mother-in-law __/ d) neigh/frnd/relative __/
e) nurse __/ f) doctor __/ g) FP worker __/ h) dai __/
i) PC __/ j) husband __/ k) other __/

If mother is on partial bf, go to Q.22. If no, go to Q.36

SECTION II
b) *<u>(for termination of predominant bf / or feeding ____ [named fluids])</u>*

21. Since my last visit, is there anything else besides breastmilk and these fluids that you have fed your baby ? (prompt) 1=no 2=yes __/

If no, go to Q.35. If yes, ask Q.22A

22A. What was baby's age when comp food was first started (days) __/__/__/

22B. What food did you feed her/him ? *(enter in column 2)*
1) cow's milk __/ 2) powder milk __/ 3) gruel __/
4) fruit __/ 5) others __/

22C. Did you give this (name food as mentioned above) *enter column 3* __/
on the next day as well 1= no 2= yes

If no, go to Q.36. If yes, ask Q.22D (in box) and Q.24 onwards

22 D. What did you use for feeding this food? __/
1= bottle 2= spoon 3= hand 4= others 5= dropper

24 hours recall	day 1 food	day 2 food	after term.def
PRBF/ PTBF/ EBF			

23. After applying termination definition, the baby is __/
1= EBF 2= PRBF 3= PTBF 4= non-BF

For partial bf, ask following questions

24A. And why did you think baby needed these additional (comp) feeds in addition to breastmilk __/__/
(write in mother's words - to be coded later
-reasons for individual foods not required)

B. If mother says "insufficient BM" ask why she thought so
(to be coded later) __/__/

25. Did anyone advise you to start these (comp) foods

a) no	__/	b) mother	__/	c) mother-in-law	__/
d) friend/rel/neighbour	__/	e) doctor	__/	f) nurse	__/
g) FP worker	__/	h) husband	__/	i) dai	__/
j) PC	__/	k) other	__/		

26A. If other milk is given, which one do you give? __/
1= infant formula 2= half cream milk 3= full cream milk
4= condensed milk 5= cows milk 6=
7= 8= 9= comb
(recorded after tin/packet seen by interviewer)

B. In what dilution is CM given? __/__/
(Give times dilution, eg. 02= 2 times, 10 =10 times)

C. In what dilution is PM given? __/__/

D. If concentrated, how many times? __/__/

Ask Q.27 only if bottle use has been specified before in Q15y or z
If mother uses a bottle why does she do so? __/__/

----

28. Is CF khichuri given (1=no 2= yes) __/

29A **KHICHURI** **ingredients**

1) rice __ 2) lentils __

3) vegetables __ 4) oil __

5) salt __

B cooked how many times per day __/

C how heated & times per day __/

feeding

30A how fed (1= bottle 2= spoon 3 = hand) __/

B how many times (day and night) __/

C feeding time in relation to BF __/

1= fed before giving BM

2= fed after givin BM

3= at times before and at times after BF

31. Is gruel given (1= no, 2= yes) __/

GRUEL

32A **ingredients** **(1=no, 2=yes)**

1) rice powder ____

OR2) wheat powder ____

3) milk ____

4) sugar ____

5) oil ____

B cooked how many times per day __/

C how heated & times per day __/

feeding

33A how fed (1= bottle 2= spoon 3 = hand) __/

B how many times (day and night) __/

C feeding time in relation to BF __/

1= fed before giving BM

2= fed after giving BM

3= at times before and at times after BF

Only ask Q. 34 if breastfed before but stopped now

34. How many days did you breastfeed altogether? __/__/

35. SPECIAL GROUP QUESTIONS

If baby was non-bf on last visit, (or was partially bf and now is on ebf), i.e mother has changed her feeding practice,

baby maybe — partial bf / predom bf / ebf

ASK following questions:

a) if NON-BF: When did you start breastfeeding (baby's age in days) __/__/

or b) if PRBF or PTBF: When did you stop other feeds (") __/__/

c) How and why did you decide to change your babies feeding practice? __/ __/

____

____

____

(note suggestions by self / media / health facility / individuals)

<u>*To check for PC and FP*</u>

37. Since we visited you the last time, did anyone apart from your family and friends, come and advise you about feeding your baby __/
1=no one 2=dai 3=FP worker 4=PC 5=nurse 6=doctor

If above is 1, go to Part III Q. 38. If yes is code 2-6, ask Q.37

If non-BF, go to Part III, Q. 38

37i). Did she observe you while you were breastfeeding to check how you were doing __/
1=no 2= yes

ii) Did she show/ help you to hold the baby while breastfeeding? __/
1=no 2= yes

PART III CONTRACEPTIVE PRACTICE

38a. Have you started having periods again? 1= no 2= yes 3= PP bleeding cont __/

b. If yes, what was baby's age in days when it started __/__/__/

39. Are you using any family planning method to delay your next child? __/
1=no 2=yes 3= have not thought about it yet

If answer is 1 or 3, go to Q.41

40A. If yes, how are you doing it __/__/
(prompt for methods)
1= combined pill 2= prog only pill 3= condom 4= IUD 5= inj 6= foam tab
7= LAM 8= homeo 9= kabiraj 10= abstinence 11= more than 1 method
12= withdrawal 13= safe period 14= ligation 15=Norplant

B. Method started when baby was how old? (days) __/__/
(NA if method = 7 or 10)

C. Contraceptive method advised by? __/
1= family planning worker 2= health facility staff
3= husband 4= others

41. Are the LAM criteria applicable for this mother? 1=no 2=yes __/

LAM criteria
- no periods as yet
- mother on EBF or almost EBF (PRBF)
- gap between 2 breastfeeds
< 6 hrs at night
< 4 hrs during day

To check on number of actual visits

42A). Since our last visit, please tell us:
How many times you were visited by the FP worker __/
0= not visited 1= visited once

B) (for intervention group only)
How many times you were visited by the PC __/

OBSERVATIONS

43. Baby's weight in kg __/.__/__/
Baby's weight in kg __/.__/__/

44. Baby's length in cm __/__/.__/
Baby's length in cm __/__/.__/

45. Mother's wt in kg __/__/.__/
46. Mother's MUAC __/__/.__/

47. Feeding status __/
1=EBF 2= PRBF 3= PTBF 4= NON-BF

OTHER OBSERVATIONS and COMMENTS

ANNEX 7. TRAINING SCHEDULE FOR INTERVIEWERS

Day	Time	Topic	Method
Day 1	0900-0930	Introduction, trainers and participants	informal conversation
	0935-1030	BF situation, current infant feeding recommendations	lecture and discussion
	1100-1200	explanation of BF terms and definitions, calculation of age of infants, complementary foods	lecture and discussion
	1200-1330	orientation to research project and objectives of the study	discussion
	1400-1530	what mothers say-examples of case histories	discussion
	1535-1700	going through a questionnaire	demonstration and discussion
Day 2	0900-1000	how to converse with mothers what and how to observe during home visits	role play and discussion
	1005-1045	types of diarrhoea	lecture
	1100-1230	types of diarrhoeal stools	practical in the wards
	1330-1430	diarrhoea (contd.)	discussion
	1500-1700	interviewing mothers	role play
Day 3	0900-1000	clarifications of terms and questions in the questionnaire	discussion
	1005-1045	common illnesses in childhood, especially respiratory tract illness	lecture
	1100-1230	common illnesses (contd.)	case demonstration in hospital
	1400-1530	interviewing mothers for common illnesses	practical

Day	Time	Topic	Method
Day 4	0900-1000	classification of malnutrition	lecture
	1005-1100	anthropometric measurements	demonstration
		growth charts and calculation of W/A, W/L, L/A, MUAC	demonstration
	1105-1230	above session contd	practical
	1400-1500	local foods used for complementary feeding	discussion
	1505-1700	practice filling questionnaires with mothers and babies in hospital	practical
Day 5	0900-1000	review of previous day's progress	discussion
	1005-1230	anthropometric measurements	practical
	1400-1700	further practice and discussion	practical

Week 2-3 Practice in the field -
questionnaires pre-testing and anthropometry measurements

ANNEX 8. TRAINING MANUAL FOR INTERVIEWERS

This manual has been prepared for the research project "Impact of peer counsellors on breastfeeding practices of mothers in Dhaka, Bangladesh". The manual has two sections. The first section provides information and instructions about the interviewer's role and how to conduct interviews. The second section provides a copy of the feeding definitions used and the outcomes to be studied in the research project.

SECTION 1

This section will explain the interviewer's role in research, procedures for identifying the respondents and interviewing them, about working conditions, and the need for field supervision.

1. The interviewer's role in research

Data collected should be accurate and reliable and that is why the interviewers (you) have a very important role in research projects. You will need to:

a) have a clear understanding of the objectives of the research

b) understand the importance of following sample instructions correctly and uniformly

c) understand why the respondents have to be interviewed within the specified time period

The interview will be termed successful only if relevant and accurate information is obtained and you, the interviewer and the respondent are satisfied. Success will depend primarily on two factors: i) your capability in convincing respondents about the importance of their information ii) your skill in using the questionnaires, understanding the various types of questions and appropriate ways of questioning (notes provided with questionnaires).

2. Identifying respondents for the research

The field workers will first go around the clusters assigned to them for identifying mothers in the third trimester of pregnancy, recording their names, block and house numbers in their note books. Along with the field worker, you should see the map of the area, identify the location of the houses (from landmarks), and accordingly plan the route to be taken. You will then have to go to these houses and confirm that they are actually in the third trimester of pregnancy and then check the exclusion criteria, before requesting them to participate in the study. Reasons for exclusion and for refusal, will have to be recorded in the enrolment register.

3. Interviewing procedures

The steps for these procedures are described in this section.

3.1 Starting the interview and suggested strategies

It is important to keep in mind that while requesting an interview you are encroaching on a mother's time and privacy. To gain their co-operation, the way you approach them, explain what you require from them, and how it will benefit them, is crucial for obtaining their consent. As far as possible, you should try to include the grandmothers and the husbands at this stage. If it is not possible for husbands to be available at home during the day (including weekends), an introductory message should be left for them and the wives asked to obtain their written consent on it.

3.2 Other information for mothers

Mothers may think that they will need to answer a few questions and may get irritated if it goes on for longer than what they had anticipated. Therefore they should be informed right at the beginning that each interview may take 45 minutes to an hour so if this time was inconvenient for them, they could suggest a more convenient time.

3.3 Suggested strategies for certain circumstances

- if children are crying, suggest mother quieten or feed them before sitting down with you.
- if mother seems busy doing housework, ask if you should wait or come back later.
- if mother is not listening attentively, seeming disinterested - try to be more convincing.
- if grandmothers are present in the house, try to get them on your side, so they can aid in persuading the mother to participate.
- before asking sensitive questions regarding contraception etc., request other family members and neighbours to leave the room explaining that some private questions have to be asked.
- try to avoid measuring the baby in the presence of neighbours. If you have to do it, and they ask how much the baby weighs, do not tell them the exact figures, just that s/he is right for his/her age (mothers are superstitious that someone could cast the "evil eye" if they know, which will affect the baby's growth).
- if mother is not at home on the scheduled date of interview, leave a message with other family members or neighbours that she should stay at home the following day, when you will visit again.
- if mother is employed outside the home, take the infant's feeding history from the caretaker. When mother is at home on a holiday, take the infant's night feeding history and frequency and record the contraceptive practices.

4. Asking questions in a formal interview

As an interviewer you must ensure that you are:

- following the questionnaire instructions
- all the applicable questions are asked and answered
- the answers are clear, unambiguous and as complete as possible

Questions are asked mainly to a) collect facts and b) to assess awareness about certain topics, opinions and attitudes.

It is important for you to remember the reasons, because it will affect the way you ask and handle these questions, although we will demonstrate and instruct you regarding each question in the questionnaire. Some instructions are given in the following section.

4.1 Asking Closed Questions : These usually have a specific answer. If a respondent says she/ he has forgotten or does not know, give some tips on how to recollect it and give some time for them to think. If required, they can ask another member of the household for this information.

4.2 Asking Open Questions: If the answer sounds vague, you may have to probe to obtain a clearer answer, but avoid leading questions which may bias the answers. Some additional questions for clarifying the answers are:

- could you please explain that a little more?
- what do you mean by that exactly?
- what else do you think?

Sometimes, when respondents are given time to think, they may end up with statements which are completely different from what they may have said at first, so to be sure you have the final version on record, you can ask: - so let me check again to be sure, you are saying that "----", repeating respondents statements exactly, but not interpreting or summarising yourself.

4.3 Maintaining uniformity

It is important that ALL the respondents are asked questions in the same way, so that the answers are comparable for statistical analysis.

You can do this only if you adhere strictly to the instructions on the questionnaire and by:

- asking all applicable questions
- asking questions in the order they come in the questionnaire
- avoiding unnecessary explanations
- avoiding probing unnecessarily or repeatedly
- recording answers clearly

4.4 Inadequate Responses

These may be either of the following:

Partial Response	- where the answer is incomplete
Irrelevant Response	- where the answer is not relevant to that particular question
Inaccurate Response	- where the answer is not correct (difficult to assess but can sometimes be gauged from the previous answers/ attitude while answering)

Non-verbal response - if the respondent nods while a number of options are read out (eg: do you agree, disagree or don't know?).

If you feel that the response was inadequate, you may have to proceed in the following way:

- Repeat the question in exactly the same way as it is written
- Reflect (read back) the respondents answer like a question
- Request further clarification of the answer.

4.4 Non-Responses

This category is not to be ignored, if we have to assess what proportion of the population agreed and co-operated for the study. There is a possibility that the non- responders may have different characteristics than the responders, but unless there is some basic information available from them (as in those who drop out at a later part of the study), we may not be able to ascertain this.

Non- response may be:

a) Unsuitable/ineligible respondent: for example contraceptive details cannot be obtained from another household member or another sibling

b) Refusals: from the respondent or another influential member of the household

c) Not available: if the informant is not at home that day, on a number of occasions, or gone to the village/or moved to another area.

If unsuitable respondent, find out when the mother will be home and try to go on that day to obtain the specific information.

In case of a refusal, try to find out the real reasons for the refusal and the person responsible. Try and explain about the study and the implications again to the mother and the influential family member. If they still refuse, inform the breastfeeding counsellor, who will visit them and attempt to explain and influence also.

In case of non-contacts, visit again another day, early in the morning - or find out where the mother has gone temporarily and visit her there - or find out when she will be coming back (if out of Dhaka) and request her to come earlier if possible to get the next months interview for the child.

5. Recording answers

Closed or pre-coded questions - usually require only one answer (unless multiple answers are acceptable) - *see questionnaire instructions*. Check carefully before entering this number/ category in the questionnaire form.

Answers to open questions - record clearly, in full, word for word, as stated by the respondent, during the interview, with a blue pen, whatever may be said. Even if they seem wrong or irrelevant, you must record them. Errors should be crossed out neatly rather erased or overwritten.

6. General points about interviewing

- Dress comfortably and appropriately for the community visit
- Greet the respondent and all the family members present and request permission for the interview
- Make some small talk before actually starting the interview
- Seat yourself at the same level as the respondent - at bed or chair level or on the floor
- Conduct the interview as if conversing - looking at the respondent when questioning and in between writing the answers. Do not use any judgmental words or phrases such as "that's good", or "that's bad" or, "you should not have done that".
- Even if she did something atrocious in your presence, do not make any comment about it (feeding with a dirty bottle or dirty hands)
- To keep the respondent talking, you can encourage her by using non-committal phrases like "yes, I see" or "is that so?" or "Oh?"
- Avoid too much divergence from the interview although lots of unwanted information may be given at times, especially regarding family members health problems
- DO NOT give any advice on any topic. Explain that you are not qualified on that aspect, and to ask whoever they usually consult. Only if a child is severely malnourished, can you advise them to attend a hospital or nutrition rehabilitation centre (obtain a referral slip from PI).

Interviewing in the presence of others

The first interviews often tend to attract not only other family members, but also unrelated neighbours. In order to keep a cordial relationship with everyone, inform them what the interview will be about and most of them might leave straight away or soon after. If others interrupt or repeatedly volunteer information, explain gently that the mother alone should be allowed to answer first, but that their comments might be asked for later on. For personal questions, which may be embarrassing to answer in front of male or older female members, ask to be left alone with the mother either in that room or another, so that she can answer freely.

Field Supervision

Supervision is essential both for guidance and ensuring good work performance. Your immediate supervisors will be the breastfeeding counsellors, followed by me. We will monitor 10% percent of the total interviews. This is a requirement for a good research project, and does not mean that we do not trust you. Monitoring of the interviews will give you the chance to clarify any points that may not have been made clear earlier. It will also help to increase your confidence regarding your capabilities as an interviewer.

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SECTION 2

This section provides definitions of feeding status, some of the terms used in the questionnaires and the outcomes of the study.

Definitions of infant feeding categories

The definitions which will be used in the study are:

Exclusive breastfeeding (EBF): only breastmilk. (Medicines, oral rehydration solution (ORS) and vitamins are permitted by this definition, but not water, juices or teas).

Predominant breastfeeding (PRBF): breast milk and water, water-based drinks such as sugar water and juices.

Complementary foods (CF)*: milk, gruel, semi-solids or solids given in addition to breastmilk

Partial breastfeeding (PTBF): breastmilk and complementary foods

Non-breastfed (NBF): no breastmilk

* maybe liquid or solid

Clarifications of Terms Used in Questionnaires

Total household members - persons living in the house (usually day and night) and eating from the same pot. Husbands who live away from the house for more than 2 months (ref: ICDDR,B Urban Health Extension Project criteria), are excluded.

Occupation -

Office employee - receiving a regular salary

Business - usually applied to buying and selling of goods - may be small scale or large scale, varying in amount in different months (>Tk 5000/month to be coded as business, rest as others).

Factory worker - employed in a factory - so a worker should mention type of work done. (A peon or guard is an office employee)

Domestic servant - may be part time / full time. Income may vary from few hundred to few thousand (for those employed in expatriate houses).

Shop worker/ salesman will be included in "odd jobs", because it is different from shop owner who will fall into the "business" category.

Technician - includes skilled workers, eg. mason, carpenter, electrician, plumber etc.

Others - includes those having odd jobs or working as vendor or doing different type of work at different times.

Income - Father's income to be entered only if he supports this family. Total family income - includes contributions by other family members who may or may not be living in the same house.

Contraceptive methods - any method, medicine or application which is consciously used by the couple for child spacing. Also includes withdrawal, coitus during estimated "safe period" and abstinence.
Traditional birth attendant (TBA) - a dai who has received formal training on safe delivery. Can be recognised by the box/ bag with a logo and name of the organisation which has provided the training.
Vaginal assisted type of delivery - if any instrument, such as forceps or vacuum extractor are used (stitches/episiotomy are part of vaginal deliveries)
Baby first held by the mother - physical contact with the mother, but not necessary the same time that the baby has actually first breastfed.
First food - the very first food (fluid/gruel) put into the baby's mouth.
Prelacteals - any fluid/ food which is fed to the baby before s/he is fed colostrum.
Colostrum - the thick, yellowish secretion which is secreted from the breast within the first week of life. The earlier the baby starts breastfeeding, the earlier is the change to transitional milk (usually 3-5 days), followed by whitish mature milk.
Postlacteals - any food which is given <u>after</u> feeding colostrum. This maybe a prelacteal which is <u>continued</u> after the baby starts feeding colostrum, OR a food which is given after starting colostrum - i.e. in addition to colostrum, over the first 3 days.
Feeding now - refers to foods (milk, water, gruel or solids) fed to the baby during the last 24 hours. PROBE for water/ water-based drinks/ honey.

For termination of EBF/ PRBF and breastfeeding status - For determining if there were changes in feeding status over the last month, as compared to that reported for the last 24 hours.

Reasons for starting other milk - PROBE for additional or underlying reasons as opposed to accepting the reason stated straight away, which may not be the real reason.
For example - when a mother says "insufficient breastmilk", ask why and how she thought that (signs and symptoms), or how she came to this conclusion, or did anyone suggest it.

<u>Outcomes to be Studied</u>

1. Duration of exclusive breastfeeding (EBF) - the period during which the baby takes only breastmilk.
Termination of exclusive breastfeeding - if any other water, liquid or solid is given for 2 successive days. (obtained from 24 hour recall data followed by questions for termination).

2. Breastfeeding prevalence in the first 5 months (see Questionnaire 3)
Termination of predominant breastfeeding - if any other milk/ gruel /solid is given for 2 successive days. Infants will be classified monthly as exclusively breastfed, predominant, partial or non-breastfed by two methods. From 24 hour recall, and after the probing questions for termination of EBF and PRBF are used. Final entry in the questionnaires will be made by your supervisors.

3. Complementary feeding in the first 5 months

By 24 h recall - record age of infants in days when complementary foods were started.

The type, frequency, dilution (if milk), and mode of feeding should be obtained

The reasons for first starting the complementary feeds and the persons influencing the mother's decision-making have to be noted.

4. Usage and acceptability of contraceptive methods during first 5 months

Record contraceptives advised and actually used by the mothers. Criteria for using LAM are provided in Questionnaire 3. Whether or not a mother meets the LAM criteria will be recorded monthly. Mothers will be said to accept the LAM if they use it alone, without additional contraceptives.

5. Infant morbidity during first 5 months

24 hour recall data for prevalence of diarrhoea, dysentery (mucous and/ or blood) and cough and fever should be collected first, followed by "day by day" data for a total of 7 days.

Severe illness - Any illness which occurred during monthly visits and required a baby to be taken to a health facility, will be termed severe.

6. Infants' anthropometric status during first 5 months

Body weight and length will be measured. Infants wearing light clothes will be weighed on SECA manual scales to the nearest 10 g and the average of 2 readings taken. Length will be measured to the nearest mm on a lengthboard, taking the average of 2 readings (re-positioning baby between measurements).

Mothers anthropometric measurements will be taken at 8 months of pregnancy. Weight and MUAC will be repeated after delivery and monthly. Weight will be taken on bathroom scales (x1kg) wearing light clothes. Height (cm) will be measured with a clipboard placed on the head, levelled and spot marked on the wall and distance to the ground measured with measuring tape.

Left mid-upper arm circumference (MUAC) will be recorded to the nearest mm using a non-stretch measuring tape.

ANNEX 9. STANDARDISATION PROCEDURES FOR COLLECTION OF ANTHROPOMETRIC DATA

This standardisation procedure provides a prompt return of information, pinpointing errors so that correction could be made before sources of error became fixed.

1. Data collection:

Five infants constituted the standardisation series. We could not have 10 infants at one time, as suggested for the test (WHO, 1983) because these were sick infants in the hospital, and could not stay away from the ward for a long time. There were 4 interviewers and myself (5 observers), while the trainer who was regularly doing anthropometry, was taken as the Supervisor. The 5 observers measured each subject twice in such way as to avoid being influenced by the first measurement. The results of the initial measurement were noted on an appropriate record form and put aside until the second series of measurement were taken, in the same order as before, removing the infant from the scales each time.

2. Calculation:

Step 1- The results of duplicate measurements were entered in the first 2 columns a and b.

Step 2- In the column d the figure corresponding to (a-b) was entered with its appropriate sign.

Step 3- In column d^2, (a-b) is squared.

Step 4- Pluses and minuses of (a-b) are counted. The sum of the most frequently occurring sign constitutes the numerator of a fraction of which total number of signs is the denominator. Zeroes were ignored.

Step 5- In column s, the sum of (a+b) is entered.

These five steps were carried out simultaneously by all 5 observers and the trainer.

Step 6- The s column of the trainer's sheet was transferred to the sheet of each observer under column S.

Step 7- The difference between the observer's s and Trainer's S was entered in column D (s-S) with the appropriate sign, and squared in column D^2.

Step 8- Pluses and minuses of (s-S) were counted. The sum of the most frequently occurring sign constitutes the numerator of a fraction of which the total number of signs is the denominator. Zeroes were ignored.

Step 9- The sums of d^2 and D^2 and the results of the sign counts were transferred to a single sheet of paper.

Evaluation of results:

The following general rules apply in the analysis of results:

(1) The trainer's sum of d^2 will usually be smallest; her precision will be the greatest because of her expected greater competence.

(2) An observer's sum of d^2 (inversely related to precision) is arbitrarily no more than twice the supervisor's sum of d^2.

(3) An observer's sum of D^2 (inversely related to accuracy) is arbitrarily no more than twice the supervisor's sum of d^2.

(4) An observer's sum of D^2 should not be larger than her sum of d^2. If it is not , the data should be closely scrutinised and recalculated.

Measurement of C.V. (coefficient of variation):

The coefficient of variation was determined by intra- and inter observer measurements.

The formula used to calculate coefficient of variation (C.V) was: sd/mean x 100%

1: Standardisation of body weight (gm) of five infants taken by five observers

Sub	Age	Sex	A	B	C	D	E	Trainer
1	4 mo	Male	4720	4710	4700	4710	4710	4700
2	6 mo	Male	6920	6930	6920	6910	6900	6900
3	5 mo	Female	5030	5020	5010	5000	5010	5010
4	8 mo	Female	8210	8220	8210	8200	8200	8200
5	3 mo	Male	5020	5010	5030	5020	5010	5000

CV= 0.2-0.3%

Table 2: Standardisation of length (mm) measured in 5 infants by five observers and supervisor

Sub	Age	Sex	A	B	C	D	E	Trainer
1	4 mo	Male	581	584	586	587	584	583
2	6 mo	Male	654	655	654	656	652	652
3	5 mo	Female	591	588	592	594	590	589
4	8 mo	Female	662	666	664	666	664	664
5	3 mo	Male	557	558	556	559	554	553

CV= 0.3 to 0.5%

ANNEX 10. PEER COUNSELLOR MONITORING FORMS AND WEIGHTING FOR SCORES

8th month of pregnancy		YES	NO
explained own responsibilities		----	----
1. enquired about mother's health	1/2 L	----	----
2. empathy shown	1 C	----	----
PC said ----------------------------			
3. past feeding history taken	1/2 L	----	----
4. feeding intentions for coming baby asked	1/2 L	----	----
5. previous feeding problems enquired	1/2 L	----	----
6. identified decision makers for infant feeding and involved them in the discussion	1L + 1C	----	----
7. asked about information obtained from ANC/ family about breastfeeding	1L	----	----
8. explained the relevant information at this stage	2C	----	----
9. any misconceptions clarified if yes, specify	1C	----	----
10. further clarifications required If yes, specify	1C	----	----
11. Attitude	1L + 1C		

L = listening and learning
C = confidence building

(L = 5, C = 7) Total score = /12

Justification for weighting scores in the pregnancy visit:

No score is given for the first question, because all the PCs have to do this and it is neither an L or C question!

1/2 points were given for the first 4 L questions because they are important to know, but will not influence BF outcome, whereas the L questions given 1 point will do so.

All the C questions have 1 point each, except for Q.8, "explaining the first 5 counselling messages" which will score 2 points if 4 or more messages have been given. These messages are crucial for initiating and maintaining EBF. Some questions have both L and C components - listening first, before counselling as in "identifying decision makers and involving them in the discussion"

This also scores 2 points because these people can either support EBF or make it impossible!

"Attitude" is also a combination of L and C and can only be deduced from careful observation during the whole counselling session (non-verbal). A PC may be able to score well on all the previous points, but if her attitude is not good, i.e., if she does not have a good rapport with the mother, cannot make her feel comfortable, does not give her enough time, does not speak convincingly about the importance of EBF and the other messages, she will not be able to influence her breastfeeding outcomes. (The importance of all these points was explained during training and reminded later if found deficient during monitoring).
But in front of an observer, a PC may consciously behave differently from what she may do in her absence. In the 20 weeks PC follow up questionnaire, although the interviewers did not specifically ask about "Attitude", some mothers did complain that PCs did not come as frequently as before and did not spend enough time with them even when they did come.

PCs went for counselling during the 9th month also, repeating all the messages provided earlier, especially making an effort to involve the husband, if he was not present before, reminding them about sending the birth notification slip to ICDDR,B and also informing the PC as soon as possible after delivery. So we felt the first visit would be more important to see how the PC was interacting with the mother and getting relevant information.

First visit after delivery

PCs visited within few hours of delivery, in many cases were present during delivery, so it was usually not possible to monitor them on these visits. Besides family members did not like to have so many outsiders visiting right after delivery. We monitored a few visits at the beginning, understood the problems, and then decided to monitor the Day 5 visit only, when mother and baby were more settled and the family members more receptive.

The first visit included congratulating the mother and family members, enquiring about welfare of the mother and baby, how breastfeeding was going, discouraging pre and postlacteals, encouraging bedding-in and demand feeding, and most importantly, helping the mother with position and attachment of the baby at the breast. So when the 5th day visit took place, the initial counselling specific to the first three days postpartum had already taken place (unless mother was in hospital).

5th day visit		**YES**	**NO**
1. empathy shown for good progress	1C	----	----
2. empathy shown for problems	1L+1C	----	----
PC said ---			
3. enquired about infant feeding status (+ probed)	2L	----	----
4. checked position and attachment	2P	----	----
5. any other practical help given if yes, specify	2P	----	----
6. thanked family members for supporting mother	1C	----	----
7. encouraged frequent and demand breastfeeding	1C	----	----
8. counselling messages given mothers' food and rest	1C	----	----
9. benefits if baby is EBF for 5 months baby mother family	2C	----	----
10. Attitude	1L +1C	----	----

(L = 3, C = 8, P = 4) Total scores = /16

Justification for weighting in the 5th day visit:

This visit has no half points, minimum is 1 and maximum is 2.

Questions which are the same as in pregnancy visit are nos. 6,7,9 and are weighted the same way.

Q.1 and 2 (empathy) have 3 points because PC can empathise for both the mother and the infant, whereas it was for the mother alone in pregnancy and so had 1 point.

Q. no 3 (infant feeding status) is very important - if not probed carefully, may not know the actual feeding status and related reasons, so has 2 L points.

Q no. 8 is a new message at this stage so has 1 point and Q. no 9 "benefits if baby is EBF for 5 months" is repeated and has 2 points because it is still very important (may have not listened carefully during pregnancy). Thus, counselling messages have 3 points in total.

Q. 4 and 5 are new in this session as Practical help points, and crucial at this time for influencing BF outcome.

Monthly visit		YES	NO
1. empathy shown for good progress	1 C	----	----
2. empathy shown for problems	1L + 1C	----	----
PC said ---			
3. enquired about infant feeding status (+ probed)	2L	----	----
4. checked position and attachment	2P	----	----
5. any other practical help given	1P	----	----
if yes, specify			
6. thanked family members for supporting mother	1C	----	----
7. encouraged frequent and demand breastfeeding	1C	----	----
8. counselling messages given			
mothers' food and rest	1C	----	----
9. benefits if baby is EBF for 5 months	1C	----	----
baby			
mother			
family			
contraceptive effect	1C	----	----
10. Attitude	1L +1C	----	----
	(L =4, C = 8, P = 3)	Total score =	/15

Justification for weighting in monthly visits:

The weighting is as before for most of the questions, except for Q. no 9 (counselling messages regarding benefits for baby) - This has 1C point only compared to 2C on 5th day, because the importance of repeating these every month is less once their breastfeeding practices are established.

The "contraceptive effect and LAM", although a mother's benefit, has to be explained at first and reminded at each visit, especially to avoid long breastfeeding gaps, so merits 1 point. So there are still 3 points for the counselling messages, but allocated differently.

Total scores for all 3 visits are 42, if all points are scored. If some questions are not applicable (e.g. no previous baby/ no family members available etc.), the PC will still score the point. If they are present, and she does not ask about them, she will score 0. The same goes for what she should have done, but did not do. Half points will be given if she said or did something, but not appropriately enough.

ANNEX 11. Baseline comparisons of selected variables in each cluster (intervention)

	C # 1 n=18	C# 2 n=11	C# 3 n=18	C# 4 n=23	C# 5 n=25	C# 6 n=14	C# 7 n=19	C# 8 n=21	C# 9 n=15	C# 10 n=5
mother's age										
median	23	21	25	23	25	22	24	24	23	25
range	17-29	18-26	17-34	14-32	16-35	19-26	16-30	18-29	16-27	22-27
mothers education (yr)										
median	5	4	3.5	5	8	1.5	5	4	5	7
range	0-10	0-10	0-10	0-15	0-14	0-12	0-12	0-10	0-12	0-14
parity										
first	7 (39)	1 (27)	2 (11)	6 (26)	8 (31)	5 (36)	4 (21)	7 (33)	4 (27)	2 (40)
second	5 (28)	6 (54)	7 (39)	5 (22)	9 (35)	3 (21)	10 (53)	3 (14)	6 (40)	2 (40)
family income (Tk/mo)										
median	4775	5000	4800	4800	5450	3250	4000	5000	4800	7300
range	1800-14,000	0-8,000	1000-30,000	1700-32,000	2400-26,000	2000-39,400	1320-153,000	1500-30,000	1500-20,000	1800-30,000
total household members										
median	4	3	4	4	4	3.5	3	4	4	7
range	2-7	2-5	2-13	1-12	2-12	2-13	2-5	2-10	2-9	2-7

Annex 11. contd ...... Baseline comparisons (intervention)

	C # 11 n=31	C# 12 n=26	C# 13 n=18	C# 14 n=21	C# 15 n=17	C# 16 n=16	C# 17 n=19	C# 18 n=15	C# 19 n=20	C# 20 n=10
mother's age										
median	23	20	23	23	21	24	23	23	20	24.5
range	15-30	15-31	14-27	17-32	15-27	16-30	16-32	18-30	17-30	17-31
mothers education (yr)										
median	4	3	1.5	5	6	2.5	4	0	4	5
range	0-10	0-12	0-10	0-12	0-14	0-14	0-14	0-9	0-10	0-14
parity										
first	10 (32)	12 (46)	5 (28)	9 (45)	4 (23)	3 (19)	3 (16)	3 (20)	10 (50)	1 (10)
second	9 (29)	9 (35)	7 (39)	3 (15)	10 (59)	5 (31)	9 (47)	2 (13)	2 (10)	4 (40)
family income (Tk/mo)										
median	6000	3550	4150	5000	7300	3200	4500	3500	5000	4950
range	1200-50,000	800-81,000	1250-10,000	800-95,000	2000-30,000	2000-12,000	2200-57,000	2000-17,600	2400-17,500	3500-10,000
total household members										
median	4	2.5	3	4	4	3	3	4	3	5
range	2-11	2-15	2-9	2-14	2-6	2-8	2-15	2-14	2-10	2-12

Annex 11 contd. **Baseline comparisons of selected variables in each cluster (control)**

	C # 31 n=15	C# 32 n=9	C# 33 n=13	C# 34 n=14	C# 35 n=35	C# 36 n=26	C# 37 n=13	C# 38 n=10	C# 39 n=17	C# 40 n=6
mother's age										
median	19	23	20	24.5	23	20	22	20	22	24.5
range	16-28	18-28	15-30	19-30	16-30	16-30.5	16-34	16-25	16-30	18-30
mothers education (yr)										
median	4	6	3	1	1	2	1	0	3	7.5
range	0-9	0-12	0-10	0-14	0-14	0-12	0-12	0-9	0-11	0-10
parity										
first	9 (60)	4 (44)	5 (38)	2 (14)	6 (17)	11 (42)	6 (46)	3 (30)	6 (35)	2 (33)
second	2 (13)	4 (44)	5 (38)	4 (29)	11 (31)	6 (23)	1 (8)	4 (40)	4 (23)	1 (17)
family income (Tk/mo)										
median	3000	3500	4000	4000	3800	4300	3000	3000	4500	5250
range	1500-15,000	2450-9000	1800-20,000	1200-33,000	1350-30,000	0-30,000	1800-10,000	2000-30,000	1500-20,000	2500-16,000
total household family members										
median	3	3	4	4.5	4	4	4	3	4	5
range	2-8	2-7	2-10	3-10	2-14	2-15	2-7	2-6	2-10	2-8

Annex 11. contd ..... Baseline comparisons (control)

	C # 21 n–22	C# 22 n=9	C# 23 n=21	C# 24 n=15	C# 25 n=18	C# 26 n=13	C# 27 n=14	C# 28 n=25	C# 29 n=33	C# 30 n=35
mother's age										
median	22	23	23	24	19.5	20	21	20	23.5	23
range	17-30	17-32	17-30	16-31	15-30	15-31	16-32	14-32	16-30	17-33
mothers education (yr)										
median	0	4	7	5	3.5	4	2.5	3	6	7
range	0-11	0-14	0-14	0-14	0 9	0-12	0-10	0 10	0-16	0 14
parity										
first	10 (45)	2 (22)	6 (29)	5 (33)	10 (56)	7 (54)	5 (36)	10 (40)	11 (33)	14 (40)
second	5 (23)	2 (22)	8 (38)	5 (33)	2 (11)	4 (31)	6 (43)	9 (36)	8 (24)	13 (37)
family income (Tk/mo)										
median	2500	3000	5000	4500	2750	2700	4000	4500	4600	7000
range	0-10,000	2000-5000	1800-15,000	1700-90,000	300-14,020	1500-8000	2000-48,500	2000-17,000	1500-30,500	2000-50,000
total household members										
median	3	3	4	5	3.5	3	3.5	5	4	4
range	2-7	1-5	2-8	2-12	2-9	2-4	2-19	2-8	2-15	2 9

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