

**INFANT FEEDING PRACTICES AND BELIEFS
IN ONE COMMUNITY IN THE SIERRA OF RURAL
ECUADOR: A PREVALENCE STUDY**

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SUMMARY

Infant feeding practices and beliefs of 54 women in one rural community in the Sierra of Ecuador are described. Breastfeeding was nearly universal, with a mean duration of 16.9 months: males were weaned gradually, which was significantly different from the sudden weaning of females. Infants' diets were supplemented at a mean 9.7 months; first food included soup, meat broth, oats, and grains. Males' diets were supplemented significantly earlier than females. Mothers reported 16 months as the best weaning age. The best age to begin supplementing breast or bottle was 8.8 months. Milk, soup, meat, oats, "all foods," and vitamins were believed to help produce breastmilk. Most mothers said they would give a bottle if they were unable to produce breastmilk.

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INTRODUCTION

Protein energy malnutrition along with infectious diseases, is widely accepted as the underlying cause of high mortality and morbidity rates of young children in less developed countries. Since undernutrition cannot be explained only by insufficient ingestion of food, environmental factors must also be examined. These factors include quality of water, housing conditions, availability of farm land, socioeconomic status of the family, literacy, food behavior and taboos, distribution of food within the family, as well as the previously mentioned infectious diseases.

Children under five years of age and pregnant and lactating women are the groups most frequently cited as being nutritionally at-risk. This investigation focused on children, since this is a group at which many intervention programs are aimed, and because this large segment of the population will become the laborers and leaders upon whom a developing nation depends.

Several critical decisions by the mother, all culturally based, help determine the feeding pattern and ultimately the nutritional status of the young child. First, of course, is the mother's dietary intake and general health during pregnancy. Another is the decision whether to breastfeed or to give a human milk substitute. If a mother has chosen to breastfeed, the length of breastfeeding is critical to the child's nutritional status. The stage of the infant's development and manner in which solid foods are introduced are also important to the child's nutriture. The last critical decisions are the type of weaning process and the method of transition to an adult diet. If a mother makes inappropriate choices for her situation, whether based on cultural or socioeconomic factors, her child(ren) may become malnourished. When infectious and parasitic diseases interact with poor nutrition the child may either become malnourished and eventually die, or recover due to positive influences in the environment.

The present study examines the infant feeding practices of rural Ecuadorian mothers. Length of breastfeeding, age and order in which semi-solid foods were introduced, weaning practices, cultural ideals for infant feeding, and foods believed to help produce breastmilk were examined through personal interviews with mothers in their homes.

REVIEW OF LITERATURE

Malnutrition is a significant public health problem in Ecuador. Recent studies indicate 37 to 78% undernutrition in preschool children, and 10 to 74% undernutrition in school children (1-4). Undernutrition in children appears to have remained around 45% in the last 20 years. These high degrees of undernutrition are not surprising for a developing nation, especially one for which a shortage of calories and protein has often been reported. Most recent estimates of food availability are 2,078 kilocalories and 48 g protein, compared to a recommended 2,300 kilocalories and 57.5 g protein (5, 6). (More detailed information on prevalence of undernutrition and food intake can be found in Ref. 7).

Infectious and parasitic diseases, quality of water, housing conditions, availability of farm land, socioeconomic status of the family, literacy, food behavior and taboos, and distribution of food within the family all need to be examined in relation to health and nutrition. Morbidity and mortality due to infectious and parasitic diseases were highest in children under five years of age (8, 9). In rural areas, only one-tenth of the population had potable water and/or sewage service (9, 10). Rural housing conditions were generally sub-standard, with small crowded houses, no electricity, no water and primitive kitchens. Seventy-eight per cent of all farms were less than five hectares (4), and the average *per capita* income in 1978 was US\$842 (4). Twenty-three per cent of the population over ten years of age has been officially estimated as illiterate (11).

Few authors have reported on food taboos and distribution of food within the family in Ecuador. According to available information, taboos for pregnant women included legumes, leafy vegetables, milk, meat (third trimester only), beef, barley, grains, and fruits (12-14). Fathers were believed to require the best foods (both qualitatively and quantitatively) because they were working (3, 13). Only 28% of children received special foods such as eggs, cornstarch, meat, milk, oats, fruits, and grains (12, 13).

Many beliefs existed about breastfeeding and lactation in Ecuador. One was that if a girl was breastfed for a long period of time, she would be very fertile as an adult (13). It was also believed that only breastmilk should be given in the first six months of life, because other flavors and consistencies might lead to digestive upset (14). Pork and legumes eaten by a lactating mother were thought to produce diarrhea in the infant (14); also, if a mother

were to drink cold beverages, she would produce cold milk (14).

A few beliefs regarding weaning practices have also been reported. A common belief was that infants were able to eat sweet foods before salty foods (13). Eggs, meat, legumes, and vegetables were usually not given until one year of age, because these foods were considered to be damaging to younger babies (14).

METHODS AND PROCEDURES

Data Collection Instrument

An interview schedule was developed which focused on the duration of breastfeeding, the age and order in which semi-solid foods were introduced, the way weaning was accomplished, the cultural ideals for breastfeeding and weaning, and the food which was thought to promote lactation. All 15 questions were in Spanish. The questionnaire was pre-tested in rural Ecuador and then minor revisions were made to conform to village idiom. Villagers understood the intent of all questions.

Sample Selection

One hundred research participants were randomly selected based on a map of the community; the map was drawn by an Ecuadorian civil engineer. All 167 houses on the map were numbered and then these numbers were placed on equal-sized pieces of paper. One hundred slips of paper were drawn at random; these 100 households were then grouped by location on the map and different areas were visited daily. Homes were visited at least two different days in an attempt to interview everyone selected for the sample. Many women chosen to be part of the sample were not available, because they were planting subsistence and cash crops in distant fields. Therefore, only 54 mothers in 49 households were interviewed. No attempt was made to determine the representativeness of this sample.

Data Collection

The interview schedule was administered in Spanish by the investigator. Interviewing was done in the participants' homes during the afternoon hours. Interviews varied from 10 to 40 minutes,

with an average interview lasting about 20 minutes, and were conducted in November and December 1980. No one refused to be interviewed.

Analysis of Data

Frequencies, cross-tabulations, Pearson product-moment correlations, analyses of variance, multiple regressions, and t-tests were computed using the Statistical Package for the Social Sciences (15). Descriptive data from participant observation were also used in an attempt to better describe the infant feeding practices in the community.

Village Location

The population studied lived in the village of San Juan y Sarapamba, Parroquia Eloy Alfaro, Cotopaxi province, Ecuador. The village was located at a distance of approximately 3 km from the provincial city of Latacunga, 100 km south of Quito. Access to the community was by a winding dirt road up a mountain, a minimum of 30 minutes by automobile or bus. San Juan y Sarapamba was located between 2,750 and 3,000 m above sea level.

Description of Village

Like many rural villages in Ecuador, San Juan y Sarapamba is a mestizo, Spanish-speaking community. The people are poor, work their own small farms and perform unskilled labor when jobs can be found. Average income at that time was probably around \$700 per year. Most villagers lived in small one or two room houses made of an adobe-type mixture with a tile roof. Women cooked over open fires built on dirt floors.

The village had neither running water nor electricity. Water was collected at a stream 2-1/2 hours by foot from the village. Villagers were cognizant that the water was dirty, but few connected this with the high prevalence and frequency of diarrhea and other health problems. No system existed for the disposal of human wastes.

Nearly all the children attended school for two or three years; most adults were minimally literate, but adult females seldom could read.

Because of the cool dry climate, only maize, *quinoa*, barley,

beans, potatoes, and a limited variety of fruits and vegetables could be cultivated. Depleted soil, inadequate fertilizer, and insect infestation led to low yields. Farming methods were primitive. Most families raised small animals –chickens and pigs to sell for cash and guinea pigs to eat on special occasions. Other animals found in the village included rabbits, sheep, dairy cows, turkeys, and pigeons. These were almost always used as a source of cash, rather than food for the family's table.

Some insects and small game were occasionally eaten, and soups of varying consistencies and potatoes were the staples of the diet. Commonly consumed vegetables and fruits were onions, cabbage, tomatoes, oranges, and bananas. Animal protein and fruits and vegetables other than those previously mentioned were consumed on an irregular basis only. Noodles, bread, sugar, and salt were the most common processed foods. Consumption of alcoholic beverages was prevalent among the men.

RESULTS

Demographics of Sample

Fifty-four mothers were interviewed. Their mean age was 30.8 years, with a range of 18 to 80 years. They had 4.4 living children on the average, the range being one to 12 living children. Ages of their children ranged from ten days to 46 years. These women had also borne an average 1.1 additional children who were dead at the time of the interview. Total children born to the mothers ranged from one to 16, with a mean of 5.5. Mother's age and total number of children were significantly and strongly correlated ($p \leq 0.001$, $r = 0.61$).

Several questions about breastfeeding and weaning practices referred to the mother's youngest child. The youngest children included 27 females and 26 males, their mean age being 27.5 months. The intergestational period before the birth of these children averaged 26.3 months, with a range of 11 to 48 months. Intergestational period was significantly and positively correlated with the age of youngest child ($p \leq 0.05$), the mother's age ($p \leq 0.05$), the number of dead children ($p < 0.01$), and the number of total children ($p < 0.05$).

Breastfeeding and Weaning Practices

Forty-nine (90.70/o) of the youngest children were breastfed. Breastfeeding was usually on demand, and the five children who were not breastfed were given infant formula in a bottle. Children were weaned from either breast or bottle at an average 16.9 months, weaning ages ranging from 12 to 24 months. Mothers with a lesser number of living children weaned their youngest children at a significantly later age ($p < 0.05$). Mothers with a smaller number of total children tended to wean their children later, but this difference was not significant. Sixty-three per cent of the children were weaned suddenly from the breast, whereas the other 37/o were weaned more gradually from either breast or bottle. Sudden weaning methods were not allowing the breast anymore (29 mothers) and putting hot pepper on the breast (5 mothers). Gradual weaning was accomplished by giving the child other foods at the same time as breast or bottle, until the child was accustomed to solid foods or showed no interest in breastmilk or formula (20 mothers). Males and females were weaned significantly differently ($p \leq 0.01$): males were usually weaned gradually, and never by hot pepper put on the mother's breasts, and females were usually weaned suddenly.

Mothers began giving semi-solid foods at 9.7 months, with a range of zero to 19 months. Most of the responses were clustered in the eight to 12 month range. Mean age at which males were given semi-solid foods was 8.5 months, for females it was 10.9 months. Males were given semi-solids significantly earlier than females ($p \leq 0.01$).

Older mothers tended to supplement their children's diets later, but this difference was not significant. The foods most frequently given first were: soup, 62 o/o, meat broth, 30o/o, oats, 23o/o, and grains, 13o/o. Also mentioned were eggs, meat, "what we eat" (foods eaten by the rest of the family), gelatin, and cow's milk. Males were fed meat broth as a first food significantly more than females ($p \leq 0.01$). Mothers who reported feeding oats as a first food had a significantly smaller number of children who had died ($p < 0.05$). Those who gave soup as a first food tended to have a larger number of living children, but this difference was not significant.

Mothers' Cultural Ideals and Practices

Twenty-four mothers reported that they fed all their children

in the same way, and 25 said that they fed their children differently. Ninety-six per cent of these stated that this was due to the spacing of their children. The women commented that if they became pregnant soon after giving birth, they would not be able to breast-feed the youngest child as long as was desirable. Three women also responded that they fed their children differentially based on the sex of the child.

The mean age that the mothers felt was best for weaning was 16.0 months, with a range of ten to 24 months; 12 and 18 months were the most frequent responses, accounting for 66.00/o of the mothers. Those who specified a later best weaning age had significantly fewer living children ($p \leq 0.01$) and fewer total children ($p < 0.05$). The respondents were also able to specify a best age at which to begin giving foods other than breastmilk or infant formula. The mean was 8.8 months, the median was 9.3 months, and the range was birth to 15 months. Three responses—six, eight, and ten months—accounted for 580/o of the respondents. Mothers specified a significantly earlier best age to introduce semi-solid foods to males than to females ($p \leq 0.05$). Actual weaning age and age of first semi-solid foods were higher than best ages. Actual and best weaning ages were significantly and strongly correlated ($p \leq 0.001$, $r = 0.91$), as were actual and best ages to introduce semi-solid foods ($p < 0.001$, $r = 0.92$).

Mothers reported a wide variety of foods which they believed helped to produce breastmilk, the most frequent responses being: milk, 280/o; soup, 230/o; meat, oats, and "all foods", 210/o each; and vitamins, 140/o. Mothers who felt that oats helped to produce breastmilk had significantly larger total families ($p < 0.05$), and tended to have more living children. Reported by less than 100/o of the respondents were: "eating well", chicken soup, liquids, powdered milk, and preserves.

Mothers were also asked what they would give their children if they were unable to produce sufficient breastmilk. The bottle, presumably containing some form of infant formula, would be given by 720/o of the mothers. Also mentioned were milk, baby foods, and powdered milk. Six mothers, however, would have nothing to give to their children, so they would die. These mothers tended to have a smaller number of living children, although this difference was not significant.

DISCUSSION

Infant Feeding Practices and Beliefs

It appears that the prevalence of breastfeeding, at least in rural areas, has remained steady at around 95% in the last 20 years. This study confirms that trend. In this research infants were weaned at 16.9 months, which is consistent with the previously reported figures of 13.7, 19.8, and 22.8 months (12, 13). Mothers mentioned 18 months most frequently. No statistical difference in weaning age by sex was found. Duration of breastfeeding appeared to be dependent on the length of time before a mother became pregnant again. This reason was also cited in the literature (16). Duration of breastfeeding did not differ with age of the mother. One study supported findings that most children were weaned suddenly (16). Further analysis revealed that children were weaned significantly differently based on sex ($p \leq 0.01$), males usually being weaned gradually.

Age of supplementation of the diet with semi-solid foods was also consistent with previous studies. Foods were introduced at 9.7 months in San Juan y Sarapamba, compared to 6.9 and 11.2 months in other locations (12, 13). Eighty-seven per cent of the infants had their diets supplemented by one year of age. Most responses were clustered between eight and 12 months. Males in this study were given semi-solids significantly earlier than females ($p \leq 0.01$). We found that soup, meat broth, oats, and grain were the first food to be given to infants; oats and grain would be served as thin gruels, and some mothers served them in bottles. All these weaning foods would contribute only minimal quantities of nutrients to the infants' total diets, at a time when they require many additional nutrients to supplement breastmilk or formula. Other studies have reported soups, potatoes, soft-textured grain products, and fruits and fruit juices (12-14).

Mothers felt that the best weaning age was 16 months. Twelve and 18 months were reported most frequently, probably reflecting cultural norms. Actual weaning age was one month more than the best weaning age, probably due to the low socio-economic status of the families in San Juan y Sarapamba. The best age to supplement the breast or bottle was believed to be 8.8 months. The most frequent responses were six, eight, and 10 months, again probably reflecting cultural norms. Actual age to introduce semi-solid foods superseded the ideal age by one month.

No data on best ages to wean or supplement the diet were found in the literature. The reasons for the significant correlations between best and actual ages for weaning and introduction of semi-solid foods are unclear. Participant observation by the researchers suggested that the women have adapted their ideals to the realities of village life and their socioeconomic situations.

Milk, soup, meat, oats, "all foods", and vitamins were reported by the mothers to be foods which help produce breastmilk, but they did not always consume these foods during lactation. The foods that these mothers reported as helpful for lactation appeared to be those which were regularly available to them, rather than special foods which would have to be acquired in the market. Previous studies reported that oats, meat broth, milk, all foods, maize, barley, and grains would help produce breastmilk (12, 13). Most mothers in San Juan y Sarapamba would give their infants the bottle if they had an inadequate supply of breastmilk. The bottle would most likely contain some form of commercial infant formula. Six mothers, however, said they would have nothing to give the infants so they would die. The nation-wide ICNND survey in 1959 stated that mothers without breastmilk would give their young infants milk, oats, powdered milk, maize, or barley (12). Bottles were probably almost unknown in Ecuador 20 years ago.

Commercial infant formula was readily available in the Latacunga area. Cans of powdered infant formula were prominently displayed in pharmacies and grocery stores, and consumers were able to choose from a wide variety of brands.

Typical infant formula preparation in San Juan y Sarapamba included heating (not boiling) the water with herbs such as anise or oregano. The herbs were believed to help prevent diarrhea. A small quantity of powdered formula was added to a varying amount of water in the bottle. Formula was frequently not correctly diluted, due to lack of knowledge of proper preparation procedures and high cost of the formula. Bottle hygiene was inadequate. Bottles were washed with other dishes used by the family. Some families used hot water, but few used any soap. Bottles typically were not stored in a special place, but wherever they happened to be put or fall. Nipples were washed infrequently. Adults would often suck on the nipple to see if the formula was coming through the hole. It was not uncommon for dogs to lick the nipple, or flies to land on it. These practices were observed in about five homes in San Juan y Sarapamba.

Participant observation by the investigators confirmed data in the literature as well as the responses to the survey by the mothers of San Juan y Sarapamba. Males of all ages ate before females, and were nearly always given the best food(s). This meant that they received several chunks of meat instead of just one, or a piece of fruit, or a commercially produced roll. Males were also fed larger quantities, and the female serving the meal was expected to stop eating anytime a male wanted an additional serving. In all matters, children were treated as small-sized adults, therefore, they were unlikely to be given special treatment once the next child was born.

The data collected via interviews and observations, although limited in scope, have implications for nutrition educators. A nutrition education program would be more effective if it began by demonstrating that infants and children have special needs which are different from those of adults. Then the participants could be taught how to fulfill these special needs of children within such constraints as food availability and income.

Areas for Further Study

This exploratory study also suggested several areas for further study. For example, the addition of semi-solid foods to the diet could be examined in terms of quantity of food given at different ages, how the foods were served, how mothers decided when to introduce semi-solids, whether some foods were given very early in life (before mothers said they started introducing foods), and reasons why male and female children were given foods at different ages. Similarly, it would be valuable to study the process of weaning in greater detail. This might include how mothers decide when to wean their children, whether there are seasonal differences in weaning, how gradual and sudden weaning were accomplished, and why weaning differences exist between males and females. Since significant differences were found by sex in the way infants were introduced to semi-solid foods and the way they were weaned, length of breastfeeding could be more closely examined to determine whether a difference also existed.

Current concern about the spread of bottlefeeding in the developing world would suggest more detailed observation of women who bottlefed their infants. It would be useful to examine the differences between mothers who breastfeed and bottlefeed, and whether this affects the introduction of semi-solid foods.

Also useful would be how the mothers decide to feed their infants a human milk substitute, and exploring what foods mothers would give if they had no breastmilk.

Mothers' diets during lactation also merit closer examination. What lactating mothers actually eat, whether their diets vary by length of lactation or sex of child, what effects specific foods are believed to have on breastmilk, how mothers decide which foods assist lactation, and food taboos during lactation might be studied.

Anthropometric measurements of the children, presence of clinical signs of malnutrition, presence of morbidity in children, and socioeconomic status of the family could also be studied in conjunction with infant feeding practices and beliefs. The most useful anthropometric measurements to perform would be weight, height or length, mid-upper arm circumference, and triceps fatfold. The socioeconomic rating devised by Ortiz Calvache and Borsotti (2) in Ecuador could be applied, or an index such as the one developed in Guatemala by Mata (17) could be adapted.

RESUMEN

PRACTICAS Y CREENCIAS DE ALIMENTACION INFANTIL EN UNA COMUNIDAD DE LA SIERRA RURAL DEL ECUADOR

Se describen las prácticas y creencias respecto a la alimentación de los niños de 54 mujeres en una comunidad rural de la Sierra del Ecuador. La lactancia era casi universal, y se continúa hasta una edad mediana de 16.9 meses. Los niños eran cuidadosamente destetados, lo que contrasta en forma significativa con el rápido destete de las niñas. Se añadieron alimentos a las dietas de los niños a una edad mediana de 9.7 meses, siendo los primeros alimentos sopa, caldo de carne, avena y granos. Las madres daban alimentos a los niños significativamente más temprano que a las niñas, e informaron que la mejor edad para destetarlos era a los 16 meses de edad. La mejor edad para suplementar el pecho o el biberón era de 8.8 meses, siendo su opinión que la leche, sopa, carne, avena, "todos los alimentos" y vitaminas, les ayudaban a producir leche. La mayoría de las madres manifestaron que en caso de no poder amamantarlos, les darían biberón.

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