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The Effect of a Breastfeeding Education Program on Lactational Amenorrhea in the Philippines

Gail Savina and Kathy Kennedy

A study was conducted in two communities in the rural Philippines to determine whether breastfeeding mothers could intensify their nursing enough to increase the period of lactational amenorrhea. Women in one community were exposed to a breastfeeding education program before the birth and during lactation, while women in the other community served as a comparison group. Increased breastfeeding was observed in the group that received breastfeeding education, beginning in the sixth month postpartum. Bottle use began earlier and was more common in the comparison group, but the introduction of solid foods at five to six months was similar. No difference in the duration of postpartum amenorrhea (a proxy for the duration of infertility) was observed between the groups. (STUDIES IN FAMILY PLANNING 1989; 20, 4: 203–214)

Women who fully breastfeed their children do not generally resume menses as early as non-breastfeeding women, or women who practice mixed feeding.[1] Over the past 30 years, clinical and field-based studies have traced the associations among postpartum infertility, hormone levels, and suckling. Elevated serum prolactin levels (as well as suppressed ovarian steroids and gonadotropins) are associated with delays in the resumption of ovulation and with inadequate luteal function postpartum (Brown et al., 1985; Gross and Eastman, 1985; Glasier et al., 1984; McNeilly et al., 1982; McNeilly et al., 1980). Prolactin levels, which are high at birth, are maintained by suckling, but the exact nature of the relationship between prolactin and ovarian function is in question. Prolactin levels have been found to be correlated with frequency of suckling, the interval separating suckling episodes, whether suckling occurs at night-time, and the number of minutes spent suckling (Delvoye et al., 1977; Gross et al., 1980; Wood et al., 1985; McNeilly et al., 1980; Gross and Eastman, 1985; Elias et al., 1986). The introduction of supplemental food could lead to lower levels of prolactin if suckling is diminished (Howie et al., 1981; Gross and Eastman, 1985; Gross et al., 1980). However, it is unclear how much suckling is enough, possibly because definitions and measures used vary considerably. Passive observation on the number of suckling episodes and lactational infertility has yielded conflicting results in Mexico, Zaire, Bangladesh, and the USA (Rivera et al., 1985; Elias et al., 1986; Huffman et al., 1987; Rivera et al., 1988; Delvoye et al., 1977). To our knowledge, the current study is the first active effort to alter the pattern of suckling in order to change the consequent pattern of menstruation.

This study was conducted in the Philippines to determine whether breastfeeding could be systematically enhanced as a family planning measure and to try to understand the relationship between suckling and ovarian activity more fully. Birth rates are high and contraceptive prevalence rates (CPRs) are low in the rural Philippines. In the Western Visayas, for example, the CPR is only 27 percent (Cabigon, 1986), and women use less effective contraceptive methods, such as periodic abstinence (Laing, 1987). Improvements in contraceptive use are needed, and attention must be paid to the role of breastfeeding in fertility regulation. In rural areas of the Philippines, breastfeeding generally continues for more than a year, and demographically has a greater inhibitory effect on fertility than either contraception or nonmarriage (Zablan, 1985). If the duration of postpartum infertility were extended, perhaps by improving the intensity (defined here as frequency and duration) of breastfeeding, the impact on fertility could be significant.

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Objectives and Methods

This study investigated whether a group of Filipina women could be persuaded through an education campaign to intensify their suckling practices enough to increase their periods of postpartum amenorrhea. Specifically, the study measured the effect of an education program on suckling characteristics, bottle use, the introduction of supplementary foods, and postpartum bleeding in a group of women in the rural Visayas.

The quasi-experimental study was conducted in two communities, each with a population of about 15,000, in eastern Negros Oriental, central Philippines, about six kilometers from the provincial capital of Dumaguete. The sample communities were selected for comparability and convenience, and were sufficiently separated geographically to avoid interaction. The intervention, an education program about infant feeding, was conducted among respondents in the experimental community only. Infant feeding practices and resumption of menses in the two groups were measured and compared, and analyses of those variables most predictive of return to menses were made.

The Sample

The mountains that bisect Negros Island descend sharply to the ocean on much of the eastern side, leaving little lowland plain for agriculture. Most study respondents lived in small wood or grass houses on plots of land that they tenanted or owned, near other family members but outside of the towns. They subsisted by farming or fishing in combination with other small-scale enterprises (see Table 1). The majority of women supplemented the family income by tending vegetable gardens or raising chickens, pigs, and other animals for consumption or sale. They also harvested crops (mostly corn), took in laundry and sewing, or produced goods for sale. The women in both groups were similar in age, education, and property status.

Table 1 Socioeconomic characteristics, by experimental group

Characteristic	Experimental (N = 68)	Control (N = 67)
Age in years (mean ± sd)	26.6 ± 4.8	26.3 ± 4.2
Education in years completed (mean ± sd)	7.3 ± 2.8	7.2 ± 2.8
Property (N)		
Owner	50	58
Renter, squatter, tenant	18	9
Mother's part-time work (N)		
None	32	16
Raise vegetables	23	22
Other	13	29
Husband's work (N)		
None	0	2
Farmer/fisherman	20	26
Wage job*	28	17
Other (piecework, driver, etc.)	18	22
Unknown	2	0

Note: sd is standard deviation.
*Wage jobs were often part-time or temporary, and included carpentry, factory, janitorial, secretarial, and police work.

All pregnant women in each community who met the following criteria were admitted into the study: expected delivery date between 1 September 1985 and 15 January 1986; age 18–35; did not hold a full-time job; did not intend to use hormonal contraceptives; had a husband or regular partner; planned to breastfeed the infant; had no serious obstetric complications; agreed to participate and gave written informed consent. Sixty-eight mothers were recruited in one community as the intervention (experimental) group, and 67 were recruited as controls in the other community. Since assignment to exposure groups (education versus no education) was geographically based, contamination among respondents was limited. The two communities were separated from each other by a distance of about ten kilometers, so contact between the groups was thus not considered a problem.

Prior to the intervention, control group mothers reported (on an admissions record) more involvement in income-generating activities that could compete with their time available to breastfeed. They were also somewhat less likely to deliver in a hospital or to use modern family planning before this pregnancy than the mothers in the education group (Table 2). Experimental and control mothers were otherwise similar. Twins were born to two mothers in the control group. An additional mother in the control group stopped breastfeeding within two weeks postpartum due to a serious breast infection. These mothers were removed from the data analysis, reducing the number in the control group to 64.

As among Filipinas in general and Visayan women in particular, the majority (96 percent) of women in the study had breastfed their penultimate infant and continued for an average 13.8 months, compared with the Visayan average of 88 percent and 13 months. The average last birth interval (31.5 months) was similar to the Visayan mean birth interval (32.9). The average duration of the previous postpartum amenorrhea (8.3 months) was slightly longer than the Visayan average reported (7.0 months) (Zablan, 1986).

The Intervention

The purpose of the education program was to promote more frequent and more intensive breastfeeding and to postpone weaning. Previous research that had been conducted in the Philippines identified beliefs that were

Table 2 ·Fertility and delivery-related characteristics, by experimental group

Characteristic	N	Experimental	N	Control
Parity (excluding study infant)	68		67	
Nullipara (%)		25.0		28.4
Mean number of children		1.9		1.7
Duration of breastfeeding previous infant	51		48	
Mean months ± sd		14.0 ± 6.8		13.7 ± 6.9
Age when solids given to previous infant	46		47	
Mean months ± sd		5.1 ± 1.7		5.5 ± 2.5
Duration of amenorrhea after previous infant	49		45	
Mean months ± sd		8.5 ± 5.9		8.0 ± 5.9
Birth interval (mean months)	51	32.3	49	30.6
Source of prenatal care* (%)	68		67	
Traditional attendant and/or midwife		93		90
Hospital or clinic		28		27
None		2		2
Place of delivery (%)	68		67	
Home		69		84
Hospital		31		16
Contraceptives used following birth of previous infant (%)	68		67	
None		31		33
Modern (pills, IUD)		29		4
Traditional (rhythm, abstinence)		40		63

Note: sd is standard deviation.
*Multiple responses.

obstacles to prolonged and frequent breastfeeding (Simpson-Hebert et al., 1986). For example, it was thought that a mother's milk was unsuitable for her infant if she was "cold" after doing laundry by hand with cold water. Myths such as this were addressed directly in the education program. Specific education messages were:

- Breastfeed often, day and night.
- Wait four months before introducing supplemental foods: breastmilk is sufficient for most babies for four to six months.[2]
- Problems with insufficient milk should first be handled by nursing the baby more often: frequent suckling produces more milk.
- Supplements, if fed, should be given *after* breastfeeding the infant.
- Colostrum should be fed to the newborn and not discarded.
- It is normally safe to breastfeed if the mother is sick, if the baby is sick, or if the mother has just come from the hot sun or the cold.

The breastfeeding education program was set up as a separate activity that was closely coordinated with the ongoing services of midwives who were paid by the government. Two health educators hired by the study worked with local midwives to establish small classes of five to ten women, usually neighbors. The classes were conducted in the women's homes or in local health centers. Although the health educators "taught" the classes (using lectures, pictorials, games, and activities), the atmosphere was social and informal, midwives and others were often present, and health topics other than breastfeeding were discussed. The health educators also visited the study participants in their homes once or more each month, to answer questions about breastfeeding and other concerns. Although health educators were not members of the local community, they worked in the community daily. Referrals between midwives and health educators were reciprocal and occurred frequently.

Education in the experimental group began two to three months before birth and continued up to twelve months postpartum. Each mother attended a two-hour class and one individual counseling session per month. The mothers in the control group received no special education about infant feeding. (Although efforts were made to disassociate health educators from data collectors in the experimental group, the respondents knew that these workers were employed by the same study. They knew, in effect, that the health educators and the data collectors were "friends." The bias that this may produce on the data is acknowledged, but it is impossible to measure.)

Data Collection

Background data, including information about the last child breastfed and the return of menses after the previous birth, were gathered through interviews upon admission to the study. Each month a 24-hour self-report form was completed, recording each breastfeeding episode and any supplementa feeds. Each mother was also interviewed monthly about feeding practices and vaginal bleeding. The respondents were given watches to time their feeding episodes, and monthly photographs of their infants, both of which are socially valued items. The accuracy and reliability of data were monitored by random rechecks of respondents by a supervisor. Data collectors were trained to inspect the respondents' homes visually for evidence of feeding bottles and the like, to insure that observations matched interview data. When questions arose as to the honesty or accuracy of data, respondents and/or close relatives were re-interviewed.

Definitions

The duration of unsupplemented breastfeeding was the number of weeks from birth until the start of regular supplements. This was equivalent to the period of exclusive or pure breastfeeding. Supplements could be either liquids or solids, and "regular" feeding consisted of routine feeding, occurring at least once a day. (Substances given medicinally, such as vitamins, honey, water, and citrus juice were not considered supplements even if given routinely. These substances were given in very small amounts: a sip of water or diluted citrus was given after nursing, for example, to clean the mouth, and a drop of honey was given on a grass blade. Because almost all mothers fed these substances in minute quantities from birth, these foods did not serve as indicators of supplementation.) Solids were those foods given by spoon or hand rather than by bottle or cup. The first taste of any food is the first time any solid or liquid (except the "medicinals" described above) was given, rather than routine or regular feeding of the supplement or solid

Breastfeeding intensity was measured in terms of frequency, defined as the number of suckling episodes per 24 hours, and in terms of duration, defined as the number of minutes spent suckling per 24 hours. For one sample day each month, mothers recorded all breastfeeding episodes on a 24-hour (pictorial) diary sheet. The mothers noted the times each episode began and ended. From these data the number of suckling episodes per day and the total minutes spent suckling per day were computed. Determination of what constituted a distinct suckling episode was left to the mother.[3]

The outcome variable of interest in this study was the duration of postpartum infertility. The return of menses postpartum can be used as an estimate of the time of return to fertility. In some mothers fertility returns before bleeding and in some mothers after. Owing to the absence of large studies detailing the resumption of postpartum ovulation, distributions of the return to fertility around the end of amenorrhea are not available. Early first bleeding episodes have been observed to be ovulatory less frequently than late first bleeding episodes (Howie et al., 1982). The current study assumes that lactational amenorrhea is a proxy for lactational infertility and that all mothers are equally likely to be fertile at the end of postpartum amenorrhea.

Duration of postpartum amenorrhea was defined as the period from birth until the first evidence of any vaginal bleeding (exclusive of bleeding during weeks one through four postpartum). This is the definition of postpartum amenorrhea used throughout the analysis unless otherwise stated. In many women, the first vaginal bleed was not followed by another menstrual period within the time that a normal cycle would be expected to end. For this reason, a second postpartum amenorrhea endpoint representative of the end of lactational infertility was computed, and called cyclic "menses." This was calculated retrospectively as the first vaginal bleeding episode followed within three to six weeks by another. *Regla*, an indigenous term, referred to the number of weeks from birth until the occurrence of a bleeding episode identified as "normal" by the woman herself, using subjective criteria.

For women who bled only once prior to a subsequent pregnancy, this bleeding episode was also considered the first menses. For four women who became pregnant prior to resumption of menses,[4] the estimated date menses would have occured (determined by counting back 36 weeks from the date of delivery) was the endpoint of the amenorrheic period. For two mothers who had not resumed bleeding when data collection ceased, duration of postpartum amenorrhea was estimated as the period from birth to the completion of data collection: this was 86 weeks for one mother and 96 weeks for the other. Nine mothers dropped out of the study and no endpoint was recorded for them. They were excluded from all analyses about duration of postpartum amenorrhea except life-table analysis.

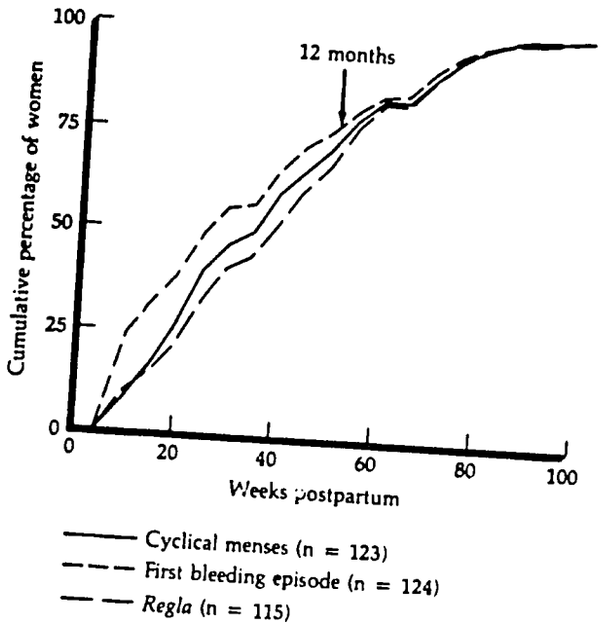
Correlations among the three endpoints were high (r greater than or equal to .87, p less than .001 for any pair of associations). The mean durations of postpartum amnenorrhea (in weeks) for all mothers in both groups were 32.1 (standard deviation 26), 37.8 (standard deviation 22), and 42.7 (standard deviation 29) for first bleeding episode, cyclic menses, and *regla*, respectively (Figure 1).

Respondents left the study after two consecutive menses, pregnancy, initiation of hormonal contraception, or for reasons such as the death of the infant or moving away from the study area. Nine respondents (7 percent of sample) were terminated before evidence of fertility (bleeding or conception) was determined. Four of these were experimental mothers (two moved away, one started using hormonal contraceptives, and one baby died), and five were controls (four moved away and one used hormonal contraceptives).

Results

The t-test was used to determine the significance of differences between group means.[5] When variables were categorical, a chi-square was computed. The prospective risk of resuming cyclical menses was computed by the life-table method of incidence estimation, which al-

Figure 1 Cumulative percent of all women who experienced bleeding, by three types (definitions) of bleeding



lowed data from the nine mothers lost to follow-up to be included for the months prior to their attrition. Differences in the distributions of the survival functions were tested by log-rank chi-square. Pearson product-moment correlations were computed to describe the relationships between the duration of postpartum amenorrhea and selected continuous variables.

Only one mother (in the control group) failed to breastfeed successfully; she stopped after two weeks because one of her breasts was swollen, bloody, and infected. No data were obtained on total months of breastfeeding because most mothers were terminated from the study before they weaned their children.

All mothers successfully established breastfeeding during the first three days postpartum, the time when colostrum was produced. Ninety-seven percent of the experimental mothers reported feeding colostrum to their infants, compared to 72 percent of the controls ($p<.001$). Significantly more experimental mothers ($p<.001$) reported feeding colostrum to the study infant compared to their previous infant. There was no significant difference between the previous infant and the study infant among control mothers in the reported feeding of colostrum.

The mean age for giving a first taste of any food and for introducing regular supplements (liquids and/or solids) was significantly younger for control infants, but there was no difference between the two groups in the mean age when regular solids were started (Table 3). In addition, neither group showed a significant change from the age when solids were introduced in the past (as shown in Table 2). The difference in the introduction of regular supplements diminished during the sixth month (see Figure 2), and by the eighth month all mothers in both groups fed supplements regularly.

Significantly more control mothers (56 percent) ever used bottles compared with mothers in the experimental group (35 percent). The difference was especially profound during the early months: twice as many control group mothers ever used a bottle during the first three months.

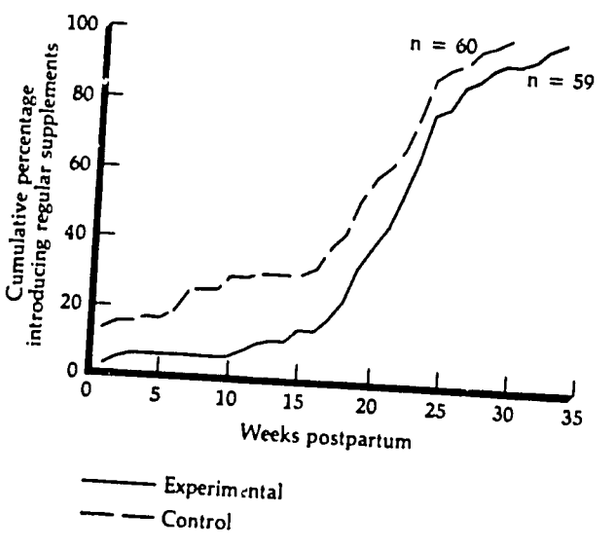
For ten months, there was no significant difference between amenorrheic experimental and control mothers in the number of minutes they suckled per day. For the first five months there was no difference in the number of episodes of breastfeeding per day. Control group mothers began to display significantly fewer episodes of

Table 3 Age (in months) at which supplements were introduced, by type of supplement

Type of supplement	Experimental	Control	Significance
First taste of any food (N)	(61)	(60)	
Mean ± sd	4.6 ± 1.6	3.3 ± 1.7	0.01
Median	5.0	3.0	
Regular supplements started (N)	(60)	(59)	
Mean ± sd	5.3 ± 1.8	4.4 ± 1.8	0.01
Median	6.0	5.0	
Regular solids started (N)	(58)	(58)	
Mean ± sd	5.5 ± 1.1	5.2 ± 1.2	ns
Median	5.5	5.0	

Note: sd is standard deviation; ns is nonsignificant.

Figure 2 Cumulative percent of women who introduced regular supplements, by experimental group



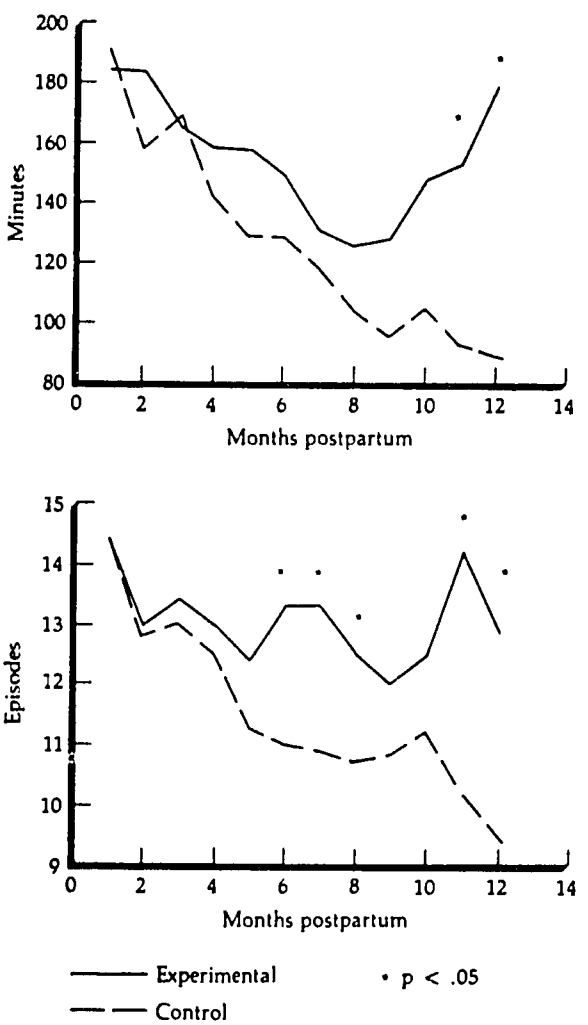
breastfeeding at about the same time that supplements were introduced. At six months the experimental and control mothers were breastfeeding an average of 13 and 11 times per day, respectively (Figure 3).

Since all mothers either slept in the same bed or the same room with their infants and essentially nursed on demand during the night, no useful comparison could be made between the two groups. There is an implicit assumption, then, that no differences in breastfeeding at night occurred between the groups. This is recognized as a source of possible error in the findings.

There was no significant difference between the two groups in the mean duration of postpartum amenorrhea as measured by any of the three endpoints (Table 4 and Figure 4). When defined as the first vaginal bleed, the difference between either the mean or the median periods of postpartum amenorrhea in the two groups was 10–11 days. The cumulative risk of bleeding was similar across groups by months (Table 5; see also the top panel in Figure 4). The cumulative risk was virtually the same as the proportional hazards function since so few mothers were lost to follow-up.

In summary, significantly fewer experimental mothers used feeding bottles, especially during the early months postpartum, and they waited significantly longer before introducing supplements on a regular basis. Although there were no differences in suckling behavior during the early months, beginning in month six experimental mothers displayed greater frequencies of suckling. Nevertheless, no actual differences between the two groups in duration of amenorrhea were observed.

Figure 3 Mean number of breastfeeding episodes and minutes per day, by experimental group over time



Factors Related to Duration of Postpartum Amenorrhea

Experimental and control groups were then combined in order to examine those factors related to the duration of postpartum amenorrhea: non-feeding determinants of postpartum amenorrhea, the relationship between supplementation and the duration of postpartum amenorrhea, and the relationship between supplementation and suckling patterns.

Table 6 presents the relationship between duration of postpartum amenorrhea in the study sample and those variables found to be associated with its duration in other studies. Simple correlations indicated that three variables—duration of postpartum amenorrhea following the previous baby (r = .59), parity (r = .33), and mother's education (r = −.26)—were significantly related to duration of postpartum amenorrhea in the current study. Mother's age at delivery (r = .19) and infant's birthweight (r = .07) were not independently related to postpartum amenorrhea.

Figure 5 and Table 7 show the cumulative percent of women resuming menses at each month postpartum by the time when regular supplements were introduced: early (months one through three), intermediate (months four through six), or late (after month six). Of the 25

Table 4 Duration of postpartum amenorrhea defined as weeks to menses, first bleeding, and *regla*, by group

Duration	Experimental	Control
Menses (N)	(64)	(59)
Mean ± sd	37.4 ± 22.2	38.5 ± 22.6
Median	35.0	37.0
First bleeding episode (N)	(64)	(60)
Mean ± sd	32.3 ± 23.4	33.9 ± 24.4
Median	25.5	27.0
Regla (N)	(61)	(56)
Mean ± sd	39.8 ± 22.0	42.7 ± 25.0
Median	39.0	42.7

Note: sd is standard deviation.

women who introduced supplements early, 92 percent had experienced menses at the end of the year. Of the 12 who introduced supplements late, only 50 percent had menses at one year. Table 8 gives the mean duration of postpartum amenorrhea by time of introducing regular supplements. A simple correlation between time

Figure 4 Cumulative percent of women who experienced three types (definitions) of bleeding, by experimental group

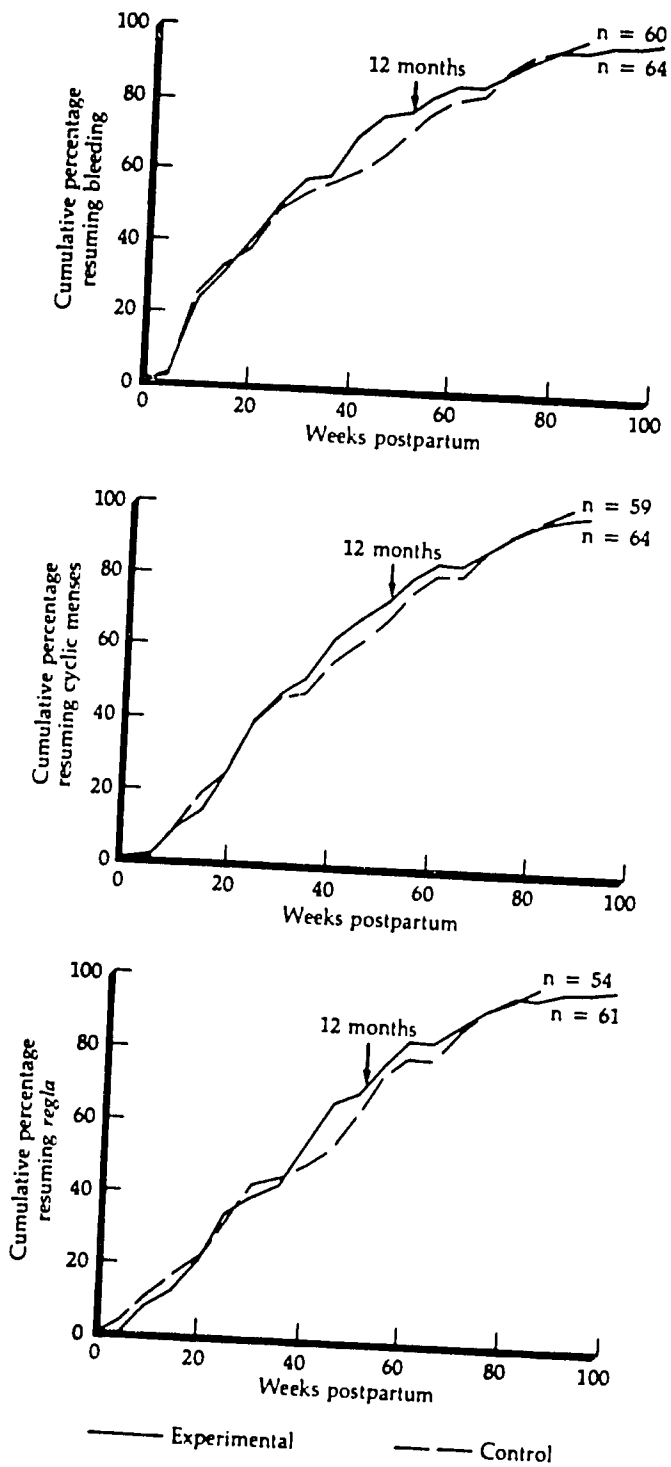


Table 5 Cumulative risk of bleeding, by month postpartum and by group

Month postpartum	Experimental (N = 68)	Control (N = 64)
1	.000	.000
2	.197	.222
3	.303	.270
4	.318	.350
5	.426	.383
6	.504	.464
7	.566	.497
8	.566	.497
9	.678	.549
10	.711	.601
11	.775	.671
12	.807	.726

postpartum (weeks) when regular supplements began and time postpartum (weeks) of the first bleed yielded $r = .31$, $p<.001$ (N=111).

In order to determine whether supplementation resulted in reduced levels of breastfeeding, mothers were divided according to whether they were breastfeeding exclusively or giving supplements in addition to breastfeeding in the first three months postpartum (Table 9). The mothers who breastfed exclusively in both groups almost always fed more often and for more minutes than mothers who used supplemental feeding. These figures are not tested for significance because the numbers of mothers who supplemented are low.

Figure 5 Cumulative percent of all women who experienced cyclic menses, by time regular supplements were introduced

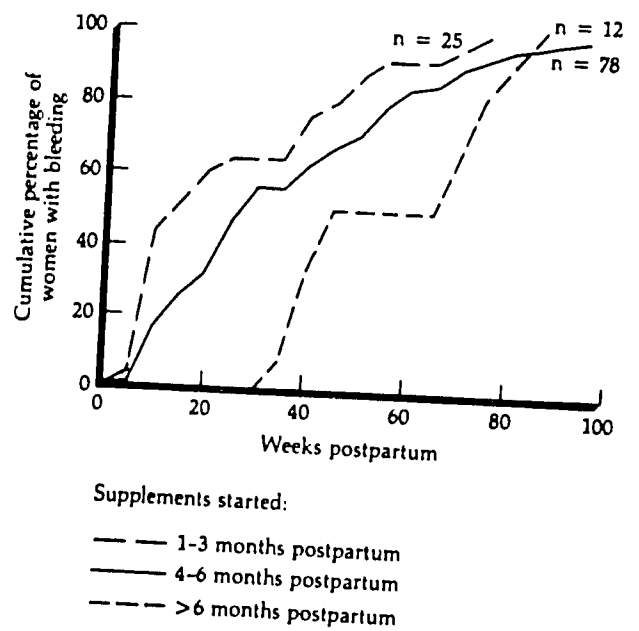


Table 6 Median duration of postpartum amenorrhea (weeks), by selected covariates and by group

Independent variable	Duration of postpartum amenorrhea (weeks)						Correlation coefficient with postpartum amenorrhea
	Total		Experimental		Control		
	(N)	Median	(N)	Median	(N)	Median	
Mother's age at delivery							.19
18–25	(53)	18.0	(29)	19.0	(24)	16.0	
26–35	(71)	35.0	(35)	30.0	(36)	37.0	
Duration of postpartum amenorrhea following birth of previous child							.59*
<4 months	(33)	18.0	(16)	18.5	(17)	11.0	
5–12 months	(33)	38.0	(18)	37.5	(15)	39.0	
>12 months	(21)	54.0	(12)	51.5	(9)	68.0	
Parity level of study child							.33*
1	(33)	15.0	(16)	12.0	(17)	15.0	
2	(34)	22.5	(16)	21.5	(18)	25.5	
3	(23)	39.0	(14)	38.0	(9)	39.0	
>3	(34)	48.5	(18)	37.5	(16)	53.0	
Education (years completed)							-.26*
1–6 (elementary)	(72)	32.5	(34)	30.0	(38)	38.0	
7–10 (high school)	(35)	29.0	(19)	39.0	(16)	26.0	
11–16 (college)	(17)	10.0	(11)	10.0	(6)	9.5	
Infant's birthweight (grams)							.07
1,800–2,550	(18)	26.0	(4)	32.0	(14)	25.0	
2,600–3,300	(84)	25.5	(46)	25.0	(38)	27.5	
3,350–3,900	(22)	28.5	(14)	26.5	(8)	34.0	

*p<.01.

Table 7 Cumulative percentage of experimental and control mothers with bleeding, by month postpartum and by time of introduction of supplements

Supplements started	N	Month postpartum							
		3	6	9	12	15	18	21	24
1–3 months									
Experimental	7	57	71	86	86	86	100	100	100
Control	18	39	61	72	94	94	100	100	100
4–6 months									
Experimental	44	30	52	68	82	89	96	98	100
Control	34	18	41	50	71	79	97	100	100
>6 months									
Experimental	8	0	0	38	62	62	88	100	100
Control	4	0	0	25	25	25	75	100	100

Multivariate Analysis of Factors Related to Postpartum Amenorrhea

The preceding single variable analyses have suggested that factors associated with the duration of postpartum amenorrhea include: the duration of postpartum amenorrhea following the birth of the previous child, the duration of unsupplemented breastfeeding of the current child, parity, and mother's education. A multiple linear regression was attempted of these factors with postpartum amenorrhea as the dependent variable. However, mother's education, age, parity, time to supplementation, and duration of previous postpartum amenorrhea all proved to be interrelated, resulting in unacceptably high degrees of colinearity for any model of more than two variables. Thus, the relative importance of the independent variables to the current duration of amenorrhea has not been determined, although the univariate strength of the associations of these factors with postpartum amenorrhea was presented in Table 6. A matrix of the associations among the variables showed that women with high levels of education were significantly more likely to be younger, of lower parity, and to have shorter durations of postpartum amenorrhea.

Table 8 Duration of postpartum amenorrhea (weeks), by time regular supplements were introduced

Age regular supplements started	N	Duration of postpartum amenorrhea (weeks)	
		Mean ± sd	Median
1–3 months	25	24 ± 21	15
4–6 months	78	35 ± 23	28
>6 months	12	57 ± 19	57

Note: sd is standard deviation.

Table 9. Mean suckling frequencies and suckling durations for experimental and control mothers, by type of breastfeeding and by months postpartum

Months postpartum	Experimental		Control	
	Pure breast-feeding	Supplements and breastfeeding	Pure breast-feeding	Supplements and breastfeeding
	Frequency (episodes per 24 hours)			
1	14.8 ± 5 (63)	10.0 ± 6 (4)	15.2 ± 9 (52)	14.0 ± 5 (11)
2	14.3 ± 6 (63)	9.0 ± 1 (2)	13.2 ± 4 (47)	12.8 ± 4 (14)
3	14.1 ± 6 (54)	17.2 ± 9 (4)	13.0 ± 4 (45)	10.4 ± 4 (9)
	Duration (minutes per 24 hours)			
1	188.3 ± 92 (63)	105.8 ± 62 (4)	196 ± 108 (52)	161.4 ± 64 (11)
2	188.8 ± 94 (63)	120.5 ± 48 (2)	174 ± 114 (47)	154.7 ± 104 (14)
3	182.6 ± 101 (54)	136.0 ± 42 (4)	161 ± 92 (44)	102.0 ± 52 (8)

Note: Number of cases shown in parentheses.

Conclusions

Although the education program resulted in changes in several important feeding variables, namely colostrum feeding, bottle use, duration of unsupplemented breastfeeding, and suckling frequency after the fifth month, these changes did not affect the duration of postpartum amenorrhea. Experimental mothers introduced supplements significantly later than controls and breastfed more intensively during months 6–12 postpartum, more often fed colostrum, and less often used bottles, but they did not display longer periods of postpartum amenorrhea.

One reason for these results seems to lie in the suckling pattern common among Visayan women. Although suckling data were gathered on women only until they resumed cyclic bleeding, these data show that suckling was intense during the first year: at least prior to cyclic menses, women breastfed at averages of no less than nine times per 24 hours and over one and a half hours per day during the infant's first year. Even in the control group, however, the average frequencies and durations of breastfeeding remained high even after supplements were introduced. Given extensive breastfeeding and little supplementation, the education program might have needed to achieve nearly impossible goals (that is, elimination of *all* supplements for six months) to make a substantial change in postpartum amenorrhea.

During the first five months postpartum, education about breastfeeding had little impact on suckling patterns. During the later months, when rural mothers are typically pressured to leave the house for economic reasons, suckling frequency (and later, duration) tended to fall off, except for women under the influence of the education program. It was during this period that the experimental mothers displayed greater suckling frequency and duration. The failure of the education program to extend the duration of postpartum amenorrhea among rural Filipinas, then, may be due to the fact that even the control mothers suckled at an optimal level throughout the study. Education could make little improvement on this. By the time that education could make a measurable difference in suckling frequencies, mothers were beginning to resume menses. The implication of this finding is that educational programs may be more effective among groups of women who suckle at less than optimal intensity, given competing claims on their time and energy. These groups may include urban women and those who give birth in a context less supportive of breastfeeding.

A second explanation for the lack of association between suckling intensity and duration of postpartum amenorrhea in this group may be methodological. Suckling episodes are difficult to define and measure accurately. For that reason large variability is found in suckling patterns, and it is difficult to obtain significant correlations in samples of limited size. This problem has been encountered elsewhere (Huffman et al., 1987). Another methodological problem may have been a Hawthorne-type effect in which the mothers in the control group improved their breastfeeding practices simply because they were interviewed about breastfeeding so often.

Policy Implications

This study shows that within a population of breastfeeding rural Filipinas a program to promote breastfeeding can be successful in changing levels of certain well defined behaviors. For example, mothers exposed to the education program introduced regular supplements later than controls, although only one month later. Differences in breastfeeding patterns were not seen until the sixth month, when nursing may tend to decline naturally. Finally, colostrum feeding became nearly universal in the education group.

These differences can be counted as an improvement and they may contribute to infant health. (A forthcoming report for this study demonstrates that the health benefits were conferred preferentially on the education group babies.) Such a health education program might also contribute to stemming the 15 percent decline in duration of breastfeeding documented among rural women between 1978 and 1983 (Zablan, 1985). Zablan suggests that the slight increase in breastfeeding duration found among urban women during the same period may be due partly to the activities of the National Movement for the Promotion of Breastfeeding, active since 1980. Breastfeeding promotion campaigns in Honduras and Thailand have also been shown to accelerate the breastfeeding transition by increasing breastfeeding duration (Janowitz et al., 1987; Knodel et al., 1985; Van Esterik, 1985).

With regard to inhibiting fertility, however, there was no indication that a breastfeeding education program could make a significant contribution within the rural population studied. At best, by helping to maintain breastfeeding at current levels, education could help maintain the contraceptive protection currently conferred by breastfeeding. This is about seven months in the Visayas (or nine months among the study population).

The chief reason for this may be that rural women currently breastfeed at what are, for them, optimal levels. The number of breastfeeding episodes per day and the number of minutes spent feeding per day are impressive. Observation of the mothers and their communities during the study period suggests that eventually women are pressured to occasionally leave the home to help earn money. Their infant feeding patterns are delicately balanced against the other claims on their time. Although folk beliefs that undermine breastfeeding have been cited elsewhere (Simpson-Hebert et al., 1986), such beliefs did not seem to interfere with breastfeeding in this sample. Rather, medical personnel who counseled against breastfeeding if the mother was sick seemed to exert a stronger negative influence than traditional beliefs.

Economic needs, modified by custom and social pressure, appeared to play the largest role in the mothers' breastfeeding decisions. In contrast to some cultures where women remain close to their dwellings, Filipinas come and go. They are often busy outside the house. For example, in rural areas even simple household chores, like washing clothes, take the mother away from the house. The need to earn extra money also draws women outside the home to sell their husbands' fish, to grow vegetables, to raise and care for livestock, to harvest crops, and so forth.

When a baby is given supplemental foods, the mother has more freedom to leave the home. The mother's flexibility is enhanced also by the fact that rural Filipino families are meshed in a network of relatives and close neighbors. (Eighty percent of the respondents in this study lived within 500 meters of relatives, and half of these were within 30 meters.) These relatives and neighbors readily assume childcare chores for absent mothers.

Economic concerns worked both to promote and threaten breastfeeding. On the one hand, milk products were too expensive to use regularly, and mothers often had to delay supplementation until the infant could eat cereal. The need to be productive economically, on the other hand, tended to separate mothers from infants, leading to earlier supplementation.

A close-knit social group also exerted inhibitory influences on breastfeeding. The immediate extended family expected the mother to breastfeed and provided strong support and encouragement. On the other hand, this group was a ready source of childcare, allowing the mother to leave her baby behind at an early age.

It is possible that education may have a stronger impact among women who are not currently feeding at optimal levels, for reasons of economics, ignorance, lack of tradition, or lack of social support. In order to explore this possibility, the current study is being replicated among a group of urban women in Manila, who generally breastfeed for shorter durations and with less intensity.

Lessons from this study may have practical value for family planning program managers confronted by populations with high breastfeeding rates and low contraceptive prevalence. First, the promotion of breastfeeding with the intention of increasing birth intervals may be most effective in populations with low motivation to breastfeed and/or low suckling frequencies and durations. Second, women who resumed menses early after a previous birth have been observed to repeat this pattern, and special contraceptive attention should be directed at them. Finally, since rural women tend to successfully initiate breastfeeding in a supportive social context, educational efforts for these women should be directed at reinforcing breastfeeding after the first few months, when suckling typically declines. For urban women who are deciding whether to breastfeed their babies, prenatal education may be more critical.

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Notes

1 Numerous studies document the relationship between feeding status and return to fertility (usually measured as menses or prolactin levels). This research is summarized in McCann et al. (1984). Recent studies are reported in Potts et al. (1985). Other articles include Habicht et al. (1985), Perez et al. (1971), Balderrama-Guzman (1982), and Osteria (1973).

2 Health educators advised the mothers that unsupplemented breastfeeding was safe and sufficient for the majority of babies until at least four to six months of age. However, if an infant's growth should falter before four months, dietary supplements would most likely be indicated. In this study, the growth of breastfed infants was regularly monitored by the health educators and field workers to see if additional supplements were indicated.

3 Personal differences in deciding what constituted a suckling episode may explain the large variation in suckling found within the sample. For example, cases in which infants fell asleep at the breast or nursed intermittently were recorded by some mothers as one long suckling episode and by others as several short ones. From 20:00 hours through 6:00 hours, only the frequency and duration of suckling were recorded. Although the absence of a variable to measure the longest interval between feeds at night represents an omission of data, it was felt at pre-test that data about nighttime inter-episode intervals were difficult to collect reliably.

4 Four mothers conceived during lactational amenorrhea (a situation locally called *gidayon*). The earliest conception is unlike the other three in that it was the only "unheralded" pregnancy of a mother in the education group, and the only one in which regular non-breastmilk supplements had not previously been established. The mother conceived at about postpartum week 16, and this was the approximate time that the baby received its first taste of any food other than breastmilk. The first food was *sukmil*, given as a ritual indicating the intention to begin feeding the child other foods. Importantly, however, the baby was also given to a wet nurse (a sister or friend of the mother) but it is not known how often. Solid and liquid supplements were not given regularly until ten weeks after conception. Feeding bottles were not used throughout the time the woman was in the study. The three other conceptions during amenorrhea occurred at about 6, 10, and 16 months postpartum. Regular supplements were established at 5, 2, and 6 months postpartum, respectively. Bottle use preceded the 6- and 10-month conceptions, but bottle use was not reported at all in the case of the 16-month conception.

5 In computing group means for suckling variables, data from one experimental mother were excluded. This mother's suckling behavior was so extreme (on the order of 40–50 times per day, 500 minutes per day, etc.) that inclusion of her data excessively skewed the experimental group mean. Special follow-ups gave no indication that she was purposely altering the data. However, inclusion of her data would distort the picture of the experimental group's behavior. Data from one control mother were also excluded because they were so deviant. This mother had only two follow-ups, but reported a breastfeeding frequency of 70 times per day.

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