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The Contraceptive Potential of Breastfeeding in Bangladesh

*MCH-FP Extension Project (Urban)
Health and Population Extension Division*

Sarah Salway
Sufia Nurani



CENTRE
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Urban MCH-FP Extension Project

Urban FP/MCH Working Paper No. 28

The contraceptive potential of breastfeeding in Bangladesh

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Foreword

I am pleased to release these reports on urban Maternal and Child Health and Family Planning issues which are based on the operations research activities of the MCH-FP Extension Project (Urban) of the Centre. Over the years, the Centre has acquired a unique expertise on urban development matters that ranges from operations research on reproductive health, child survival and environmental issues to providing technical assistance for capacity building to service delivery organizations working in urban areas.

This work has produced important findings on the health conditions and needs of city dwellers, particularly the poor and those living in slums. The research has also identified service delivery areas in which improvements need to be made to enhance effectiveness. Together, these research findings have been translated into interventions currently being applied in government and non-government settings.

In order to carry out this innovative work, the Centre has established a partnership effort known as the Urban MCH-FP Initiative, with different ministries and agencies of the Government of Bangladesh and national non-government organizations, notably Concerned Women for Family Planning, a national NGO with wide experience in the delivery of MCH-FP services. The partnership receives financial and technical support from the United States Agency for International Development (USAID).

The overall goal of the partnership is to contribute to the reduction of mortality and fertility in urban areas. In practice, this joint work has already resulted in the development and design of interventions to improve access, coordination and sustainability of quality basic health services to urban dwellers with emphasis on the needs of the poor and those living in slum areas.

The Centre looks forward to continuing this collaboration and to assist in the wider dissemination and application of sustainable service delivery strategies in collaboration with providers in government, the NGOs and the private sector.


Syed Shamim Ahsan
Senior Adviser and Director
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Summary

This working paper uses both quantitative and qualitative data to explore the issue of lactational protection against pregnancy in Bangladesh.

High quality, longitudinal data from two surveillance sites, one urban and one rural, are used to explore the contraceptive potential of breastfeeding in Bangladesh. Results show that in the early 1990s, postpartum amenorrhoea lasted for longer than eight months on average in both study populations. Life table analyses illustrate that among breastfeeding Bangladeshi women, lactational amenorrhoea affords a high degree of protection against pregnancy. Full breastfeeding is shown to afford significantly greater contraceptive protection than partial breastfeeding, though partial breastfeeders are also shown to enjoy good protection against pregnancy whilst amenorrhoeic, presumably because of intensive suckling despite supplementation. The results also suggest that lactational amenorrhoea can afford good protection against pregnancy beyond six months postpartum, particularly for women who fully breastfeed in the first six months. Among women whose child survived to at least two months of age, the cumulative risk of conception among all those who remained amenorrhoeic *regardless of their breastfeeding status* is shown to be less than 2% by six months and less than 3% by nine months. Findings also suggest that older women have significantly lower risks of conception during postpartum amenorrhoea than younger women.

The paper identifies a number of barriers, both client and service-related, that currently inhibit the effective incorporation of lactational amenorrhoea into postpartum family planning strategies in Bangladesh. Qualitative data from in-depth interviews with service providers suggest that at present, family planning programme activities

do not promote breastfeeding for its contraceptive qualities, and in many cases actually undermine breastfeeding practices that are beneficial to birth spacing (as well as child health). Many family planning workers have poor knowledge of the contraceptive potential of breastfeeding, and commonly promote contraception in the early postpartum period regardless of breastfeeding and amenorrhoeic status. Interviews with women reveal a common understanding that the chance of pregnancy is low during postpartum amenorrhoea, but little recognition of the connection between breastfeeding patterns and risk of conception. Therefore, though at present Bangladeshi women benefit from the contraceptive protection of breastfeeding, without appropriate support, this natural barrier to conception may gradually wane.

The paper recommends that since most women are reluctant to accept modern methods of contraception soon after birth and contraceptive continuation rates are in any case still very low, measures should be introduced to explicitly incorporate lactational amenorrhoea into postpartum family planning strategies in Bangladesh.

1. Introduction

The relationship between breastfeeding and the chance of conception has been noted for over a century and has been a topic of investigation for at least the past 40 years (1, 2). Data from numerous settings have demonstrated the correlation between breastfeeding duration and birth interval length (3), as well as the duration of postpartum amenorrhoea (4, 5). An impressive body of clinical evidence also suggests that breastfeeding has an important contraceptive effect.

In Bangladesh, long durations of intensive breastfeeding have traditionally resulted in extended durations of postpartum amenorrhoea and long intervals between births even in the absence of contraception (6). Huffman *et al.* (7) reported a median duration of postpartum amenorrhoea of 15.5 months for women giving birth in Matlab between 1975-80 and the national Bangladesh Fertility Survey (BFS) of 1975 gave a figure of 14.6 months (8). Analyses of data from the 1989 BFS suggest that lactational amenorrhoea continues to have an important contraceptive effect and that overall it reduced fertility in Bangladesh by 35% (9).

However, the contraceptive effect of breastfeeding is not absolute, and, since ovulation may occur in the first menstrual cycle following the birth, a woman may conceive even without any visible menses. Recent studies have attempted to evaluate the contraceptive potential of breastfeeding more precisely and to develop guidelines for use by individual women.

Drawing on results from eight countries, the Bellagio Consensus Statement concluded that, for women who breastfeed 'fully or nearly

fully'¹ and remain amenorrhoeic, the cumulative risk of conception over the first six months postpartum is less than 2%, that is, similar to or lower than the risks attached to use of modern methods of contraception (10). Subsequent studies have further investigated the relationship between breastfeeding patterns and conception, and have addressed two important questions: does breastfeeding have to be full or nearly full for a contraceptive effect to exist? and; can contraceptive protection be achieved beyond six months postpartum?

Recent studies suggest that a high degree of contraceptive protection can be achieved even among women who are not breastfeeding fully (11). Gray *et al.* (12) concluded that a certain level of protection may be achieved by different patterns of breastfeeding, for example either long, infrequent feeds or shorter, frequent feeds, but that a certain degree of nipple stimulation must be maintained to suppress ovarian activity. Other researchers have concluded that amenorrhoea alone can be taken as the indicator of low pregnancy risk among breastfeeders, regardless of whether supplements have been introduced to the baby's diet or not (13, 14).

¹ The Bellagio Consensus Statement recognised that 'exclusive breastfeeding', wherein 'the infant receives only breastmilk given directly from the mother's breast (with the possible exception of medicine or vitamin drops)' would maximise lactational protection against pregnancy. However, since such breastfeeding is rare in developing country settings (with the majority of infants being given, at the least, small amounts of traditional mixtures, water, teas or juices) the recommendations were based on 'full or nearly full breastfeeding'. No precise definition of 'full or nearly full breastfeeding' was offered, and it was pointed out that local variations in breastfeeding habits make such a definition difficult. However, it was understood that 'for breastfeeding to be sufficient to be used for family planning, the breastfeeding pattern must include at least these aspects: breastfeeding should constitute the overwhelming majority of the baby's diet; breastfeeding frequency and duration should be high, and not affected by additional feedings; and additional feedings should not act as replacements for breastfeeding' (10, pp486-487).

Most studies have confirmed the findings of the Bellagio consensus statement, namely that lactation can provide a high degree of protection up to six months postpartum. There is less agreement, however, as to whether this protection can be relied upon beyond six months. Some researchers have concluded that six months is the point at which the risk of pregnancy increases to an unacceptably high level (12), whereas others suggest that protection extends beyond this time, particularly in populations where there is intensive and prolonged breastfeeding. Recent findings suggest that lactational amenorrhoea may be relied upon for protection against pregnancy up to nine or even 12 months in certain situations (15). It has even been suggested that protection may be relied upon up to the resumption of menses, regardless of the time since birth (13).

Thus, despite the Bellagio 'consensus', research in this area continues to produce varying results and recommendations. Partial explanation for divergent results lies in inconsistent study designs and analyses.² Leaving methodological issues aside, however, there appears to be significant real variation in the natural protection against pregnancy afforded by lactation, both between and within populations. Though this is probably largely explained by differing breastfeeding patterns, recent research also suggests that the effect of lactation on ovarian activity may be mediated by other physiological factors such as maternal nutrition (16,17). This highlights the need for population-based analyses and suggests that generalisations across settings may be dangerous.

² Many studies have employed small samples, often consisting of individuals that are unrepresentative of the population at large, have failed to use life table methodology (or are not explicit about the way life tables were constructed), or have failed to control for potentially confounding factors. Different researchers have used different outcome measures, some looking at ovulation (using a range of biochemical assays), others considering hypothetical pregnancy rates, and still others considering observed pregnancies.

An understanding of the contraceptive potential of breastfeeding is not purely of academic interest. It is a necessary prerequisite to the development of appropriate postpartum family planning policy in any particular setting. Moreover, the potential role that lactational protection against pregnancy can play in an overall strategy of postpartum family planning service provision will depend on the knowledge, attitudes and behaviour of both clients and providers.

To date little research has addressed the issue of natural protection against pregnancy in Bangladesh. Weis (18) analysed data from the 1989 BFS and concluded that breastfeeding affords good protection against pregnancy among amenorrhoeic Bangladeshi women for the first 12 months after birth. The present paper uses both longitudinal surveillance data and qualitative data in order to explore the issue of lactational protection against pregnancy among Bangladeshi women in more detail. The quantitative data are used to describe the levels and differentials in lactational protection against pregnancy. In addition, the prevailing client and provider perspectives on breastfeeding as a contraceptive are explored using data from in-depth interviews and group discussions.

2. Methods and data

The data used in the present paper come from two research sites of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR): the Matlab MCH-FP project treatment area and the Dhaka slum study area of the Urban Health Extension Project.³

³ The study area of the Urban Health Extension Project consisted of sample clusters of slum households in five *thana* of Dhaka city: Demra, Sutrapur, Mohammedpur, Kotwali and Lalbagh.

Quantitative data from the Record Keeping System (RKS) of Matlab and the Urban Surveillance System (USS) of UHEP were used to examine the levels and patterns of natural protection following childbirth in the two study populations.⁴

The RKS data consisted of seven, two-year cohorts of women who had a live birth in the Matlab treatment area between 1978-9 and 1990-1. For each live birth, the woman's monthly reproductive and contraceptive records for the 36 months following the birth were extracted from the RKS database. For the cohorts 1978-9 to 1986-7, the monthly lactation records for the 36 months following the birth were also extracted, though this information was unfortunately not available for the 1988-9 and 1990-1 cohorts. As well as the monthly records of reproductive, contraceptive and lactational status, background variables describing the woman's education, religion, and socio-economic status were available. The sample sizes of the cohorts were: 1978-9: 5,558; 1980-1: 6,152; 1982-3: 6,240; 1983-4: 5,593; 1986-7: 5,875; 1988-9: 6,136; 1990-1: 5,483.

One cohort of women was analysed from the USS including all women in the USS sample clusters who reported a live birth between April 1992 and June 1993. A special add-on questionnaire was designed to collect data on the duration of postpartum amenorrhoea and time to the adoption of contraception following the birth. The questionnaire was administered to each woman, at each three-monthly visit following the birth until any one of three possible endpoints: resumption of menstruation *and* initiation of contraception; conception; or loss to follow-up (due to out-migration from the cluster, or absence from the household for two consecutive visits). A total of 1,201 women were reported to have had a live birth in the period April 1992 to June

⁴ These surveillance systems are described in more detail elsewhere (19, 20).

1993, of which 1,151 were successfully followed up and received the special questionnaire at least once. The information gathered from this add-on questionnaire was linked to the routine USS data. In this way, information on the woman's pregnancy and contraceptive status were available for each round following the birth. In addition, baseline demographic, educational and socio-economic data relating to the woman and her household were available.

As well as the quantitative surveillance data, this paper also makes use of qualitative data in order to describe the understandings and opinions of users and providers of family planning services. A series of in-depth, semi-structured interviews was carried out with women resident in Matlab and the urban slums of the UHEP working area. RKS and USS records were used to identify women who had adopted contraception following their last birth and these women were then located and interviewed. One group consisted of women who, following the birth of their last child, had adopted contraception prior to the resumption of menses (the before-menses group). The other group consisted of women who had adopted contraception after the resumption of menses (the after-menses group). In Matlab, a total of 39 women were successfully interviewed (19 before-menses cases, and 20 after-menses cases). In Dhaka, a total of 34 women were interviewed (20 before-menses cases, and 14 after-menses cases). The data collection was completed between November 1993 and May 1994.

Family planning providers working for the MCH-FP Project in Matlab, and for government and NGOs serving the UHEP areas, formed the second group of informants. Data collection in Dhaka city was conducted in two phases, with a total of 50 family planning providers from seven non-government organisations (NGO) and six government service outlets (GoB) being interviewed using a semi-structured guideline. In Matlab, semi-structured in-depth interviews were

conducted with 12 fieldworkers (Community Health Workers, CHWs) and five clinic-based paramedics (Lady Family Planning Visitors, LFPVs), and four focus group discussions were held with 19 fieldworkers. The data collection was completed between July 1993 and May 1994.

The qualitative interviews and discussions with users and providers covered a variety of topics related to contraceptive use following childbirth. In the present paper, only the findings relating to the contraceptive potential of breastfeeding are discussed, while other findings are presented elsewhere (21).

3. Findings

3.1 Current patterns of postpartum amenorrhoea

Table 1 shows the quartiles in months of the life table survival distribution of postpartum amenorrhoea in the Matlab 1990-1 and the USS 1992-3 cohorts.⁵ These recent data from both study populations show that the pattern remains one of long durations of postpartum amenorrhoea. In the Dhaka slum population, among women with a surviving birth, the median duration of postpartum amenorrhoea was 8.8 months (se=0.3), and in Matlab the figure was 9.5 months (se=0.2). In both populations, there was a wide variation in the duration of postpartum amenorrhoea, with some women reporting the return of menses within two months and others remaining amenorrhoeic for more than two years.

Important differentials in the duration of postpartum amenorrhoea were found among subgroups of women in both the

⁵ Unless otherwise stated, all life tables were computed using the SAS procedure 'proc lifetest, method=life'. This computes the life table in the traditional, actuarial manner.

Matlab and the USS population. In the Matlab 1990-1 cohort, among women who had only one or two living children the median duration of postpartum amenorrhoea was just 7.2 months (se=0.2 months), whereas for women who had three or four living children this figure was 13.0 months (se=0.3). Among the Dhaka slum population, these figures were 6.4 months (se=0.5) and 10.9 months (se=0.5) respectively. Similarly, younger women had much shorter durations of postpartum amenorrhoea than older women in both populations. In addition to differences by age and the number of living children, educated women were found to have significantly shorter durations of postpartum amenorrhoea than women who had received no schooling, in both populations.

Table 1. Quartiles in months of life table survival distribution of postpartum amenorrhoea in Matlab 1990-1 and Dhaka slums 1992-3

	Matlab 1990-1		Dhaka slums 1992-3	
	All women	All women whose child survived	All women	All women whose child survived
.75	4.3	4.7	2.9	3.6
.50	8.8 (0.2)	9.5 (0.2)	7.5 (0.5)	8.8 (0.3)
.25	16.5	17.1	13.7	14.4
N	5483	4990	1151	1017

- Notes: 1. Standard error of the median shown in parentheses.
 2. Unadjusted data. Adjustments for delayed reporting of pregnancy (described below) among women who conceived during amenorrhoea made little difference to the results. With adjustments, among all women in Matlab, the median duration of amenorrhoea was 8.7 months (se=0.2), and among all women in the USS, the median duration was 7.4 months (se=0.4).
 3. The second column in each panel refers to women whose child survived to the end of the period of follow-up.

In the Matlab population, area of household, an indicator of socio-economic status, was also negatively associated with duration of postpartum amenorrhoea. For the USS population, an index of asset ownership was used as an indicator of socio-economic status. This too was negatively associated with the duration of postpartum amenorrhoea, with women in the lowest socio-economic group having a median duration of 9.3 months (se=0.9) compared to 6.7 months (se=0.7) among women in the highest socio-economic group. Overall, the differentials observed were similar in both the study populations and mirrored those that have been noted elsewhere (7, 8). Whilst the differential between educational and socio-economic subgroups is probably largely explained by divergent breastfeeding behaviours, differences between age and parity groups may also reflect underlying fecundity levels, as has been noted elsewhere (22, 23).

3.2 Trends in postpartum amenorrhoea

Although inconsistencies in methodology make comparisons difficult, evidence suggests that the period of natural protection against pregnancy following birth may be on the decline in Bangladesh. Recent national surveys have estimated the mean duration of postpartum amenorrhoea to be around 12 months and have found important differentials between socio-economic groups (24, 25). Also, earlier studies in Matlab reported longer durations of postpartum amenorrhoea than those observed here in the recent study cohorts. This finding, plus the observed differentials between subgroups, suggests that patterns of postpartum amenorrhoea may have changed in recent years. The Matlab RKS data allow us to examine the trend in the duration of postpartum amenorrhoea in this population over the period 1978 to 1991.⁶

⁶ Since these data were collected in a uniform manner, and without recall, the comparisons made over time between cohorts are likely to reflect real changes, rather than to be artefacts of the methodology employed.

Table 2 shows that, between 1978 and 1983, the median duration of postpartum amenorrhoea fluctuated around 13 months for all women and around 14 months for women whose child survived. Thereafter, the median duration of postpartum amenorrhoea declined sharply from a figure of 14.7 months for the 1982-3 cohort, to 9.5 months for the 1990-1 cohort among women whose child survived the full period of follow-up of 36 months. Substantial reductions in the duration of postpartum amenorrhoea were also found among almost all subgroups of women.

Compared to the national population, it appears that the pace of the decline has been somewhat faster in Matlab. In 1975, the BFS estimated the mean duration of postpartum amenorrhoea to be 14.6 months and in the 1989 survey this figure was estimated to be 12.4 months. This represents a decline of 15% over the period, compared to a 21% decline in the mean duration of postpartum amenorrhoea in Matlab between 1978-9 and 1990-1 (from 14.5 months to 11.4 months).⁷

⁷ Estimates of mean durations were produced using the SAS procedure 'proc lifetest, method=PL'.

Table 2. Median months of postpartum amenorrhoea in Matlab 1978 to 1991

Cohort of birth	All women			All women whose child survived		
	Median	s.e.	N	Median	s.e.	N
1978-9	13.7	(0.2)	5558	14.9	(0.2)	4725
1980-1	12.8	(0.2)	6152	13.9	(0.2)	5315
1982-3	13.6	(0.2)	6240	14.7	(0.2)	5371
1984-5	12.5	(0.2)	5593	13.4	(0.2)	4979
1986-7	11.2	(0.2)	5975	12.0	(0.2)	5427
1988-9	10.1	(0.2)	6136	10.5	(0.2)	5644
1990-1	8.8	(0.2)	5483	9.5	(0.2)	4999

- Notes: 1. Standard error of the median shown in parentheses.
 2. Unadjusted data. Adjustments for delayed reporting of pregnancy (described below) among women who conceived during amenorrhoea made little difference to the results.
 3. The second set of figures refers to women whose child survived to the end of the period of follow-up.

3.3 Trends in breastfeeding

The observed decline in the duration of postpartum amenorrhoea leads us to explore the trends over time in breastfeeding.⁸ Many studies have reported the almost universal and prolonged nature of breastfeeding in Bangladesh (7, 26). Information on breastfeeding was available for the Matlab cohorts from 1978-9 to 1986-7. Table 3 shows the quartiles in months for the life table survival distribution for full breastfeeding and all breastfeeding (full plus partial).⁹

⁸ Though changes in maternal nutritional status could account for part of the decline in the duration of postpartum amenorrhoea, changes in breastfeeding patterns are likely to be a more important factor.

⁹ 'Full' describes those women who give no regular supplementation to the baby's diet in addition to breastmilk, whereas the 'partial' category includes women who give foods other than

The median duration of all breastfeeding appears not to have declined during the study period. Differentials between subgroups were also found to be small and there was no consistent trend towards shorter or longer durations among different subgroups. Comparisons with national estimates are complicated by the fact that different surveys have employed different definitions and methods, and the data presented in the reports usually do not allow recalculation of the estimates. However, the overall impression is that durations of all breastfeeding (full plus partial) have not changed greatly over the past ten to 15 years. The 1975 BFS reported a mean duration of breastfeeding of 28.9 months and the 1989 BFS, a duration of 28.7 months (9).¹⁰ Data reported by Baqui *et al.* (27) also suggest that durations of all breastfeeding remain long in the urban slums. Of slum children aged between 18 and 23 months, 82% were found to be still breastfed (27) compared to 87% for the Matlab cohort of 1986-7.

breastmilk (either liquid or solid) on a regular basis. 'None' describes women who are not feeding their child at the breast at all. The 'partial' category is clearly broad and includes a variety of breastfeeding patterns. In addition, the definition of 'full' breastfeeding is somewhat ambiguous, and conversations with CHWs suggested that there is some inconsistency in how these definitions are applied.

¹⁰ Calculated by the current status method.

Table 3. Quartiles in months of life table survival distributions of full and all breastfeeding in Matlab 1978-9 to 1986-7

Cohort	Full breastfeeding			All breastfeeding (full plus partial)			N
	.25	.50	.75	.25	.50		
1978-9	3.7	6.0 (0.1)	8.66	26.7	33.9 (0.2)		5558
1980-1	3.3	5.8 (0.1)	8.60	26.9	34.7 (0.2)		6152
1982-3	3.4	6.1 (0.1)	9.89	27.1	34.4 (0.2)		6240
1984-5	3.5	5.8 (0.1)	8.34	26.5	34.3 (0.3)		5593
1986-7	2.8	5.1 (0.1)	7.39	26.7	33.2 (0.1)		5975

Notes: 1. Standard errors of the median are shown in parentheses.

2. Cases where the child died before the end of breastfeeding were censored at the time of death.

Turning to full breastfeeding, the picture is somewhat different. The Matlab data suggest that, having fluctuated around six months from 1978-9 to 1982-3, the median duration of full breastfeeding decreased to around five months in 1986-7 (Table 3). Analysis by maternal characteristics suggested that durations of full breastfeeding fell in almost all subgroups from 1982-3 onwards. Differentials in the median duration of full breastfeeding mirrored those described earlier in postpartum amenorrhoea, with shorter durations among younger women, women with fewer children and more educated women. Thus, the observed differentials and trends in the duration of full breastfeeding were in line with the changes in postpartum amenorrhoea in Matlab.

Though it is difficult to discern trends from national survey data, there is some suggestion that durations of full breastfeeding are declining. The DHS conducted in 1993-4 found that almost 50% of children were given foods other than breastmilk before three months of age (28). Also, data from the USS suggest large differentials in the

duration of full breastfeeding between the Matlab and the Dhaka slum population. Baqui *et al.* (27) reported that, among children aged three to five months in the USS areas, only 10% were exclusively breastfed. In the Matlab 1986-7 cohort, at three months old 73% of children were still fully breastfed and by five months of age this figure was 51%. Therefore, though comparisons are complicated by the use of different data collection methods and definitions, the available data suggest that, although durations of all breastfeeding remain long, durations of full breastfeeding have declined in recent years in Bangladesh and that significant differentials between subgroups now exist.

The above analysis has shown that, despite evidence of decline, lactation continues to confer a long duration of postpartum amenorrhoea for most women in Bangladesh. However, as noted above, postpartum amenorrhoea does not necessarily indicate the absence of any risk of pregnancy. Therefore, it is of interest to explore the risks of pregnancy in the postpartum period, in order to describe the patterns of natural protection against pregnancy following birth more fully. The following sections present findings from the analysis of pregnancy risks in the postpartum period in both the Matlab and Dhaka slum populations.

3.4 Risk of pregnancy following birth

3.4.1 Methodological comments

Despite some methodological complexities, the longitudinal data from the RKS and USS provided an excellent opportunity to explore the risks of pregnancy following birth in two relatively large samples drawn from natural populations of Bangladeshi women.

In order to explore the risks of pregnancy in the postpartum period, a totally non-contracepting population ideally should be taken, since the adoption of contraception obviously affects the risk of pregnancy, and is also likely to be positively associated with fecundity. In the absence of such a population, data from the Matlab 1978-9 cohort and the USS 1992-3 cohort were analysed, since contraceptive use in the early postpartum period was relatively low in both these cohorts and unlikely to seriously affect the estimates produced.¹¹

In the absence of hormonal data indicating the resumption of ovarian activity, the pattern of reported conception by time postpartum was used to assess the risks of pregnancy following birth. Relying on women's self-reports of pregnancy will necessarily mean that rates of conception are somewhat underestimated. A certain number of pregnancies that result in early miscarriage will remain undetected. In addition, experience suggests that women do not always report pregnancy soon after it occurs, either because they do not realise they are pregnant or, more likely, choose not to divulge the information to others at an early stage of the pregnancy. This is particularly likely in cases where the woman chooses to terminate the pregnancy. Reports of pregnancies that occur during postpartum amenorrhoea are likely to be subject to particularly long delays even where a woman wants to be pregnant, since she may not suspect pregnancy until familiar symptoms arise.¹²

¹¹ In the Matlab 1978-9 cohort, 9% of amenorrhoeic women had adopted contraception by six months postpartum, and 19% by 12 months postpartum. In the USS 1992-3 cohort, these figures were 7% and 10% respectively.

¹² These problems have been recognised for some time in Matlab and CHWs are trained to probe for pregnancy, since their duties include the provision of antenatal care. In the USS, as well as recording women as pregnant, an additional code was used for any woman who reported that she might be pregnant but was unsure of her pregnancy status. In most cases, it was found that these women went on to report pregnancy later. For the purposes of the present analysis, any woman whose last reported pregnancy status was 'unsure' was treated as a pregnancy case.

Recognising the potential for delayed reporting of pregnancy, the RKS and USS data were carefully examined before embarking on an analysis of pregnancy risks. The nature of the analysis called for caution – it would clearly be unwise to underestimate the risks of pregnancy in the postpartum period, and draw exaggerated conclusions about the contraceptive potential of lactation. Examination of reported gestational lengths suggested that the vast majority of women in both Matlab and Dhaka slums reported their pregnancy within three months of conception and therefore the following adjustments were made to the pregnancy reporting in the datasets:

RKS For all live birth outcomes, the timing of conception was adjusted to give a gestational period of nine months. For all nonlive birth outcomes, the timing of conception was adjusted back in time by three months (or less if this resulted in a period of gestation of nine months).¹³

¹³ In the RKS 1978-9 cohort, 90% of pregnancies during postpartum amenorrhoea ended in a live birth, and 10% ended in a nonlive birth or were lost to follow-up before the pregnancy outcome.

USS For all live birth outcomes, the timing of conception was adjusted to give a gestational period of nine months. For pregnancies where the outcome was not a live birth, the timing of conception was adjusted back in time by four and a half months (or less if this resulted in a gestational period of nine months).^{14 15 16}

3.4.2 Probabilities of conception during postpartum amenorrhoea

In the first stage of the analysis, the monthly probabilities of conception during amenorrhoea by time after birth for non-contracepting women were calculated using life table analysis.¹⁷ Figure 1 plots the risks for all such women, regardless of breastfeeding status, for the RKS and USS data. The figure shows that in both the RKS and USS populations, the monthly probability of conception among amenorrhoeic women fluctuated at around 0.006 over the first 12 months postpartum. The estimates for the USS are based on smaller numbers and are therefore less stable. When the analysis was repeated excluding women whose child died within the first two months of life

¹⁴ In the USS 1992-3 cohort, 33% of pregnancies during postpartum amenorrhoea ended in a live birth, and 67% ended in a nonlive birth or were lost to follow-up. The percentage that ended in a live birth is much lower than in the case of the RKS because the duration of follow-up was shorter and so many pregnancies were censored prior to the pregnancy outcome.

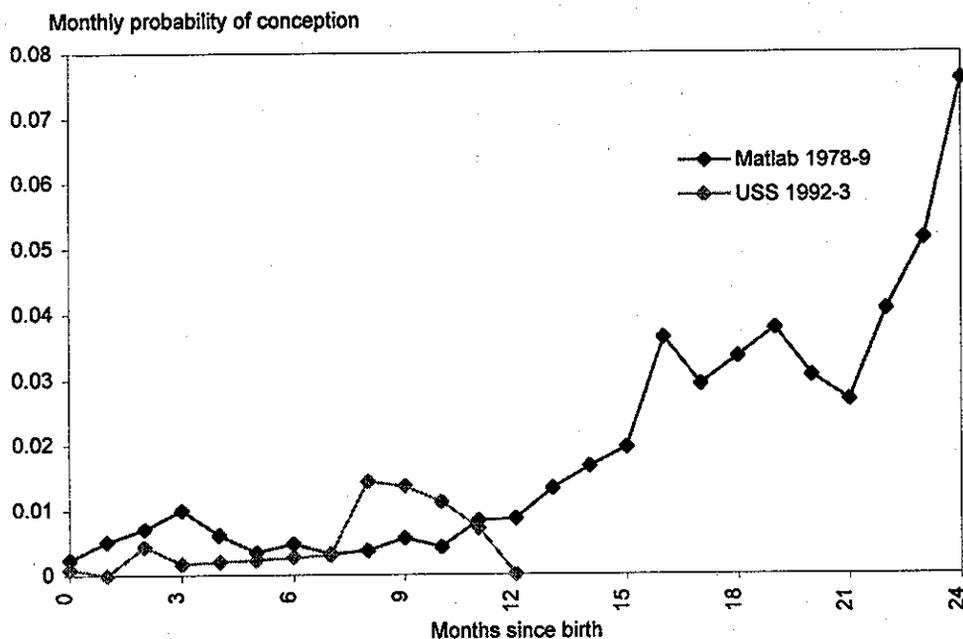
¹⁵ In order to test the sensitivity of results to the type of adjustments made, analyses were also conducted using a more extreme adjustment. In this, the same adjustment was made for live birth outcomes, but in the case of nonlive birth outcomes, the timing of conception was adjusted back in time by six months in the RKS file, and by seven and a half months in the USS file. The results were found to be very similar for both adjustments. Therefore, only the results arising from analysis of the datasets where the smaller adjustments were made are presented here (since these are felt to be the most reasonable considering the patterns of pregnancy reporting in the two populations).

¹⁶ As well as the pregnancies that were reported and recorded, some women may have been pregnant at the time of loss to follow-up but not have reported this. In order to overcome this potential bias, the period of follow-up was shortened for any woman whose observation was censored. In the same way as the reported pregnancies were backdated, the period of follow-up was shortened by three, and four and a half months.

¹⁷ Cases were censored at loss to follow-up, resumption of menses, or adoption of contraception.

(and thus ceased breastfeeding soon after birth or were not breastfed at all), the pregnancy risks were lower, as expected, fluctuating around 0.004 for the first 12 months.¹⁸ The small numbers and truncated follow-up in the USS population make it difficult to draw any firm conclusions about changing risk of pregnancy over the first 12 months postpartum. However, the figures for Matlab suggest that the probability of conception only begins to rise beyond ten months postpartum.

Figure 1: Monthly probability of conception among non-contracepting amenorrhoeic women by time since birth, Matlab 1978-9 and Dhaka slums 1992-3



¹⁸ The results for women whose child survived beyond two months accord very well with the figure of 0.0032 for the monthly probability of conception during the first six months after birth, estimated by Campbell and Gray (29) for a sample of intensively breastfeeding American women.

Table 4 shows the cumulative percentage of amenorrhoeic, non-contracepting women who conceived by time since birth in the Matlab and USS cohorts. In Matlab, among *all* women who remained amenorrhoeic, 3.4% (se=0.3) conceived within six months of their birth, and 6.2% (se=0.4) by 12 months. In the USS population these figures were around 1.1% (se=0.4) and 6.2% (se=1.5).¹⁹ When the women whose child died within two months were excluded, less than 2% of the remaining amenorrhoeic, non-contracepting women conceived by six months postpartum in both Matlab and Dhaka slums. That is, among women whose child survived to at least two months of age, the cumulative risk of conception among all women who remain amenorrhoeic, *irrespective of their breastfeeding status* was less than 2% by six months and less than 3% by nine months.

¹⁹ The slightly lower risks in the USS population may be explained by unreported menstrual regulation / abortions.

Table 4. Life table cumulative percentage of amenorrhoeic, non-contracepting women conceiving by time since birth in Matlab 1978-9 and Dhaka slums 1992-3

Months after birth	All women	Excluding women whose child died < 2 months
Matlab 1978-9		
3	1.4 (0.2)	0.3 (0.1)
6	3.4 (0.3)	1.2 (0.2)
9	4.5 (0.3)	2.3 (0.2)
12	6.2 (0.4)	3.9 (0.3)
15	9.8 (0.5)	7.5 (0.5)
18	17.2 (0.8)	15.2 (0.8)
21	25.4 (1.0)	23.5 (1.0)
24	33.9 (1.3)	32.3 (1.3)
N	5558	5144
Dhaka slums 1992-3		
3	0.5 (0.3)	0.3 (0.2)
6	1.1 (0.4)	0.9 (0.4)
9	3.1 (0.9)	2.9 (0.9)
12	6.2 (1.5)	6.0 (1.5)
N	1141	1063

- Notes: 1. Includes all amenorrhoeic women regardless of breastfeeding status.
 2. Cases were censored at return of menses, adoption of contraception and loss to follow-up.
 3. Standard errors are given in parentheses.
 4. The number of women in the USS sample differs from that in Table 7 because information on contraceptive use was missing for 10 cases.

3.4.3 Differentials in pregnancy risk during postpartum amenorrhoea

The above analysis suggests that lactational amenorrhoea provides good protection against pregnancy in the first six to nine months following birth for Bangladeshi women. We turn now to examine differentials in pregnancy risk during postpartum amenorrhoea.

It is of particular interest to explore whether breastfeeding status has an important influence on the risk of pregnancy during amenorrhoea for Bangladeshi women. Furthermore, to what extent postpartum amenorrhoea affords the same protection against pregnancy among different subgroups of women is an important issue and one that has not been addressed in most earlier studies. Data for the 1978-9 Matlab cohort provided an opportunity to explore in more detail the change in risk of pregnancy during lactational amenorrhoea by time postpartum, as well as the risks associated with different breastfeeding patterns and other maternal characteristics.²⁰

In order to explore these relationships, the logistic formulation of the hazard model was used. Hazard models are now commonly employed in demographic analysis in order to allow the incorporation of time-varying covariates and censored observations (30, 31).²¹ In the present example, one time-varying covariate was of interest, namely breastfeeding status.

Time postpartum and breastfeeding status

Initial analysis focused on exploring the variation in risk of conception during postpartum amenorrhoea with time postpartum and breastfeeding status. The results of the hazard models confirmed that risks of pregnancy do not increase with time postpartum *per se* within the first ten months postpartum, but that beyond this time the monthly probability of conception increases regardless of breastfeeding status.²²

²⁰ Unfortunately, breastfeeding data were not available for the USS cohort and the sample size was too small to perform hazard model analyses using the USS data.

²¹ For the sake of brevity, details of the methodology employed are not included here but are described elsewhere (19).

²² Only the main findings are presented here. Further details of the model building process and the results obtained are described elsewhere (19).

Partial breastfeeding was found to be associated with significantly higher risks of pregnancy during amenorrhoea than full breastfeeding, even when supplements have been only recently introduced. The odds ratio for risk of pregnancy for women who were partially breastfeeding compared to women who were fully breastfeeding in the first six months postpartum was 1.83 ($p=0.05$). However, compared to no breastfeeding at all, partial breastfeeding was found to afford additional protection against pregnancy. Results suggest that women who introduce supplements at around five or six months postpartum (as currently recommended) but continue to breastfeed partially, can enjoy a significantly higher degree of protection against pregnancy during amenorrhoea for well over a year following the birth than women who wean their child completely at that time.

Other maternal characteristics

In addition to examining the pattern of pregnancy risks during amenorrhoea by time postpartum and breastfeeding status, it was of interest to explore whether other maternal characteristics are associated with the risk of conception. In this stage of the analysis, age, number of living children, religion, education, and household area (a measure of socio-economic status) were considered as independent variables. Bivariate analyses suggested that risk of pregnancy during amenorrhoea is negatively associated with age and positively associated with education. No significant association was found with number of living children, religion or household area.

The associations observed could be explained by differing breastfeeding patterns, and/or differing levels of underlying fecundability (fecundity and/or coital frequency). When models were estimated that included breastfeeding status, the effect of education was found to lose significance, suggesting that the higher risks of pregnancy

among more educated women are explained by their tendency to introduce supplements to their child's diet earlier. In the case of age, however, a significant negative association persisted after controlling for breastfeeding status, and in fact the size of the effect increased. The odds ratio for risk of pregnancy for women aged less than 30 compared to women aged 30 years or more, was 1.89 ($p < 0.001$). No significant difference was found between women aged less than 20 years and those aged 20-29 years.

Having fitted the final model, the predicted probabilities were used to calculate cumulative risks of pregnancy for hypothetical scenarios as shown in Table 5. In this way, it was estimated that 0.6% of women aged 30 or more who fully breastfeed for six months, would conceive during amenorrhoea by six months postpartum, compared to 1.1% of women aged less than 30. For women who fully breastfeed for six months and then go on to partially breastfeed up to one year, 1.2% of women aged 30 or more would conceive by nine months postpartum and 3.0% by 12 months, compared to 2.3% and 5.5% respectively of women aged less than 30. For women who partially breastfeed from birth onwards, the risks are somewhat higher, though still low. Among women aged 30 or more, 1.1% would conceive by six months postpartum, 1.7% by nine months and 3.5% by 12 months, compared to 2.1%, 3.3% and 6.4% among women aged less than 30.

Table 5. Percentage of non-contracepting amenorrhoeic women conceiving by time since birth under different breastfeeding scenarios (Matlab 1978-9)

Hypothetical scenario	Percentage of women who would conceive		
	by 6 months postpartum	by 9 months postpartum	by 12 months postpartum
Breastfeed fully for six months			
age < 30	1.1	-	-
age 30 +	0.6	-	-
Breastfeed fully for six months and partially from six to 12 months			
age < 30	1.1	2.3	5.5
age 30 +	0.6	1.2	3.0
Breastfeed partially from birth to 12 months			
age < 30	2.1	3.3	6.4
age 30 +	1.1	1.7	3.5

The findings from Matlab and Dhaka slums suggest that among breastfeeding Bangladeshi women, regardless of their exact breastfeeding status, lactational amenorrhoea affords a high degree of protection against pregnancy for six to nine months postpartum. The USS data analysed came from a recent cohort of women from a population where breastfeeding practices are changing and supplementation now occurs soon after birth in many cases (27). Despite these conditions, risks of pregnancy during lactational amenorrhoea were still found to be low in the first six to nine months postpartum.²³ The additional analyses that were possible using the

²³ It should be emphasised that the risks of pregnancy during amenorrhoea for women who do not breastfeed at all are high even in the months immediately following birth. In the 1978-9 Matlab cohort, the odds ratio of conception during amenorrhoea for non-breastfeeders compared to full breastfeeders in the first six months postpartum was 66.1 ($p < 0.001$). Therefore, even if

older data from Matlab illustrate that risks of pregnancy during amenorrhoea are not uniform among women. Younger women (under 30 years) experience significantly higher chances of becoming pregnant during postpartum amenorrhoea than older women. Moreover, women who breastfeed fully enjoy greater protection against pregnancy than those who introduce supplements to their child's diet.

3.5 The users' perspective

The above analyses have illustrated that breastfeeding can afford an extended period of high protection against pregnancy for many Bangladeshi women. However, the extent to which this potential can be exploited is dependent upon the knowledge and attitudes of women themselves. This section presents the main findings regarding the user's perspective towards natural protection against pregnancy following childbirth gathered through the series of in-depth interviews conducted with women in Matlab (39 respondents) and Dhaka slums (34 respondents).

3.5.1 Postpartum amenorrhoea (*mashik bondho, shorir bondho*)

All mothers know that a period of amenorrhoea follows the birth of a child and that the time to the return of menses varies from woman to woman. Since menses is a time of ritual impurity and carries with it restrictions on a woman's behaviour, including sexual relations, religious activities and, in the case of Hindus,²⁴ cooking and serving food, a woman's menstrual state is fairly common knowledge. Respondents spontaneously compared their experience of amenorrhoea to those of their relatives and neighbours, and mentioned discussing these issues with other women.

non-breastfeeding women remain amenorrhoeic, the absence of menses cannot be considered indicative of low risk of pregnancy and other methods of contraception should be started immediately if no subsequent pregnancy is desired.

²⁴ In the case of some Muslim households, women may be restricted from cooking and serving food when menstruating, though this is not actually proscribed by the teachings of the Quran.

The chance of pregnancy is perceived to be very low during this period of amenorrhoea. Though all respondents except one were aware that some women do conceive again before the menses returns (the local name for this being *mura* or *muria*), the absence of menses is in many cases regarded as an indication that conception is highly unlikely, if not completely impossible. The period of amenorrhoea is sometimes referred to as '*shorir bondho*', meaning the body is closed; the same term that is used when a woman has reached menopause, or when certain types of contraception are being used. The period of amenorrhoea is perceived to be a time when the body is getting back to normal and blood is being replenished. Though women are not in general aware of the process of ovulation, the idea that a period of recovery is needed before another child is conceived, is common. The return of menses is a signal to the woman that she is once again fertile and runs the risk of another pregnancy if she has relations with her husband.²⁵

3.5.2 Conception during amenorrhoea (*mura baccha*)

Although the return of menses is commonly recognised as an indication of heightened risk of pregnancy, it is also common knowledge that pregnancy sometimes occurs without menses being seen. It is important to emphasise, however, that the chance of conception before menses is by no means the same for everyone and the fact that such pregnancies are commonly recognised does not mean that all women perceive themselves to be at risk. A number of factors that are associated with risk of *mura* conception were identified.

²⁵ Reports from users and providers indicate that, in cases where menses resumes very soon after birth some women may not recognise the increased risk of pregnancy, mistaking the bleeding for that of childbirth.

The understanding that reproductive history tends to repeat itself over generations is common. Thus, it was common for respondents to talk about increased risk of conception during amenorrhoea if one's mother or sister, or if one's mother-in-law or sisters-in-law, had had a *mura* pregnancy.

Related to the idea that there are familial reproductive traits, is the understanding that a woman's reproductive experience will tend to repeat itself from one pregnancy to the next. Different women have different types of bodies and respondents talked about having a rule (*neom*) or pattern to their length of postpartum amenorrhoea and time between successive pregnancies. Thus, women who have had several conceptions following the resumption of menses in the past have confidence that they will not conceive before menses shows itself in the future. It is common, both in Matlab and Dhaka, to hear the phrase '*amar baccha emneyi deritey ashey*', that is '*my children just come late anyway*', as an explanation for why methods of contraception are not being used. Similarly, those who have previously experienced a *mura* pregnancy are worried that the same may happen again.

Finally, a number of respondents expressed the opinion that the risk of *mura* pregnancy increases with time since the birth. However, this understanding was expressed more commonly among the Matlab women (10 respondents) than the urban women (3 respondents). It was also apparent that, whereas the Dhaka respondents recognised an increased risk beyond a year or a year and a half postpartum, the Matlab respondents stated that the rise begins much earlier; in one case at three months, in seven cases at six months, and in two cases at eight months. Findings from fieldwork with both the users and the providers suggest that the opinions expressed by the Matlab women are the result of strong educational and motivational work carried out by the family planning staff in that area.

3.5.3 Breastfeeding, amenorrhoea and protection against pregnancy

Zeitlyn and Rowshan have described the belief among Bangladeshi women that breastmilk is made from blood (32). They suggest that women believe that the body cannot produce both milk and blood at the same time, meaning that the act of breastfeeding induces amenorrhoea and infertility. Van Ginneken also mentions a strong belief in the pregnancy-preventing capacity of lactation in some Muslim societies (33). Findings from the present study, however, reveal that understandings related to breastfeeding, absence of menses and renewed pregnancy, are varied and in many cases incomplete. There is no widespread understanding that the way a woman feeds her infant will affect her risk of conceiving again. Table 6 summarises the beliefs of the Matlab and Dhaka respondents regarding the contraceptive potential of breastfeeding. It can be seen that, though some were aware of such a relationship, most recognised no connection between the two.

Table 6. Summary of perceptions of the contraceptive effect of breastfeeding by location and timing of adoption of contraception

Contraceptive potential of breastfeeding	Matlab users		Dhaka users	
	Contraception dopted:		Contraception adopted:	
	after menses	before menses	after menses	before menses
Yes, in most cases	4	1	0	1
Yes, in some cases	1	2	2	3
Heard of this, but seems not to be the case these days	1	2	0	1
No connection recognised	14	14	12	15
Total	20	19	14	20

Among the few respondents who recognised a relationship between breastfeeding and conception, none felt that it could be considered to be universal and none could clearly articulate why such a connection exists. In those cases where such an understanding was expressed, the knowledge appears often to have come from older female relatives, that is, it does not seem to be newly acquired. In only one case did the respondent mention health workers as the source of this information.

Interviews with respondents also suggested that the belief in the contraceptive potential of breastfeeding is on the decline. Several respondents mentioned the fact that though breastfeeding used to afford protection against pregnancy, nowadays it appears to make little difference, though they did not suggest why this might be. Others mentioned that they had heard of such an effect from older relatives but saw no evidence of it themselves today.

Matlab before-menses case

Respondent: *It's [chance of pregnancy] the same whether you feed other things (alga) or breastmilk, it is not less. If the menses comes then it will come, it comes even if the breastmilk is taken. People used to say that if the breastmilk is taken then pregnancy comes later. I have heard this, but now it comes fast anyway.*

No evidence was found of breastfeeding being consciously employed as a contraceptive method either now or in the past. Respondents were questioned about their mothers' and older female relatives' experiences of childbearing, but none made any reference to the importance of breastfeeding in extending the time between pregnancies or the like. Even though many respondents expressed a preference for a long duration of amenorrhoea, it seems clear that

breastfeeding is not practised intentionally for this purpose. This is perhaps not surprising, since breastfeeding in Bangladesh has until recently been almost universal and has lasted for very long durations. With patterns such as these prevailing, there has been little room for adjustment of behaviour and the majority of women have benefited from the contraceptive effect of their breastfeeding unintentionally.²⁶

Although very few women expressed an understanding that breastfeeding in general protects against pregnancy, the association between a child dying early in life and the swift return of menses and a subsequent pregnancy, is well recognised among both rural and urban women. Senior female relatives were mentioned as the source of this knowledge, as well as personal observation. Local expressions were spontaneously used to describe this phenomenon, though their exact meaning could not always be explained.

Matlab before-menses case

Respondent: *If the child in the lap (koler baccha) dies then another child may come. People say that if the child dies then it may come again, this they call moillitey polli.²⁷ My mother and my aunts say this.*

Though many of the respondents who referred to this association could offer no explanation as to why it should exist, several (in Matlab 9 respondents and in Dhaka 5 respondents) related it to the breastmilk not being fed. Though none of the respondents in the present study articulated the precise idea that the body cannot produce both

²⁶ Of course, with the changing patterns of breastfeeding now being seen in urban, and to a lesser extent in rural areas, the issue of adapting breastfeeding patterns to gain maximum contraceptive protection becomes more pertinent.

²⁷ The word 'moilli' refers to death and 'polli' to germination or regrowth.

breastmilk and menstruation at the same time, ideas expressed were similar to those discussed by Zeitlyn and Rowshan (32). This milk *'falls down into the woman's tubes'* where it *'makes the menses come quickly'*, or it *'dries up'* which also means that the menses comes back.

In summary, the current findings show that Bangladeshi women recognise a reduced risk of pregnancy during the period of postpartum amenorrhoea. Moreover, traditional understanding does draw some connection between the breastmilk that is produced to feed the newly born child and a renewed pregnancy, in the case where a young child dies. However, this idea does not, for most women, extend to a general understanding of a connection between breastfeeding patterns (for instance in terms of the quantity of milk, frequency of suckling, duration or timing of supplementation) and the duration of postpartum amenorrhoea or the risk of conception. Findings presented elsewhere show that Bangladeshi women are often reluctant to adopt contraception during amenorrhoea, not only because of the perceived low risk of conception, but also because of understandings related to possible negative health consequences of contraceptive use at this time (21). This means that currently in Bangladesh many women take advantage of the contraceptive protection afforded by lactation despite their limited understanding of the relationship at work.

3.6 The providers' perspective

The knowledge, attitudes and practices of family planning providers are an important influence over contraceptive behaviour in Bangladesh and elsewhere. This section summarises the main findings regarding the contraceptive potential of breastfeeding from the series of interviews with family planning providers in Matlab and Dhaka.

3.6.1 Postpartum amenorrhoea

Family planning providers in both Matlab and Dhaka were familiar with the fact that a period of amenorrhoea commonly follows a birth. All Matlab providers were aware of a relationship between breastfeeding and postpartum amenorrhoea. Among the Dhaka providers, all GoB workers were aware of this relationship and 12 spontaneously mentioned breastfeeding as the main reason for amenorrhoea. Among the NGO workers, 27 believed there to be a relationship between breastfeeding and amenorrhoea, though only nine spontaneously mentioned lactation as the main reason for the absence of menstruation following a birth.

Aside from the role of breastfeeding, a number of other explanations for the period of postpartum amenorrhoea were offered by respondents. Among Dhaka NGO workers, the most common explanation offered was that the blood loss at the time of delivery means that the woman's body is short of blood (11 women),²⁸ an understanding that was also commonly expressed by users interviewed in Matlab and Dhaka slums. This explanation was not given by either Matlab workers or the Dhaka GoB staff, though weakness and poor nutrition of the recently delivered mother were commonly felt to be associated with postpartum amenorrhoea.

Dhaka NGO fieldworker

Respondent: *For many after the birth of the child a lot of blood is lost and for many a little blood is lost. If the blood in the mother's body is less then often the menses will come later.*

²⁸ Numbers given in parentheses indicate the number of respondents giving particular answers or expressing particular opinions.

Matlab CHW group discussion

Participant 5: *Those who are healthy, who have blood in their bodies, who can eat well, those who have strength (shokti) in their body, their menses comes fast.*

Matlab LFPV

Respondent: *I was very weak. If I am not healthy then how will my menses come?! If any mother is weak (durbol) then her menses will stop. Why? Because if her physical condition is bad, unwell, then where will her menses come from? The menses does not only depend on the hormones, it also depends on the physical condition...*

Most respondents regarded the period of postpartum amenorrhoea to be a natural phenomenon, the duration of which varies between women. However, it was interesting to note that a minority of Dhaka family planning providers considered postpartum amenorrhoea to be abnormal, and that the normal state of affairs is for menses to resume 40 days after delivery. Other Dhaka providers noted that extended durations of postpartum amenorrhoea are common in rural areas but not among the urban population, or stated that, though long durations of postpartum amenorrhoea used to be the norm, women tend to experience a rapid resumption of menses nowadays. Attitudes towards postpartum amenorrhoea among urban providers no doubt reflect their personal experience as well as observations in the communities served. As breastfeeding patterns change and durations of amenorrhoea shorten, it is likely that more family planning providers will come to view the resumption of menses shortly after birth as the normal, natural pattern and extended amenorrhoea as an aberration.

3.6.2 Lactational protection against pregnancy

In Matlab, all except one worker recognised a relationship between breastfeeding and the risk of conception, and respondents expressed a fairly consistent understanding of the relationships between breastfeeding, amenorrhoea and conception. All providers in Matlab explained the reduced risk of conception during breastfeeding first and foremost in terms of *'the inhibition of egg ripening'* (though a small number also referred to other mechanisms).

Matlab CHW group discussion

Participant 2: *If breastmilk is fed fully (pura puri) then the ripening of the eggs is stopped. If the breastmilk is not fed then the eggs may ripen at any time and menses will come.*

In Dhaka, a variety of understandings regarding these relationships was apparent. Eight of the thirteen GoB workers felt that a relationship between breastfeeding and conception exists, and among the NGO workers, 23 acknowledged such a relationship, with a further six expressing the opinion that such a relationship sometimes exists. However, many Dhaka workers had an unclear or incomplete understanding of reproductive anatomy and physiology and this was reflected in a poor understanding of the process of return to fertility following birth. Among respondents who recognised a link between breastfeeding and conception, many were unable to offer any explanation for this relationship (6 GoB, 12 NGO), or could only explain it in terms of the fact that menses is stopped (1 GoB, 6 NGO). Among respondents who offered an explanation for the relationship, the most common response was that the sucking causes the uterus to contract or to vibrate which in turn prevents pregnancy (6 GoB, 8 NGO). In some cases, respondents stated that this contraction and

movement prevents the egg and sperm from meeting and sitting in the uterus, so the child cannot be formed. This explanation was offered by FWAs, NGO fieldworkers, FWVs and NGO supervisors.

Dhaka NGO supervisor

Respondent: *If the woman feeds breastmilk time and again (barey barey) then inside there is contraction (shongkochon) in the uterus and so the egg and the sperm cannot sit there, and because of this the next child will come later. If a woman continues to feed the child regularly, with the normal amount of milk, then the next child will come later.*

Another mechanism that was suggested by two NGO respondents was that breastfeeding weakens the mother's health and nutrition so that she is unable to conceive.

Dhaka NGO fieldworker

Respondent: *The uterus quickly dries up. The child gets all the mother's nutrition through sucking. The mother has little strength and this is why the next child comes later.*

Only six urban respondents (2 GoB, 4 NGO) stated that the relationship between breastfeeding and reduced chance of conception is explained by the fact that breastfeeding 'stops the eggs from ripening' or 'means that ovulation cannot happen'.

3.6.3 Duration of contraceptive protection afforded by breastfeeding

The resumption of menses is commonly recognised by both Dhaka and Matlab family planning providers as an indication that the woman's fertility has returned and any contraceptive protection afforded

by breastfeeding has come to an end. In addition, the majority of providers in both Dhaka and Matlab felt that the duration of lactational contraceptive protection is limited, even if a woman remains amenorrhoeic, and all were aware of the fact that conception is possible prior to the resumption of menses.²⁹

Among the Matlab CHWs, the most common opinion expressed was that protection against pregnancy during amenorrhoea lasts for six months (5 in-depth cases, 2 group discussions). However, other respondents felt that the duration of protection is shorter than this, lasting just three or four months. Responses of the LFPVs were similarly split between six months and the shorter duration of three to four months.

Among the Dhaka respondents who acknowledged the contraceptive effect of breastfeeding (8 GoB, 29 NGO), there were mixed opinions as to the duration of such an effect. Some felt the protection lasts for the first five or six months postpartum (3 GoB, 7 NGO), whereas others felt the period of protection to be longer, stating that eight months (2 NGO), 12 months (2 NGO), 18 months (1 GoB), or as long as 24 months (3 GoB, 3 NGO) protection could be afforded. Three NGO workers suggested that protection against pregnancy lasts as long as menses does not return, a further eight respondents stated that the duration of protection is not fixed but varies from case to case (1 GoB, 7 NGO), and five NGO workers were unable to state how long protection lasts.

²⁹ Incomplete understanding of the menstrual cycle meant that most respondents were unable to explain how a *mura* conception is possible. In some cases, respondents stated that menses does actually happen, though the woman does not notice it because only a few drops of blood are lost and in other cases respondents suggested that 'ovulation' does not occur when a child is conceived as a *mura*. Most respondents, however, admitted their ignorance of how a *mura* conception takes place.

The majority of both GoB and NGO workers in Dhaka who recognised the contraceptive potential of breastfeeding, stated that this effect ceases to exist if the woman feeds foods other than breastmilk (6 GoB, 16 NGO). Some respondents, however, felt that as long as menses does not return, whether or not other foods are fed, a contraceptive effect remains (2 GoB, 7 NGO). Similarly, in Matlab almost all respondents felt that the contraceptive protection of breastfeeding is dependent upon the woman feeding breastmilk exclusively, without any other supplements to the child's diet. In only one case did a CHW state that protection depends more on whether the woman remains amenorrhoeic than on whether or not she feeds supplements.

3.6.4 Confidence in and promotion of breastfeeding as a contraceptive

Despite the fact that many of the family planning workers in Dhaka and Matlab acknowledged a relationship between breastfeeding and conception, many were uncertain about the extent of this protection and expressed reservations as to how much such protection should be relied upon. Many respondents stated that such protection does not exist for all women, citing examples of women who became pregnant while breastfeeding as the reason for their lack of confidence in the relationship.

Dhaka NGO coordinator

Respondent: *People say that these are related, but I am not sure. I have seen that people get pregnant while they are breastfeeding.*

Matlab CHW group discussion

Participant 5: *She cannot be completely sure. It's like 50% sure and 50% not. Since she is breastfeeding fully then she can be 50% sure. So long as she does not feed alga the hormone work will not start. But then there are 50% for whom you can't really say whether it will happen or not.*

Respondents in both Matlab and Dhaka stated that such a relationship depends greatly on the ability of the woman to produce large amounts of breastmilk and to breastfeed her child frequently and exclusively. In Dhaka, respondents noted that changing lifestyles and demands on women's time mean that such breastfeeding behaviour is impossible for many. In Matlab, respondents identified poor nutrition and weakness as important reasons why many women do not produce sufficient milk and cannot feed their child exclusively.

Though all the family planning staff interviewed in Dhaka and Matlab said that they promoted breastfeeding as part of their services to clients, this was invariably explained in terms of child health. Among the Dhaka providers, the active promotion of breastfeeding for its contraceptive effect was mentioned by only two respondents, and a number of workers stated that they actually conceal this information from women in case it should be a further reason for avoiding contraception. Only four respondents felt that lactational protection against pregnancy could be relied upon as a method of contraception (2 GoB, 2 NGO). Among Dhaka providers, the current norm is to promote contraceptives immediately after birth, at 40-45 days, regardless of breastfeeding or amenorrhoeic status.

Dhaka NGO fieldworker

Respondent: *No, they do not understand [the contraceptive effect of breastfeeding]. And we don't make them understand either. If we did then they would not take a method. We tell them, 'Whether your menses comes or not go to the clinic and have a check-up and take a method'.*

Dhaka NGO supervisor

Interviewer: *And do you tell the mothers that if they feed the breastmilk then a child will not come?*

Respondent: *We do not say this, we cannot give that guarantee. But maybe we tell those mothers who are a bit conscious that the risk is a bit less, but it's not that they can rest completely assured. She can perhaps use the condom or she can take the injection.*

Dhaka family planning providers on the whole saw no advantage of a long duration of postpartum amenorrhoea following the birth. Most respondents felt that a short duration of postpartum amenorrhoea is best since the likelihood that the woman will take a method of contraception is higher once menses resumes, and the risk of pregnancy during the period of amenorrhoea lower if it does not extend for a long time.

Dhaka NGO fieldworker

Interviewer: *So, do you think that it's good for the mother and small child if menses stays stopped?*

Respondent: *No, because if she doesn't take a method then a mura pregnancy may happen, so how can it be good? If it comes after 40 days then it's good. Then they don't mess around.*

It is clear that active promotion of breastfeeding for the purposes of contraception is rare among Dhaka family planning workers. In addition, there is evidence to suggest that the advice and information provided by family planning workers may not always be supportive of breastfeeding patterns that are best for child health and lactational protection against pregnancy. Several respondents reported that they advise women to feed water alongside breastmilk from the time of the birth onwards to prevent constipation, and a number of respondents stated that they promote exclusive breastfeeding for just three months. In addition, there is a common understanding among providers that breastmilk is often produced in insufficient quantity and that there is very little that can be done about this. Consequently, family planning workers are poorly equipped to provide support and advice to women who face any kind of problem breastfeeding and frequently encourage the introduction of supplements in the early months postpartum.³⁰

In Matlab, the active promotion of breastfeeding for its contraceptive potential also appears to be rare. Only one CHW and three LFPVs who were interviewed mentioned this explicitly. Some of the respondents reported that they used to promote breastfeeding in this way, but that this is no longer a reliable method.

Matlab LFPV

Respondent: *When menses is stopped very few conceptions happen, and menses comes seven, eight months, one year later. In the past three years or four years was more common, now most people have their menses quickly.*

Interviewer: *And so what do you say to the women? That if breastmilk is fed then a child will not be conceived?*

³⁰ This issue is discussed in more detail elsewhere (34), and similar findings have been reported by Perry et al. (35).

Respondent: *No, I do not say this because it is not sure. For instance, what if the mother is breastfeeding but a mura pregnancy nevertheless happens?! That's why we do not say. We used to say this, now we do not say this.*

However, despite the fact that breastfeeding is not often actively promoted for its contraceptive effect in Matlab, at least some family planning providers do have confidence in the protection against pregnancy that is afforded by breastfeeding and take this into consideration when providing contraception following the birth. In in-depth interviews with CHWs, eight respondents reported delaying the provision of contraceptive methods to women who they feel are already protected by lactational amenorrhoea and this behaviour was also reported by participants in two of the group discussions.

Clearly, there are important differences in the knowledge, attitudes and behaviours of Dhaka and Matlab providers regarding lactational protection against pregnancy (Table 7). Overall, Matlab providers showed better knowledge about and greater confidence in, the contraceptive potential of breastfeeding. However, it should be emphasised that inconsistency and confusion were apparent among providers in both Matlab and Dhaka, and in neither area was breastfeeding found to be actively promoted as a contraceptive option in the period following childbirth.

Table 7. Summary of reported knowledge, attitudes and behaviour regarding lactational protection against pregnancy among Dhaka and Matlab family planning providers

	Dhaka GoB	Dhaka NGO	Matlab
Breastfeeding affords protection against pregnancy			
yes	8	23	16
maybe/sometimes	0	6	0
no	5	8	1
Lactational amenorrhoea can be relied upon as a contraceptive			
yes	2	2	12
no	11	35	5
Breastfeeding promoted among community women for its contraceptive effect			
yes	1	1	4
no	12	36	13
Total	13	37	17

Note: 1. For Matlab, only the in-depth interview cases have been included.

4. Discussion and recommendations

Analysis of data on women living in Matlab and Dhaka slums showed that durations of postpartum amenorrhoea remain long in Bangladesh. In the early 1990s, postpartum amenorrhoea lasted for longer than eight months on average in both study populations.

In addition, the results from both populations suggest that among breastfeeding Bangladeshi women, lactational amenorrhoea affords a high degree of protection against pregnancy even in the presence of supplementation. Whereas the data from Matlab were from an older

cohort (1978-9) where breastfeeding was relatively intense and extended, the USS 1992-3 data came from a population where supplementation occurred soon after birth in many cases (27). Despite these differences, risks of pregnancy during lactational amenorrhoea were found to be low among amenorrhoeic women in both the cohorts. Among women whose child survived to at least two months of age, the cumulative risk of conception among women who remained amenorrhoeic was less than 2% by six months in both populations. Hazard model analysis of the Matlab 1978-9 data allowed exploration of the risks of pregnancy during amenorrhoea by breastfeeding status. In line with other studies, full breastfeeding was found to afford significantly greater contraceptive protection than partial breastfeeding. However, partial breastfeeders were also found to enjoy good protection against pregnancy during amenorrhoea in the months after birth.

Results also suggest that lactational amenorrhoea can afford good protection against pregnancy beyond six months postpartum. The Matlab analysis showed that the monthly probability of conception during amenorrhoea does not start to rise until around 10 months postpartum, and in both study populations, the cumulative percentage of amenorrhoeic women conceiving by nine months was less than 3%.³¹ Findings from the multivariate analysis of the Matlab data also revealed that older women have significantly lower risks of conception during postpartum amenorrhoea than younger women.

Although the data used in the present analysis were of high quality, a number of potential limitations should be acknowledged. Firstly, no information was available on coital frequency. It might be suggested that low pregnancy rates compared to western populations

³¹ This figure relates to the women whose child survived to at least two months.

are explained by postpartum abstinence and reduced coital frequency. Evidence from the in-depth interviews with women presented elsewhere suggests that this is unlikely, and that Bangladeshi couples may often resume sexual relations even before the traditional period of ritual impurity (21). Spousal separation is another factor which could contribute to low risks of pregnancy. Some studies have shown that husbands may spend significant amounts of time away from their home each month. However, data from the 1989 BFS suggest that in only very few cases do husbands spend longer than a month away from home (26). In addition, it is less likely that urban husbands would spend long periods away from home, especially following the birth of a child. Unreported menstrual regulation or abortion may also contribute to low pregnancy rates, though this is unlikely to be an important bias in the RKS where surveillance is extremely intense.

Despite these methodological issues, the findings are in line with those from other recent studies which have also shown that lactational amenorrhoea can provide good contraceptive protection beyond six months in some populations (14, 36, 37).

It seems clear that breastfeeding affords good protection against pregnancy for Bangladeshi women and deserves careful consideration within family planning programmes in the Bangladeshi context. However, although breastfeeding is currently acting as an important check on fertility in Bangladesh, time series data from Matlab and the national population suggest that the duration of postpartum amenorrhoea is on the decline. Large differentials in the length of postpartum amenorrhoea were found in both the Matlab and USS slum populations, with some subgroups of women experiencing relatively short durations. Changes in breastfeeding patterns are the most likely explanation for the observed downward trend in the duration of postpartum amenorrhoea. Though the duration of all breastfeeding (full

plus partial) remains long, evidence suggests that supplementation is occurring earlier than in the past in both Matlab and the national population.

Moreover, evidence from the present study strongly suggests that, at present in Bangladesh, family planning programme activities do not promote breastfeeding for its contraceptive qualities, and in many cases actually undermine breastfeeding practices that are beneficial to birth spacing (as well as child health). Many family planning workers have poor knowledge of the contraceptive potential of breastfeeding, and others see lactational amenorrhoea as a barrier to their task of providing contraceptives, rather than an extra tool that can be employed by women against unwanted pregnancy. In addition, evidence suggests that contraceptive methods are being promoted early in the postpartum period. It is therefore clear that the exploitation of the contraceptive effect of breastfeeding currently comes about in spite of, rather than because of, family planning programme activities.³²

Furthermore, although women commonly understand the chance of pregnancy to be low during postpartum amenorrhoea, few recognise a connection between breastfeeding patterns and risk of conception.³³ Therefore, though at present Bangladeshi women benefit from the contraceptive protection of breastfeeding, without appropriate support, this natural barrier to conception may gradually wane. Coupled with a reluctance to adopt modern methods of contraception soon after birth, this is likely to lead to an increase in unwanted births and short birth intervals (21).

³² This is particularly true in the Dhaka slum setting where there is very little overlap between contraceptive use and amenorrhoea, but virtually no active promotion of breastfeeding for its contraceptive effect.

³³ Findings in other settings have also shown that awareness of low risk of pregnancy during amenorrhoea does not necessarily imply an appreciation of the association between breastfeeding, amenorrhoea and conception (38).

The current policy of promoting and providing contraception to women in the immediate postpartum period is inappropriate for a number of important reasons. Firstly, as the findings presented here clearly indicate, the majority of women in Bangladesh breastfeed and are naturally protected against pregnancy for an extended period of time. Secondly, most women are reluctant to initiate contraception soon after birth. Women are aware of the diminished risk of pregnancy during postpartum amenorrhoea, and are also unwilling to use 'strong', modern methods of contraception at a time when they feel weak and vulnerable, and have concerns about their child's breastfeeding and health (21). Thirdly, since the majority of women deliver at home with the assistance of traditional birth attendants or relatives, contact between women and family planning services is no more likely at the time of delivery or within the 40-45 day postpartum period, than at other times. Finally, continuation rates remain low, so that early adoption will have a limited impact on birth intervals since use is unlikely to extend beyond the period of natural protection against pregnancy (21, 39).

Though a policy of withholding contraceptives from couples who wish to initiate use in the immediate postpartum cannot be justified, for the majority of women in Bangladesh this is simply not the case. It is therefore clear that measures must be taken in order to provide greater support to breastfeeding and to explicitly incorporate lactational amenorrhoea into the range of methods promoted to women in the postpartum period. Findings from the present study suggest that lactational amenorrhoea can be relied upon as a contraceptive by Bangladeshi women for the first six to nine months postpartum, even if breastfeeding is not full. However, it is also clear that the risks of pregnancy are higher among partially breastfeeding women than among those who breastfeed fully. In the light of these findings and increasing

evidence from around the world, current policy regarding the timing of promotion of contraception to amenorrhoeic women in Bangladesh needs careful review.

Regardless of the exact policy guidelines that are developed, in order to incorporate lactational amenorrhoea into family planning programmes, steps are needed to increase both the knowledge of, and trust in, the contraceptive potential of breastfeeding among family planning providers. Training materials need to provide consistent and accurate information and workers need to be given clear guidelines.^{34 35} In addition to training, incentive structures that focus purely on the prevalence of modern method use, need to be reviewed. Efforts must also be directed at educating clients about the contraceptive potential of breastfeeding, including the importance of frequent and intensive suckling, the increasing risk of pregnancy beyond six to nine months postpartum, and the need to initiate contraception promptly if menses resumes before this time. Despite findings which suggest that partial breastfeeding may still confer good protection against pregnancy, it is nevertheless important that family planning and health workers emphasise the importance of full breastfeeding for the first five to six months, since this will ensure lower risks of pregnancy as well as being beneficial for child health. Moreover, it should be stressed that, in cases where women do not breastfeed at all, or where menses resumes at 40-45 days, contraception is needed immediately if another pregnancy is to be avoided.

³⁴ A review of several GoB and NGO training materials revealed inconsistent and incomplete information on this topic (21).

³⁵ Experience and training materials from other countries where breastfeeding is currently being promoted as a contraceptive can be usefully drawn on (15).

Though the wisdom of directing scarce resources to promoting breastfeeding as a contraceptive has been questioned (40), such steps are likely to have positive effects on both child health and fertility.³⁶ In the context of Bangladesh, where many women currently prefer to delay the adoption of modern contraception until menses, such an approach would appear to be sensitive to the needs of those the family planning programme is seeking to serve.

³⁶ Findings from studies where women were actively using breastfeeding as a method of child spacing (rather than purely for child feeding) suggest that breastfeeding practices may be enhanced, with women being more likely to breastfeed fully (41, 42).

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MCH-FP Extension Work at the Centre

An important lesson learned from the Matlab MCH-FP project is that a high CPR is attainable in a poor socioeconomic setting. The MCH-FP Extension Project (Rural) began in 1982 in two rural areas with funding from USAID to examine how elements of the Matlab programme could be transferred to Bangladesh's national family planning programme. In its first years, the Extension Project set out to replicate workplans, record-keeping and supervision, within the resource constraints of the government programme.

During 1986-89, the Centre helped the national programme to plan and implement recruitment and training, and ensure the integrity of the hiring process for an effective expansion of the work force of governmental Family Welfare Assistants. Other successful programme strategies scaled up or in the process of being scaled up to the national programme include doorstep delivery of injectable contraceptives, management action to improve quality of care, a management information system, and developing strategies to deal with problems encountered in collaborative work with local area family planning officials. In 1994, this project started family planning initiatives in Chittagong, the lowest performing division in the country.

In 1994, the Centre began an MCH-FP Extension Project (Urban) in Dhaka (based on its decade long experience in urban health) to provide a coordinated, cost-effective and replicable system of delivering MCH-FP services for Dhaka urban population. This important event marked an expansion of the Centre's capacity to test interventions in both urban and rural settings. The urban and rural extension projects have both generated a wealth of research data and published papers.

The Centre and USAID, in consultation with the government through the project's National Steering Committees, concluded an agreement for new rural and urban Extension Projects for the period 1993-97. Salient features include:

- To improve management, quality of care and sustainability of the MCH-FP programmes
- Field sites to use as "policy laboratories"
- Close collaboration with central and field level government officers
- Intensive data collection and analysis to assess the impact
- Technical assistance to GoB and NGO partners in the application of research findings to strengthen MCH-FP services.

The Division

The reconstituted Health and Population Extension Division (HPED) has the primary mandate to conduct operations research to scale up the research findings, provide technical assistance to NGOs and GoB to strengthen the national health and family planning programme.

The Division has a long history of accomplishments in applied research which focuses on the application of simple, effective, appropriate and accessible health and family planning technologies to improve the health and well-being of the underserved and population-in-need. There are several projects in the Division which specialize in operations research in health, family planning, environmental health and epidemic control measures which cuts across several Divisions and disciplines in the Centre. The MCH-FP Extension Project (Rural), of course, is the Centre's established operations research project but the recent addition of its urban counterpart - MCH-FP Extension Project (Urban), as well as Environmental Health and Epidemic Control Programmes have enriched the Division with a strong group of diverse expertise and disciplines to enlarge and consolidate its operations research activities. There are several distinctive characteristics of these endeavors in relation to health services and policy research. First, the public health research activities of these Projects focus on improving programme performances which has policy implications at the national level and lessons for international audience. Secondly, these Projects incorporate the full cycle of conducting applied programmatic and policy relevant research in actual GoB and NGO service delivery infrastructures; dissemination of research findings to the highest levels of policy makers as well as recipients of the services at the community level; application of research findings to improve programme performance through systematic provision of technical assistance; and scaling-up of applicable findings from pilot phase to the national programme at Thana, Ward, District and Zonal levels both in the urban and rural settings.



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