Infant Feeding Practices in Complex Emergencies: A Case Study Approach

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Abbreviations:
BMS = breast-milk substitute
CMR = crude mortality rate
DSM = dried milk
FIL = feedback inhibitor of lactation
PEM = protein-energy malnutrition
UNICEF = United Nations Children's Fund
WHO = the World Health Organization

Abstract

The majority of deaths associated with complex emergencies are attributed to infants and children under the age of five years. Most of these deaths are related to preventable diseases such as malnutrition, diarrhea, and malaria. Infant feeding emergencies have emerged as a major factor in complex emergencies. This paper reviews the current information relative to infant feeding, and uses four case studies as educational tools for the management of infant feeding emergencies.

Child mortality rates in refugee population have been linked directly to protein-energy malnutrition (PEM). Breast feeding has many advantages over all other forms of feeding for children up to the age of two years of age. These advantages are discussed in detail in this paper. In addition, the appropriate and inappropriate uses of breast-milk substitutes (BMS) are discussed. Breast feeding also may play a role in the spread of HIV infections from the mother to the infant. However, in the setting of complex emergencies in the developing world, the risk of an infant dying of malnutrition and infection when not breastfed is likely to be greater than is the risk of death due to HIV acquisition through breastfeeding.

The physiology of lactation is reviewed with particular reference to the roles of prolactin, oxytocin, and the feedback inhibitor of lactation (FIL) hormone. No medications have been demonstrated to augment milk production that can be used in a practical sense in complex emergencies. Lastly, the principles promulgated by the WHO and UNHCR for the feeding of infants and children in emergencies and for milk powder distribution are summarized.

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Introduction

Burkholder and Toole in 1995, defined complex emergencies as "relatively acute situations affecting large civilian populations, usually involving a combination of war or civil strife, food shortages, and population displacement, resulting in significant excess mortality."[1] The refugee camps for fleeing Rwandans set up in the former Zaire in 1994, manifest extraordinarily high crude mortality rates (CMRs), up to 52 times the baseline! A survey of the nutritional status of the population and the prevalence of diarrheal syndromes also noted an overall CMR of 41.3 deaths per 10,000 persons per day, the majority of the deaths attributed to infants and children under the age of five.[1] Research conducted in the war-ridden Eastern Congo between August 1998 and May 2000 by the International Rescue Committee identified almost two million excess civilian deaths. Only 11% were the direct result of hostile trauma; 89% of the deaths were attributed to preventable diseases

such as malnutrition, diarrheal disorders, and malaria that primarily were the result of the destruction of basic health and public health infrastructure.[2] Such epidemiological findings are common to all of the complex emergencies that occurred as part of this past decade.

As complex emergencies increasingly last longer, strategies for targeting the most vulnerable infants and children through child survival programs are common in the protracted phase of the emergency. Targeting usually is based on nutritional status. As such, infant feeding emergencies have emerged as a priority in complex emergencies. However, information essential to the infant feeding decision-making process is lacking. In this paper, current information and data essential for decision-making is reviewed, and four clinical case studies are utilized as educational tools for the management of potential infant feeding emergencies.

The Problem

The major impact of decreased access to food, health goods, and services occurs among the most politically and economically vulnerable. Vulnerable groups in complex emergencies often represent ethnic, religious, and minority populations that are threatened with extinction. The most vulnerable components of these populations are children (especially infants and children under age of five years), women (both pregnant and lactating), and the elderly and handicapped. Civilians account for up to 90% of fatalities in some internal wars. In the complex emergencies of the 1990s, >2 million deaths have occurred among children, representing mortality rates far greater than were those reported among the warring combatants.[3] In a recent study in the Congo, one-third of thetotal number of deaths consisted of children under five years of age. In two provinces, it was estimated that 75% of children born during the war, died or will die before their second birthday.[2]

The health problems arising in refugee camps in the developing world have remained consistent, differing only in terms of severity of the event and the coping capacity of the affected population. They occur predominantly in the early phase of encampment. Mortality and morbidity, more often than not, are the result of communicable diseases and malnutrition, or a combination of the two. The threat of protein and energy deficiencies is referred to as protein-energy malnutrition, or PEM, which is characterized by malnutrition, secondary infections, and micronutrient deficiencies. Among the four most important forms of malnutrition worldwide are 1) PEM; 2) iron deficiency and anemia; 3) vitamin A deficiency; and 4) iodine deficiency disorders. In refugee camps, scurvy, beriberi, pellagra, and xerophthalamia occur.[4] A combination of these forms of disease and disorders is common to refugee populations. Data in 53 developing countries have directly linked PEM with increased child mortality rates.[4] In refugee camps in Thailand, Somalia, Sudan, and Malawi, 50% to 95% of deaths were attributed to measles, diarrheal diseases, acute respiratory infections, malaria, HIV/AIDS, and other infectious diseases, often exacerbated by malnutrition.[1] Disease effects are increased during war and conflict because malnutrition increases the chance of infection; and the over-crowding in camps contributes to the spread of disease. In Somalia, more deaths among children with PEM were attributed to measles than from any other cause.[5] In Rwanda, feeding centers operated by Concern Worldwide, found that "medical care", especially in those suffering with infections, was as important as was the provision of nutrition.[6] The case fatality rate for severe malnutrition in a study of two rural South African hospitals was 32%.[7] Contributing factors were inadequate feeding, poor management of rehydration and infection, lack of resources, and lack of knowledge and motivation among staff. Without appropriate care, morbidity from malnutrition with long-term irreversible consequences, remains extremely high among children aged 6–24 months.

During war and conflict, breastfeeding, which supplies infants with the best nutrition, can be interrupted by separation, maternal trauma, death, and/or exhaustion. Factors that directly affect breastfeeding success and frequency of suckling include maternal stress, hydration, and nutritional status. The war in the Congo, like that of similar conflicts in Somalia, Rwanda, and the former Yugoslavia, resulted in large numbers of unaccompanied children, some of whom were not yet weaned from the breast. Unaccompanied children have suffered the highest mortality rates of all vulnerable groups, ranging between 20 and 120 deaths per 10,000 persons per day. In Rwanda, it was estimated that 1,800 unaccompanied children were present out of 450,000 Hutu refugees. Of these, about 50 were below the age of 2 years.[7] In Eastern Zaire, young babies were found alive and abandoned at massacre sites. Other mothers were sick or malnourished and died during the trip.

It was considered, during the response to complex emergencies that, "Younger children caused the greatest difficulties with regard to feeding, as they required exclusive breastfeeding if they were to have a chance of survival."[7] Humanitarian relief efforts in developing countries often are directed towards identifying those infants requiring wet nurse supplementation, and supplementary and therapeutic feedings for those most severely ill and malnourished. Even here, therapeutic feeding centers, usually considered safe havens, often have been the target of warring factions, resulting in the theft of food, the murder of infants, their mothers, and relief workers.

Severely malnourished children are more likely to have young mothers, and to have been born prematurely or with a low birth weight. Small, premature or malnourished infants tend to breastfeed less often, and have a less vigorous suck.[8] This produces less prolactin release and less breast milk production. Young mothers and mothers with low educational level may have less problem-solving skills leading to an inability to support their infants when food supplies are limited, which, in turn, leads to malnutrition. In the developing world, poor birth outcomes occur in closely spaced pregnancies. The so-called "maternal depletion syndrome" includes contributing conditions of increased maternal workload, disastrous socioeconomic conditions, worsening patterns of food consumption, and little or no health care.

In developed countries, the epidemiological pattern of complex emergencies is quite different. In the former

Yugoslavia, war-related trauma, not infectious disease, predominate due to the availability of advanced and sophisticated weaponry. Women, children, and the elderly were targeted in an attempt to destroy the morale and will of the civilian population. The health-care system was the first to be destroyed and the last to be rehabilitated. The first effects of a crisis appeared in the field of healthcare delivery, and then in the population's health status. As in many developed countries, few Yugoslavia women breastfed, and wet nursing was not practiced. By the age of four months, >50% of all mothers already had stopped breastfeeding, and only 20% of infants were breastfed after the age of six months, relying primarily on diluted cow's milk.[9] In addition, a disturbing trend towards a further decrease in the rate of breastfeeding was observed in war areas.[9,10] As the war escalated, the breast-milk substitute (BMS) supply ceased abruptly. The humanitarian relief organizations had no choice but to rapidly reorganize the logistics system to supply and distribute BMS and weaning foods. However, studies suggest that there existed widespread failure of the ability of the humanitarian agencies to act in accordance with international policies and recommendations for infant feeding. Reasons for these failures included: 1) weak institutionalization of policies; 2) massive quantities of unsolicited donations of infant-feeding products; 3) the absence of monitoring systems; 4) inadequate coordination mechanisms; 5) the high costs of correcting mistakes; and 6) the cumulative effects of poor practice.[11]

Breastfeeding

Breastfeeding has been the main method of feeding infants and toddlers since the dawn of humankind. It only has been during the 20th century in the developed world that safe options for not breastfeeding infants have been available. In many parts of the world, these safe options still do not exist. The World Health Organization (WHO) recommends exclusive breastfeeding during the first six months of life.[12] Initiation of breast feeding should begin within one hour of birth, followed by frequent, on-demand feeding, with no food supplements from birth to six months of age. One of the neurological capabilities of the newborn infant is the ability to breastfeed vigorously within the first two hours after birth, even at gestational ages when bottlefeeding is difficult. The innate behavior of infants includes pre-feeding behavior that involves active searching for the nipple, attaching well to the breast, and feeding vigorously, all within 120–150 minutes after delivery. Safe, nutrient-rich, weaning foods should begin around the sixth month as a complement to breastfeeding. Calorie-dense foods should be used as weaning foods. Breastfeeding should continue until at least two years of age.[12]

There are numerous benefits associated with breastfeeding. Infants digest human milk easier than they can digest breast-milk substitutes. Breast milk is an excellent source of protein, fats, and carbohydrates for the infant. Vitamin and mineral concentrations in human milk usually are adequate to meet an infant's needs. Only in extreme cases will a mother's own reserves or tissues be depleted significantly. During times of food shortages, breast milk cannot be diluted as can powdered milks. Breast milk provides many immunologic factors including lactoferrin, immunoglobulins, lyzozyme, antibodies against infectious diseases, and a myriad of other substances that help supplement the developing immunologic system of the infant during the first six months of life. Breast milk is clean. Bacteria and viruses in water and food do not contaminate breast milk. The cleanliness of human milk decreases the rate of infectious disease in breastfed infants. Recurrent episodes of infectious diseases, particularly gastroenteritis, increase the risk of malnutrition in infants.

Furthermore, breastfeeding promotes child spacing. The lactational amenorrhea method, which consists of amenorrhea within the first six months postpartum, full or nearly full breastfeeding (giving only breast milk and having no interval longer than five hours between breastfeeding) has been shown to be an effective method of birth control. By practicing the required frequency of breastfeeding, there is less than 0.1% chance of pregnancy.[13] When any of the factors listed above is not present, the rate of pregnancy increases.

In all of the countries of the world, it is cheaper to breastfeed an infant than it is to feed the child a breast-milk substitute. Data for 1998 provided by the United Nations Children's Fund (UNICEF) estimated that the cost of a breast-milk substitute for one year in the United States is [US]$778. This is approximately 3% of the gross national product per capita in the United States. In Mexico, the cost of breast-milk substitutes is approximately [US]$241, which is 7% of the gross national product per capita. In Nigeria, the use of breast-milk substitutes for one year is estimated to cost [US]$176, which is 68% of the gross national product per capita. In Haiti, the cost of breast milk substitutes for one year is estimated to be [US]$900, which is 257% of the gross national product per capita. These costs do not include the fuel and water required for sterilization, and the cost of extra healthcare associated with feeding breast-milk substitutes.[14]

The importance of breastfeeding in the diet of infants and toddlers varies with the age of the child. For infants 6–12 months of age, weaning foods should be added to the diet in a gradually increasing manner. In an upper-middle class population in the United States, research has shown that breast milk supplies 85% of an infant's caloric intake at six months of age, 63% at nine months of age and 38% at 12 months of age.[15] Infants in the developing world add caloric intake from weaning foods at a slower rate. A study in Honduras showed that at one year of age, approximately 80% of the infant's caloric intake still came from breast milk.[16] Infants breastfed into the second year of life still may receive between 30 and 50% of their nutritional intake from breast milk. By two years of age, most children are receiving < 25% of the their caloric intake from breast milk.

Weaning foods that are added usually begin with carbohydrates such as rice, wheat, or cassava. Fruits and vegetables, which are a good source of B vitamins, usually are added next, and protein foods such as egg, meat, and other dairy products are added last. Fats and energy foods such as oils, nuts, and other high fat foods should be added in small amounts. The weaning foods available in many areas of the developing world tend to be of high carbohydrate content

such as rice and cassava, and low in protein and fat. Consequently, breast milk still is very important as a source of protein and fats for infants well into the second year of life. The goal is to provide adequate nutrition through breastfeeding and supplemental feeding to prevent the development of PEM in the developing world that can be seen in the toddler who is not breastfed or who is weaned before two years of age.[17]

The growth of breastfed infants follows a slightly different pattern than does the growth of infants who are fed using formula. Most of the growth curves used worldwide have been based on the National Center for Health Statistics growth curves of the United States. These growth curves are based on rural, small town, caucasian populations of infants who never were breastfed or were breastfed only for a short period. Pooling of growth records from several studies of breastfed infants in the developed world, indicated that breastfed infants tend to have a faster weight gain in the first three to four months of life, and then a decreased growth velocity. Breastfed infants may cross growth percentiles downward between four and 12 months of age as they approach their final percentile line. Crossing less than three percentile lines in weight is accepted as normal among breastfed babies. However, their length and head circumferences should not cross percentiles downward.[18] A recent study noted that prolonged breastfeeding, with an average duration of two years, improved linear growth compared to children who were weaned at an earlier age.[19] Monitoring the growth of infants and children in a refugee population should occur during complex emergencies. The format for this monitoring depends on the stage and the duration of the conflict.[17,20] The World Health Organization is developing new growth curves based upon data from mothers of different ethnic and racial groups who breastfed their infants exclusively for 4–6 months with continued breastfeeding thereafter with the addition of complementary foods.

What criteria are needed for an infant to be successfully fed a breast milk substitute if breast milk is not available?

1) The breast milk substitute, such as formula or powdered milk, must be available on a continuing basis;
2) Clean water must be available to mix with the powder;
3) Money must be available to continue to pay for the breast milk substitute;
4) A safe method of storage of the breast milk substitute must be available, such as refrigeration, which diminishes bacterial proliferation in the milk; and
5) There must be a method of cleaning bottles or the feeding utensils. If these utensils are not cleaned well, they provide a source of bacteria, which then may produce gastroenteritis in the infant.

If the above five factors are not met, then feeding the infant with a breast-milk substitute is not safe, and will result in increased morbidity and mortality for infants. If breast-milk substitutes (BMS) cannot be given safely to infants, then consideration should be given to banning baby bottles as a method of discouraging the use of breast-milk substitutes.

Breastfeeding and Infections

In a meta-analysis that combined studies from Pakistan, Philippines, Brazil, Gambia, Senegal, and Ghana, breastfeeding provided the greatest protection from disease and death during the first two months of life. Breastfeeding still is significantly protective for both respiratory and gastrointestinal disease up until one year of age. During the first six months of life, protection against gastroenteritis was greater than was the protection provided against respiratory diseases.[21] It is this protection against recurrent episodes of gastroenteritis in the young infant that decreases the risk of malnutrition, dehydration, and death. Even in the developed countries, studies have shown that breastfed infants have less otitis media during the first year of life and less wheezing-associated illnesses than do infants who were not breastfed. Breastfed infants also appear to have fewer chronic diseases, such as asthma, later in life.[22–26]

The spreading HIV epidemic, particularly in sub-Saharan Africa, has caused many people to question the importance of breastfeeding infants in these areas. The sero-prevalence for antibodies to HIV-1 is significant in the general refugee population.[27] In the Goma, Zaire refugee camps, fevers of unknown origin were found to be serologically contributed to by HIV, arboviruses, and tuberculosis, alone or in combination.[28] In one study of hospital admissions to a regional hospital in South Africa, 29.2% of pediatric patient admissions were HIV positive; of these, 65.8% were malnourished.[29] Research supports the hypothesis that breastfeeding provides a route of transmission to the nursing infant. It is estimated that one-quarter to one-third of infants infected with HIV in the developing world may have been infected through breastfeeding rather than in utero or during the perinatal period. Mothers at greatest risk of transferring HIV to their infants by breastfeeding may be those who were not infected during pregnancy and who acquire acute HIV infection from a partner who is infected while breastfeeding, (they were not infected during pregnancy). This has been demonstrated in mothers who were infected by a HIV-positive, postpartum, blood transfusion and in breastfeeding women in Rwanda who sero-converted after the birth of their infant.[30] The transmission of HIV through breast milk is facilitated by a high maternal viral load of HIV, low maternal CD4 count, maternal Vitamin A deficiency, cracked nipples, and mastitis.[31,32] Mixed feeding (combining breast milk and other foods) may cause HIV transmission across the gastrointestinal tract by damaging the epithelium of the infant's intestine by allergic reaction or infection. A recent study from South Africa has shown that infants who exclusively were breastfed for the first six months of life, had no increased risk of transmission of HIV when compared to a group of infants who were fed breast-milk substitutes. However, the mothers who continued to breastfeed after the infant reached six months of age, when weaning foods were added, had a higher HIV transmission rate to their infant. These infants had continued onset of HIV infection between six and 15 months of age. In infants who were fed formula, there was no transmission of HIV

after six months of age.[33] Studies currently are underway in Africa and Asia that are evaluating the efficacy of a short course of anti-HIV drugs during the prenatal and postnatal period. In decreasing the transmission rate of HIV through breastfeeding.[32,34,35] In complex emergencies in the developing world, the risk of the infant dying of malnutrition and infection when not breastfed is likely to be greater than is the risk of death due to HIV acquisition through breastfeeding.[36,37]

In severe PEM, a major contributor to mortality is infection. Studies conducted in therapeutic feeding centers in sub-Saharan Africa concluded that a reduced mortality rate among young, malnourished, breastfeeding infants was attributed to management using a supplemental suckling technique combined with the administration of antibiotics. The supplementation of Vitamin A alone in PEM may reduce mortality in children with measles and other infections by 20–50%.[1,38] The anti-infective, therapeutic role of vitamin A is an important public health intervention to reduce mortality from infections in developing countries. It is one of the most cost-effective interventions available in infant feeding emergencies, especially when PEM is suspected.

Stress and the Physiology of Lactation

There are problems that occur during emergencies that influence the physiology of breastfeeding. The production of human milk and its transfer to the infant involve numerous hormones. The two major hormones are prolactin and oxytocin. Prolactin is involved in the production of milk, and oxytocin is involved in the release of milk or the "let down" of milk from the breasts. Suckling by the infant causes secretion of prolactin from the adenohypophysis, and of oxytocin from the neurohypophysis. Supporting hormones necessary for successful breastfeeding, include cortisol, insulin, thyroid hormone, growth hormone, and parathyroid hormone.[39] Other necessary factors are maternal hydration and nutrition. A mother of a two to three-month-old infant makes approximately 700 ml. of milk per day. Consequently, a woman needs to drink to replace the liquids that she loses during breastfeeding. Gastroenteritis or lack of water can decrease the maternal milk supply. Return of hydration and continued suckling by the infant usually will improve the maternal milk supply. Maternal nutritional status is less important than is hydration. Mothers will make milk of adequate quality and quantity for their infant and lose weight themselves before their milk supply drops to a dangerously low level. However, pregnant and lactating women are considered nutritionally vulnerable populations.

Stress can affect the production and release of breast milk. Anecdotal evidence that maternal stress can decrease milk supply exists. Stress appears to cause a temporary decrease in oxytocin release. Therefore, although a mother may feel that her breasts are filled, she does not have milk "let down" or release to her infant. When a mother's breasts are not emptied, a hormone called feedback inhibitor of lactation (FIL) begins to work. The FIL hormone is present in maternal milk. When the breast is emptied of milk, the FIL does not remain in contact with the aveolar cells of the breast, and the mother makes more milk. If the breast is not emptied, the FIL remains in contact with the maternal alveolar breast cells, and inhibits the production of the milk proteins. The FIL acts locally, and this appears to be the mechanism by which the supply of milk can be decreased only in one breast. The FIL hormone has been identified in human, cow, and goat milks.[40] Consequently, decreased oxytocin secretion leads to the breast not being emptied with subsequent decreased milk production even though the infant continues to suckle at the breast and maternal prolactin levels continue to rise. Reducing the stress, rest, good nutrition, maternal hydration, and continuing to have the infant suckle all are important in improving maternal milk supply.

Medications to Increase Maternal Milk Supply

There are no magic medications that increase maternal milk supply. The phenothiazines including chlorpromazine and thorazine, have been shown to produce some effect, but have significant side effects. Metaclopromide, (or Reglan®) has been shown to increase maternal milk supply; but it also has side effects, and usually is not available in complex emergencies. Many societies in which breastfeeding is an integral part of the culture, have traditional foods or medications that are reported to increase maternal milk supply. Whether the increased milk supply is an effect of the drug or of the food or is a placebo effect causing decreased stress levels in the mother is unclear.

Using Breast Milk Substitutes

In some cases, the maternal milk supply does not return despite continued suckling and attempts to reduce stress. Then, decisions must be made about methods of getting milk or other foods into the infant. Such decisions depend upon the infant's age, how much of the infant's nutrition must come from breast milk, and the methods available for getting breast milk substitutes into the infant. Many cultures have a tradition of using a wet nurse—a woman who nurses another woman's baby. This may be a mother whose own baby recently has died, it may be a relative or friend who is nursing an infant of her own, or a woman who recently has weaned her own infant. Women can successfully nurse twins. However, they need extra nutrition and hydration. Restarting breastfeeding after weaning by having an infant suckle at the breast is called relactation. A women's breasts respond to the suckling with the release of prolactin and oxytocin. Many women will find a gradual increase in the amount of milk they can produce. This requires frequent nursing of the infant, and the infant may require temporary supplementation until the woman's milk supply becomes adequate.[41]

If adequate breast milk substitutes and clean water are available, feeding breast milk substitutes to the baby may not be an issue. However, once this option is embarked upon, it must be done in a manner that will not transmit infection. Baby bottles are very difficult to clean. Other options include cup, saucer, and spoon-feeding. These can be used in very young infants by gradually letting the milk drip into the infant's mouth or letting the infant lap at the milk. Spoons, saucers, and cups are much easier to clean

1. Infants born into populations affected by emergencies should be breastfed.
2. Every effort should be made to create and sustain an environment that encourages frequent breastfeeding of all children up to two years of age.
3. The quantity, distribution, and use of breast-milk substitutes at emergency sites should be strictly controlled.
4. To sustain growth, development, and good health, older infants and young children need to ingest hygienically prepared foods that are easy to eat and digest, and that nutritionally complement breast milk.
5. Caregivers need uninterrupted access to appropriate ingredients with which to prepare nutrient-dense foods for feeding to older infants and young children.
6. Because the number of care-givers is reduced during emergencies, and their ability to cope is diminished by physical and mental stress, strengthening care-giving capacity is an essential part of promoting good feeding practices for infants and young children.
7. To encourage adequate food intake, the health and vigor of children, especially newborns, should be actively protected. Children need to suckle frequently and well, and as appropriate, to maintain their appetite for complementary foods.
8. There should be a continual search for malnourished children, so that their condition can be identified and treated before it becomes severe. The underlying causes of malnutrition should be investigated and corrected.
9. To minimize the negative impact of emergencies on feeding practices, interventions should begin immediately during the acute phase. The focus should be on alleviating pressures on care-givers and channeling scarce resources to meet the nutritional needs of infants and young children.
10. Emergencies, by definition, are marked by frequent and rapid change. Promoting optimal feeding for infants and young children in such circumstances requires a flexible approach based on careful continual monitoring.

Table 1—Guiding principles for feeding infants and young children in emergencies (Abstracted from WHPO: *The Management of Nutrition in Major Emergencies*[42])

1. Accept, supply, and distribute donations of milk products only if they can be used under strict control and in hygienic conditions, e.g., in a supervised environment for on-the-spot consumption.
2. Accept, supply, and distribute milk products only when received in a dry form. Liquid or semi-liquid products including evaporated or condensed milk will not be accepted.
3. Accept, supply, and distribute dried milk (DSM) only if it has been fortified with vitamin A.
4. Support the principle that, in general feeding programs, protein sources such as pulses, meat, or fish are preferred to dried skim milk. DSM premixed centrally with cereal flour and sugar is useful for feeding young children, especially if prepared with oil.
5. Advocate the distribution of dried milk in a take-away form only if it previously has been mixed with a suitable cereal flour, and only when culturally acceptable. The sole exception to this may be where milk forms an essential part of the traditional diet (e.g., among nomadic populations) and can be used safely.
6. Adopt the policy of the World Health Organization concerning safe and appropriate infant and young child feeding, in particular by protecting, promoting, and supporting breastfeeding, and encouraging the timely and correct use of complementary foods in refugee settings.
7. Discourage the distribution and use of breast-milk substitutes in refugee setting. When such substitutes are absolutely necessary, they will be provided together with clear instructions for safe mixing and for feeding with a cup, and with a warning as to their dangers.
8. Take all possible steps to actively discourage the distribution and use of infant-feeding bottles and artificial teats in refugee settings.
9. Advocate that when donations of DSM are supplied to refugee programs, the specific donors will be approached for cash contributions to be specially earmarked for operational costs of projects to ensure the safe use of this commodity.

Table 2—Principles for milk powder distribution (Abstracted from WHO: *The Management of Nutrition in Major Emergencies*[42])

than are bottles. Description of how to cup feed an infant is given in Infant Feeding in Emergencies.[41] Older children may be fed successfully without milk. As a rule, children under the age of one year need milk in their diet as a source of protein and fats. In some complex emergencies, breast-milk substitutes, such as standard infant formulas, are not available. In situations in which the mother of an infant has died, and no wet nurse can be found, short-term feeding using modified evaporated milks and other milk powders must be used for a short period of time. Emergency recipes are listed in *Infant Feeding in Emergencies*.[41]

Case Studies

Based on the above information, what would you do in the cases listed below? Suggested answers are provided; however, there may be other equally valid recommendations.

Case 1

You are running the refugee camp hospital in a developing country. Refugee families arrive on a daily basis. A father brings his wife and two-month old baby to the hospital. His wife has had severe, non-bloody diarrhea for three days, and had to be carried into the camp. Since yesterday, she does not believe that she has had enough milk for her baby.

Suggested management: The mother probably is dehydrated. She needs to be treated with oral rehydration solution, and allowed to rest and continue to nurse her baby. Breast milk is the best for the baby; however, oral rehydration solution or

clean breast milk substitutes may be given by spoon or cup if the infant shows signs of mild dehydration. It is most important for the baby to continue to suckle at the mom's breast to increase milk supply.

Case 2
A girl who is 12-years old comes to the emergency aid center with her 18-month old sister. She has been separated from her parents, and has her three siblings, aged three, six, and nine years with her. She is looking for milk for her sister. The area of the emergency-aid center is overflowing with refugees, and has no running water and no electricity.
Suggested management: The 12-year old girl looking for milk for her 18-month old sister can be taught to give her sister milk in a cup, and rely largely on supplemental food. Teach the 12-year old how to clean the cup and obtain clean water. With three unaccompanied small children, this 12-year old needs supervision in finding a secure family living situation and protection until the children are reunited with their parents. Arrange for supplementary food rations for her and her siblings.

Case 3
You are in charge of the hospital in a refugee camp. During the past three days, you have had several requests for milk for babies. A three-month old infant was brought by his aunt after rebel soldiers killed his parents. The aunt has a six-week old infant that she is nursing. Another worker was approached by a woman who stated that she "lost her milk" for her two-month old infant after being raped by the soldiers. You have a new group of volunteers coming next week. Should they be asked to bring supplies of powdered formula and bottles?
Suggested management: Several requests for milk for babies have occurred. The three-month old infant brought by his aunt who has a six-week old infant would be an ideal situation to consider the aunt as a wet nurse. The aunt will need supplemental food rations. The second woman stated she lost her milk after being raped by the soldiers. Anything that can be done to relieve the stress in this situation should be attempted, and the baby needs to continue to suckle at the mother's breast. Both mother and baby must be monitored closely. Having the mother continue to nurse the baby may give her a reason to begin to deal with the trauma she has suffered. Should bottles and powdered formula be ordered? These do not have to go together. Powdered formula or milk may be needed. The use of cups and spoons may be a preferable method of getting the milk into the infants. Emergency substitutions for formula can be used in short-term situations.

Case 4
A father brings his 2-month old son to the refugee camp clinic. His wife was killed in the fighting yesterday, and he has no milk to feed the baby. The area you are in is not insecure, and there are plans to move the refugee camp tomorrow.
Suggested management: It is critical to find a wet nurse. To do so, you must arrange for the wet nurse to receive supplementary food rations. Interim oral rehydration solution or BMS may be required for the infant.

The World Health Organization has produced a list of 10 principles for feeding infants and young children in emergencies (Table 1). The United Nations High Commission for Refugees (UNHCR) has developed a list of 10 principles for milk powder distribution during emergencies (Table 2).[42] Keeping these two sets of principles in mind together with the other information presented will help assure the best nutrition and health possible for infants and young children during complex emergencies. These children then will have a better chance of growing up to be healthy, productive adults who can contribute to the rebuilding of their societies.

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