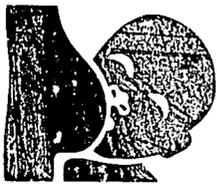


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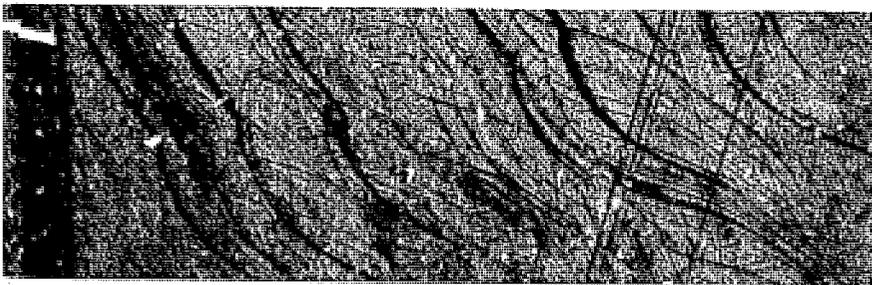


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PROMOTION OF BREASTFEEDING:
CAN IT REALLY DECREASE FERTILITY?

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February 1, 1986

Introduction

The role of breastfeeding in reducing fertility in populations where contraceptive use is minimal is now well established. Cleland et al (1984) have shown that in Africa and Asia, postpartum infecundity associated with breastfeeding reduces total fecundity by 30-33%, compared to the reduction by contraception of 5% and 20% respectively. Given the normally high fertility rates in many countries in these regions (usually between 6 and 7 births per woman), the promotion of contraceptive methods has been the principal focus of family planning agencies. Since the contraceptive effect of breastfeeding wanes at the time of the first postpartum resumption of menses, contraceptive use at this time is important to prevent subsequent pregnancies. Because of high contraceptive discontinuation rates and the overlap between breastfeeding and contraception, family planning programs can improve their effectiveness by promoting the use of contraception near to the time when menses will resume (WHO/NRC, 1983). Therefore, an important aspect of family planning policy has been assessment of appropriate timing of contraceptive use in the postpartum period.

The potential role of breastfeeding in reducing fertility among populations in developing countries with generally lower fertility (such as urban groups) is also significant. Even in those countries where family planning programs are effective and where fertility rates have declined in the last decade, breastfeeding can fill the gap among women who do not use contraception even though information about contraception or its

availability appears not to be the problem. Among educated women who generally are more likely to accept contraception, there is often a gap between contraceptive use and declines in breastfeeding, so that increases in fertility result. Analyses of the World Fertility Survey in Kenya found that younger educated urban women had higher fertility (TFR of 4.6 births per women for those aged 15-24 who had secondary education) compared to 3.8 for those in the same age group with no formal education. The birth interval of the more educated women was 4 months shorter than that of the women with no formal education (25 verses 29 months). This difference is attributed to declines in the duration of breastfeeding that were not compensated for by increases in contraceptive use (Mosley, 1982).

The purpose of this paper is to illustrate how promotion of exclusive breastfeeding to 4-6 months of the infant's age, can increase birth intervals and subsequently reduce fertility. The extension of unsupplemented breastfeeding to this age helps fulfill the objectives of family planning programs. It also leads to decreases in morbidity and mortality among infants due to diarrhea, by increasing the time infants benefit from the anti-infective properties of breastmilk and by decreasing their exposure to contaminants in supplemental foods given too early. In addition, by extending the spacing between births, improvements in maternal and child health are likely.

Effect of Breastfeeding on Fertility

Breastfeeding reduces the probability of conception because it extends the postpartum anovulatory period and reduces the likelihood of conception once ovulation has occurred. The period of anovulation closely corresponds to the period of amenorrhea, and thus the resumption of menses is a reasonable marker for return of ovulation. Only 3-10% of women conceive during amenorrhea. The probability of ovulation during amenorrhea is relatively low (generally ranging between 15-35%) and the luteal functioning needed to support the maintenance of the fertilized ovum is often inadequate at the time of the first postpartum ovulation (McNeilly et al, 1985; Brown et al, 1985). While the proportion of anovulatory cycles decreases as the postpartum duration increases, the proportion with inadequate luteal phases is still high at later postpartum durations (Brown et al, 1985).

The relationship between this biologic effect of breastfeeding on ovulation is supported by demographic studies that illustrate increases in average birth intervals corresponding to extended durations of breastfeeding. Recent analyses of the World Fertility Studies have indicated that for each additional month in the average duration of breastfeeding, there is an increase in the average birth interval of .25 to .5 months (Jain and Bongaarts, 1982; Smith, 1985).

Specific breastfeeding practices related to the probability of ovulation and conception point to the particularly important

role of breastfeeding intensity on reducing fertility. Suckling frequency has been shown to be a major determinant of the probability of ovulation. In studies of Scottish women, McNeilly et al (1985) observed that a suckling frequency of more than five times per day and duration of more than 65 minutes with a minimum of 10 minutes per feed was sufficient to maintain complete suppression of ovarian activity. The mean duration of breastfeeding in the study group was less than one year. Studies in Zaire where breastfeeding durations average over two years, found that when women suckled more than 10 times per day, only 10% illustrated signs of ovulation (Robyn et al, 1985). Similar findings of the association between suckling and ovulation have been reported in Mexico, New Guinea, Boston, and Denmark (Rivera, 1985; Wood et al, 1985; Elias, 1985; Anderson and Schioler, 1982).

The timing of supplementation is related to the probability of ovulation. This is because as supplementation is initiated, the frequency of suckling and the interval between suckling bouts often declines. Howie et al (1981) noted that among 27 women, none ovulated prior to supplementation. Rivera (1985) showed that both the practice of supplementation and the frequency of suckling were determinants of ovulation. In his study, 33% had ovulated prior to supplementation. However the definition of supplementation did not include the use of teas. The feeding of teas to the infant could also have affected suckling frequency, especially if given by bottle. Perłata et al (1982) noted a

relationship between full breastfeeding and lower frequency of ovulation among Chilean women compared to those who partially breastfed. Similar findings have also been reported between the role of full versus partial breastfeeding and duration of postpartum amenorrhea in the U.S., Guatemala, India and Bangladesh (Elias et al, 1985; Delgado et al, 1979; Prema, 1979; Huffman et al, 1986).

The practice of night feeds has been shown to be particularly important in maintaining anovulatory cycles. Gross and Eastman found among Philippine women that the longest interval between night feeds and the age of the baby were the major factors predicting prolactin levels. Elias et al (1985) noted that the strongest predictors of amenorrhea were nursing at night and exclusive breastfeeding. Night nursing was more important in women who nursed on average 10 times per day, while in those who nursed 5 times per day, the duration of full breastfeeding was most important. In a study of Canadian women, those who menstruated early in the postpartum period (at a mean of 5 months) compared to those who menstruated later (at a mean of 15 months), the age of the child when he/she began to sleep through the night was 9 months for the early group and 19 months for the later group.

These studies have shown that the delay of supplementation of the infant can increase the effectiveness of breastfeeding in preventing ovulation. Supplementation at 4-6 months is needed to promote adequate child growth. If full breastfeeding extends to

4-6 months, the likelihood of ovulation occurring up to this point is minimized. Changing the practice from one of never breastfeeding or of supplementing within the first few postpartum weeks to breastfeeding with delayed supplementation for 4-6 months, can add on a minimum of 2-3 additional months to the birth interval if lactation is terminated once supplementation is started. However, exclusive breastfeeding for this 4-6 months duration will be likely to also result in longer total durations of breastfeeding. The effect on the birth interval is therefore likely to be greater.

Illustration of Effect on Fertility

In order to assess the impact of exclusive breastfeeding on fertility, comparisons of changes that would be possible given varying assumptions on fertility components can be made. Populations that currently have a high proportion of women who do not breastfeed, and among those who do breastfeed, the total duration is for a relatively short time period, are those most likely to benefit from increases in the duration of total breastfeeding. Because of the lack of data on all components of the birth interval, calculations on changes in fertility need to be based on certain assumptions. Birth intervals consist of gestation durations (9 months), postpartum amenorrhea (1 month for nonbreastfeeders, and up to 20 months for some breastfeeders), menstrual interval or the time from first postpartum menses to conception, and time added due to

miscarriages and stillbirths (2 months). The duration of the menstrual interval varies from 5-10 months in most populations not practicing contraception. The use of contraception will extend this duration. We will assume that for non-breastfeeders, this duration is slightly longer than for breastfeeders, since evidence on contraceptive use in the postpartum period appears generally to be slightly greater for nonbreastfeeders (Smith, 1985).

Mexico is an example of a country with a relatively high proportion not initiating breastfeeding (20%). The median duration of breastfeeding for women who initiate breastfeeding is estimated at 9 months. The median birth interval for all women is reported at 26 months from WFS data (Smith, 1985). Based on the assumptions given above, assuming a menstrual interval of 11 months, the average birth interval for non-breastfeeders is estimated at 23 months. For breastfeeders, the average birth interval is estimated at 27 months. (See Figure 1)

Changing the practices of women to increase the percent breastfeeding and to increase the proportion exclusively breastfeeding for at least 4-6 months will have varying effects on fertility depending on assumptions for the effect of increases in the duration of exclusive breastfeeding on duration of the anovulatory period. Figure 2 gives an illustration of the assumed range in the percent of women who remain amenorrheic assuming that all women breastfeed exclusively for 6 months. These figures are based on empirical studies of practices of

Figure 1

Estimated Birth Interval Components in Mexico Based on
Current Practices

Birth Interval for Nonbreastfeeders (20% of postpartum women)

$$\begin{aligned}
 \text{BI (non-breastfeeders)} &= 9 \text{ mo (gestation)} \\
 &+ 2 \text{ mo (Fetal Loss)} \\
 &+ 1 \text{ mo (Amenorrhea)} \\
 &+ 11 \text{ mo (time to conception)} \\
 &= 23 \text{ mo.}
 \end{aligned}$$

Birth Interval for Breastfeeders (80% of women)

Median duration of breastfeeding = 9 mo

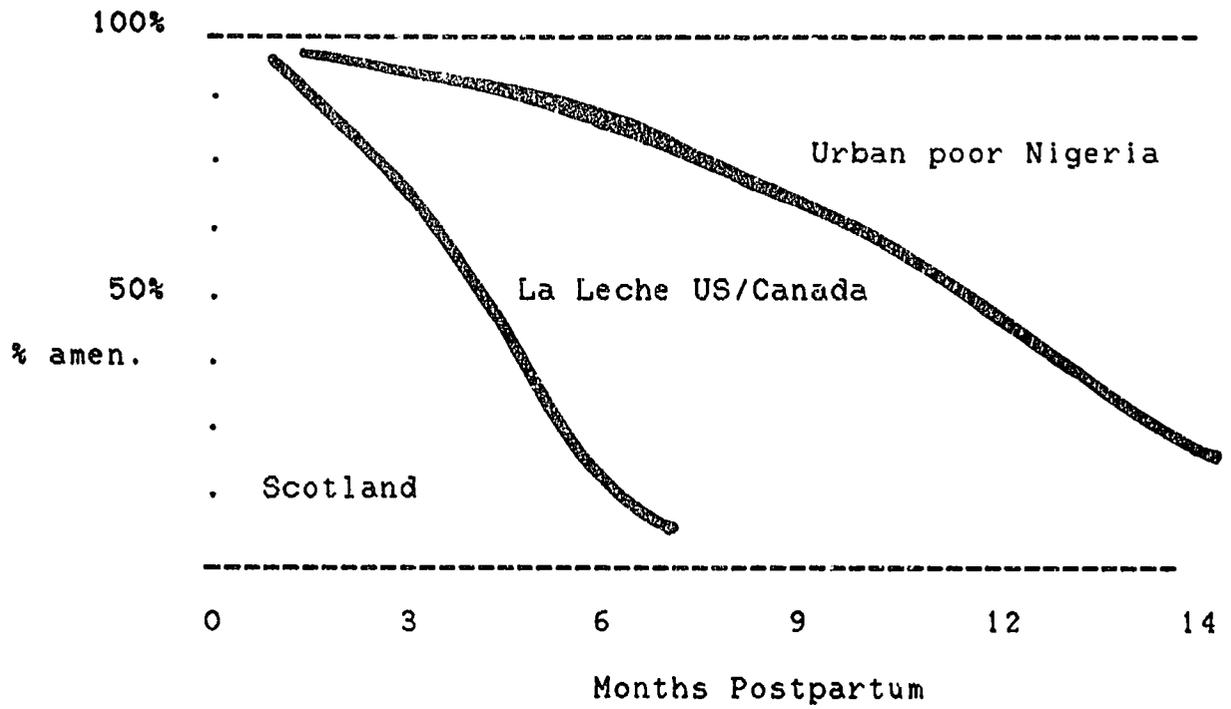
$$\begin{aligned}
 \text{BI(breastfeeders)} &= 9 \text{ mo (gestation)} \\
 &+ 2 \text{ mo (Fetal Loss)} \\
 &+ 6 \text{ mo (Amenorrhea)} \\
 &+ 10 \text{ mo (Time to conception)} \\
 &= 27 \text{ mo.}
 \end{aligned}$$

Average Birth Interval (Observed in WFS)

$$\text{BI(all)} = 20\% (23 \text{ mo}) + 80\% (27 \text{ mo}) = 26 \text{ mo.}$$

Figure 2

Percent of Women Currently Breastfeeding and Amenorrheic by Postpartum Duration



breastfeeding and durations of amenorrhea.

A median duration of amenorrhea of 13-15 months has been observed in the U.S. and Canada among women practicing "natural mothering" where frequency of suckling remained high even after 1 year postpartum. Because supplements were fed to the infants, none were malnourished, but suckling frequency was still high. Similar durations have been noted in urban poor women in Nigeria and Asia (where malnutrition would be more evident however) (WHO, 1980).

Table 1 gives estimates for effects on birth intervals using the varied assumptions presented in Figure 2 for durations of amenorrhea.

Contraceptive use during the Postpartum Period

If women use contraception during the postpartum period, then the need to promote breastfeeding for family planning purposes would not be as great. However data from many developing countries indicate that even where family planning programs have been successful, as in Malaysia, Colombia or Costa Rica, there is a large proportion of women not using

Table 1

Effect on Birth Interval
of Changes in Duration of Amenorrhea due to
Increasing the Percent Breastfeeding
and the Duration of Exclusive Breastfeeding to 6 months
(Mexico)

% Breastfeeding	Duration of Amenorrhea for Breastfeeders ¹ (mo.)	Birth Interval (mo.)
80%	6 months	26 months
80%	8 months	28 months
80%	10 months	29 months
80%	12 months	31 months
80%	14 months	33 months
100%	6 months	27 months
100%	8 months	29 months
100%	10 months	31 months
100%	12 months	33 months
100%	14 months	35 months

¹Using varying assumptions for the duration of amenorrhea. Assumes duration is 6 months with little exclusive breastfeeding, and that the duration varies from 8 months to 14 months with exclusive breastfeeding for 6 months.

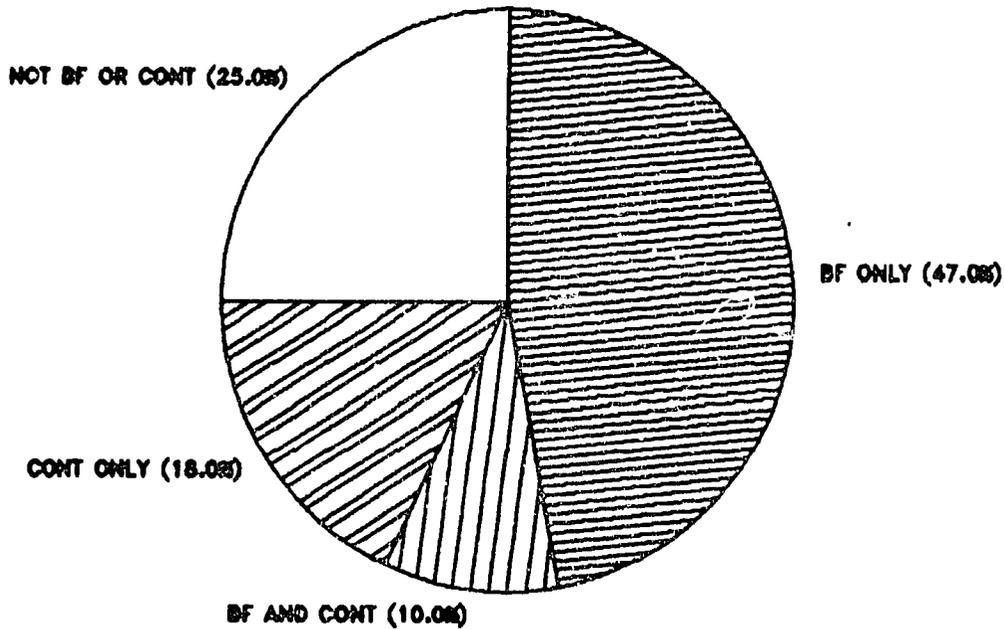
contraception in the first two years following a birth (Smith, 1985). Figures 3-6 illustrate the proportion of women with living infants either breastfeeding only, breastfeeding and using contraception, using contraception only or neither breastfeeding nor using contraception at 6 months and at 18 months postpartum. Mexico represents an extreme case, where at 6 months postpartum, 31% of women neither use contraception nor breastfeed. This increases to 61% at 18 months postpartum. Total contraceptive use rises only slightly, from 21% to 24% indicating that the decline in breastfeeding at later ages is not compensated for by an increase in contraceptive use. This trend of minimally increasing contraceptive use with declining breastfeeding is evident for all the countries shown in Figures 3-6, as well as in other countries. As indicated in these figures, there is very little overlap between breastfeeding and contraceptive use.

Figure 7 shows the proportion of women in specific developing countries who are neither using contraception nor breastfeeding at 6 months postpartum. This proportion ranges from 10% in Indonesia, to 35% in Malaysia and 38% in Yemen. Increasing the proportion of women fully breastfeeding at 4-6 months would cause a higher proportion of women to be protected. The impact on fertility would be substantial, especially for countries in transitional stages of development such as Panama, Jamaica, Venezuela, Malaysia, etc., where 25% or more of the women are neither breastfeeding nor using contraception at 6 months postpartum.

Figure 3

Use of Contraception and Breastfeeding
at 6 months and 18 months Postpartum

COLOMBIA
6 MONTHS



COLOMBIA
18 MONTHS

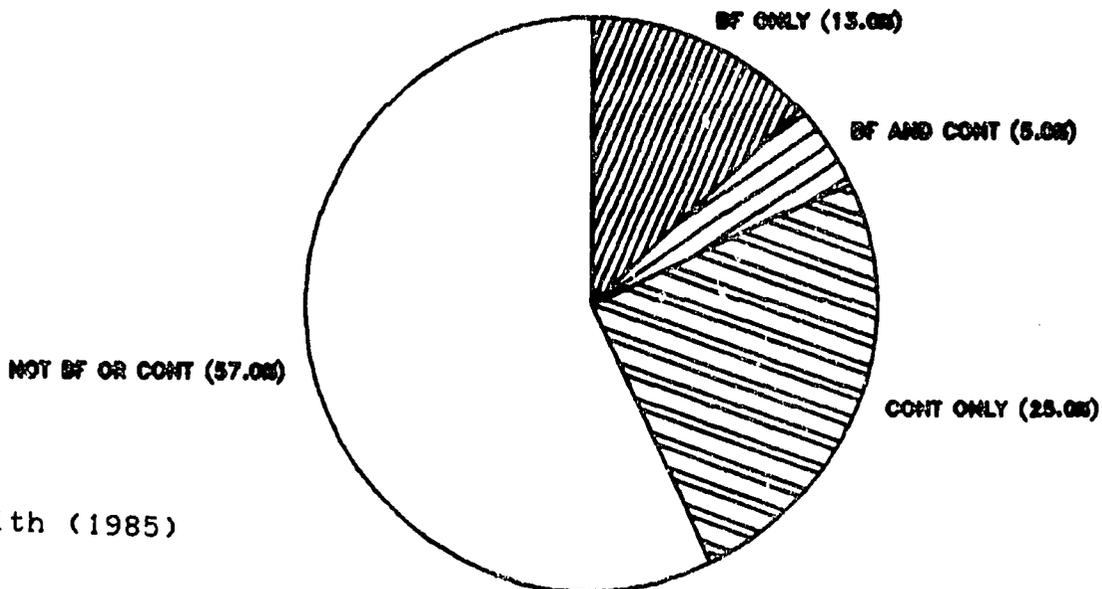
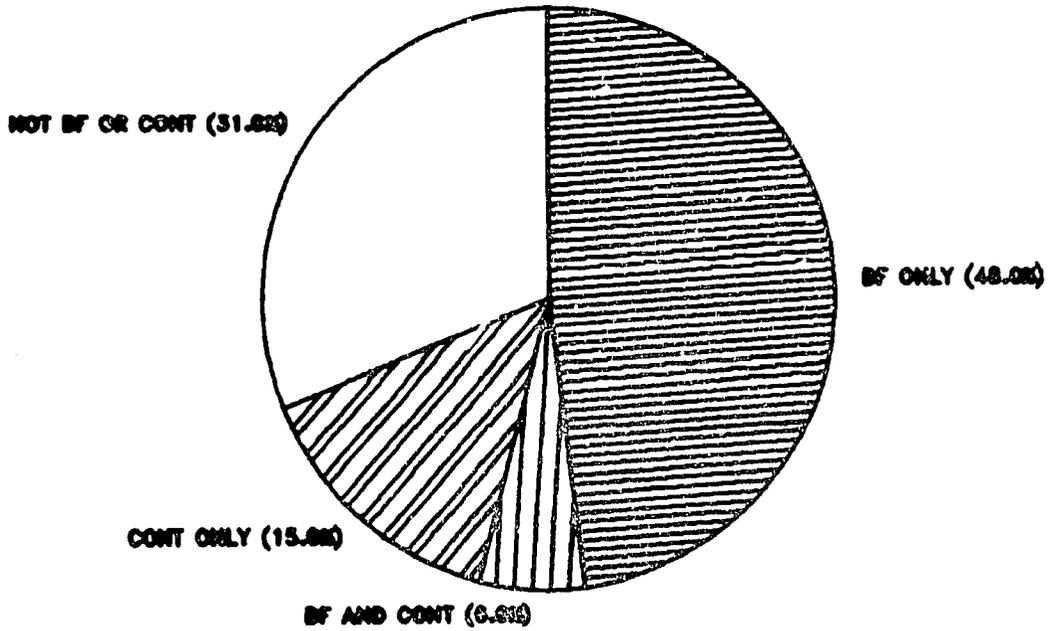


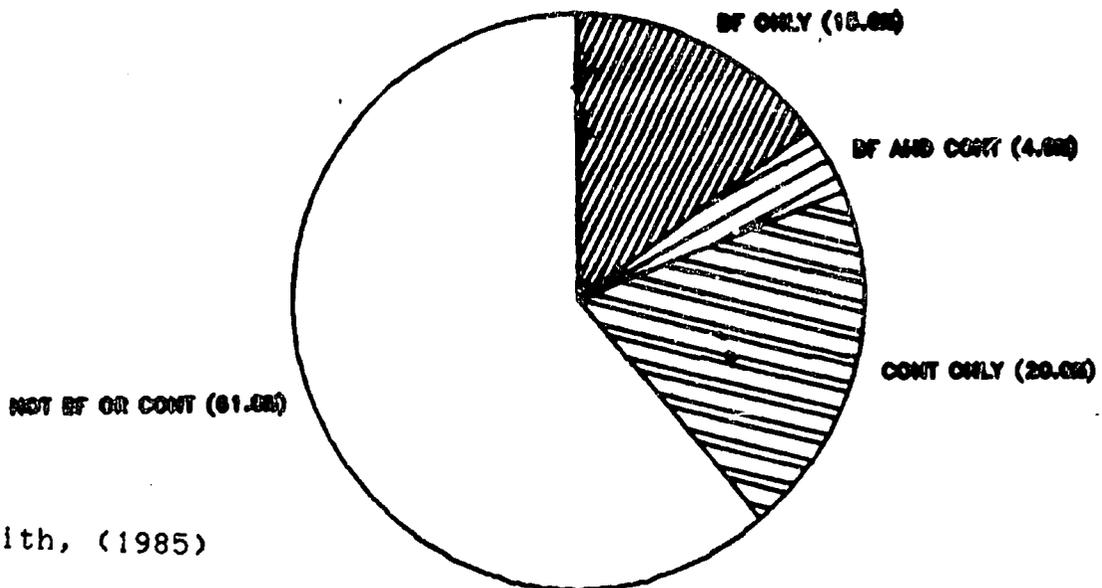
Figure 4

Use of Contraception and Breastfeeding
at 6 months and 18 months Postpartum

MEXICO
6 MONTHS



MEXICO
18 MONTHS

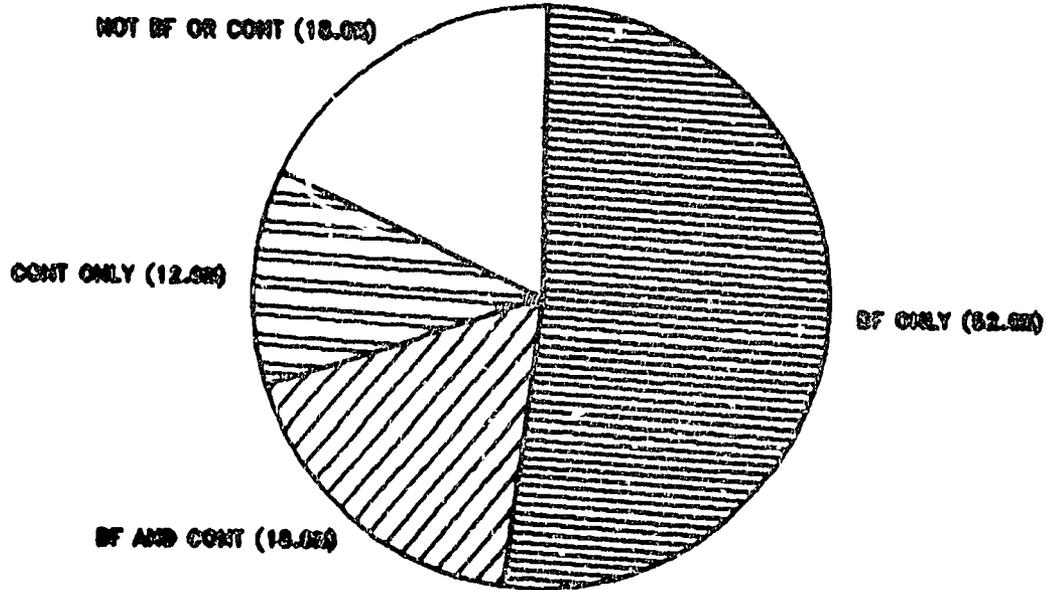


Ref: Smith, (1985)

Figure 5

Use of Contraception and Breastfeeding
at 6 months and 18 months Postpartum

PHILIPPINES
6 MONTHS



PHILIPPINES
18 MONTHS

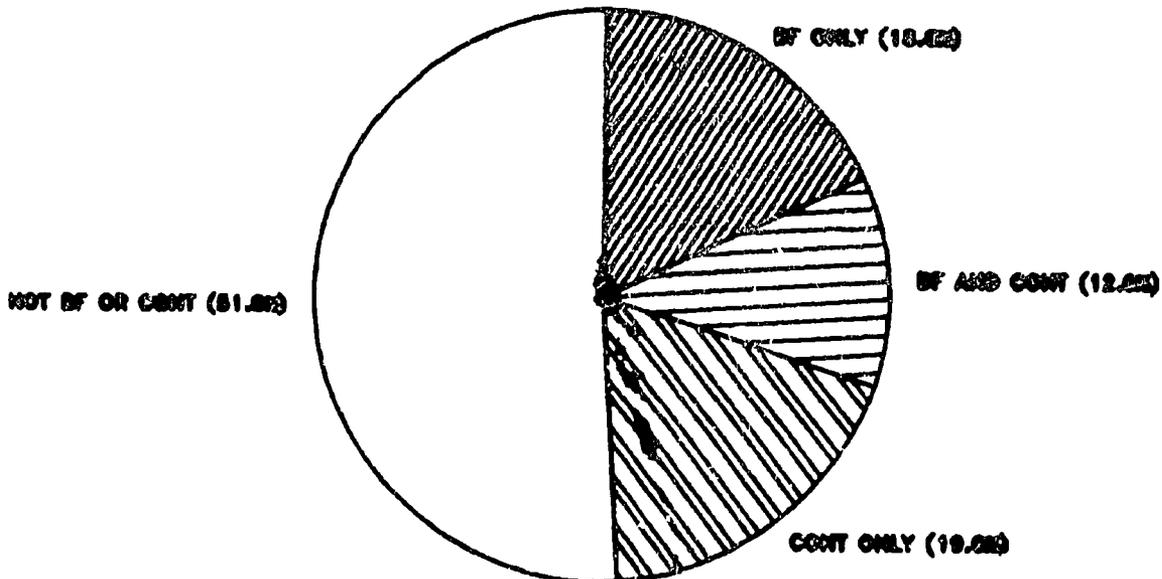
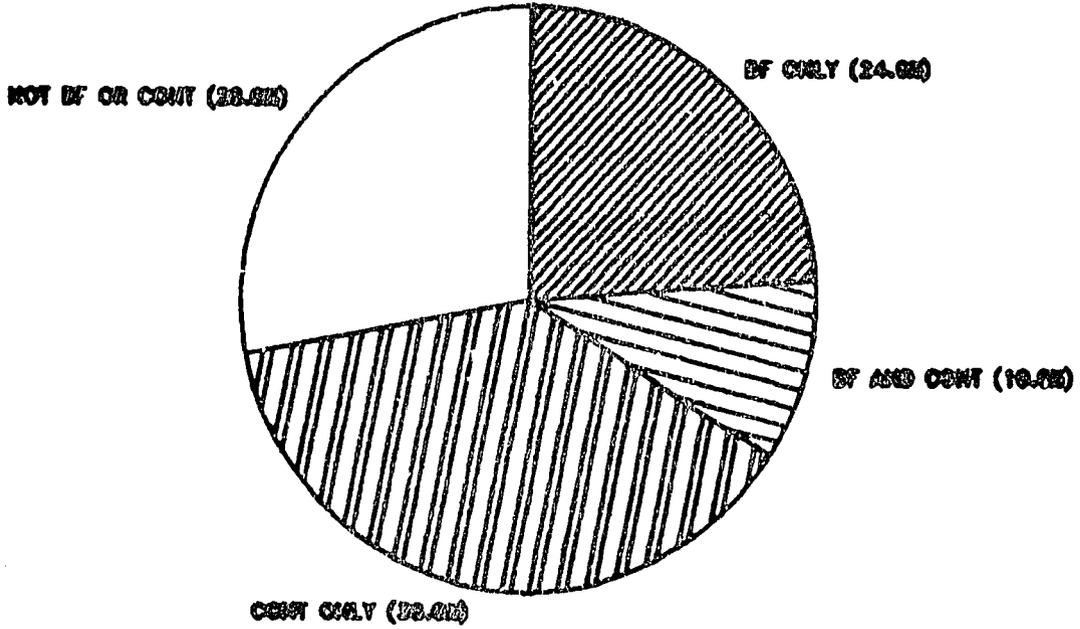


Figure 6

Use of Contraception and Breastfeeding at 6 months and 18 months Postpartum

COSTA RICA
6 MONTHS



COSTA RICA
18 MONTHS

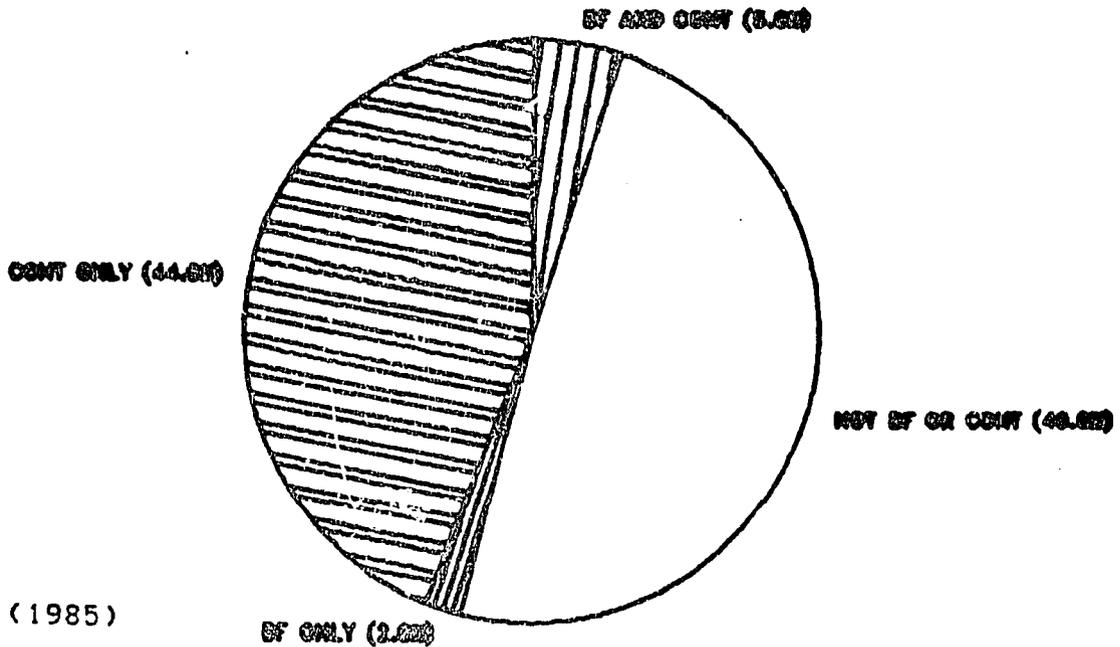
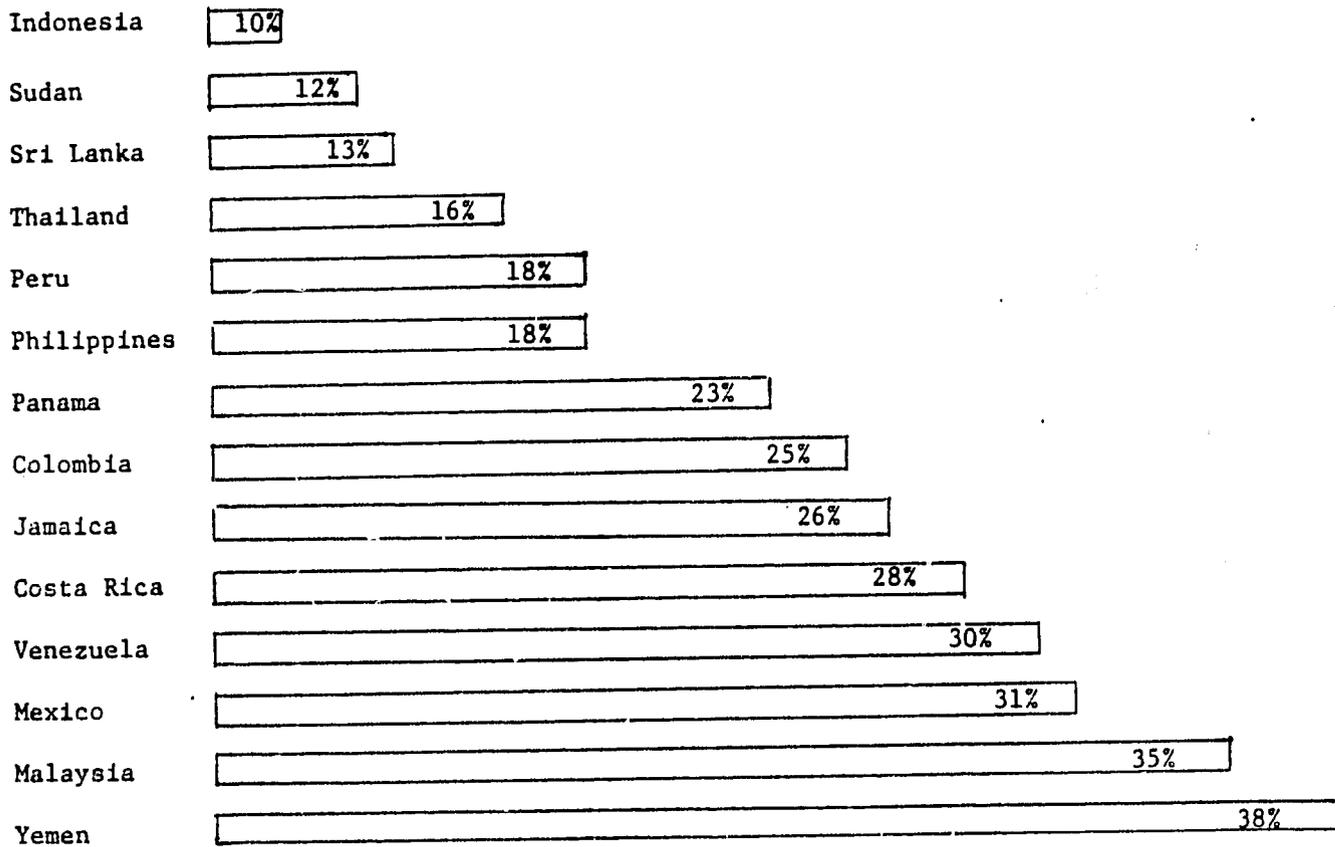


Figure 7

Percent of Women Not Breastfeeding
or Using Contraception at 6 Months Postpartum

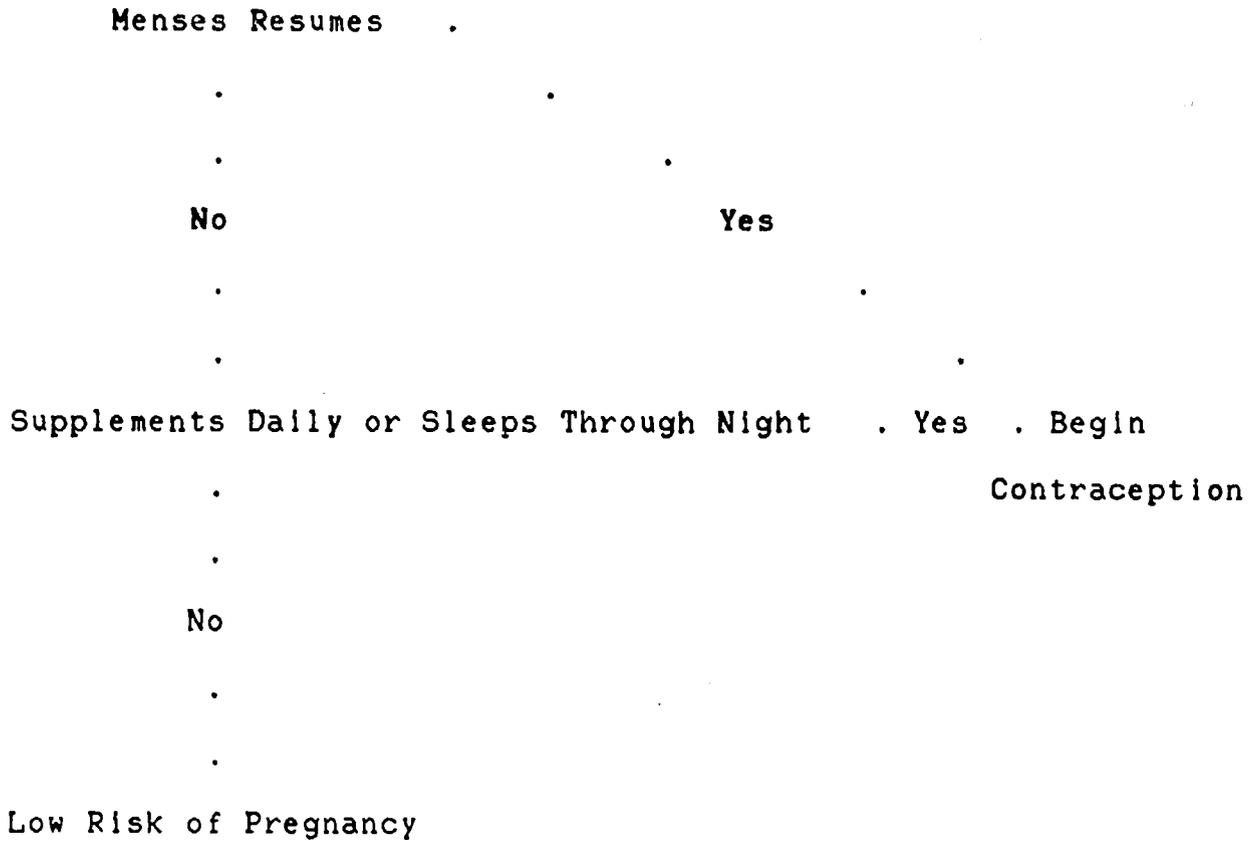


The impact of fertility is shown by studies conducted in the Philippines (Reyes-Makil and Simpson-Hebert, 1985). The proportion of pregnancies among women who were bottlefeeding by 12 months postpartum was 2.5 times (50% compared to 20%) as high as that among women who were fully breastfeeding or breastfeeding with supplements. This was in spite of the fact that a higher proportion of women in the bottlefeeding group used contraception.

Advice on when contraception should be initiated could be given by family planning workers or other health practitioners using the guide illustrated in Figure 8 (Labbok, 1985). This decision tree takes into account the impact of supplemental feeds or lack of night feeds on return of fecundity.

Figure 8

Decision Tree for Use of Contraception
During Lactation



(Labbok, 1985)

Programs to Increase the Incidence and Duration of Exclusive Breastfeeding

An increase in the proportion of women who exclusively breastfeed can be accomplished through three pathways:

1) Increasing the incidence of breastfeeding (having more women initiate breastfeeding) and subsequently breastfeed exclusively for 4-6 months

2) For women who currently are breastfeeding less than 4-6 months, increasing the duration of exclusive breastfeeding for 4-6 months

3) For women currently breastfeeding more than 4-6 months, but supplementing prior to that time, increasing the duration of exclusive breastfeeding

Successful programmatic efforts to increase the incidence or duration of breastfeeding have included hospital based programs, health professional training, and mass media campaigns.

Hospital Based Programs

Changes in hospital practices can lead to substantial increases in the proportion of women initiating breastfeeding. In the Philippines, changes in hospital routines led to a doubling of the proportion of women breastfeeding, from 40% to 87% (Clavano, 1981). Activities included shortening the period between delivery and initiation of breastfeeding, allowing rooming in, promoting breastfeeding on demand, and prohibiting infant formula distribution. In Guatemala, changes in hospital routines promoting immediate suckling after delivery increased the proportion of women breastfeeding at 6 months from 17% to 53%, and at 12 months from 0% to 12% (Klaus and Kennel, 1976). In another Guatemalan study by Sousa (1974) immediate suckling and rooming in lead to an increase in the percent breastfeeding from 27% to 77% at two months postpartum. Similarly large effects were noted in Singapore, when support for breastfeeding was given to mothers by hospital staff and no supplementary feeds given to normal infants in the hospital .

A recent study in Sweden examined the effect of hospital distribution of free infant formula to recently delivered mothers. Mothers who received samples were less likely to be breastfeeding at 1 month postpartum, compared to mothers who did not receive samples (78% compared to 84%) and more likely to have introduced supplements to the infant by 2 months (18% compared to 10%).

A study in Campinas, Sao Paulo, Brazil compared the effect

of rooming in on both the total duration of breastfeeding and on the duration of full breastfeeding (Hardy et al, 1982). They found that the proportion of women who were breastfeeding at one month was higher in the group with rooming in compared to those whose infants were kept in the nursery (86% vs. 73%). The proportion fully breastfeeding was also higher in the rooming in group; for example at four months 55% were fully breastfeeding compared to 42%.

Training of Health Professionals

The effect of changing hospital practices on breastfeeding incidence and duration is evident. An important mechanism to promote changes in hospital practices is through the training of health professionals. In addition, changing attitudes and practices of health providers can affect breastfeeding practices of their patients.

An education program for midwives and health visitors in Oxford, England led to an increase in the proportion of women breastfeeding at discharge and at 5 months duration, compared to the rates prior to training (Discharge-37% to 52%; at 5 months-23% to 43%).

Training of physician-nurse teams in Indonesia, Kenya, Philippines and Thailand in lactation management led to changes in hospital practices, including the elimination of pre-lacteal feeds (use of supplemental bottles during the period when colostrum is produced), provision for total rooming in, and

elimination of supplemental water and formula. In addition, breastfeeding lectures to staff were given, lactation clinics established, and courses provided for other institutions and professional groups in the community (Naylor and Wester, 1984).

Mass media

Education of the general public through mass media has been another approach to increase the incidence and duration of breastfeeding. Brazil's national breastfeeding promotion program included mass media as one part of its multisectoral approach, which also included changes in hospital practices, formation of breastfeeding support groups, training programs for pediatricians and obstetricians, funding of research on breastfeeding, and inclusion of breastfeeding in the elementary school curriculum (Marin and Oliveira, 1985). Evaluations of the program have shown dramatic increases in the incidence and duration of breastfeeding (Silvas, 1985).

Gueri et al (1978) evaluated the impact of a six week campaign to promote breastfeeding in Trinidad and Tobago. Their results indicated that those mothers who had a high recognition of the campaign were more likely to delay introduction of the bottle than those who had lesser recognition (28% compared to 19%). A mass media campaign conducted in Sweden also noted an increase in the duration of breastfeeding that was attributed to the campaign (Sjolin, 1976).

As part of the diarrhea control program in Honduras, breastfeeding promotion was included in the mass media campaign. After the campaign there was a significant increase in the number of mothers who reported breastfeeding during bouts of diarrhea. Similar positive results from mass media campaigns were noted in the Gambia, where the proportion of mothers breastfeeding on demand and breastfeeding during diarrhea increased. Mass media campaigns have also been used to promote breastfeeding in Colombia, Nicaragua, Chile, the Philippines, Jamaica and Yemen.

Conclusion

Increases in the incidence and duration of breastfeeding have been shown to be attainable objectives of programs that change hospital routines, provide education and training of health professionals or that address the general public through mass media channels. Interventions have already been tested and been proven successful.

In addition to these approaches, promotion of exclusive breastfeeding would include educating mothers and health professionals about the need for frequent suckling by the infant to maintain adequate milk production so that supplemental feeds will not be needed. This can be accomplished by on demand suckling, night feedings, no use of supplemental bottles of water, teas or formulas. If the mother needs to be away from the infant, then she should express her milk and this should be fed to the infant. This will help her to maintain milk production

and will provide the infant with necessary food in her absence. The high suckling frequency needed to maintain adequate milk production for unsupplemented breastfeeding will lead to an enhancement of the period of postpartum infecundity. Many studies have shown that when suckling is frequent and no supplements are fed to the infant, ovulation is unlikely to occur. Even once ovulatory cycles resume, women who suckle their infants frequently experience inadequate luteal phases that do not support the maintenance of fertilized ovum.

The promotion of exclusive breastfeeding would lead to decreases in fertility because a large proportion of women currently do not use contraception during the postpartum period, even in countries where family planning services are widely available and taken advantage of by couples. For example, in Colombia where the total fertility rate is 3.9 births per woman, at six months postpartum 72% of mothers are not using contraception and more than one-third of those are not breastfeeding. If the non-breastfeeders were induced to breastfeed and if the current breastfeeding women were encouraged not to supplement until 4-6 months, the average birth interval would increase by a minimum of 10%.

This change could be brought about without any need to address desires related to childbearing, and therefore could reach women who are resistant to approaches by family planning workers, e.g. those who do not want to use contraception for religious reasons or those women who desire more children.

This approach would also take advantage of professionals often outside of the family planning field, and thus expand the personnel involved in family planning promotion. In addition to the benefits for fertility reduction, the promotion of exclusive breastfeeding would result in significant improvements for infant health, due to reductions in diarrhea morbidity caused by too early introduction of contaminated foods and because of the anti-infective properties found in breastmilk.

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