

PN-ABZ-539
92281

**Evaluation of the Effectiveness of Home-Based
Counseling to Promote Exclusive Breastfeeding
Among Mexican Mothers**

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September 1996

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This activity was supported by the United States Agency for International Development (USAID) under Cooperative Agreement No. DPE-5966-A-00-1045-00. The contents of this document do not necessarily reflect the views or policies of USAID.

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Project Personnel

This was a multi-institutional collaborative project which involved the Center for Pediatric Research, Norfolk, Virginia with Instituto Nacional de la Nutricion—"Salvador Zubiran" (INNSZ). Investigators and staff of INNSZ were responsible for project field work (directed by Dr. M. Lourdes Guerrero) and for lactation counseling in the community with the support of La Leche League. This project had support and involvement of La Leche League of Mexico, which trained and supervised medical staff and promotoras to make home visits in San Pedro Martir.

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Executive Summary

Breastfeeding practices in Mexico are far from optimal: twenty percent of Mexican infants do not initiate breastfeeding and bottle-feeding within the first few months of life is common. To improve breastfeeding practices, a major breastfeeding promotion effort has been undertaken in Mexico over the past few years, focused on the Baby-Friendly Hospital Initiative (BFHI). It is well known that hospital policies and practices have contributed to negative trends in breastfeeding, and that hospital-based breastfeeding promotion is effective in regard to successful initiation of breastfeeding. However, to achieve and sustain exclusive breastfeeding for four to six months postpartum, community initiatives are needed.

Lay peer counseling of mothers by women of the same community is an important strategy that is being used for health and breastfeeding promotion in a number of countries throughout the world. Experience suggests that this is a highly effective method of providing the social and informational support that mothers need for successful breastfeeding. However, there is a lack of research-based data to document the cost-effectiveness of this strategy.

This intervention study examines the effectiveness of home-based counseling by lay peer counselors (promotoras) to increase the practice of exclusive breastfeeding among mothers in San Pedro Martir, a peri-urban neighborhood of Mexico. We examined two levels of intervention, three home visits and six home visits, compared with a concurrent control group and data from an historical cohort of San Pedro Martir mothers.

Background

San Pedro Martir is a predominantly low-income, peri-urban area on the southwestern outskirts of Mexico City. The population is approximately 15,000, with about fifteen births per month identified by census of the community. Medical care is provided to this population by the San Pedro Martir Clinic, private physicians, and several nearby hospitals. Among mothers residing in San Pedro Martir, approximately 5% deliver at home, 37% deliver in clinics, and 58% deliver in hospitals.

For nearly fifteen years, research on protective factors in maternal milk has been conducted among mothers and infants in San Pedro Martir, by a multi-institutional collaboration of Mexican and U.S. scientists. This research has established important mechanisms of breastfeeding protection against specific causes of diarrheal disease, but also identified the need for intervention to help improve infant feeding practices in the community. Based on a cohort study conducted from 1988-1991, we found that 95% of San Pedro Martir mothers initiated breastfeeding, but breastfeeding declined rapidly in the first few months postpartum, and exclusive breastfeeding was rare.

Methods and Results

Ethnographic Study

From June through September 1994, a rapid ethnographic assessment of 150 San Pedro Martir mothers was conducted to identify cultural beliefs, social influences, and circumstances associated with infant feeding procedures. The results were as follows:

- ▶ Strong consensus existed that the most important reasons for choice of infant feeding are good nutrition growth, and protection against illness—factors also associated with breastfeeding rather than bottle-feeding.
- ▶ Seventy-six percent of mothers had encountered one or more problems that caused them to reduce or cease breastfeeding, including negative physician advice, perception of maternal or infant illness, and perception of having bad milk.
- ▶ Early supplementation of breastfeeding was common and situation-specific. During infant or maternal illness, many thought breastfeeding should not be practiced. Seventy-two percent agreed that an infant grows best if given a combination of breast and bottle-feeding.
- ▶ Physicians were the most important source of advice about infant feeding, followed by family members.

The ethnographic study results suggested strategies which were incorporated into the intervention study: 1) physician education; 2) training promotoras to address common maternal concerns; and, 3) involving key family members in the educational intervention.

Intervention Study

This randomized, controlled, community intervention study was initiated in March 1995 and continues through September 30, 1996. The study involves two intervention groups and a concurrent control group. In addition, the historical cohort study of 316 mother-infant pairs conducted in San Pedro Martir from 1988-91 is used as a pre-intervention comparison group. The two prospectively enrolled intervention groups consist of mothers allocated to receive more frequent (MF) and less frequent (LF) home-based counseling by promotoras about exclusive breastfeeding. MF mothers were visited on six occasions: twice during pregnancy, immediately after delivery, and postpartum at weeks two, four, and eight. LF mothers were visited by promotoras on three occasions: at the end of pregnancy, immediately after delivery, and the end of postpartum week two. The major outcome was exclusive breastfeeding to three months of age, meaning that no other liquids or foods were given. Infant feeding practices were examined on the first day postpartum, and at two weeks, four weeks, six weeks, two months, three months, and six months of infant age. Data collection was performed through structured interviews of study mothers conducted by trained experienced staff other than the promotoras.

Physician Education

In April 1995, a seminar for San Pedro Martir primary care physicians on the benefits and management of breastfeeding, was jointly sponsored by the Instituto Nacional de la Nutricion and La Leche League of Mexico. Of the 80 physicians invited, half attended.

Identification and Training of Promotoras

Three women were hired and trained as promotoras. Each had a high school education and was a respected resident of the San Pedro Martir community. The promotoras were trained and supervised in lactation counseling and management by La Leche League of Mexico in collaboration with the physician coordinator of the study.

Randomization into Study

To minimize the possibility that intervention households would influence control households, San Pedro Martir was mapped and divided into 39 clusters of two to four blocks each. These clusters were randomly allocated to one of the three study groups (thirteen clusters per group).

Enrollment and Follow-up

Study mothers were identified by continuous surveillance of the community. As of July 1, 1996, there were 159 mother-infant pairs enrolled in the study, with 105 followed to at least three months postpartum. Follow-up of these study mothers and infants continues through September 1996. The following summarizes the preliminary findings.

Neonatal Infant Feeding

Thirty-five percent of infants were bottle-fed in the first hours after birth regardless of control or intervention group. Colostrum feeding increased from 17% in the historical cohort to 61% of mothers in the intervention study, a significant secular trend. However, there was no difference in colostrum feeding among concurrent control and intervention groups.

Exclusive Breastfeeding

Among mothers followed to at least three months postpartum, exclusive breastfeeding was maintained from two weeks to three months by one of fifteen (7%) control mothers, thirteen of 40 (33%) mothers who received three home visits, and twelve of 25 (48%) mothers who received six home visits ($p=0.023$, Fisher's exact). However, many mothers gave supplementary feedings for a short time then returned to exclusive breastfeeding. In the 1988-91 cohort, exclusive breastfeeding in the past week was practiced by only 3% to 6% of mothers. In the current study, 35% of control group mothers exclusively breastfed at two weeks, but this decreased to 7% at three months postpartum. In the three-visit intervention group, exclusive breastfeeding was 70% at two weeks, decreasing to 50% at three months. In the six-visit intervention group, exclusive breastfeeding was 79% at two weeks and 72% at three months. Using a logistic model to account for infant age and group effects, a significant ($p<0.001$) secular increase in exclusive breastfeeding between the historical and concurrent control groups was found. Within the current intervention study, the three-visit and six-visit intervention groups had significantly ($p<0.001$) more exclusive breastfeeding at each time point than the concurrent controls. Further, exclusive breastfeeding was significantly ($p<0.001$) higher in the six-visit group compared with the three-visit group.

Conclusions

These preliminary data indicated a dramatic increase in exclusive breastfeeding in the study area. Most of this trend, but possibly not all, is associated with mothers receiving home visits from a trained peer counselor (promotora). Home-based counseling does not appear to have affected infant feeding in the early postnatal period, but is clearly observed in subsequent weeks and months. The fact that exclusive breastfeeding from two weeks to three months was practiced by 7% of control mothers and 33% and 48% of mothers visited by

promotoras three times and six times, respectively, demonstrates a significant dose-response effect. The major impediment to even greater success in this community was the negative influence of physician advice.

Programmatic Implications

- ▶ Early intervention is critical. In Mexico, infants are given supplementary liquids and foods very early in life, thus, programmatic efforts to increase the duration of exclusive breastfeeding must begin prenatally and in the first week of life.
- ▶ Repeated contact is important. This study shows that mothers changed from partial to exclusive breastfeeding following counseling and that the number of contacts was significantly associated with exclusive breastfeeding.
- ▶ Home-based peer counseling significantly increases the duration of exclusive breastfeeding.
- ▶ The magnitude of increase shown in this project suggests that through the combination of hospital, physician, and mother-to-mother interventions, it is possible to restore exclusive breastfeeding as the social and medical norm in Mexico and elsewhere.

Introduction

Breastfeeding practices in Mexico are far from optimal: twenty percent of Mexican infants do not initiate breastfeeding and bottle-feeding within the first few months of life is common. To improve breastfeeding practices, a major breastfeeding promotion effort has been undertaken in Mexico over the past few years, focused on the Baby-Friendly Hospital Initiative (BFHI). It is well known that hospital policies and practices have contributed to negative trends in breastfeeding, and that hospital-based breastfeeding promotion is effective in regard to successful initiation of breastfeeding. As part of BFHI in Mexico, La Leche League and others have been training and using promotoras to provide individual counseling to mothers while in the hospital in order to establish successful lactation practices from the moment of birth. However, to achieve and sustain exclusive breastfeeding for four to six months postpartum, community initiatives also are needed.

Lay peer counseling of mothers by women of the same community is an important strategy that is being used for health and breastfeeding promotion in a number of countries throughout the world. Experience suggests that this is a highly effective method of providing the social and informational support that mothers need for successful breastfeeding. However, there is a lack a research-based data to document the cost-effectiveness of this strategy.

Background

Breastfeeding Patterns in Mexico

A number of studies have been conducted on infant feeding patterns in Mexico over the past two decades. In the 1986 National Health Survey of Mexico, 20% of Mexican mothers reported never breastfeeding their infant; this estimate varied from 34% in Baja, California to 5% in Oaxaca, Mexico. These studies have generally shown breastfeeding to be initiated earlier, practiced for longer duration and more completely among rural and indigenous populations, than in urban, westernized populations, and more in the southern states than in the northern states of Mexico.

Upon discharge from the birthing facility, 43% of Mexican mothers planned to exclusively breastfeed their infants while 50% planned to combine breastfeeding with bottle-feeding. Mothers who planned to combine breastfeeding with bottle-feeding did so because they thought they did not have enough breastmilk because it was considered healthier for the infant to have some formula. Some mentioned the need to work, convenience, and free formula samples as reasons to introduce bottle-feeding.

Breastfeeding Research in San Pedro Martir

For nearly fifteen years, research on protective factors in maternal milk has been conducted among mothers and infants in San Pedro Martir, by a multi-institutional National Institute of Health (NIH)-funded collaboration of Mexican and U.S. scientists. The principal investigators of this program project are Dr. Larry K. Pickering, Director of the Center for Pediatric Research in Norfolk, Virginia, and Dr. Guillermo M. Ruiz-Palacios, Chief of the Department of Infectious Diseases of the Instituto Nacional de la Nutricion—"Salvador Zubiran," Mexico City. The research from this program project has established important mechanisms of breastfeeding protection against specific causes of diarrheal disease, but also identified the need for intervention to help improve infant feeding practices in the community. A cohort study conducted from 1988-1991 found that 95% of San Pedro

Martir mothers initiated breastfeeding, but breastfeeding declined rapidly in the first few months postpartum, and exclusive breastfeeding was rare.

Importance of Promotoras

Successful breastfeeding promotion engages positive forces to support breastfeeding and to make the choices to initiate and continue breastfeeding easier ones. An effective force that has emerged from research and experience is the use of natural helpers or peer counselors to encourage and guide mothers in the breastfeeding experience. Natural helpers are persons who are respected, trusted, in control of their own life circumstances, and responsive to the needs of others. Promotoras are natural helpers who, in various international sites, promote breastfeeding in a target population of women through clinic and/or home visits. These individuals generally have no nursing or medical experience, but are trained to provide critical woman-to-woman support during the prenatal and postpartum periods. Several studies in Mexico and elsewhere have shown that women are more likely to practice some breastfeeding and/or exclusively breastfeed their infants if enrolled in a program in which they receive timely counseling by promotoras. Perez-Escamilla and others showed in a well designed and analyzed trial that lactation counseling in selected Mexican hospitals significantly increased full breastfeeding among primiparous mothers. In Honduras, Dewey and others have found compliance with exclusive breastfeeding to approach 80% among primiparous mothers by implementation of an intensive program of lactation guidance prenatally, during hospital and postnatally in the community (Dewey, personal communication). Efforts such as those of La Leche League in Honduras, and the Lo Barnchea program in Chile point to the successful efforts of peer encouragement to help other mothers achieve exclusive breastfeeding. Many of the programs in place are oriented toward hospital-based counseling due to the opportunity to reach many mothers and to establish successful lactation from the moment of birth. However, there is also need for a community-based approach for early counseling and follow-up, and to reach those mothers not delivering in large urban hospitals.

Project Aims

The hypothesis of this project is that a well-targeted educational intervention which involves lactation promotoras to visit mothers and family members in their homes, supported by appropriate medical advice, will increase the prevalence and duration of exclusive breastfeeding and the median duration of any breastfeeding in the study population.

The specific aims of this project are to:

- ▶ Conduct ethnographic research in the San Pedro Martir population to determine the attitudes and behaviors of mothers, close relatives and health care providers regarding infant feeding practices from birth to six months of age, especially regarding exclusive feeding of colostrum and maternal milk.
- ▶ Conduct a community-based intervention study of the effectiveness of home-based counseling by promotoras to increase exclusive breastfeeding in the San Pedro Martir area.
- ▶ Compare the effectiveness of more frequent and less frequent home-based counseling visits to increase the practice of exclusive breastfeeding by San Pedro Martir mothers.

Research Methods

Study Area

San Pedro Martir is a periurban area on the southwestern outskirts of Mexico City. The population of San Pedro Martir is approximately 15,000, with a mean of about fifteen births per month, identified by census of the community. Medical care is provided to this population by the local San Pedro Martir Clinic and by several nearby hospitals. Among mothers residing in San Pedro Martir, approximately 5% deliver at home, 37% deliver in clinics, and 58% deliver in hospitals. Of those delivering in hospitals, approximately 49% of mothers deliver their infants in IMSS; 28% at other hospitals; and, 23% deliver in private hospitals.

Historical Cohort Study

From April 1988 to December 1991, a longitudinal study was conducted in the San Pedro Martir community to determine breastmilk protection against specific causes of diarrheal diseases. This longitudinal study followed 316 mother-infant pairs from birth up to eighteen months postpartum with baseline questionnaires and weekly home visits to record infant health and feeding patterns. Mothers were enrolled into the cohort study during the last trimester of pregnancy and were visited at home within eight days postpartum, where they were interviewed by a social worker to record the location of delivery, postpartum care, prelacteal feedings, infant birth weight, maternal parity, breastfeeding history, maternal perception of difficulty with breastfeeding, and household demographic and hygiene characteristics. Field workers visited study homes weekly to ascertain cases of diarrhea, fever, or vomiting. Children reported to be ill were examined at home by a study physician. During weekly interviews, mothers were asked the number of times in the previous 24 hours their child was breastfed, given a bottle of milk, juice, tea, water, rice water, atole, and/or solid food feedings. Infant weights were measured approximately every two months using hanging scales. Upon cessation of breastfeeding, a social worker visited mothers to administer a brief questionnaire to determine the mother's reasons for ceasing breastfeeding, and the role of family and medical influences. This cohort database was analyzed to examine secular trends in infant feeding within San Pedro Martir.

Ethnography

Study Design

From June through August 1994, we conducted a rapid ethnographic study in the San Pedro Martir area of Mexico City to identify cultural concepts and specific psychosocial and health factors that influence mothers not to practice exclusive breastfeeding.

Study Population

The study population consisted of 150 mothers with one or more children under five years of age residing in the San Pedro Martir area of Mexico City who were identified from a community census. If a mother had moved, but another eligible mother was identified during a visit to the listed address, the newly arrived mother was

interviewed instead. To assure representativeness, interviews were obtained from each of the three sections of San Pedro Martir: Ejidos, Colonias, and Pueblos.

Survey Instruments

A standardized questionnaire and two sets of interview cards were developed based on freelist interviews with five promotoras and fifteen other San Pedro Martir mothers. The instruments were pretested in Mexico and reviewed and approved by EPB in early July.

Interviews

Beginning mid-July, project investigators (Drs. Guerrero and Calva) and the project social worker initiated interviews of identified eligible mothers. Interviews required approximately 45 minutes to one hour each. Interviewers visited study subjects in their homes.

Use in preparation for the intervention study: The ethnographic study suggested strategies which were incorporated into the intervention study: 1) physician education; 2) training promotoras to address common maternal concerns; and, 3) involving key family members in the educational intervention.

Intervention Study

This randomized, controlled, community intervention study was initiated in March 1995 and continues through November 1996 (after September 1, 1996, project costs are being borne by the Instituto Nacional de la Nutricion and the Center for Pediatric Research). The study involves two intervention groups and a concurrent control group. In addition, the historical cohort study of 316 mother-infant pairs conducted in San Pedro Martir from 1988-91 was used as a pre-intervention comparison group. The two prospectively enrolled intervention groups consist of mothers allocated to receive more frequent (MF) and less frequent (LF) home-based counselling by promotoras about exclusive breastfeeding. MF mothers were visited on six occasions: twice during pregnancy, immediately after delivery, and postpartum at weeks two, four, and eight. LF mothers were visited by promotoras on three occasions: at the end of pregnancy, immediately after delivery, and the end of postpartum week two. The major outcome was exclusive breastfeeding to three months of age, meaning that no other liquids or foods were given. Infant feeding practices were examined on the first day postpartum, and at two weeks, four weeks, six weeks, two months, three months, and six months of infant age. Data collection was performed through structured interviews of study mothers conducted by trained experienced staff other than the promotoras.

Physician Education

In April 1995, a seminar for San Pedro Martir primary care physicians on the benefits and management of breastfeeding, was jointly sponsored by the Instituto de la Nutricion and La Leche League of Mexico. Of the 80 physicians invited, half attended.

Identification and Training of Promotoras

Three women were hired and trained as promotoras. Each had a high school education and was a respected resident of the San Pedro Martir community. The promotoras were trained and supervised in lactation counseling and management by La Leche League of Mexico in collaboration with the physician coordinator of the study.

To prepare for their work in the community, the promotoras attended a five-day training course conducted by La Leche League and spent seven weeks observing and participating in lactation clinics and mother-to-mother support groups. For six months in advance of initiating the intervention study, the promotoras practiced applying their counseling skills in the San Pedro Martir community under the joint review and supervision of Dr. Guerrero and the League. During this period the educational approach and content of messages to mothers in the intervention groups was discussed and developed. As the promotoras began to counsel pregnant women in San Pedro Martir, they expressed the need for an organized set of visual aids or materials as a guide. Under the supervision of Dr. Guerrero and with support from the League, the promotoras developed a visual aid notebook that met their needs. The project was site-visited by Judy Canahuati and Sandra Huffman during the preparatory phase, who reviewed the status of promotora training, demonstrated a problem-solving approach to counseling, and encouraged an interactive rather than didactic approach to counseling mothers.

Educational Content of Visits

Prior to initiating the intervention study, the educational content of home visits in the intervention groups was that visits to the mothers during pregnancy emphasized the benefits of exclusive breastfeeding, especially during illness, the basic anatomy and physiology of lactation, positioning of the infant and latchking on, common myths and beliefs, anticipation of typical problems and solutions to those problems, and preparation for delivery of the infant. Subsequent visits were spent reviewing questions of concern to the mother, identifying the breastfeeding and health status of mother and infant, addressing their needs, and providing encouragement and support.

Randomization into Study

To minimize the possibility that intervention households would influence control households, San Pedro Martir was mapped and divided into 39 clusters of two to four blocks each. These clusters were randomly allocated to one of the three study groups (thirteen clusters per group).

Enrollment and Follow-up

Study mothers were identified by continuous surveillance of the community. As of July 1, 1996, there were 159 mother-infant pairs enrolled in the study, with 105 followed to at least three months postpartum. Follow-up of these study mothers and infants continues through November 1996.

Results

Ethnographic Study

As part of the ethnographic survey, a total of 150 San Pedro Martir mothers with children 0-5 years of age were identified and interviewed. These mothers ranged in age from seventeen to 42 years (mean 26.1, SD 5.6). The results are described below.

Infant Feeding

Ninety-one percent of mothers had breastfed their infant. Duration of breastfeeding ranged from two days to three years. Bottled milk was introduced by many mothers very early. Twenty-four percent reported introducing bottled milk on day one postpartum, 40% by day fourteen, and 60% by three months postpartum. Ninety-eight percent of mothers had given tea, water, etc. to their infant. Twenty-one percent gave tea or water to their infant on day one of life, and 58% by day fourteen. The majority of mothers introduced solids in the second and third month postpartum. By the end of the third month, 69% of mothers had introduced solid foods.

Cultural Consensus Analysis

Mothers were asked to rank the relative importance of nine factors which from previous, freelist interviews were thought to influence maternal choice of infant feeding methods (Table 1). The numbers in parentheses are the mean (averaged) rank of each item among the 150 mothers surveyed. It should be noted that the first four items have mean ranks from 1.8 to 3.2, indicating these items were considered most important, with the remaining five items having a lesser order of importance.

Table 1
Cultural consensus analysis of the relative importance
of nine factors relative to infant feeding choice

Rank Ordering	Mean Rank	Factor
1	(1.84)	Que mi nino tenga una buena alimentacion (So that my child has good nutrition).
2	(2.63)	Que mi nino se enferme menos (So that my child is sick less often).
3	(2.64)	Que mi nino crezca mejor (So that my child grows better).
4	(3.15)	Que sea lo mas limpio, mas higienico (So that it is cleaner, more hygienic).
5	(6.37)	Que me sea lo mas comodo (So that it is more comfortable).
6	(6.79)	Que me da libertad para hacer otras cosas (That gives me freedom for other things)

7	(6.97)	Que sea lo mas barato (A way that is cheaper).
8	(7.05)	Que sea lo que le parezca mejor a mis esposo (So that it is preferred by my husband).
9	(7.58)	Que no se deformen y que no se lastimen mis pechos (So that my breasts are not deformed or hurt).

Infant Growth

As indicated in Table 1 above, infant growth is a major cultural value for choice of feeding method. While infant growth appeared to be a value largely attributed to breastfeeding, 72% of mothers agreed with the statement that a baby is more full and grows better if in addition to breastmilk, the mother gives a bottle of milk to the infant.

Reasons to Quit and Reinitiate Breastfeeding

Fifteen percent of mothers said that if they had an illness, *coraje* or *susto*, these would be reasons to quit breastfeeding their child. Thirty-seven percent of mothers indicated they believe that if they were not well-nourished or were not eating well, this would be a reason to quit breastfeeding their child.

Nineteen percent of mothers indicated that on some occasion they had stopped breastfeeding for a few days and then had reinitiated breastfeeding. The following lists the reasons listed by mothers for reinitiating breastfeeding, and the number of times the item was mentioned if mentioned by more than one mother: better nutrition (8); I wanted to breastfeed (2); I felt it was necessary (2); wouldn't accept other food (2).

Barriers to Breastfeeding

As shown in Table 2, 85% of mothers surveyed indicated that they had encountered at least one problem while breastfeeding; 76% had encountered a problem that reduced their frequency of breastfeeding or caused them to cease breastfeeding. Illness of the mother or of the infant and doctor's advice to cease breastfeeding were the most commonly reported problems that adversely affected breastfeeding intensity or duration.

Supplementation Patterns

As shown in Table 3, the ethnographic study found that supplementation of infants under six months of age with liquids other than milk were situation-specific, having to do with the perceived health status of the infant.

Source of Infant Feeding Advice

The majority of mothers ranked doctors as the most important source of advice regarding infant feeding, followed by their mothers, husbands and mothers-in-law (see Table 4).

Table 2. Frequency of problems encountered while breastfeeding among 106 mothers with children > 6 months of age

	Yes —> Changed frequency of breastfeeding?		How?*		
	%	Yes %	1	2	3
Maternal illness	24	14	6	3	5
Mother taking medication	24	8	2	4	2
Mother working outside the house	16	8	6	0	2
<i>Coraje</i> **	49	27	18	6	3
<i>Susto</i> **	25	14	7	3	4
Sick infant	56	25	14	7	4
Milk was insufficient	50	25	24	2	7
Pain	53	15	15	0	0
Embarrassment	10	5	5	0	0
Doctor said to cease	42	30	6	2	22
Any of the above	85	76			

Notes: * How: 1 = less frequent, 2 = temporary cessation, 3 = permanently ceased breastfeeding.

** *Coraje* and *susto* are folk illnesses or conditions.

Table 3. Percent of mothers who would feed their infant less than six months of age the item listed

Item	If the infant had...				
	Diarrhea	Heat (Thirst)	Stomach Upset	Fever	Only a few days of age
Water	49	93	17	66	21
Tea	60	51	89	53	62
Atole	33	3	6	4	1
Rice water	64	12	24	7	3
Bottle milk	10	7	5	11	19
Breastmilk	69	28	33	46	95
Oral rehydration solution	96	9	9	25	1

Table 4. The relative importance of sources of advice regarding infant feeding, as reported by the mother

Mother's Source of Advice	Importance ranking	
	First (Percent of respondents)	Second
Doctor	65	18
Mother	18	41
Husband	5	15
Mother-in-law	4	11
Sister	3	7
Neighbor or friend	3	1
Other person	2	7

Intervention Study

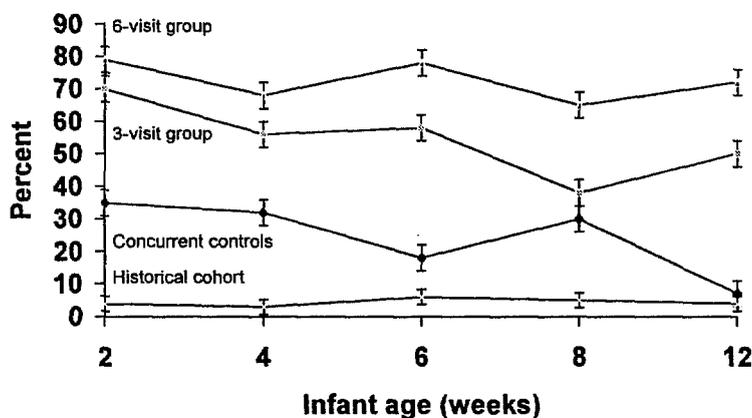
Neonatal Infant Feeding

Thirty-five percent of infants were bottle-fed in the first hours after birth regardless of control or intervention group. Colostrum feeding increased from 17% in the historical cohort to 61% of mothers in the intervention study, a significant secular trend. However, there was not difference in colostrum feeding among concurrent control and intervention groups.

Exclusive Breastfeeding

Among mothers followed to at least three months postpartum, exclusive breastfeeding was maintained from two weeks to three months by one of fifteen (7%) control mothers, thirteen of 40 (33%) mothers who received three home visits, and twelve of 25 (48%) mothers who received six home visits ($p=0.023$, Fisher's exact). However, many mothers gave supplementary feedings for a short time then returned to exclusive breastfeeding. The percentage of mothers exclusively breastfeeding their infant in the week prior to interview is shown in Figure 1. In the 1988-91 cohort, exclusive breastfeeding in the past week was practiced by only 3% to 6% of mothers. In the current study, 35% of control group mothers exclusively breastfed at two weeks, but this decreased to 7% at three months postpartum. In the three-visit intervention group, exclusive breastfeeding was 70% at two weeks, decreasing to 50% at three months. In the six-visit intervention group, exclusive breastfeeding was 79% at two weeks and 72% at three months. Using a logistic model to account for infant age and group effects, a significant ($p<0.001$) secular increase in exclusive breastfeeding between the historical and concurrent control groups was found. Within the current intervention study, the three-visit and six-visit intervention groups had significantly ($p<0.001$) more exclusive breastfeeding at each time point than the concurrent controls. Further, exclusive breastfeeding was significantly ($p<0.001$) higher in the six-visit group compared with the three-visit group.

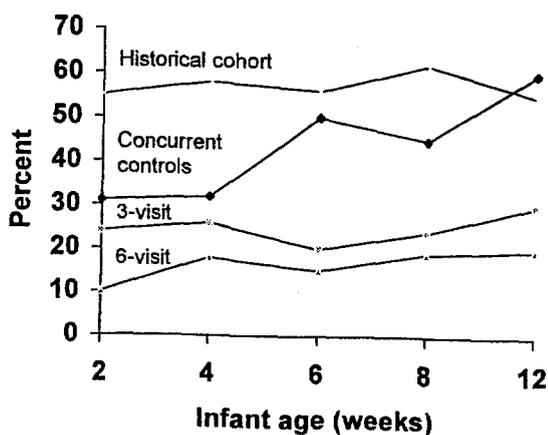
Figure 1. Comparison of the percent of mothers exclusively breastfeeding their infants during the past week in Intervention and control groups



Introduction of Breastfeeding

As shown in Figure 2, the intervention groups had significantly ($p < 0.05$) reduced formula feeding to their infants compared with the control groups, and the reduction in bottle-feeding was intervention dose-related. In the six-visit intervention group, only 10% of infants were bottlefed at two weeks increasing to only 20% at three months, compared with the three-visit group which had 23% bottle-feeding at two weeks and 28% bottle-feeding at three months of age. The concurrent controls increased from 31% bottle-feeding at two weeks to 28% bottle-feeding at three months. In the historical cohort, bottle-feeding remained at about 55% prevalence from two weeks to three months. Thus, the concurrent controls began with a different pattern but became similar to the historical controls by three months postpartum. These breastfeeding and bottle-feeding data indicate a secular trend in the control groups as well as differences between intervention and control groups.

Figure 2. Comparison of the percent of mothers giving bottled milk to their infants during the past week in Intervention and control groups



Conclusions

These preliminary data indicated a dramatic increase in exclusive breastfeeding in the study area. Most of this trend, but possibly not all, is associated with mothers receiving home visits from a trained peer counselor (promotora). Home-based counseling does not appear to have affected infant feeding in the early postnatal period, but is clearly observed in subsequent weeks and months. The fact that exclusive breastfeeding from two weeks to three months was practiced by 7% of control mothers and 33% and 48% of mothers visited by promotoras three times and six times, respectively, demonstrates a significant does-response effect. The major impediment to even greater success in this community was the negative influence of physician advice.

Programmatic Implications

- ▶ Early intervention is critical. In Mexico, infants are given supplementary liquids and foods very early in life, thus, programmatic efforts to increase the duration of exclusive breastfeeding must begin prenatally and in the first week of life.
- ▶ Repeated contact is important. This study shows that mothers changed from partial to exclusive breastfeeding following counseling and that the number of contacts was significantly associated with exclusive breastfeeding.
- ▶ Home-based peer counseling increases the duration of exclusive breastfeeding.
- ▶ The magnitude of increase shown in this project suggests that through the combination of hospital, physician, and mother-to-mother interventions, it is possible to restore exclusive breastfeeding as the social and medical norm in Mexico and elsewhere.

Dissemination Activities

The findings from this project are being disseminated through presentations at professional meetings, publication, and through dissemination of a video which was made regarding this project by Jane and Marco Bravo for La Leche League of Mexico. Copies of this video have been provided to EPB and collaborating Mexican institutions. It has been suggested that parts of the video may be suitable for airing on Mexican television or other Latin American countries.

Research Plans and Recommendations

There are at least four publications in progress from this study: two from the ethnographic research and two or more from the intervention study data. There is a great wealth of information which will be available from the study upon full analysis in the coming months, for example: what were the characteristics of mothers who exclusively breastfed versus those who did not, and what were the characteristics of women most or least affected by the intervention study? To what extent was the outcome influenced by negative physician advice and by BFHI? To what extent were the needs of the mothers informational support, and how many mothers had specific lactation problems that required the lactation management training of the promotoras?

In addition to the analysis of the rich dataset that the intervention study will provide, the experience of this study suggests a number of aspects which would provide important areas for future follow-up studies. For example, what is the potential impact in a community through use of trained volunteers? To what extent can the informational support required by mothers be provided through media? To what extent do the problems faced by mothers require someone knowledgeable in lactation management and counseling? How can physicians and health care workers be better trained in Mexico and elsewhere to meet the needs of mothers? In addition, serious consideration should be given to the lessons learned in Mexico and how the lessons may be applied to the lactation support needs of mothers and infants in the United States.

WELLSTART INTERNATIONAL

Wellstart International is a private, nonprofit organization dedicated to the promotion of healthy families through the global promotion of breastfeeding. With a tradition of building on existing resources, Wellstart works cooperatively with individuals, institutions, and governments to expand and support the expertise necessary for establishing and sustaining optimal infant feeding practices worldwide.

Wellstart has been involved in numerous global breastfeeding initiatives including the Innocenti Declaration, the World Summit for Children, and the Baby-Friendly Hospital Initiative. Programs are carried out both internationally and within the United States.

International Programs

Wellstart's *Lactation Management Education (LME) Program*, funded through USAID/Office of Nutrition, provides comprehensive education, with ongoing material and field support services, to multidisciplinary teams of leading health professionals. With Wellstart's assistance, an extensive network of Associates from more than 40 countries is in turn providing training and support within their own institutions and regions, as well as developing appropriate in-country model teaching, service, and resource centers.

Wellstart's *Expanded Promotion of Breastfeeding (EPB) Program*, funded through USAID/Office of Health, broadens the scope of global breastfeeding promotion by working to overcome barriers to breastfeeding at all levels (policy, institutional, community, and individual). Efforts include assistance with national assessments, policy development, social marketing including the development and testing of communication strategies and materials, and community outreach including primary care training and support group development. Additionally, program-supported research expands biomedical, social, and programmatic knowledge about breastfeeding.

National Programs

Nineteen multidisciplinary teams from across the U.S. have participated in Wellstart's lactation management education programs designed specifically for the needs of domestic participants. In collaboration with universities across the country, Wellstart has developed and field-tested a comprehensive guide for the integration of lactation management education into schools of medicine, nursing and nutrition. With funding through the MCH Bureau of the U.S. Department of Health and Human Services, the NIH, and other agencies, Wellstart also provides workshops, conferences and consultation on programmatic, policy and clinical issues for healthcare professionals from a variety of settings, e.g. Public Health, WIC, Native American. At the San Diego facility, activities also include clinical and educational services for local families.

Wellstart International is a designated World Health Organization Collaborating Center on Breastfeeding Promotion and Protection, with Particular Emphasis on Lactation Management Education.

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