ARCHIVOS LATINOAMERICANOS DE NUTRICION
Organo Oficial de la Sociedad Latinoamericana de Nutrición

Vol. 42 Nº 3, 1992

Infant feeding practices among low-income Mexican urban women: a four month follow-up.

Rafael Perez - Escamilla [1], Rosario Roman Perez [2], Luis A. Mejía [2], and Kathryn G. Dewey [1]

SUMMARY. We studied the infant feeding practices of 61 healthy women who delivered vaginally and without complications in two public hospitals in the city of Hermosillo, Sonora, Mexico. During the hospital stay, 51% of the women were planning full breastfeeding (full-BF), 43% partial breastfeeding (partial-BF) and 6% exclusive formula feeding (FF). At 2 weeks and 4 months post-partum (pp) the predominant feeding modes were partial-BF (59%) and FF (61%) respectively. The parameters that were positively associated with any breastfeeding at 4 months pp were: social support, previous breastfeeding experience and neonatal feeding mode. The infant feeding policies in both hospitals were not conducive for breastfeeding. The majority of infants were already receiving solid foods and juices by 3 months pp.

RESUMEN. Prácticas de alimentación infantil en madres de bajo nivel socioeconómico de México: Un seguimiento de cuatro meses. Estudiamos las prácticas de alimentación de 61 madres sanas que tuvieron un parto natural y sin complicaciones en dos hospitales públicos en la ciudad de Hermosillo, Sonora, México. Durante la estancia en el hospital el 51% de las madres planeaban alimentar exclusivamente con pecho, el 43% alimentar en forma mixta con pecho y fórmula y el 6% únicamente con fórmula. A las 2 semanas y 4 meses post-parto (pp) los métodos predominantes de alimentación fueron mixto (59%) y fórmula exclusiva (61%) respectivamente. Los parámetros que se asociaron positivamente con la alimentación con leche materna a los 4 meses pp fueron: apoyo social, experiencia previa con alimentación al pecho y método de alimentación infantil durante la etapa neonatal. Las políticas de alimentación infantil en los dos hospitales no eran conducentes al amamantamiento. La mayoría de los infantes ya habían sido ablactados a los 3 meses pp con alimentos sólidos y jugos.

INTRODUCTION

Recent trends suggest that by the year 2000, 80 % of the population in Latin America will be living in urban areas (1, 2). The early introduction of supplementary bottles accompanied by short breastfeeding durations is a common event in urban areas of Mexico (3-20) and other developing countries (21-23). This is of public health concern due to the well documented immunological and nutritional properties of breast milk (24,25) and the protective effect of breastfeeding with regard to child spacing (26,27) and childhood morbidity and mortality among disadvantaged groups in the developing world (28).

Most previous studies have been cross-sectional or retrospective. With cross-sectional data it is difficult to establish temporal relationships; with retrospective data there is the potential problem of memory recall bias. Therefore, it is important to conduct longitudinal studies of infant feeding patterns in order to identify factors associated with the early introduction of formula and the early termination of breastfeeding in urban areas of the developing world.

This exploratory study forms part of a project which had as its objective the desing and implementation of a maternity ward-based breastfeeding promotion program targeted to low-income women from Hermosillo (capital of the State of Sonora, Northwest Mexico).

We reported earlier (29) the infant feeding patterns during the neonatal period in the same population. The

(1) Nutrition Department. UC Davis. Davis California, 95616.
(2) Centro de Investigación en Alimentación y Desarrollo (CIAD). Hermosillo, Sonora, Mexico.

objective of this paper is to document in a prospective fashion infant feeding patterns during the first 4 months of life and to identify factors that are associated with the early termination of breastfeeding in the city of Hermosillo.

METHODOLOGY

Study design

Eighty two women of low socio-economic status who were residents of Hermosillo and delivered vaginally and without complications a healthy, term infant (>37 weeks of gestation, birth weight >2500 g, apgar score >7) were contacted in two public maternity hospitals. After obtaining their consent, the women were interviewed using a standardized interview first during the hospital stay and later in their homes at 16.2 ± 3.2 and 129.0 ± 18.0 days pp.

Hospitals

In hospital A the newborns remained in a nursery room and were not brought to their mothers throughout the stay in the hospital. In hospital B infants were brought to their mothers approximately 4 hrs after delivery and remained together thereafter. In both hospitals the infants were routinely supplemented with formula even if the mother intended to breastfeed. In hospitals A a nurse supplemented the infant whereas in hospital B the mother was responsible for this task. The hospital stay averaged 1.9 days in hospital A and 1.6 days in hospital B. At discharge, women who delivered in hospital A were given a card containing the birth characteristics of the newborn. On the back, there were hanwritten instructions for the preparation of a specific brand of infant formula. In both hospitals, a large number of women received a free can of powdered-milk-based infant formula at hospital discharge and very low percentage reported receiving breastfeeding information or advice from hospital staff either before of after delivery. It is important to underscore that even though the infants roomed with their mothers in hospital B they were routinely supplemented with formula.
(Table 1)

Subjects

Women were of low socio-economic status and a large percentage were not married. Family income and mother's educational level were lower among women from hospital A. Mean birth weight compared favorably with figures reported for higher socio-economic groups in both developed and developing countries (30). Most of the women were breastfed as children. A large percentage believed breastfeeding to be the ideal feeding method for infants. The majority of women received prenatal care and 15% had a tubal ligation after delivery. The maternal employment rate was 13-17% at 4 months pp. The use of oral contraceptive pills at 4 months pp was high (30%). (Table 2).

Infant weight and length at 4 months pp matched closely the 50th percentille of the NCHS reference standards (31). In hospital A a similar proportion of males and females were delivered whereas in hospital B males were slightly overrepresented.

The maternal food frequency indicates a relatively varied diet. Women tended to consume foods from the 3 Mexican food groups (ie. fruits and vegetables, breads and cereals and foods with high protein content). As expected the food items that were consumed most frequently were beans and tortillas. (Table 3).

Interviews

The pre-tested interviews included open-ended and fixed alternative questions regarding hospital and maternal infant feeding practices, breastfeeding support, social support and socio-economic status. The 4 month interview also included maternal and infant food frequency questionnaires. Interviews were conducted by 4 trained female local field assistants with college education. The research staff met with the interviewers on a daily basis. When an answer to a question was missing or incoherent, the assistants were instructed to contact the subject again in order to obtain or clarify the missing information. Birth weight and length were obtained from hospital records. At 4 months pp infant nude weight was measured using a beam balance (Detecto Scales Inc., NY) to the nearest 5g graduations. Infant height was measured with a locally built portable wood infantometer to the nearest 1 mm. The infantometer contained a fixed head support and a slide foot support. Maternal triceps skinfold was measured at 2 weeks and 4 months pp using a skinfold caliper (Large) with an accuracy of 1 mm. Maternal weight, without shoes, was measured at 4 months pp using a portable floor scale (Health o Meter) to the nearest 500 g. Maternal height, without shoes, was measured to the nearest mm usig a metallic measuring tape and a 90 degree wood angle.

TABLE 1
POLICIES RELATED TO INFANT FEEDING IN THE HOSPITALS

	Hospital A (n = 31)	Hospital B (n = 30)
Hospital stay (days pp)	1.9 ± 0.2	1.6 ± 0.8
Nursery	yes	no
Person in charge of formula feeding	nurse	mother
Pre/postnatal BF information	8/31 (26%)	5/30 (17%)
Free can of formula	8/23 (35%)*	19/24 (79%)
Formula prescription	yes	no

(*) $p < .05$

Attrition

Twenty one women were lost to follow-up during the 4 month study, indicating an attrition rate of 26%. Prior to the 2-week interview, one woman refused to participate in the hospital, one was a house maid who could not be reached for interview and four could not be located at the reported address. The remaining 12 women moved from the city and could not be located for the 4 month follow-up interview.

Statistical analyses

The satatistical analyses were based on the 61 dyads who completed the study. Student's t-test and chi square tests (32) were used to compare hospitals and to examine factors associated with use of formula at 4 months pp.

Multiple logistic regression (33) was used to assess the independent effect of constructs that were found to be significantly associated with lactation performance in the

TABLE 2
SUBJECT'S CHARACTERISTICS [1]

	Hospital A	Hospital B
Age (Y)	24.4 ±5.3 (n = 30)	24.7 ± 4.9 (n = 30)
Parity (# live births)	2.9 ± 1.6 (n = 31)	2.7 ± 1.8 (n = 20)
Mat schooling (yrs)	5.8 ± 3.0 (n = 27)*	8.0 ± 2.8 (n = 23)
Married (%)	15/29 (52%)	19/30 (63%)
Employed at 4 m (%)	4/31 (13%)	5/30 (17%)
Salary (% min wage)	104.9 ± 69.8 (n = 31)	217.7 ± 246.5 (n = 29)
TV (%)	17/30 (57%)*	21/26 (81%)
Sewerage (%)	13/30 (43%)	16/26 (73%)
Refrigerator (%)	17/30 (57%)	19/26 (73%)
Mother BF as child (%)	31/31 (100%)	27/29 (93)
Prenatal care (%)	25/30 (83%)	26/30 (87%)
Prenatal visits (#)	6.8 ± 3.7 (n = 26)	7.2 ± 3.8 (n = 27)
Tubal ligation (%)[2]	4/31 (13%)	6/29 (21%)
% horm contracep 4 mo	11/31 (35%)	7/30 (23%)
Maternal height (m)	1.57 ± 0.06 (n = 31)	1.57 ± 0.05 (n = 30)
Maternal wt 4 mo (Kg)	63.2 ± 10.3 (n = 31)	61.6 ± 12.8 (n = 30)
Infant birth wt (Kg)	3.37 ± 0.54 (n = 31)	3.31 ± 0.42 (n = 30)
Inf length 4 mo (cm)	63.2 ± 2.8 (n = 31)	64.1 ± 0.42 (n = 30)
Infant sex (% F)	16/31 (52%)	13/30 (43%)

(1) * $p \leq .05$ (T - test or x^2)
(2) in the hospital following delivery

TABLE 3
MATERNAL FOOD FREQUENCY AT 4 MONTHS PP.

	Consumers n	Consumers %	Times/week
Beef	54	88	2.4
Chicken	48	79	1.6
Beans	60	98	15.4
Milk	52	85	8.5
Cheese	53	87	4.9
Bread	40	65	5.0
Tortillas	51	84	13.9
Fruits	53	86	6.7
Vegetables	59	97	7.8

bivariate analyses. Results of the multivariate analyses are expressed as odds ratios and their respective 95% confidence intervals (95%CI).

Definitions

Exclusive breastfeeding (EBF) is used to describe infants who were fed breast-milk as the only source of milk and did not receive herbal teas and/or water during the week preceeding the interview. Full breastfeeding (full-BF) is defined as the use of breast milk as the sole source of milk for the infant in the 7 days prior to the interviews. Infants were considered partially breastfed (partial-BF) if they received breast-milk and another type of milk in the 7 day period prior to the interviews. Formula fed infants (FF) were those who received infant formula as the only source of milk in the 7 day period prior to the interviews. Breastfeeding (BF) designates any breast feeding (partial-BF or full-BF).

RESULTS

The infant feeding patterns are presented with both hospital groups combined since we did not find significant differences between maternity wards (Figure 1). Even though the majority of women felt that full-BF was the ideal infant feeding method, only half of them planned to follow this method. The incidence of full-BF dropped from 23% at 2 weeks pp to 16% at 4 months pp. Partial-BF was felt to be the ideal feeding mode by 25%, but 43% were planning to follow this method. Partial-BF decreased from 59% at 2 weeks pp to 23% at 4 months pp. Exclusive formula-feeding was considered ideal by only 2% of the women. However, FF was planned by 7% and the incidence increased from 18% at 2 weeks pp to 61% at 4 months pp.

The directionality of feeding mode changes indicates that 67% of the women who were partially-BF at 2 weeks pp were FF at 4 months pp. By contrast, only 14% of the women who were full-BF at 2 weeks pp switched to partial-BF at 4 months pp (Table 4). All of the women who were FF at 2 weeks pp were practicing the same feeding mode at 4 months pp.

Partial-BF infants tended to receive the breast less frequently than full-BF infants. FF infants tended to receive the bottle more frequently than partial-BF infants at 4 months pp. However, these differences were not statistically significant ($p > .05$). (Table 5).

The most common reason for the use of formula at 4 months pp were "insufficient milk" followed by "baby rejected breast" and "baby was not full" (Table 6). The factors positively associated with by breastfeeding at 4 months pp fell within the following constructs: social support, previous breastfeeding experience and neonatal lactation performance (ie. during the neonatal period) (Table 7).

The factors that were included in the multivariate ana-lyses were partner's breastfeeding support and the feeding method with the previous child during the first trimester of life. Only one factor from each construct was included in order to avoid multicollinearity. The factors were se-lected based on their public health relevance. Neonatal lactation performance was not represented in this analysis since this parameter is also significantly associated with social support and previous infant feeding experience in this population (29) and behaved as an intervening variable "masking" the effect of these two constructs on lactation performance at 4 mo pp. The

FIGURE 1
INFANT FEEDING PATTERNS ACROSS TIME

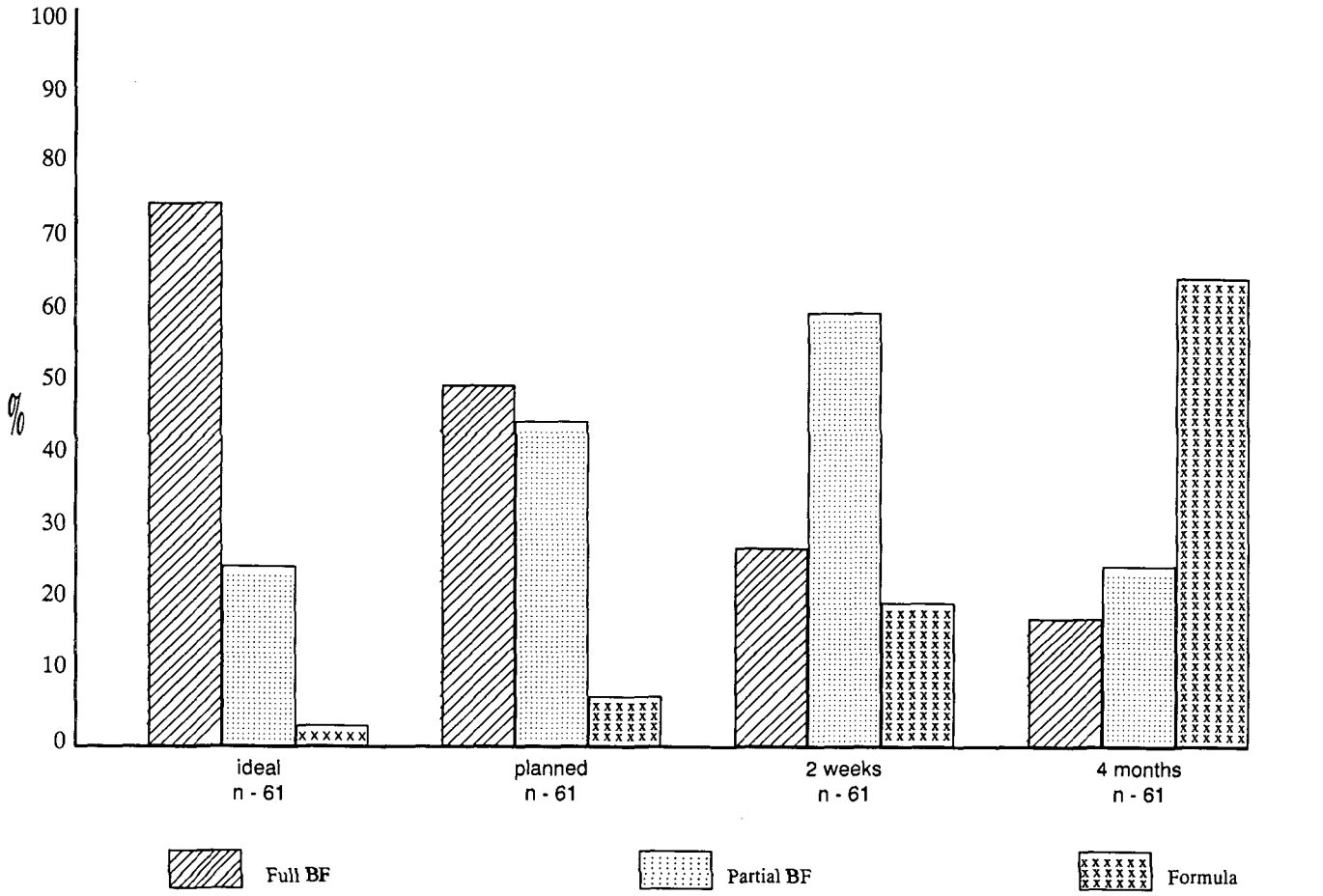

TABLE 4
DIRECTIONALITY OF CHANGES IN INFANT FEEDING PRACTICES FROM 2 WEEKS TO 4 MONTHS pp.[1]

2 wk ---------► 4 mo	n	%
PBF ---------► FF	24/36	67
PBF ---------► FBF	5/36	8
PBF ---------► PBF	7/36	12
FBF ---------► FF	2/14	14
FBF ---------► PBF	7/14	50
FBF ---------► FBF	5/14	36

(1) PBF: partial-BF; FBF: full-BF; FF: fórmula feeding

TABLE 5
BREAST AND FORMULA FEEDING FREQUENCY AT 4 MONTHS pp.

Feeding mode	n	BF freq/24 h	FF freq/24 h
Full-BF	13	11.0 ± 2.3	na
Partial-BF	36	8.6 ± 3.8	5.3 ± 3.0
Formula	11	na	8.3 ± 1.5

(na) not applicable

results indicated that both social support and previous infant feeding experience were independently and significantly ($p \leq .05$) associated with lactation performance at 4 mo pp. Women with partners that approved their breastfeeding decision were 6.2 times more likely (95% CI:2.8-13.6, n=42) to breastfeed at 4 mo than women who did not received this support. Mothers who had fully breastfed their previous child during the first trimester of life were 6.1 times more likely (95%CI:2.4-14.1, n=42) to breastfeed at 4 mo than mothers who had not practiced this feeding mode with their previous child.

TABLE 6
REASONS FOR GIVING FORMULA AT 4 MONTHS pp.

	n	%
Insufficient milk	17	34
Baby rejected breast	11	22
Baby not full	5	10
Maternal illness	4	8
To complement breast milk	3	6
Medical advice	3	6
Accustom infant	3	6
Infant illness	3	6
Hospital prescription	1	2
Other	3	6

The factors not associated with any breastfeeding incluided: prenatal care, hospital in wich the infant was born, maternal mood after delivery, use of pacifier, support with housework, infant and child care, maternal employment, use of hormonal contraceptives, and maternal anthropometric variables (triceps skinfold, weight and height) at 4 months pp, socio-economic status and level of education.

The majority of infants were given solid foods and fluids such as juices by 3 mo pp (Table 8). One third of the infants who were receiving "infant formula" at 4 months pp were in reality receiving powedered whole cow's milk (Table 9).

DISCUSSION

The subject's characteristics suggest that the sample was predominantly low-income women. The infant anthropometric indicators at birth and at 4 months pp were comparable to the 50th percentile of the NCHS reference standars. This suggests the absence of pronounced growth deficits during the first 4 months of life in the present population and agrees with reports from other areas in the developing world (34).

By 4 months pp 60% of the women had already stopped breastfeeding their infants. Many of them practiced partial-BF before switching to FF. This confirms the low breastfeeding rates that have been found in Hermosillo (15-19), Sonora (20) and other urban areas of Mexico (3-14) and the developing world (21-23). The most common reason for the use of formula was insufficient milk, in agreement with previous reports from Hermosillo (15-16, 19), and other urban areas of Mexico (4,6-10,12-13) and the developing world (21, 35-37).

TABLE 7
FACTORS ASSOCIATED WITH BREASTFEEDING AT 4 MONTHS pp.

	n	x^2	p[1]	+/-[a]
Support systems				
Husband's BF support at 2wk	61	7.0	**	+
Mother's BF support at 2wk	59	3.8	*	+
Friend's BF support at 2wk	59	5.3	*	+
Being married	59	4.1	*	+
Previous infant feeding				
Exclusive BF previous child	45	7.8	**	+
Formula feeding previous child	46	6.3	**	-
Neonatal lactation performance				
Insufficient milk report/2wk	61	7.4	**	-
BF frequency at 2wk	52	7.5	*	+
Total BF (vs full BF) 2wk	52	5.8	*	+
Partial BF (vs full BF) 2wk	50	11.1	***	-
Exclusive FF (vs partial BF) 2wk	47	4.9	*	-

(1) * $p \leq .05$; ** $p \leq .001$; *** $p \leq .001$
(a) direction of association

The majority of the women who were partial-BF at 2 weeks pp had stopped completely breastfeeding their infants by 4 months pp. This suggests that the early introduction of formula might be a risk factor for the early termination of breastfeeding.

Socio-cultural factors such as social support, previous infant feeding experience and feeding style during the neonatal period were related to lactation performance. By contrast, biological factors such as maternal nutritional satatus, age and parity were not related to the infant feeding decision. These results are in agreement with the hypotheses proposed by Tully and Dewey (37) and Allen and Pelto (38). The results from the multivariate analyses indicated that the partner's breastfeeding support and the previous infant feeding experience were significant independent predictors of lactation performance. This suggests that messages targeted to the women's partner should be included in breastfeeding promotion campaigns. Also, primiparous women might be more receptive to breastfeeding interventions since they had not developed infant feeding habits that might be detrimental for lactation success.

The lack of association between socio-economic status indicators and lactation performance was surprising since recent data from a representative Mexican health and fertility survey conducted in 1987 (39) reported that maternal education was inversely associated with breastfeeding duration. It is possible that we did not have

TABLE 8
INFANT FOOD FREQUENCY AT 4 MONTHS pp.

Food item	n	%	Times/wk	Age of introduction days pp ± sd
Water	37	61	14.7	2.0 ± 3.2
Water w/sugar	30	49	13.9	9.3 ± 19.6
Herbal tea	21	64	5.9	1.1 ± 0.3
Atole	27	44	8.4	74.4 ± 46.6
Juice	37	61	4.3	70.4 ± 46.6
Bean soup	20	33	1.0	85.7 ± 24.1
Other soups	34	56	4.0	86.4 ± 24.2
Cow's milk	1	2	1.0	90.0 ± 0.0
Fruits	50	82	5.7	85.1 ± 26.5
Strained fruits	36	59	4.6	79.6 ± 19.7
Vegetables	46	75	5.8	83.9 ± 23.6
Strained vegetables	9	15	4.2	76.9 ± 14.9
Meat	26	43	2.4	86.3 ± 19.7
Strained meat	9	15	4.2	78.2 ± 17.8
Beans	7	11	3.4	97.1 ± 12.5
Egg	23	38	3.9	88.4 ± 17.1
Cereal	30	49	14.5	83.7 ± 28.7
Bread	4	6	2.8	90.0 ± 42.4
Cookies	16	26	5.3	80.6 ± 33.6

enough variability in socio-economic status in this population to detec its relationship to lactation success.

The finding that the majority of women received prenatal care and that the large majority of births take place in hospitals in Mexico (40) suggest that the health sector could play an active role in the promotion of breastfeeding in this population. The large majority of women did not receive breastfeeding advice prenatally or perinatally. Furthermore, similar infant feeding polices as those found in both study hospitals have been labelled as not-conducive for breastfeeding in Hermosillo (15, 19), other areas of Mexico (3-4, 8, 12, 14) and abroad (42-49). This might also explain the lack of difference in lactation performance between women who delivered in the rooming in or the nursery hospital.

Contrary to Mexican (50) and international (51, 52) recommendations, the majority of infants were receiving solid foods and fluids such as juices by 3 months pp. This finding is similar to what has been observed in Hermosillo (15, 17, 18), the state of Sonora (20) and other areas in Mexico (3, 6, 8, 10, 12). The long term effect of this practice on infant health deserves futher consideration.

TABLE 9
MILK TYPES CONSUMED BY INFANTS REPORTEDLY RECEIVING " FORMULA" AT 4 MONTHS pp.

Milk type	n	%
Infant formula	27/51	52
Powdered whole cow's milk (NIDO)	18/51	35
Other	6/51	12

Although women did not report giving whole cow 's milk to their infants, one third of the children who were receiving "formula" were actually receiving powdered whole cow 's milk. Due to the health risks associated with feeding cow 's milk to infants under 6 months (53) this practice should be discouraged.

ACKNOWLEDGMENTS

We wish to express our appreciation to all the families who participated in the study and to the staff mem-

bers and directors of the Hospital General del Estado de Sonora and Hospital Materno Infantil. We gratefully acknowledge the assistance of Reyna Dávalos Navarro, Josefina Krimpe, Consuelo Ramirez, Alba R. Ochoa and Teresita de Jesús Ortega in conducting the surveys. Logistic support from the Centro de Investigación de Alimentación y Desarrollo (CIAD) in Hermosillo was essential for the succesful completion of this project. The support from Dr. Carlos E. Peña, director of CIAD, is gratefully acknowledged. We are very thankful for the economic assistance provided by the Mexican Council for Science and Technology (CONACYT) and the University of California at Davis.

REFERENCES

1. Uauy, R., Chateauneuf, R. and Valiente S., Food and nutrition problems in urbanized Latin America: Misdirected development. In P. L. White and N. Selvey , eds. Malnutrition: Determinants and consequences. Alan R. Liss, NY pp: 29-43, 1984.
2. Solomons, N. W. and Gross, R., Urban nutrition in the tropics: a call for increased attention to metropolitan population in the developing world. Food and Nutrition Bulletin (9) 2: 43-44, 1987.
3. Valdespino Gomez, J. L., Gomez Dantes, H., Garnica, M. E., Lam, N., Herrera, M. C., Encuesta Nacional de Salud 1986: Patrones de lactancia y ablactación en México. Salud Pública en México 31 (6): 725-734, 1989.
4. Avila, H., Arroyo, P., García, D., Huerta, F., Díaz, R. and Casanueva, E., Factors determining the suspension of breastfeeding in a urban population group. Bull Pan Am Health Organ 14 (3): 286-292, 1980.
5. Pérez Rosiles, L. and Márquez Barradas, M. L., Indicadores psicológicos de la lactancia materna. Psicología y Salud (a publication from the Universidad Veracruzana in Jalapa, Veracrúz, México) 2 (2): 32-37, 1989.
6. Vega Franco, L., Toca, T. and Torres Muñoz, F., Alimentación al seno de las clases populares en la ciudad de México. Salúd Pública de México Epoca 5 (19) 2:227-232, 1977.
7. Ruiz,F. J. and Cravioto, A., Factores que afectan la duración de la lactancia al seno materno en una cohorte de madres urbanas seguidas longitudinalmente. Boletín Médico del Hospital Infantil de México 6 (11): 705-708, 1989.
8. Santos-Torres, I., Vásquez - Garibay, E. and Nápoles-Rodríguez, F., Hábitos de lactancia materna en colonias marginadas de Guadalajara. Boletín Médico del Hospital Infantil de México 47(5): 318-323, 1990.
9. Ysunza O., A., El abandono de la lactancia materna en México. I. Tendencias recientes. La Revista de Investigación Clínica de México 38 (suplemt) : 41-46, 1986.
10. Mariscal Abascal, C., Sori M., J., Rey L., Bautista O., O. and Fiscal T., M. Estudio sobre la lactancia materna en una área suburbana. Boletín Médico del Hospital Infantil de México 34 (4): 777-786, 1977.
11. Flores-Viladroza, L., Brito-Durán, E., Avila-Rosas, H., Casnueva, E., Dorantes, E., Dorantes-Muñoz, C.,Fernández Morales, B., Karchmer, S., Gordillo-Fernández, J., Riojo-Paredes, C. and Cruz-Rodríguez, I. Exploración de factores que pueden modificar el establecimiento y la duración de la lactancia. Perinatología y Reproducción Humana (published by the Instituto Nacional de Perinatología in México City) (2) 1: 16-24, 1988.
12. Cerqueira, M.T., Hábitos de lactancia en México, Cuadernos de Nutrición (México) 10 (1) : 33-38, 1987.
13. Cerqueira, M.T., Effects of urbanization and Acculturation on Food Habits: Studies in México. In P.L. White and N. Selvey, eds. Malnutrition: Determinants and consequences. Alan R. Liss, NY pp: 189-196, 1984.
14. Vega Franco, L., Transcendencia biológica de la alimentación al seno (letter to the editor), Boletín Médico del Hospital Infantil de México 46 (11) : 743-744, 1989.
15. Saucedo Tamayo, M. S., Efectos de la lactancia y ablactación sobre el crecimiento físico en infantes de un año de edad que acuden a consulta externa al Hospital Infantil del Estado de Sonora. B.S. Thesis. Nursing school, Universidad Autónoma de Chihuahua, 1989.
16. Román-Pérez, R., García, R.E., Ochoa, A. and Ramírez, C. Factores psicosociales involucrados en la alimentación al seno materno. Memorias del segundo coloquio regional de análisis de la conducta. Ciudad Obregón, Sonora, 1987.
17. Valencia J., M.E., Jardinez M., R., Higuera C., I., Lozano T., J., Wong G., P. and Noriega Díaz, G. E., Estudio nutricional en centros urbanos marginados de Sonora. Instituto de Investigaciones y Estudios Superiores del Noroesta A. C. (internal report). Hermosillo, Sonora, México, 1981.
18. Campbell, C. E., and Latham, M. C. Infant feeding and morbidity among poor migrant squatters in Hermosillo, Sonora, México. Nutrition Research 8:969-979, 1988.
19. Borbón Arredondo, C., Felix Fernández, C., Noriega Velásquez, I.A. and Gil Gonzáles, M. E. Estudio sobre la lactancia materna en el hospital infantil del estado de Sonora. Hospital Infantil del estado de Sonora (internal report). Hermosillo, Sonora, 1987.
20. Secretaria de Salud, Encuesta Nacional de Salud: Sonora. Secretaria de Salud, subsecretaria de servicios de salud,Dirección General de Epidemiología. México, 1988.
21. World Health Organization, Contemporary patterns of breastfeeding: report on the WHO collaborative study on breastfeeding. Geneva, 1981.
22. Data from the demographic and health surveys (DHS) pre-

sented by Anderson, M. A., Nature and magnitude of the problem of suboptimal breastfeeding. July 30 - August 1, 1990. Florence, Italy.

23.World Health Organizaton, the prevalence and duration of breastfeeding: Updated information 1980-1989. WHO Wkly Epidem Rec 42:321-324 and 331-335, 1989.

24.Neville, M.C. and Neifert, M.R. eds, Lactation: physiology, nutrition and breastfeeding. Plenum Press, NY, 1984.

25.Perse, P., Van Aerde, J. and Clandinin, M. T., Nutritional value of human milk. Progress in food and nutrition science 12:421-447, 1988.

26.Short, R.V., Breast feeding, Scientific American 250 (4):35-41, 1984.

27.Huffman, L.S., Promotion of breastfeeding: Can it really decrease fertility.Clearinghouse on infant feeding and maternal nutrition. Washington DC, 1986.

28.Jason, J. M. et al., Mortality and infectious disease associated with infant-feeding practices in developing countries. Pediatrics 74(4) : 702-727, 1984.

29.Perez-Escamilla, R., Mejia, L.A. and Dewey, K.G., An exploratory study of neonatal feeding patterns and reports of insufficient milk among low-income urban Mexican mothers. Ecology of Food and Nutrition (in press), 1991.

30.Rooth G., Low birth weigth revised. Lancet 1:639, 1980.

31.National Center for Health Statistics - Center for Disease Control growth curves for children, birth - 8 years, USA, DHEW Pub. No. (PHS) 78-1650, Washington D.D., 1974.

32.Statistical package for the social sciences (SPSSX), 1983.

33.SAS Institute: SAS / STAT User's Guide, versión 6.03, NC, USA, 1988.

34.Lopez de Romaña, G., Brown, K.H., Black, R.E. and Kanashiro, H. C., Longitudinal studies of infectious diseases and physical growth of infants in Huascar, an underprivileged periurban community in Lima, Peru. American J. of Epidemiology 129 (4):769-784, 1989.

35.Gussler, J. and Briesemeister, L., The insufficient milk syndrome: A biocultural explanation. Medical Anthropology 4 (2):145-174, 1980.

36.Greiner, T., Van Esterik, P. and Latham, M.C., The insufficient milk syndrome: An alternative explanation. Medical Anthropology 5(2):233-247, 1981.

37.Tully, J. and Dewey, K. G., Private fears, global loss: A cross cultural study of the insufficient milk syndrome. Medical Anthropology (summer) : 225-243, 1985.

38.Allen, L. H. and Pelto, G. H., Research on determinants of breastfeeding duration: Suggestions for biocultural studies. Medical Anthropology (9)2:97-105, 1985.

39.ENFES (Encuesta Nacional sobre Fecundidad y Salud: México, 1987), Dirección General de Planificación Familiar, Secretaria de Salúd, Mexico; Institute for Resource Development / Macro Systems, Inc., Columbia, Maryland, USA, 1989.

40.UNICEF, The State of the world's children, Geneva, 1990.

41.Ysunza, O.A., The decline of breastfeeding in Mexico: An example of medical academic deformation. In Jelliffe D. B. and Jelliffe E. F. P. eds Advances in international maternal and child health. Vol 4. Claredon Press, Oxford, 1984.

42.Labbok, M. and Mc. Donald, M. eds. Proceedings of the interagency workshop on health care practices related to breast feeding. International J. of Gynecology and Obstetrics 31 (supl 1) : 1-191, 1990.

43.Jelliffe D.B. and Jelliffe E.F.P. eds. Programmes to promote breastfeeding, Oxford medical publications, UK, 1988.

44.Winikoff, B. et al., Overcoming obstacles to breastfeeding in a large municipal hospital: Applications of lessons learned. Pediatrics 80(3):423-433, 1987.

45.Winikoff, B. et al., Dynamics of infant feeding:mothers, professionals and the institutional context in a large urban hospital. Pediatrics 77(3):357-365, 1986.

46.Delgado, H. et al., Sinopsis del seminario sobre promoción de la lactancia natural en Centro América, Panamá y la República Domiicana. Archivos Latinoamericanos de Nutrición 35(1):33-47, 1985.

47.Helsing, E. and Kjaernes, U., A silent revolution-changes in maternity ward routines with regard to infant feeding in Norway 1973-1982. Acta Paediatr Scand (74):332-337, 1985.

48.Bergevin, Y. et al., Do infant formula samples shorten the duration of breastfeeding? Lancet 1:1148-1151, 1983.

49.Winikoff, B. and Baer, E.C., The obstetrician's opportunity: translating 'breast is best' from theory to practice. Am J Obstet. Gynecol 138:105-115, 1980.

50.Vega-Franco, L., Temas cotidianos sobre alimentación y nutrición en la infancia. Méndez Cervantes. México, 1983.

51.American Academy of Pediatrics, Pediatric nutrition handbook, USA, 1985.

52.Cameron, M. and Hofvander, Y. Manual on feeding infants and young children, Oxford medical publications, USA, 1983.

53.Committee on nutrition. American Academy of Pediatrics, The use of whole cow's milk in infancy.Pediatrics (72) : 253, 1983.