

# Maternal and Infant Feeding Practices in Rural Bolivia<sup>1</sup>

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*Seventy-four members of mothers' clubs in a rural area outside of La Paz, Bolivia, were interviewed in order to learn more about maternal and infant nutritional practices and use of child health services.*

*Most of the women used a combination of western and traditional child health services, though a substantial percentage used only traditional services. Almost all of their deliveries were attended solely by family members, most notably the pregnant woman's husband. All the interviewed mothers breast-fed their infants, although most gave them other prelacteal liquids in the immediate postpartum period. Breast milk supplementation generally began when the infants were between four and eight months old, occasionally later.*

*Most of those interviewed said they stopped breast-feeding when they knew they were pregnant again; some continued breast-feeding through all or part of the pregnancy; only a small number stopped breast-feeding before they knew that they were pregnant. Almost all the women increased their food intake when they were breast-feeding, primarily by consuming additional liquids.*

*These findings suggest that some current maternal and infant nutritional practices in the study area (such as universal breast-feeding and increased consumption of liquids by lactating mothers) should be encouraged, while others (particularly prelacteal feeding of liquids other than breast milk and late supplementation) should be discouraged. Both traditional and western health providers should be mobilized to perform this task.*

**I**nformation about maternal and infant feeding practices is vital to planning health service interventions designed to improve maternal and infant health. In Bolivia, however, very little information has been published about these practices. One paper, by Mock et al. (1), has reported that most (93%) of the women surveyed in three Bolivian cities breast-fed their infants initially, but that by the age of nine months only about half of the infants were still being breast-fed. In gen-

eral, the duration of breast-feeding decreased with exposure to western-style health care. Only one-quarter of the survey infants received breast milk as their first food.

A second study, carried out in the rural Montero region of Bolivia's central lowlands in 1977 by Frerichs and colleagues (2), also found breast-feeding of young infants to be almost universal, with 96% of those surveyed being breast-fed. The duration of breast-feeding was found to be somewhat longer than that reported in the cities. At the age of nine months more than 80% of the study infants were still being breast-fed; and while weaning generally occurred between 12 and 15 months of age, about a quarter of the infants were breast-fed longer than 15 months. Three-quarters of the deliveries took place at home, and the only atten-

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dants at half the deliveries were the mother's friends and family members.

National infant feeding data from the 1989 Demographic and Health Survey (DHS) have recently become available (3). These data indicate that virtually all newborns in Bolivia were breast-fed at the time of the survey, but that the median duration of breast-feeding varied considerably—from 19.7 months in the Altiplano (high plateau) region to 16.4 months in the Valle (valley) region and 13.2 months in the Llanos (lowland plains) region. The percentage of young (<4 month old) infants receiving only breast milk declined along the same gradient (from 74% to 52% to 31%, respectively). The data also showed that the duration of breast-feeding was shorter in urban areas of Bolivia (15.4 months, compared to 18.1 months in rural areas), and that the percentage of young infants exclusively breast-fed was also lower in the cities (47% compared to 65% in rural zones).

The study reported here, while preceding the 1989 DHS, extends the above findings by focusing on specific infant feeding practices and maternal nutrition in one rural Altiplano area. Neither of the small studies referred to above was conducted in the Altiplano, and neither provided information about supplementary feeding. Although some data on supplementary feeding were obtained by the DHS, the types of "solid" foods provided were not recorded. Only the urban study (1) asked specifically about infant feeding in the early postpartum period, and none of the previous studies collected data on maternal nutrition during pregnancy or lactation.

In addition, this article explores the relationship of maternal and infant nutrition to use of western and traditional health services. Within this context, it recommends strategies for maintaining present patterns of breast-feeding while

at the same time encouraging appropriate supplementation and timely promotion of culturally appropriate prenatal health care.

## METHODS

Women residing in the Bolivian Altiplano, in the Department of La Paz, were enrolled in the study from the following three rural "strata": (1) densely settled towns of 500 to 700 people; (2) rural hamlets of 100 to 200 on the mountain slopes; and (3) extended family settlements of less than 100 people in the more distant valleys. These strata, relatively speaking, are all rural; all of the people studied could be reached by motor vehicle in two to four hours (using paved or unpaved graded roads) from the closest urban center, the national capital of La Paz. Within each stratum, two communities were selected for inclusion in the study,<sup>4</sup> which was conducted during July and August 1982.

In each community, mothers' club members were called together, the purpose of the study was explained, and a random sample of 12 mothers was selected. (Mothers' clubs have been formed in communities across Bolivia for the purpose of community organization and distribution of food supplements to mothers with young children.) In all the communities combined, a total of 75 interviews lasting one to two hours were conducted in either Spanish or Aymara at

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<sup>4</sup>Initially, a third community in the valley stratum was selected and women in that community were interviewed. However, at the request of the men of the community, this work was stopped after completion of three interviews.

the study women's homes. (One of these interviews was dropped for incompleteness during analysis; three additional interviews were conducted in the valley community referred to in footnote 4.) A standardized questionnaire was administered by a woman who was trilingual (in Aymara, Spanish, and English) and by one of the investigators (who spoke Spanish and English); the questionnaire permitted open-ended responses and focused on selected aspects of pregnancy, delivery, infant and child nutrition, and health service utilization. The interviewers prepared themselves to administer the questionnaire by interviewing women similar to those studied in a community that was not included in the study.

The questions referred to each mother's "usual" experience with her entire family, rather than with one particular child. Some precision may have been lost by using this approach, because of possible variations in each mother's experiences with different children and because of inaccurate recall. However, this approach also obviated certain problems arising if one focuses only on specific children—such as the question of whether to collect data only for the most recent child or for all children born during a certain time period (3, 4) and the possibility that the most recent child or period of recall is "unusual" in terms of the mother's overall experience. (There is also evidence from numerous studies indicating that women generally follow the same infant feeding pattern with each of their children—5.)

The data analysis was descriptive in nature. No statistical evaluation was made of observed differences because of the small numbers of women studied.

In return for their participation, all of the women (including those not selected for the interview) were given an "instant" color photograph of themselves and their families.

## RESULTS

### Demographic Characteristics of the Families

The mean ages of the "town," "hamlet," and "valley" women included in the study were 34.3, 31.6, and 35.5 years, respectively. Most of the women were between the ages of 20 and 45. Maternal parity and the number of living children in each survey family were similar in the three study strata. The average mother had delivered six children, and several had delivered more than 10. The mean number of living children was 4.5, the average number of living children under five years old being approximately 2. Over half the women reported that one or more of their live-born children had died. Such mortality was reported by fewer women in the "town" stratum than in the other study strata.

Interview data on maternal occupation appeared to reflect the study women's self-identification more than their daily activities. Most of the mothers said they were housewives; but in fact many of them spent some of their time farming or selling food and household goods in the local market.

### Delivery Patterns

As Table 1 indicates, over 90% of the interview subjects delivered their babies at home alone or with only family members in attendance (8% delivered alone). Husbands, either alone or with another person, served as the birth attendants for most of the study women. The husband was the sole attendant for about 40% of the women in the two most rural strata, while he and another family member served as the birth attendants for about half of the women interviewed in the towns and about a third of those interviewed in the other two strata.

**Table 1.** Percentage distribution of primary birth attendants used, by community strata.

Birth attendant	Town/ plateau (n = 24)	Hamlet/ mountainside (n = 23)	Valley settlement (n = 27)
None	13	9	4
Husband	13	39	41
Husband and other	54	35	30
Mother or mother-in-law	8	9	19
Traditional birth attendant	13	9	4
Doctor	0	0	4

Use of traditional birth attendants was reported infrequently—by 13%, 9%, and 4% of the women interviewed in the towns, hamlets, and valley settlements, respectively. The sole woman with a physician in attendance, a miner's wife, was also the only woman to have a hospital delivery.

### Infant Feeding

All of the study subjects breast-fed their children, but there was some variation in

when breast-feeding began, when it ended, and when supplementation began (Table 2). Fewer than half the mothers reported giving breast milk as the first food for the newborn. This practice was reported by only 15% of those interviewed in the valley settlements, as compared to 40–41% of those in the hamlet and town strata. Wine was sometimes given as the first food for a day or two before nursing the newborn, especially in the valley settlements (by 44% of the study subjects in that stratum); alterna-

**Table 2.** Percentage distribution of certain infant feeding variables, by community strata.<sup>a</sup>

	Town/ plateau (%) (n = 20)	Hamlet/ mountainside (%) (n = 20)	Valley settlement (%) (n = 27)
<i>First food for newborn:</i>			
Breast milk	40	41	15
Cow's milk	25	18	22
Wine	30	23	44
Other liquids	5	18	19
<i>Infant age at breast-feeding termination:</i>			
<8 months	0	5	4
9–12 months	14	18	22
13–18 months	24	41	44
19–24 months	38	32	22
>24 months	24	5	7
<i>Infant age at supplementation:</i>			
4–8 months	86	86	78
>9 months	14	14	22

<sup>a</sup>The numbers shown are slightly smaller than the size of the total sample involved because of missing responses to specific items.

tively, considerable numbers (18–25% of the study subjects in each of the three strata) used cow's milk for this purpose. Use of other liquids (water with herbs or salt, or coffee) was reported by 5–19% of the study subjects.

The Table 2 data also indicate that over three-quarters of the mothers breast-fed their infants for more than a year, and that some continued breast-feeding for over two years. The average duration of breast-feeding was longest in the towns, where 62% of the mothers interviewed said they breast-fed their children for over 18 months, as compared to 37% in the hamlets and 30% in the valley settlements.

Among our study subjects, various circumstances appeared to influence the duration of breast-feeding. For one thing, this duration tended to increase with maternal age (Table 3). That is, about half of the mothers who were over 29 years old had breast-fed until their infants were more than 18 months of age, as com-

pared to roughly a quarter of the younger women. Also, nearly half the women who reported using exclusively or primarily traditional ("folk") child health services said they breast-fed over 18 months, as compared to less than a quarter of the women who relied mostly or entirely on western-style health services. Interview subjects who identified themselves as housewives also tended to breast-feed their children longer than other women. In addition, it seems noteworthy that one mother said she breast-fed her male infants longer than her female infants.

Returning for a moment to Table 2, over three-quarters of the mothers interviewed said they began giving their infants foods other than breast milk between the ages of four and eight months. The percentage of interview subjects providing such supplementation before nine months was highest in the towns and hamlets (86%), as compared to 78% in the valley settlements. Soups and potatoes were the most common first supple-

**Table 3.** Percentage distribution of study women who said they terminated breast-feeding when their children were not over 12 months, 13–18 months, or over 18 months of age, by maternal age and use of traditional ("folk") or western-style child health services.<sup>a</sup>

	Infant age at which breast-feeding terminated		
	≤12 months	13–18 months	>18 months
<i>Maternal age:</i>			
<20 (n = 4)	50	25	25
20–29 (n = 15)	27	47	27
30–39 (n = 38)	18	37	45
≥40 (n = 14)	21	29	50
<i>Children's health service utilization:</i>			
Folk (n = 25)	20	36	44
Mostly folk, some western (n = 34)	24	29	47
Mostly western, some folk (n = 9)	22	56	22
Western (n = 2)	0	100	0
<i>Women's occupation:</i>			
Housewife (n = 57)	18	40	42
Other (n = 12)	42	25	33

<sup>a</sup>The numbers shown are slightly smaller than the size of the total sample involved because of missing responses to specific items.

mentary foods, though small numbers of women offered fruits, milk, cheese, oatmeal, and barley.

### Timing of Breast-feeding Termination and Next Pregnancy

Only 6% of the study women had stopped breast-feeding before they became pregnant again, the percentage increasing somewhat with the age of the breast-fed child. Fifty-six percent of all the study women said they had weaned their breast-feeding children immediately upon becoming pregnant; this figure varied little with the age of the breast-fed child. Approximately a third of the study women continued breast-feeding through all or part of the ensuing pregnancy, with the percentage that did so declining as the breast-fed child's age increased (50% for children not over 12 months, 41% for those 13–18 months, and 30% for those over 18 months). This practice of breast-feeding while pregnant was more common among study subjects living in the towns and hamlets than among those residing in the valleys.

Among the women who weaned immediately upon becoming pregnant, several said they did so because "the child rejected the breast," another said "because I had received education in Achacachi" (a nearby town), while another said, "because it makes both me and my child sick."

### Maternal Nutrition During Pregnancy and Lactation

In response to a question regarding the foods they preferred during pregnancy, many of the study women said they ate everything; nor was there any pattern evident in the responses of those who said they preferred particular kinds of food. In this same vein, there was no evidence that women customarily ate or avoided any particular foods during pregnancy, although some foods such as hot peppers, onions, sausages, and sardines tended to be bothersome during the early months of pregnancy.

Most of the study mothers said that they increased their food intake when they were breast-feeding. About half the women reported taking only additional liquids, while 35–45% reported consuming additional carbohydrates and/or proteins as well. On the basis of our interviews, it appeared that the valley mothers were the least likely to receive any additional nutrition and the least likely to receive additional protein.

### Child Health Services

The study mothers reported using a variety of child health services, a majority saying they used a combination of traditional and western services (Table 4). Overall, the responses demonstrated the anticipated urban-rural gradient. Exclu-

**Table 4.** Percentage distribution of study women using traditional ("folk") and western-style health services.

	Town/ plateau (%) (n = 24)	Hamlet/ mountainside (%) (n = 23)	Valley settlement (%) (n = 27)
<i>Children's health service utilization (curative and preventive):</i>			
Folk	21	39	41
Mostly folk, some western	54	48	48
Mostly western, some folk	21	9	7
Western	4	4	4

sive use of traditional services increased from 21% in the more densely settled towns to 39–41% in the more dispersed hamlets and valley areas. (Use of western health services was strongly tied to the women's self-identification as "employed," suggesting that both variables reflected the women's degree of modernity as seen through their own eyes.)

## CONCLUSIONS AND RECOMMENDATIONS

This study provides general descriptive insight into patterns of maternal and child health and nutrition in rural Bolivia. Hence, the behaviors it reports deserve attention, especially from those who are interested in planning culturally appropriate interventions or conducting further analytic studies.

In general, it appears that offering increased maternal health and child survival services in this region, through both western and traditional personnel, could yield substantial benefits. The fact that these services are not currently being utilized is clearly documented in Table 1. As previously noted by Frerichs et al. (2) in another part of rural Bolivia, births are generally attended only by family members (the pregnant woman's husband, mother, mother-in-law, or children). Few women in any of the areas involved reported having a traditional birth attendant present at a birth.

Both western and traditional health services for children were known to residents of the three strata studied. Between half and three-quarters of the study women freely admitted using a combination of traditional and western services. Still, 21% of all the women interviewed in the towns reported using only traditional remedies. In general, it seems clear that services intended to improve maternal and child health outcomes will require the integration of traditional and

western practices in order to be culturally acceptable to the client population. The authors of this study and Bolivian counterparts are presently implementing a community-based prenatal health care program with the support of the WHO Safe Motherhood Committee. The program includes husbands in educational prenatal care sessions and provides them with training in sterile delivery techniques likely to prove useful in the event of a normal low-risk delivery.

Beyond this, there is some evidence that the practice of breast-feeding may need increasing support and encouragement. Our study, like many others, found that shorter breast-feeding durations were linked to younger maternal age, use of western medical services, and maternal employment (3–11). These trends should be reversed. In particular, the shorter duration of breast-feeding among mothers who use mainly western health services indicates that western health professionals should take a more active role in encouraging breast-feeding. Recent experience in various countries has suggested numerous ways in which breast-feeding (and appropriate supplementation) can be promoted (7, 10).

Also, our findings help to point up certain aspects of infant nutrition that could be improved. While all mothers reported that they breast-fed their infants, usually for many months, most of these infants (especially in the more rural settlements) initially received liquids other than breast milk. This is a tradition that should be discouraged, because early suckling provides the infant with fluids rich in antibodies and stimulates milk production. In addition, consumption of nonnutritive liquids such as water, teas, and herbal broths, has been shown to double or triple the likelihood of diarrhea among infants under six months old (12).

On a related matter, the fact that all the mothers in our study reportedly re-

frained from giving their children supplementary foods other than prelacteal feedings until they were at least four months old seems desirable. However, some infants were not provided with supplementary foods until after they reached eight months of age, a circumstance also found by the DHS study (3); this is of concern because by eight months the nutritional needs of most infants cannot be met by breast milk alone, particularly if the mother is poorly nourished (13).

Regarding birth rates, it can be assumed that the combination of long-term breast-feeding and delay of supplementation for a few months had a child-spacing effect in our study population, as has been well-documented in many other populations (5, 6, 14). This child-spacing effect is particularly important in the setting of rural Bolivia, partly because of historical restrictions on access to contraception and partly because of the limited availability of western health care services. Nonetheless, the fact that almost all the mothers became pregnant again while breast-feeding suggests that additional family planning services are warranted to protect the health of both the mothers and their children. The health consequences of close child spacing are well-known. Less is known about the health consequences of breast-feeding while pregnant, but it is clearly difficult to simultaneously provide sufficient nourishment for the mother, the suckling infant, and the developing fetus (6, 9, 15).

It is interesting to note that despite the high prevalence of conception among breast-feeding women and subsequent curtailment of breast-feeding among the women in our study, relatively few mothers (14% of those whose last child was still living) cited new pregnancy as the reason for cessation of breast-feeding in the national DHS study (3). Instead, nearly two-thirds of the mothers in the

DHS study sample said they stopped breast-feeding because the child had reached weaning age. This apparent discrepancy between our Altiplano study and the national study suggests that, unless the small sample of Altiplano women was very atypical, the answers to the DHS question on reasons for cessation of breast-feeding could lead to considerable underestimation of the prevalence of conception among lactating women.

Finally, most of the study mothers increased their nutritional intake when they were breast-feeding, generally with additional liquids, sometimes with additional carbohydrates and/or proteins as well. This desirable practice should be reinforced and should be extended into the prenatal period.

A clinical study in La Paz has documented the importance of a mother's nutritional status for the growth of her breast-fed infant (16). This study found a significant correlation between the weight gain of exclusively breast-fed infants between three and six months old and maternal arm circumference during pregnancy and at three months postpartum. The fact that the average maternal triceps skinfold thickness and arm circumference measurements decreased at three months postpartum relative to prenatal measurements and then registered a further relative decrease at six months postpartum suggests a depletion of maternal body stores.

The issues raised in the foregoing paragraphs are being investigated by the authors and Bolivian counterparts as part of a detailed cross-sectional study, "Infant Feeding Practices and Fertility in Bolivia," supported by the WHO Committee on Natural Family Planning.

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## REFERENCES

1. Mock NB, Franklin RR, Bertrand WE, O'Hara C. Exposure to the modern health service system as a predictor of the duration of breast-feeding: a cross-cultural study. *Med Anthropol.* 1985;9:123-38.
2. Frerichs R, Becht JN, Foxman B. Child-bearing and breast feeding in rural Bolivia: a household survey. *J Trop Pediatr.* 1981;27:245-49.
3. Sommerfelt AE, Boerma JT, Ochoa LH, Rutstein SO. Maternal and child health in Bolivia: report on the in-depth DHS survey in Bolivia, 1989. Columbia, Maryland, USA: Institute for Resource Development/Macro Systems, Inc.; 1991.
4. Anderson JE, Rodrigues W, Thome AMT. Breast-feeding and use of the health care system in Bahia State, Brazil: three multivariate analyses. *Stud Fam Plann.* 1984; 15:127-35.
5. Lesthaeghe R. Lactation and lactation related variables; contraception and fertility: an awareness of data problems and world trends. *Int J Gynaecol Obstet.* 1987; 25(suppl):143-73.
6. McCann MF, Liskin LS, Piotrow PT, Rinehart W, Fox G. Breast-feeding, fertility, and family planning. *Popul Repts [J].* 1981;4:525-75.
7. Jelliffe DB, Jelliffe EFP. *Programmes to promote breast-feeding.* Oxford: Oxford University Press; 1988.
8. Forman MR. Review of research on the factors associated with choice and duration of infant feeding in less-developed countries. *Pediatrics.* 1984;74(suppl):667-94.
9. World Health Organization. *Contemporary patterns of breast-feeding: report on the WHO Collaborative Study on Breast-feeding.* Geneva: 1981.
10. Labbok M, McDonald M, eds. *Proceedings of the Interagency Workshop on Health Care Practices Related to Breast-feeding.* *Int J Gynaecol Obstet.* 1990; 31(suppl):190 pp.
11. Bender D, Madonna D. The impact of women's productive roles on child survival. *Soc Sci Med.* (In press).
12. Popkin BM, Adair L, Akin JS, Black R, Briscoe J, Flieger W. Breast-feeding and diarrheal morbidity. *Pediatrics.* 1990; 86(6):874-82.
13. Seward JF, Sedula MK. Infant feeding and infant growth. *Pediatrics.* 1984;74(suppl): 728-62.
14. Kennedy KI, Rivera R, McNeilly AS. Consensus statement on the use of breast-feeding as a family planning method. *Contraception.* 1988;39(5):477-96.
15. Neville MC, Neifert MR. *Lactation: physiology, nutrition, and breast-feeding.* New York: Plenum Press; 1983.
16. Noustny R, Haas JD. Maternal anthropometry and infant growth with exclusive breast feeding in La Paz, Bolivia. *J Trop Pediatr.* 1987;33:309-14.