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Using Cultural Knowledge in Health Promotion: Breastfeeding Among the Navajo

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Although many attempts have been made to promote breastfeeding in a variety of contexts, few programs have explicitly incorporated cultural beliefs in these efforts. This article describes a breastfeeding promotion program conducted on the Navajo reservation. This program was designed to be culturally appropriate. Background information regarding beliefs and factors affecting infant feeding practices in this setting is provided, followed by a description of the intervention. The intervention, which incorporated both social marketing and community participation techniques, consisted of three components: an intervention in the health care system, a community intervention, and an individual intervention. Based on medical records review of feeding practices of all the infants born the year before (n = 988) and the year after (n = 870) the intervention, the program was extremely successful. This combination of techniques, including qualitative and quantitative research into local definitions of the problem, collaboration with local institutions and individuals, reinforcement of traditional understandings about infant feeding, and institutional change in the health care system, is an effective way of facilitating behavioral change.

INTRODUCTION

Breastfeeding is recognized as the optimal way of feeding infants for the first 4-6 months of life, providing superior nutrition, conferring immunity against infectious agents, and facilitating child spacing. Despite these benefits, the United States is far from achieving the national goal for the year 2000 of 75% initiation of breastfeeding and 50% duration to 6 months.[1] In the early part of this decade, rates hovered at 52% and 18%, respectively.[2] Further, there was great regional and ethnic variability in feeding practices,

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with breastfeeding rates being particularly low among minority groups for whom infant morbidity is high.[3,4] Increasing breastfeeding rates through effective promotion campaigns could have a major impact on the health of infants nationwide.

Like all important human activities, infant feeding practices are influenced by cultural beliefs, which are shared notions that frame thinking and discussion, and values regarding certain behaviors. In cultures that subscribe to the humoral theory of illness cause and treatment, for example, breast milk and other bodily fluids are classified as being either "hot" or "cold." In Honduras, where breast milk is considered "hot," women avoid activities that would further heat the milk, such as sitting in the sun, exerting themselves, or experiencing strong emotions, particularly anger or unhappiness.[5] Among the Mende in Sierra Leone, engaging in sexual intercourse while breastfeeding is thought to cause diarrhea in the infant, so many women choose to wean early to avoid questions about their morality.[6] Cultural beliefs also influence feeding practices in industrialized societies. Although in general the breast has been eroticized in the United States,[7] with consequent ambivalence to nursing in public,[8] ethnic groups within the United States differ with regard to the specific beliefs that affect infant feeding practices.[9] Breastfeeding promotion projects are just beginning to explicitly incorporate such cultural beliefs in their efforts.[10]

Many other factors also influence infant feeding practices. Work outside the home,[11,12] or the intention to work,[13-15] being single,[16] or multiparous,[17,18] are associated with bottle feeding in certain groups. Similarly, less affluent mothers in many populations are less likely to breastfeed.[18] Finally, there is increasing evidence that, despite good intentions, the health care system discourages breastfeeding through separation of mother and infant, the provision of formula in the hospital and at discharge, and lack of assistance with nursing problems.[19-21] Clearly, all of these factors, as well as traditional beliefs, affect the cultural context in which infant feeding choices are made, and all must be addressed if breastfeeding promotion is to be successful.

This article describes the development and evaluation of a breastfeeding promotion program designed to incorporate cultural understandings about infant feeding and to address perceived barriers to breastfeeding. The cultural factors found to affect feeding practices among the Navajo are described first. The development of the intervention program, particularly means of incorporating cultural knowledge, are discussed. Finally, breastfeeding rates in Shiprock, New Mexico, before and after the intervention are compared to evaluate the effectiveness of the program. All stages of the research were approved by the Navajo Area Research and Publications Committee. Later articles will provide systematic evaluation of the program with reference to the effects of breastfeeding promotion on community rates of infant morbidity.

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RESEARCH REGARDING INFANT FEEDING PRACTICES AMONG THE NAVAJO

Methodology

Research was conducted between 1988 and 1990 regarding infant feeding practices and perceptions among the Navajo, a Native American tribe residing in the southwestern United States. The Navajo Infant Feeding Project was designed to determine how Navajo women feed their infants and on what basis they make feeding decisions. The research was conducted in three communities, which were chosen to reflect the diversity of lifestyles on the reservation: a rural community, one of the most economically developed areas on the reservation, and a town on the southeastern edge of the reservation. Detailed descriptions of the methods used are available elsewhere.[22-24]

In the initial phase of the project, ethnographic interviews explored Navajo perceptions regarding breastfeeding with the goal of developing culturally specific hypotheses about factors that affect feeding decisions. Thirty-five ethnographic interviews were conducted with two types of respondents: older, more traditional people and women of childbearing age. The interviews with the older group, including women and men, were conducted in Navajo by three researchers who speak fluent Navajo. Respondents were frequently chosen based on their reputations in the community as knowledgeable of traditional Navajo culture; some were approached because they happened to be home when the interviewers drove by. The younger respondents, usually interviewed in English, were often acquaintances of the researchers, associated with Navajo Community College, or were approached while they were waiting at the Women, Infants, and Children (WIC) supplemental food program, Indian Health Service (IHS) clinics, or flea markets. No attempt was made to interview any "representative" group in the ethnographic interview stage. Rather, we sought respondents in the three research sites who were articulate and knowledgeable about beliefs regarding breastfeeding and influences on infant feeding practices.

The ethnographic interviews explored how infant feeding practices are related to daily life and to family and kinship and how they are influenced by traditional beliefs, the health care system, and advice from relatives and others. Interviews were tape-recorded, transcribed, and translated into English. Additional interviews were conducted until no new beliefs were elicited. Respondents ranged in age from late teens to mid-70s and pursued a range of economic activities from sheep herding to secretarial employment.

Subsequently, 250 postpartum women (100 from Shiprock) were interviewed to identify demographic correlates of infant feeding choices and to further explore social, logistic, and attitudinal factors associated with feeding practices. A structured, open-ended questionnaire was used. The questionnaire included factors from the literature that are related to infant feeding behaviors in other populations (such as age, education) and items identified from the ethnographic interviews as influencing feeding practices specifically among the Navajo (such as the belief that breastfeeding results in weight gain for the mother). Some respondents were recruited while they waited for postpartum appointments at WIC or IHS clinics. Other women in the Shiprock area were acquaintances of the interviewers, while still others were approached at flea markets. Although the sampling scheme was one of convenience, the women did not differ significantly in age, parity, or amount of prenatal care from a random sample of women who had given birth in 1986 at the three research sites, according to figures provided by IHS.

On average, women in the survey were 27 years old (range = 14-42 years), had completed high school (mean years of school = 11.7, range = 1-18 years), and had 2.7 children; 44% worked outside the home. The majority (60%) described themselves as being "traditional and modern," with 31% and 9% being "modern" and "traditional," respectively.

Finally, the influence of the health care system was studied. Interactions were observed between practitioners and women in prenatal clinics, on maternity wards, and at well-baby clinics with a focus on the teaching provided about feeding. Hospital practices that might affect infant feeding choices were observed in an unstructured fashion. This part of the project was designed to document the types of education available to women from the health care system about infant feeding and to explore the effects of standard hospital policies and common staff behaviors on breastfeeding practices. Unstructured interviews were conducted with staff about attitudes and practices related to breast- and bottlefeeding. For example, respondents were asked where they had learned about breastfeeding, what they tell Navajo women about breast and formula feeding, and how breastfeeding could be facilitated in the hospital.

The staff for the research project consisted of four Navajo researchers who were fluent in the Navajo language. Two of the researchers had received training in interviewing skills through courses at Navajo Community College, and the other two had substantial prior experience with ethnographic interviewing. Three of the researchers were also able to act as cultural teachers about Navajo life and thought. In addition, the project supervisor and principal investigator, both of whom were Anglo-American, assisted in interviewing and participated in analyses of ethnographic interviews. Finally, participant observation in the hospital, including interviews with hospital staff, was conducted by an Anglo-American anthropology graduate student, who was also a registered nurse.

Findings Regarding Infant Feeding Practices and Their Determinants

Although a high proportion (81%, $n = 203$) of the 250 Navajo women interviewed at the three research sites breastfed, 62% ($n = 144$) started formula in the first week after delivery. Breastfeeding rates were lowest at Shiprock, one of the research sites: 71% ($n = 71$) initiated breastfeeding, 75% ($n = 73$) began formula in the first week, and half had stopped breastfeeding by 2 months. Although these rates of exclusive breastfeeding are not particularly low by national standards, they were of interest given high rates of the illness among Navajo infants. In fact, as late as the 1970s, Navajo infant mortality due to respiratory and gastrointestinal illness was 2.8 and 8.2 times higher, respectively, than the national average.[25]

Traditional Navajo beliefs about breastfeeding emphasize its nutritional, physical, and psychological benefits (Table 1). Breastfeeding is regarded as the proper way to feed an infant, through which the mother models proper behavior and passes on certain of her own attributes. Breast milk is valued for its nutritional qualities, which promote growth, and because it shows the child that it is loved.[22] Breastfeeding marks a child as being human; respondents called formula-fed infants "cow babies" because of how they had been fed. The Navajo word for breast, *h'abe*, which literally means "her milk," clearly indicates the function of the breast.

Navajo women identified many barriers to breastfeeding (Table 2), with both ethnographic and survey interviews indicating that maternal employment was perceived as a

Table 1. Examples of Navajo Breastfeeding Beliefs

Breastfeeding
Was provided by the Holy People as the proper way to feed an infant
Provides the original symbol of relationships between people, and models the sharing of food
Passes on maternal attributes
Promotes growth and development
Makes the child feel loved and secure
Promotes self-discipline and a better life

NOTE: For a more complete treatment, see Wright.[22]

Table 2. Reasons for Feeding Choices Among Navajo Women

	%	*n*
Reasons for not wanting to breastfeed[a]		
Problems with work or school	30	17
Negative perceptions of breastfeeding	27	15
Used formula with previous child	7	4
Other	36	20
Reasons for starting formula[b]		
Work or school	28	44
Insufficient milk	16	26
Baby did not like breast	13	21
Baby's condition	11	18
Mother did not like nursing	6	9
Other	28	44
Reasons for weaning from breast milk[c]		
Baby did not like the breast	26	29
Baby's condition or age	23	25
Maternal condition	22	24
Working, insufficient time	19	21
Insufficient milk	10	11

NOTE: Totals in each category add to more than 100% because of multiple answers. Although 250 Navajo women were interviewed, only certain women were eligible to answer each question, as delineated below.

a. Includes only women who said they did not want to breastfeed when they thought about feeding prenatally ($n = 56$); nine subsequently breastfed.

b. Includes only women who breastfed and also had begun use of formula ($n = 172$).

c. Includes only women who breastfed but had stopped prior to the interview ($n = 110$).

major barrier to breastfeeding. However, working outside the home was not associated with lower rates of either initiation or duration of breastfeeding.[23] Women who worked outside the home but postponed returning to work until the infant was 3 months old breastfed longer than anyone. Despite this finding, the perception that employment is a major barrier to breastfeeding would need to be addressed for breastfeeding promotion to succeed.

The second most common reason Navajo women gave for not breastfeeding was concern about insufficient milk and other nursing problems. Almost half (45%) of mothers

who breastfed cited nursing problems as a reason to stop breastfeeding or to start formula. Few respondents knew that milk supply can be increased by nursing more frequently, although many cited the traditional belief that lactating women should eat the traditional "strong" foods to increase their strength as well as to produce more milk. The words women used to describe why they stopped breastfeeding ("the baby didn't want the breast") suggested that the cultural value placed on individual autonomy[26] created a culturally specific interpretation of nipple confusion, in which the infants "chose" the artificial nipple over the real nipple. Women who cited these concerns as reasons for stopping breastfeeding had introduced formula earlier; 78% of those citing insufficient milk and 63% who said "the baby didn't want the breast" started formula in the first week, as compared to 39% of the rest of the sample ($p < .005$). Thus, insufficient milk was a real problem caused by the early introduction of formula and lack of knowledge about how to increase milk supply, as well as a culturally specific interpretation of nipple confusion in terms of the baby's "choice" for formula.

Although rarely mentioned by respondents, the health care system also influenced feeding practices. Virtually all Navajo babies are born in Indian Health Service (IHS) hospitals. Prior to the breastfeeding promotion program, the hospital engaged in many practices common to hospitals elsewhere in the United States that do not support breastfeeding.[19,21,27,28] Health care personnel were inconsistent in providing encouragement for and information about breastfeeding, often due to lack of knowledge. The educational materials available, most of which were provided by formula companies, stressed problems associated with breastfeeding, particularly "what to do when the mother doesn't have enough milk." Almost 80% of infants did not nurse until several hours after birth, and most were separated from their mothers much of the hospital stay. Most breastfeeding babies were given formula in the hospital, and only 36% of respondents in 1989 received assistance with breastfeeding initiation in the hospital. Finally, no breastfeeding policy existed, which meant that breastfeeding support in the hospital was left to chance and the preferences of individual providers.

Postpartum, the health care system influenced feeding practices through WIC and IHS. Despite the fact that breastfeeding promotion projects have been instituted at many WIC offices,[29,30] WIC is the source of free formula for women below the poverty level. Until recently, combination breast- and bottlefeeding was rewarded, since women using both methods received more from the system (both food and formula) than did women who exclusively fed formula or breast milk. Women who were eligible for WIC benefits breastfed a shorter period of time than other women (4.8 months vs. 5.7 months, $p < .02$). These findings persisted when limited to women who reported household incomes of less than $1000/month, suggesting it is not an artifact of differences in feeding practices between higher and lower income respondents. At IHS, relatively few women received useful information about nursing problems, despite the fact that many women were concerned about insufficient milk. Thus, while women were encouraged by the health care system to breastfeed, they did not always receive the information necessary to continue breastfeeding.

As in other groups,[31] relatives are influential in the choices Navajo women make regarding infant feeding. Navajo society is matrilineal, so that clan descent is traced through women, and the preferred form of residence after marriage is matrilocal, in proximity to the wife's family. However, household structure is quite variable, given the constraints of jobs, schooling, availability of child care, and other factors. The majority of grandmothers were supportive of breastfeeding, and many had modeled this behavior through their own feeding choices. However, maternal relatives were rarely sources of

practical advice about breastfeeding, with most discussions focusing on benefits to the baby. Baby's fathers were more ambivalent about breastfeeding, with more than half (53%) of respondents saying they were unaware of the baby's father's attitudes toward feeding. Breastfeeding was significantly more common among women who knew they had been breastfed (86% vs. 74.5%, $p < .02$) and among women whose live-in partners advocated breastfeeding (93% vs. 68%, $p < .00001$). Clearly, because relatives influence new mothers, it would be important to include them in breastfeeding promotion efforts.

Finally, statistical description of breastfeeders and bottle-feeders assisted in identifying particular groups to target at particular times. There was no association between either maternal education or self-reported degree of traditionality with how a woman chose to feed her infant. However, initiation of breastfeeding was significantly more common among women who planned prenatally to breastfeed (87% vs. 27%, $p < .00001$) and among women with previous breastfeeding experience (92% vs. 50%, $p < .00001$). While it is not possible to change previous breastfeeding experience, knowledge of the importance of prenatal intentions identified a critical moment in which intervention could be particularly effective.

In summary, traditional Navajo beliefs supported breastfeeding, except the interpretation of nipple confusion as the infant "choosing" the bottle. While a high percentage of Navajo women initiated nursing, perceived barriers (especially employment and concern about having enough milk) fostered the early introduction of formula, which interfered with milk production and resulted in relatively short duration of breastfeeding. Many health care practices were not supportive of breastfeeding, particularly the provision of formula and the lack of information about solving nursing problems. Finally, relatives were influential in infant feeding decisions but were rarely sources of advice about nursing problems.

DESIGNING THE BREASTFEEDING PROMOTION PROGRAM

The Navajo Breastfeeding Intervention Program (NBIP) was designed to facilitate both structural change (within the health care system) and micro-level change (at the individual level). Two philosophies were important in the development of the program. Community empowerment, based on Paulo Freire's work, attempts to improve health through more global change in macro-level factors that determine standards of living. It involves group efforts to identify problems; to assess social and historical roots of the problem; to envision a healthier society; and to solve the problems through a variety of individual, group, and structural changes.[32] Although far from developing a total partnership between the team and the community,[33] numerous attempts were made to facilitate local discussion of the issues involved in infant feeding, child raising, and health, which were important local concerns. For example, project staff distributed brochures and information at a booth at the Shiprock Fair, and the project was discussed on several occasions with the health board.

Second, social marketing techniques,[34,35] which assess and address existing beliefs about the advantages and barriers to breastfeeding, were used as a means of incorporating cultural knowledge into promotion activities. These efforts, based on the recognition that traditional beliefs encouraged breastfeeding and that previous "expert" opinions had been responsible in part for the increase in formula use, reframed existing understandings rather than trying to replace them. The program was designed in collaboration with the Wellstart

International Lactation Education Program, the Shiprock Indian Health Service, and Navajo consultants. Wellstart, which is dedicated to the education of health care providers regarding breastfeeding, has trained more than 500 associates in 50 countries during the past decade.

Since combination feeding had been identified as the major problem leading to early termination of breastfeeding, the goal of the NBIP was to increase the duration of exclusive breastfeeding from 1 week to 1 month. The project consisted of three components. A major part of the intervention occurred in the health care system, since hospital practices were implicated in the early introduction of formula. A community intervention was undertaken to involve community members in defining and solving the problems, and to use existing structures and programs in breastfeeding promotion. A final part of the project occurred at the level of the individual mother and her family, and focused on the provision of culturally sensitive educational materials and assistance in resolving physical and logistic barriers to breastfeeding. The intervention took place between July 1991 and June 1992. Although day-to-day operations of the intervention were the responsibility of one of the Navajo researchers from the previous project, additional assistance was sought from a photographer, an artist, and students doing summer internships with the local Health Promotion Disease Prevention office, all of whom were Navajo.

Health Care System Intervention

The intervention in the health care system focused on education of health care providers, creation of a breastfeeding policy, and provision of mechanisms whereby new skills and knowledge could be passed on to other health care workers. In addition, work with WIC caseworkers dealt with ways of counseling clients who had difficulties with nursing.

Three faculty members from Wellstart organized and presented a 3-day conference in Shiprock. Health care providers involved with maternity care, including physicians, nursing staff, community health representatives, and WIC, were invited. The conference included (a) scientific sessions that presented state-of-the-art information regarding the physiology of lactation, the relationship of breastfeeding to infant and maternal health, management of lactation problems, contraindications and controversies, and maternal and infant nutrition; (b) discussion sessions that addressed counseling techniques to support and encourage breastfeeding; (c) a hands-on clinical session in which participants worked with Navajo patients who had breastfeeding difficulties or concerns; and (d) a discussion of the implications of hospital policy, with emphasis on existing and proposed policies in the IHS hospital. Forty-five providers attended parts of the conference, with a core group of 16 being present the entire 3 days.

Following the conference, IHS staff formed a breastfeeding task force that recommended and implemented policy changes, including phasing out of discharge packs containing formula, reviewing all educational materials for hidden messages that might undermine breastfeeding, scheduling of breastfeeding discussions during prenatal visits and after delivery, separating breast- and formula-feeding mothers into different maternity ward rooms, initiating nursing within a half an hour of delivery, encouraging rooming-in, and discouraging supplemental feedings for breastfed babies. Wellstart faculty returned 6 months later to work further on clinical skills and on difficult issues regarding the implementation of policy. For example, some hospital staff who were themselves uncon-

vinced of the adequacy of exclusive breastfeeding consistently disregarded hospital policy and gave formula to new mothers without first trying to assist them in solving breastfeeding difficulties. Wellstart faculty met privately with these individuals to discuss their beliefs and concerns, and alternative strategies were suggested for handling particular situations.

Several sessions were organized with WIC caseworkers, all of whom were Navajo, using the Best Start video tapes.[10] At these sessions, caseworkers reported on their perceptions of barriers to breastfeeding among their clients. Caseworkers worked in pairs to role-play ways of counseling clients who reported particular problems. Finally, results of the research were shared with the staff, and additional ways of incorporating the results were discussed.

Community Intervention

The intervention in the community was designed to increase awareness about the role of breastfeeding in infant health and to facilitate discussion and activism concerning infant health. There were several components. A marketing strategy was designed that used radio spots to reach three audiences (teens/young couples, working women, and the elderly). Each radio spot focused on a particular barrier to breastfeeding, addressed related values, and provided information about ways to resolve the difficulty. Project staff developed preliminary scripts based on barriers to breastfeeding that had been identified in the research; these were revised by the Navajo interns to reflect age-appropriate speech. Radio spots in English addressed modesty for a teen audience, whereas others dealt with the issues associated with employment and nursing. Two spots were recorded in Navajo, and addressed ways elderly Navajos could support breastfeeding. Scripts were reviewed with appropriate focus groups, revisions were made, and master tapes with appropriate background sounds were recorded. The five radio spots first aired in December 1991.

An infant T-shirt was developed, which was distributed by WIC caseworkers to infants at WIC who had not been given any formula by the age of 6 weeks. The shirt, which showed a happy Navajo baby with the words "Breastfed, For the best start in life," emphasized traditional perceptions of the benefits of breastfeeding and delight in a happy, healthy baby. A large billboard that stated the project slogan "Breastmilk is all your baby needs for the first four months" was designed and painted by a local Navajo artist. The billboard, which shows a serene mother breastfeeding and a harassed mother trying to warm formula while her baby cries, was located at the major intersection in Shiprock.

Finally, a slide tape show was developed, again incorporating results and expressions from previous research. The tape consisted of three sections: the benefits of breastfeeding according to Navajos, perceptions of Navajo women regarding the difficulties of breastfeeding, and how community members can help women breastfeed. Each section was presented first in English then in Navajo. Statements in the tape were taken directly from interviews, so they were language and age appropriate. Photographs were taken by a Navajo photographer using Navajo models and local scenery, and all voices were Navajo. Since the content of the tape reflected what respondents had said in the interviews, traditional reasons and understandings were reinforced. The tape was reviewed for content, language, and style by numerous Navajo consultants before being shown at local health fairs and in the maternal child health clinics. While we had intended to show the slide tape show at chapter and other meetings, project funds ran out before this was accomplished. The slide tape show was recognized by the Arizona Public

Health Association with a Hemmy Award as the best health education video developed in Arizona for 1992.

Intervention at the Individual Level

A wide variety of existing educational materials pertaining to breastfeeding was reviewed for use in the project, and a comprehensive plan was developed for providing appropriate materials at appropriate times in pregnancy and postpartum. Two items were purchased: an excellent video (*Breastfeeding: A Special Relationship* by Eagle Video Productions in Raleigh, North Carolina) for use in the hospital and a picture-oriented brochure to be given in the hospital that assisted with the initial stages of nursing.

In addition, two brochures were developed to assist with education of Navajo women and their families: one for the prenatal period and one for the family to be given at delivery. The brochures addressed barriers to breastfeeding and information gaps as identified in the interviews. The brochures followed a question and answer format, and were designed at roughly a sixth-grade reading level. Information was provided regarding increasing milk supply and the impact of introducing formula on breast milk supply. However, traditional beliefs were also emphasized concerning how healthy breastfed children are and how nursing shows a mother's love.

Finally, the project used the existing tribal Foster Grandparent program, a program that links elderly volunteers to an appropriate situation. The foster grandmother connected with the project, who had breastfed her five children, visited the maternity ward 5 days per week. This bilingual laywoman talked with new mothers about how she had breastfed and how well her grown children were doing. She often answered questions about breastfeeding from the mothers, and occasionally assisted with positioning. Although a mother's support group was considered, there appeared to be both cultural and logistic difficulties in establishing and maintaining one. The foster grandmother provided a culturally appropriate, feasible alternative for providing mother-to-mother support.

EVALUATING THE IMPACT OF THE BREASTFEEDING PROMOTION PROGRAM

A medical record search was conducted to assess feeding practices before and after the intervention. All infants born at the Shiprock hospital for the year after the intervention (September 24, 1991 to September 24, 1992, $n = 870$) and all those born the year prior to the intervention (June 1, 1990 to May 30, 1991, $n = 988$) were identified by reviewing the delivery log kept in the labor and delivery ward. Data are entered by hand into this log at the time of a birth and include mother and infant names, dates of birth, chart numbers, gender of the child, and details about delivery.

The medical record of each child so identified was obtained from the Shiprock hospital. For each clinic visit, how the baby was being fed (breast milk, formula, and/or other foods) was recorded; demographic and delivery data were collected as background information. Data were entered into two laptop computers by researchers working in pairs: one located and read the information from the chart and the other entered the information directly into the computer. When each chart had been entered, researchers switched tasks to review the data entered for completion and correctness. Follow-up visits were made to several clinics to obtain more complete feeding data on some children. Additionally, errors in

Table 3. Infant Feeding Practices Before and After the Intervention

	Before	After
Number of births[a]	988	870
Hospital feeding practices[b]		
% breastfed	64.2	77.8**
% receiving formula	84.6	45.4**
Breastfeeding initiation (%)[c]	71.1	81.1**
Mean age (days) at starting formula	11.7	48.5*
Mean age (days) last known to be breastfeeding	100.6	131.6*

a. Not all infants had feeding data due to lack of follow-up through the Shiprock hospital or nearby clinics. Information was available for 1,814, 1,714, and 1,411 infants, respectively, regarding hospital feeding practices, age at introducing formula, and the last age at which they were breastfed.
b. Infants who received both breast milk and formula in the hospital are included in both percentages.
c. Some mothers did not begin to nurse until after discharge from the hospital.
*$p < .001$; **$p < .00001$.

data collection (such as children who apparently "began" breastfeeding months after stopping breastfeeding) were identified, and charts were reviewed for correct information.

Several computer programs were used for the recording and analysis of data. An application of Knowledgeman software, which is a data entry program especially suited to recording information from medical records, was customized for use by the researchers. Screens were created that requested specific information from the chart for each infant, the order of which reflected the format of the IHS medical records. Data collected was backed up daily, and then diskettes containing all information obtained were mailed to the principal investigator. Data from these diskettes were entered into the Statistical Information Retrieval (SIR) data management program, which is particularly useful when records are of variable length. For example, while the maximum number of illness visits per infant was 76, the amount of space maintained for each individual was determined by the number of their illness visits rather than the maximum number for the total population. Finally, SPSS was used for data analysis.

Table 3 shows that there was substantial improvement in breastfeeding rates after the intervention. Both breastfeeding initiation and duration had increased, and a smaller percentage of infants were given formula in the hospital. Most important, the mean age at which formula was introduced increased from 12 days prior to the intervention to 48 days afterwards ($p < .0001$). These changes could not be attributed to differences in the birthing population, since there were no differences in maternal age and parity between the two cohorts (the only two maternal characteristics recorded on the infant's chart).

DISCUSSION

This article has described the successful implementation of a health promotion program that was designed to incorporate cultural knowledge to increase breastfeeding rates. Qualitative and quantitative research was conducted to systematically investigate cultural beliefs about infant feeding and to identify the barriers to breastfeeding. The goal of the program was to assist Navajo mothers in postponing the introduction of formula.

This was accomplished through community activities such as the showing of a slide tape show, through social marketing using radio spots, and through design of brochures, all of which used findings from interviews regarding barriers to breastfeeding. Finally, the program involved an intervention in the health care system that had been a major factor in the early introduction of formula. This combination of approaches was very effective: it was demonstrated to increase the age at first introducing formula by more than 1 month.

The Navajo Breastfeeding Intervention Project was successful in this attempt for several reasons. First, all stages of the project were conducted in close collaboration with local Navajos, who acted as cultural teachers, researchers, and promoters. Additionally, the project connected with local institutions such as the tribal Foster Grandparent program, which makes effective use of traditional values and roles to provide assistance in a range of settings. These efforts added substantially to the quality of the program, to its cultural appropriateness, and to its acceptability locally. Second, the content of the program was based on previous research that identified actual feeding concerns voiced by Navajo mothers and community beliefs about breastfeeding. Rather than trying to replace existing perceptions of feeding with the latest medical knowledge, traditional beliefs about the benefits of breastfeeding were reinforced. This approach demonstrates respect for traditional beliefs and is effective, since people are understandably skeptical about the latest expert opinion.

The project was multifaceted, addressing existing beliefs and knowledge needs among the community and facilitating institutional change through policy changes and education in the health care system. Critical to the success of the hospital intervention was the collaboration with experts in clinical management of breastfeeding who were experienced in training health care providers to improve their knowledge and skills, and in facilitating attitudinal and institutional change in support of breastfeeding. Radio spots and a slide tape show used appropriate language taken directly from open-ended interviews, local actors and actresses made the messages more accessible, and a combination of English and Navajo was used to reach different age groups. Finally, some of the less conscious influences on breastfeeding were addressed specifically by targeting fathers and by working in the health care system to improve hospital practices.

Numerous attempts have been made to increase breastfeeding rates, with variable success. One of the earliest programs, which took place in Minneapolis in 1921,[36] entailed monthly ascertainment of feeding practices and home visits by a nurse to assist with nursing problems. Other programs have focused on educating women regarding current biomedical notions about infant health. Unfortunately, simply increasing breastfeeding knowledge does not always increase rates of nursing,[37,38] and messages regarding the medical benefits of breastfeeding do not address existing beliefs about the meanings of breast- and bottlefeeding, and the barriers associated with each behavior. More recent efforts have been directed at changing characteristics of the mothers' social, economic, or working environment,[39] teaching mothers new attitudes and skills,[40] intervening in the health care system,[21,27,41-43] and providing lay assistance through such organizations as La Leche League.[36]

Unfortunately, it is often difficult to evaluate the affect of such breastfeeding promotion programs. Several unique characteristics of the Navajo situation made evaluation easier: (1) virtually all Navajos living in the area use Indian Health Service facilities; (2) there are few financial barriers to care, since 100% of Navajos have health coverage or receive care free of charge through IHS; and (3) standardized forms for well-child visits and at birth specifically request information about feeding practices. Consequently, medical records exist and could be systematically reviewed for virtually all infants born before or

after the intervention. This method of ascertainment made it possible to assess the effectiveness of the project as a whole in a more rigorous fashion than is usually possible. Although we were unable to assess whether specific components of the program were effective, there was substantial increase in knowledge of health care providers following the conference, and hospital provision of formula declined dramatically.

Although the project was effective, it had certain drawbacks. First, researching a question in this detail is time consuming. Although some qualitative research is essential to understand local perceptions of the benefits and barriers of breastfeeding, less comprehensive research techniques, such as rapid ethnographic assessment[44] or focus groups, might be used, particularly when something is already known about feeding practices. Alternatively, interviews might be conducted with women in WIC or well-child clinics provided that the researcher is clearly not affiliated with the health care institution itself. Working with community groups and individuals was also time consuming because each group had different priorities, agendas, and time frames. Nevertheless, connecting with existing projects and structures provides reinforcement, spreads the message, and ensures longevity, since the other institutions persist after funding is exhausted. Finally, the initial goal of community empowerment with reference to infant feeding and health was clearly beyond the scope and time frame of this project, and required skills and connections beyond those already present. Although it was necessary to scale down this goal, the community participation that did occur significantly improved the cultural acceptability of the program.

IMPLICATIONS FOR PRACTICE

The principal implication of this project for health education and health promotion is that knowledge of local beliefs and determinants of health behavior is essential to the development of culturally appropriate health interventions. Obtaining the requisite knowledge requires the use of qualitative techniques, such as ethnographic interviews or rapid ethnographic assessment, as well as an understanding of the larger context in which health decisions are made, including economic forces, patterns of health care use, and social influences. Traditional beliefs must be addressed in any attempt to influence health behaviors, since they reveal the cultural values that inform behavior. Close collaboration with local institutions and individuals provides an opportunity to develop and test culturally appropriate materials, which can be used in conjunction with a variety of other tactics to support and reinforce the desired behavior change. Finally, institutional obstacles must be identified and addressed. This approach to the development of health promotion programs is applicable in a wide variety of settings because it is responsive to the unique beliefs, needs, institutions, and constraints present in a particular community. Further, as shown through our experience with breastfeeding promotion on the Navajo reservation, it holds great promise for the development of culturally appropriate health interventions that may be similarly effective in changing health behaviors.

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