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Special Communications

Prevention of Excess Mortality in Refugee and Displaced Populations in Developing Countries

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More than 30 million refugees and internally displaced persons in developing countries are currently dependent on international relief assistance for their survival. Most of this assistance is provided by Western nations such as the United States. Mortality rates in these populations during the acute phase of displacement have been extremely high, up to 60 times the expected rates. Displaced populations in northern Ethiopia (1985) and southern Sudan (1988) have suffered the highest crude mortality rates. Although mortality rates have risen in all age groups, excess mortality has been the greatest in 1- through 14-year-old children. The major causes of death have been measles, diarrheal diseases, acute respiratory tract infections, and malaria. Case-fatality ratios for these diseases have risen due to the prevalence of both protein-energy malnutrition and certain micronutrient deficiencies. Despite current technical knowledge and resources, several recent relief programs have failed to promptly implement essential public health programs such as provision of adequate food rations, clean water and sanitation, measles immunization, and control of communicable diseases. Basic structural changes in the way international agencies implement and coordinate assistance to displaced populations are urgently needed.

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addition to refugees, there are at least 1 million internally displaced persons in each of the following countries: South Africa, Mozambique, Afghanistan, Sudan, Ethiopia, and Iran.¹ Another 1 million are displaced in Central America. In some countries, such as Sudan, internally displaced persons have been denied access to food and health care by rival military forces.^{4,6}

Refugees and internally displaced persons are desperate individuals and families with no independent means of support. During the course of their flight, many have suffered physical and mental trauma at the hands of robbers, pirates, and marauders.^{1,7,8} On gaining refuge far from their homes, they are often placed in crowded camps where they suffer further loss of dignity, privacy, and control over their destinies. These needy populations have, appropriately, been the subject of emotional appeals for assistance and generous responses from more fortunate societies. Unfortunately, however, these personal and financial contributions have not always resulted in the prompt implementation of effective relief programs. The challenge to the international health community is to devise ways to minimize preventable mortality and morbidity so that these destitute populations might resume a more dignified and productive existence as quickly as possible.

This article reviews health profiles of refugee and internally displaced populations during the emergency and post-emergency phases. The "emergency" phase is the period during which mortality rates are higher than those experienced prior to displacement. This phase varies in length from 1 to 12 months. The emergency phase can be considered to be over when crude mortality rates (CMRs) drop to less than 1 per 10 000 per day.⁹

In the postemergency phase, mortality rates generally return to that of the surrounding population. However, me-

IT IS estimated that there are over 30 million refugees and displaced persons from war, civil strife, and persecution in the world today.¹ Acute movements of large populations into areas with insufficient resources have precipitated health crises that have demanded prompt, well-targeted responses. On too many occasions, mortality—much of it preventable—has been exceedingly high during the early phases of relief operations.

The rights of refugees are protected by several international agreements.² As defined by these agreements, a refugee is "a person who owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership [in] a particular social group, or political opinion . . . is outside the country of his nationality."² In 1969, the Organization of African Unity expanded this definition to include persons fleeing from war, civil disturbance,

and violence of any kind.³ Both definitions exclude two important classes of individuals: those leaving their countries due to extreme economic hardship, and those forced from their homes who seek refuge within their native borders. In this discussion, the term "refugee" will be used when describing an individual meeting the conventional definition, and the term "internally displaced" persons will designate individuals still within their native countries.

As of December 1988, more than 14 million refugees were in need of protection and assistance (Table 1). Most of these refugees have fled to developing countries that are characterized by low incomes and poor health indicators.¹ For example, five of the six countries currently hosting the largest refugee populations (Pakistan, Iran, Somalia, Sudan, Ethiopia, and Malawi) have an annual per capita gross national product of less than \$400 and an infant mortality rate (IMR) greater than 120/1000 live births per year. Consequently, both the quantity and the quality of care provided to refugee populations depend largely on the adequacy of relief assistance provided by the international community. In

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dia publicity, foreign donor interest, and relief agency support may decline dramatically during this phase and jeopardize the maintenance of an adequate relief program. Although the Office of the United Nations High Commissioner for Refugees (UNHCR) seeks durable solutions, many refugees remain in the social quarantine of closed refugee camps for many years. In 1987 only 1.5% of the world's refugees were voluntarily repatriated; 12% successfully settled in the country of first asylum, and 1% resettled in a third country.⁷

HEALTH PROFILES OF REFUGEE AND DISPLACED POPULATIONS

I. Emergency Phase Crude Mortality

Mortality rates are the most specific indicators of the health status of refugee populations. Accurate systems of mortality surveillance were rare during refugee emergencies prior to 1978. One of the first well-recorded situations occurred in 1978 when approximately 10 000 of 200 000 Burmese refugees in Bangladesh camps died in an 8-month period.¹⁰ Since that year, efforts to establish mortality surveillance during the emergency phase have been more successful, although the methods have varied. One review reported that monthly CMRs recorded immediately following the initial influx of Cambodian refugees into Thailand (1979), Ethiopian refugees into Somalia (1980), and Ethiopian refugees into eastern Sudan (1985) were 18 to 45 times the expected rates (based on CMRs in the host countries).^{11,12} These mortality rates were estimated from hospital and burial records in Thailand,¹³ community-based surveys in Somalia,¹⁴ and 24-hour burial site surveillance in Sudan, respectively.¹⁵ Among the many problems in estimating mortality under emergency conditions are recall bias in surveys, families' failure to report early infant deaths, inaccurate population estimates, and lack of standard reporting procedures. In general, however, bias tends to underestimate mortality rates, since deaths are usually underreported and population size is often exaggerated.^{11,16}

Table 2 summarizes crude mortality data from the emergency phases of recent refugee situations. Mortality rates vary from 6.3 per 1000 to 90 per 1000 per month, and in many situations the mortality of the refugee population is considerably higher than the mortality of the host country population. Approximately 5% of the estimated 220 000 Ethiopian refugees in eastern Sudan in 1985 died within 3 months of their arrival, a rate of 17 per 1000 per month, or 10 times the expected CMR in Sudan.¹¹ Chadian refugees in camps in western

Table 1.—Recent Refugee Influxes, Host Countries, Countries of Origin, and Populations Affected⁶⁷

Host Country	Years of Influx	Country of Origin	Population
Thailand	1975-1979	Indochina	280 000
Thailand	1979-1981	Kampuchea	300 000
Bangladesh	1977	Burma	200 000
Pakistan	1978-1980	Afghanistan	2 500 000
Iran	1979-1980	Afghanistan	2 000 000
Somalia	1979-1980	Ethiopia	700 000
Honduras	1983-1986	Salvador and Nicaragua	37 000
Mexico	1983-1986	Central America	47 000
Sudan	1976-1984	Eritrea (Ethiopia)	500 000
Sudan	1984-1985	Ethiopia	340 000
Sudan	1985	Chad	120 000
Ethiopia	1987-1988	Sudan	320 000
Ethiopia	1987-1988	Somalia	305 000
Malawi	1987-1988	Mozambique	555 000
Rwanda	1988	Burundi	50 000
Turkey	1988	Iraq	36 000
Guinea	1990	Liberia	80 000
Ivory Coast	1990	Liberia	60 000

Sudan experienced a CMR of 18 to 24 per 1000 per month between June and September 1985,¹⁷ which was 10 to 14 times the CMR for Sudan. Mortality rates in these camps were 6 times the CMRs reported among nondisplaced Sudanese pastoralists affected by a severe drought in the same region that year.¹⁸ In two more recent acute situations, mortality rates have been lower. In Malawi in early 1987, CMRs for camp-based Mozambican refugees were less than 1 per 1000 per month, half the national Malawi CMR.¹⁹ A movement of 50 000 refugees from Burundi into Rwanda in 1988 also resulted in minimal mortality once asylum had been attained.¹ Nevertheless, the most recent mass refugee movement in Africa, that of northern Somalis into eastern Ethiopia in July 1988, resulted in excess mortality. In Hartisheik A camp (population, 170 000), the CMR between August 1988 and July 1989 was estimated by a population survey to be 46 per 1000, twice the national rates for both Somalia and Ethiopia.²⁰

The rate of improvement has also varied. For example, mortality rates decreased rapidly in Cambodian refugee camps in Thailand in 1979 through 1980,²¹ whereas only slow improvement occurred over 6 to 8 months in Somalia and Sudan.¹¹ In eastern Ethiopia in 1988 through 1989, initially low mortality rates increased after 6 months, reaching a peak at 9 months (Figure). Overall, less than 1% in Thai camps died during the first 12 months, while 9% of refugees in eastern Sudan died during the same period of time.

Estimating death rates of internally displaced populations is difficult because the relief workers' access is often limited by the political sensitivity of their locations. Nevertheless, a few sit-

uations have been well documented. In Mozambique, CMRs estimated in 1983 by population-based surveys of internally displaced persons in the Gaza and Inhambane provinces ranged from 6 through 12 per 1000 per month,²¹ which was 4 to 8 times the expected CMR. In the Korem area of Ethiopia, CMRs between 60 and 90 per 1000 per month were recorded among camp populations displaced by famine in 1985, thirty to 45 times higher than the expected CMR and 7 to 10 times greater than those of settled villagers in a similar highland zone affected by the famine.^{17,22} Southern Sudanese displaced by war experienced CMRs of 60 through 120 per 1000 per month (30 to 60 times the expected rate) in camps in the southern Kordofan region between June and August 1988.²³

Age-Specific Mortality

The mortality rates for children under age 5 years in refugee emergencies are consistently high relative to other age groups. In eastern Sudan, the monthly mortality rate for children under age 5 years in February 1985 (66 per 1000) was 2.6 times the mortality rate for children aged 5 through 14 years and 7.6 times the mortality rate for persons aged 15 through 44 years.¹⁵ Data from Sudan during nonfamine periods, however, indicate that the mortality rate for children under age 5 years is usually 36 and 24 times higher than the 5- through 14-year and 15- through 44-year mortality rates, respectively.¹⁵ Within the 0- through 5-year age group, infants younger than 12 months have higher mortality rates than children 1 through 4 years old in most refugee camps, as expected. In normal times, the ratio between the IMR and the 1- through 4-year mortality rate is approximately 5:1,²⁴ whereas the same ratios reported from refugee

Table 2. — Comparison of Crude Mortality Rates in Various Refugee and Host Country Nonrefugee Populations (1978 Through 1989)

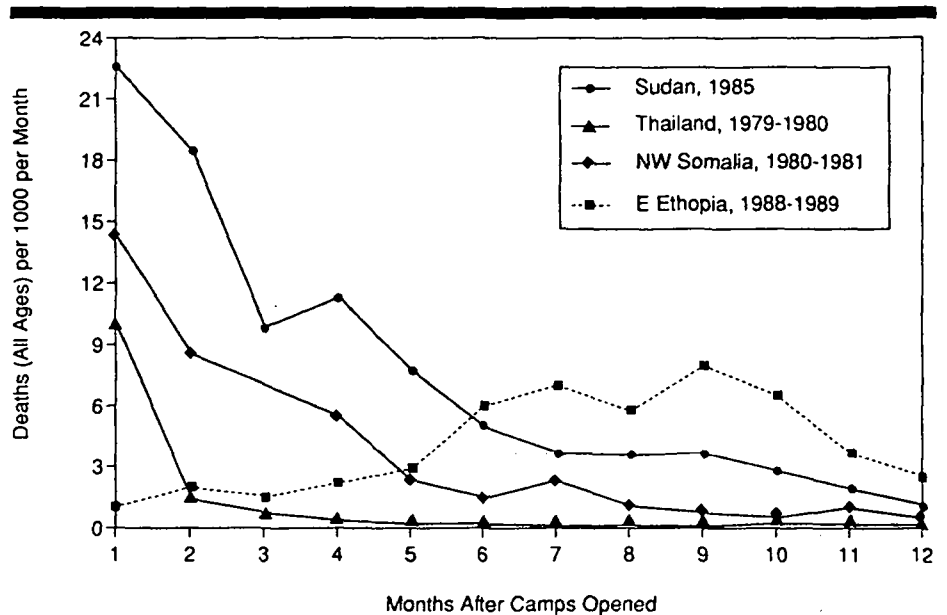
Country Region	Origin of Refugees	Population	Reporting Period	Crude Mortality Rate, Deaths/1000/mo	
				Refugees	Host Country
Refugees					
Bangladesh	Burma ¹⁰	200 000	June-December 1978	6.3	1.7
Thailand, Sakaeo	Cambodia ¹³	32 000	October 1979	31.9	0.7
Somalia, All Matan	Ethiopia ¹⁴	60 000	August 1980	30.4	1.8
Sudan, 8 Eastern camps	Ethiopia ¹¹	220 000	January-March 1985	16.2	1.7
Western camp	Chad ¹⁷	25 000	September 1985	24.0	1.7
Malawi, Mankhokwe camp	Mozambique ¹⁹	30 000	January-June 1987	1.0	1.7
Ethiopia, Hartisheik A	Somalia ²⁰	170 000	February-April 1989	6.6	1.9
Internally displaced persons					
Mozambique, Gaza/Inhambane ²¹	...	2 100 000	November 1982-October 1983	8.0	1.4
Ethiopia, Korem camps ¹⁷	...	100 000	October-December 1984	60-90	2.0
Shoa (famine victims in villages) ²²	...	380 000	February-October 1985	8.2	2.0
Sudan, El Meiram ²³	...	6000	July 1988	90	1.7

emergencies in Thailand and Somalia were 3:2 and 2:1, respectively.¹¹ One camp in eastern Sudan actually reported a ratio of 1:4 in March 1985, a reversal of the usual relationship. Thus, while refugee emergency mortality rates in all age groups appear to be higher than baseline rates, the excess mortality may be relatively more severe in the 1-through 4-year and 5-through 14-year age groups. Studies of nonrefugee, famine-affected populations have found the same pattern.^{17,18}

Causes of Mortality

The major causes of death among refugee and displaced populations during the emergency phase are measles, diarrheal diseases, and acute respiratory tract infections. These accounted for 50% to 95% of all recorded refugee deaths during the emergency phases in Thailand, Somalia, Sudan, and Malawi.^{12-16,19} Measles outbreaks resulting in many deaths were reported from refugee camps in Somalia,¹¹ eastern Sudan,¹⁶ Bangladesh,¹⁰ Ethiopia,²⁴ southern Sudan,²⁵ and Malawi.¹⁹ The case-fatality ratios of clinic-diagnosed measles have ranged between 2.3% (Thailand, January through March 1980) and 32% (Wad Kowli, Sudan, February 1985).^{15,26} In Wad Kowli, as many as 2000 children may have died of measles between February and May 1985. Malaria was also cited as a major cause of death in Cambodian refugee camps in Thailand.¹⁹ To a lesser extent, malaria has also been a major cause of death among refugees from areas of low malaria endemicity who sought refuge in camps in highly endemic zones in Somalia,¹¹ Sudan,¹⁶ Malawi,¹⁹ and Mozambique.²¹

Outbreaks of other potentially lethal communicable diseases have occurred; however, their overall contribution to mortality has been relatively minimal. Meningitis has been reported in Sudan and Thailand^{11,26}; cholera in Somalia, Sudan, Malawi, Mozambique, and Thai-



Crude mortality rates are shown by month for refugee camps in east Ethiopia (1988 through 1989), Somalia (1980 through 1981), Sudan (1985), and Thailand (1979 through 1980).

land²⁵⁻²⁸; and typhus and relapsing fever in Somalia and Sudan.¹¹ Cholera case-fatality ratios have generally been low (2% to 3%) with the exception of an unplanned camp in northwestern Somalia in 1985, where 25% of 3962 cases of cholera were fatal.²⁵⁻²⁸ This high case-fatality ratio was probably due to rapid transmission (caused by contaminated water supplies), which overwhelmed the insufficient and inadequately trained health personnel. By contrast, in seven other camps in the same region where trained community health workers conducted active case detection and early referral of severe cases, only 2.4% of 2230 cases died. Other less frequently reported causes of death include tuberculosis; viral hepatitis, especially enterically transmitted, non-A, non-B (hepatitis E virus); and pregnancy-related illness.^{11,29}

While undernutrition was cited as a direct cause of death in Thailand,²⁸ Mo-

zambique,²¹ Ethiopia,¹⁷ and Bangladesh,¹⁰ it was an important contributory cause of death in many other refugee populations. "Undernutrition" in children less than 5 years of age is defined as weight-for-height less than 80% of (or >2 SDs below) the median of the World Health Organization reference population.³⁰ High undernutrition prevalence, defined as more than 20% of a random sample of 1- through 5-year-olds, was reported in other refugee and displaced populations where mortality was high, as in eastern¹⁵ and western³¹ Sudan, Somalia,¹¹ southern Sudan,²⁸ and Mozambique.²¹ Preliminary analysis of data collected from 42 camps in Africa and Asia suggests that a linear model predicts the relationship between undernutrition prevalence and CMRs in these populations.³² Outbreaks of scurvy have been reported from refugee populations in Somalia,²⁸ Sudan,³⁴ and Ethiopia¹⁶ since 1982, and high incidence rates of

xerophthalmia have been reported among refugees in Sudan and Somalia.³⁵ Recent reports from Malawi suggest that pellagra has emerged as a major problem among Mozambican refugees.³⁶ The impact of these micronutrient deficiency diseases on mortality has not been quantified but may be considerable.

II. Postemergency Phase Crude Mortality

Crude mortality rates in the post-emergency phase are comparable to those of the surrounding population. For example, the CMR in eastern Sudan camps in 1988 was 10.8 per 1000, compared with an annual rate of 90 per 1000 in these camps during the emergency period in 1985. The national, non-refugee CMR was 16 per 1000 for Sudan in 1988.^{11,37} Sudden new influxes of refugees have been associated with temporary increases in mortality in Malawi,¹⁹ Sudan,¹¹ and Honduras.³⁸

Age-Specific Mortality

During the postemergency phase, both absolute age-specific mortality rates and the proportional distribution of mortality rates by age group of refugees resemble nonrefugee patterns. The IMRs were estimated annually for refugees in Thailand,²⁸ Somalia,¹¹ Pakistan,³⁹ and Honduras.³⁸ In each population, 3 to 4 years after the initial influx, IMRs were either equal to, or lower than, the expected IMR. In Honduras, the mean IMR for 1984 through 1987 was higher in camps for Nicaraguan refugees (92 per 1000 live births) than in camps for El Salvadoran refugees (48 per 1000). Many new refugees entered the camps for Nicaraguans during the reporting period. In Malawi, where the IMR was not reported, the mortality rate for children under 5 years of age was less than half the expected rate 2 years after the initial influx of refugees from Mozambique. In long-term situations, many infant deaths occur in the perinatal and neonatal period. For example, 33% of infant deaths in Somali refugee camps in 1985 occurred in the perinatal period,¹¹ and 40% of infant deaths in the Pakistan camps in 1984 were neonatal deaths.³⁹ This is probably no different from the situation found in nonrefugee populations.⁴⁰

Cause-Specific Mortality

The major causes of death in long-term refugee camps are diarrheal diseases and acute respiratory tract infections. Malaria is also reported as a cause of death in Thailand,¹¹ Pakistan,³⁹ and Sudan.³⁷ Vaccine-preventable diseases were unusual causes of death among children in Somali refugee camps after

1982, when immunization coverage reached high levels.¹¹ In Pakistan, however, 24% of child deaths in 1985 were associated with measles, and 38% of neonatal deaths were caused by tetanus infection.³⁹ Tuberculosis has been reported as a cause of adult deaths and was associated with 25% of all deaths of persons older than 15 years in Somali camps in 1985.^{11,37} Epidemics of communicable diseases continue to occur. A major cholera outbreak affected more than 20 refugee camps in Somalia in 1985, five years after their establishment.³⁸ Outbreaks of hepatitis E virus infection also occurred during that year.²⁹

Low prevalence rates of undernutrition have been reported in long-term refugee populations in Pakistan,³⁹ Thailand,⁴¹ Honduras,³⁸ and Lebanon.⁴² Prevalence rates of acute undernutrition greater than 20%, however, were reported in five refugee camps in northern Somalia between June and October 1988, more than 8 years after the refugees arrived.⁴³ Recent reports indicate that malnutrition prevalence has also increased among Mozambican refugees in Malawi.⁴⁴ Micronutrient deficiency disorders such as scurvy, pellagra, and iron deficiency anemia have been reported following the emergency phase.^{34,36,45} One review of scurvy outbreaks in African refugee camps concluded that the prevalence of scurvy increased with the length of time that refugees resided in the camps.⁴⁶

DISCUSSION

Most excess mortality in refugee populations has been caused by measles, diarrheal diseases, undernutrition, acute lower respiratory tract infections, and malaria, the same diseases that affect nonrefugee populations. Although outbreaks of cholera, meningitis, hepatitis, and typhus are potentially serious, they have not caused many deaths. Thus, it is not the *type* of illness but rather the *incidence* and *high mortality rates* that make these populations remarkable. Part of this vulnerability is explained by undernutrition and, possibly, by micronutrient deficiencies. Prevalence rates of acute undernutrition (low weight-for-height) in children under 5 years of age are unusually high when compared with rates of 1% to 4% commonly found in surveys of nonrefugee populations in developing countries.⁴⁷ Undernutrition increases the case-fatality rate for measles, diarrheal diseases, and other infectious diseases, and deficiencies of vitamins A and C have been associated with increased childhood mortality in nonrefugee populations.^{48,49} Other factors, such as crowding, poor water supply and hygiene,

physical trauma, and psychological stress may also contribute to the high mortality rate in these situations. The particularly high mortality rates reported for internally displaced populations are probably related to both inadequate access by relief workers and to the intentional use of food as a weapon by hostile armed forces.

The duration of the emergency phase is related to the timely provision of adequate food, measles immunization, and other public health programs. In some situations, new influxes of refugees have been associated with increases in mortality rates and the prolongation of this phase. Although mortality rates have stabilized in most long-term refugee populations, the prevention of malnutrition, measles, and diarrheal diseases has proven to be difficult.

Have the lessons of the past been learned? Although the lower death rates experienced by refugee populations in Malawi (1987 through 1988) and Rwanda (1988) are encouraging, progress remains slow. There are numerous examples since 1984 of the failure to implement basic public health programs promptly despite current knowledge and resources. Even though the threat of lethal measles outbreaks had been previously documented, several thousand children died of measles in eastern Sudan camps in 1985 because an immunization campaign was mounted too late. As recently as May 1988, more than 12 months after the initial influx of Mozambican refugees into Malawi, measles immunization coverage in two locations studied was only 53% and 68%, respectively.⁵⁰ Although the relationship between undernutrition and mortality^{51,52} has long been understood, undernutrition remained a problem in Ethiopian camps for Somali refugees in May 1989, ten months after the relief program had been launched. This problem was associated with the erratic and inequitable distribution of food rations in the camps. Despite extensive experience with scurvy in the Horn of Africa since 1982, general rations for refugees in Ethiopian camps still contained inadequate amounts of vitamin C in 1989, resulting in scurvy attack rates of approximately 1% to 2% in one camp.¹⁶ Such preventable problems result from the failure of major relief agencies and food donors to make the quality of refugee rations a priority and the lack of consensus among agencies regarding practical solutions to this problem.

The role of poor water supplies and inadequate sanitation in the transmission of diarrheal diseases is also well-known. Nevertheless, inadequate facilities were provided in a northern Somali camp where a cholera outbreak in 1985

caused almost 1000 deaths. During 1988, local political pressures led to Somali refugees in Ethiopia being placed in camps where water had to be trucked in from a town more than 100 km away. For several months, these refugees had to make do with approximately 6 L per person per day for all their needs (drinking, cooking, and personal hygiene), less than half the minimum requirement.⁵³

SOLUTIONS

Although complex social, political, and economic issues affect the well-being of refugees, implementation of the following recommendations might help them survive the acute phase of their displacement.

1. Provide food rations containing adequate calories, protein, and essential micronutrients. The minimum human nutrient requirements are well-known, yet numerous refugee relief programs fail to provide basic food needs to affected populations. An international meeting of experts in 1988 recommended that food rations contain a minimum of 8.0 MJ (1900 kcal) of energy per person per day.⁵⁴ In those emergencies where this minimum standard has been attained promptly (eg, eastern Thailand in 1979 and Malawi in 1987), malnutrition prevalence rates have diminished rapidly and mortality has been relatively low.^{50,55} In eastern Sudan (1985) and eastern Ethiopia (1988), however, inadequate rations were provided during the first 6 months of the relief operation, and high mortality rates persisted for 6 to 8 months.^{50,56}

In addition to calories, general food rations must contain acceptable quantities of protein and micronutrients. There are logistical constraints to providing fresh foods containing vitamins A, B, C, iron, and folic acid to large populations in remote areas of Africa. Options such as fortification of cereals and oil with vitamins or exchange of surplus rations for locally available foodstuffs need to be thoroughly evaluated. The evidence that vitamin A deficiency is associated with increased childhood mortality and disabling blindness is now so convincing that supplements of vitamin A should be provided routinely to all refugee children under 5 years of age at first contact and every 3 months thereafter.^{35,48}

Although supplementary feeding programs are often popular with relief agencies, their effectiveness in refugee camps in the absence of adequate general rations has been questioned.^{57,60} When the family ration is insufficient to provide adequate energy to all family members, then the supplementary ration (usually 1.7 to 2.5 MJ [400 to 600 kcal] per day) may be the only food source for

young children. This is not enough to maintain nutrition. If sufficient general rations are provided, children who are clinically undernourished may benefit from daily food supplements, but only if efforts are made to identify them and to ensure their attendance at feeding centers.

2. Provide clean water in sufficient quantity. The UNHCR recommends that each refugee receive a minimum of 15 L of clean water per day for their domestic needs.⁵⁸ In nonrefugee populations the provision of adequate quantities of clean water has resulted in reductions in diarrheal disease morbidity.⁶¹ Although the location of refugee camps is often a politically sensitive issue in the host country, proximity to safe water sources needs to be recognized as the most important criterion for site selection.

3. Implement appropriate interventions for the prevention of specific communicable diseases. Immunization of refugee children against measles in Thailand in 1979 saved lives. Although measles was an early problem in Somalia, immunization of the refugee population was effective in preventing outbreaks after 1981. Since infants as young as 6 months of age frequently contract measles in refugee camp outbreaks and are at a greater risk of dying due to impaired nutrition, it is recommended that measles immunization programs in emergency settings target all children between the ages of 6 months and 5 years.⁶² Since undernutrition affects the entire population and previous exposure to measles is difficult to determine, it may be prudent to extend immunization coverage to children 6 through 14 years of age. Immunization programs should eventually include all vaccines currently recommended by the expanded program on immunization of the World Health Organization.

Malaria control in refugee camps is more difficult. Under the transient circumstances that characterize most refugee camps, vector control techniques have generally been impractical and expensive.⁶³ Prompt identification and treatment of symptomatic individuals is a more effective measure to reduce malaria mortality, although the spread of chloroquine resistance means that effective case management will become more expensive and technically more challenging in the future. Malaria chemoprophylaxis should be considered for high-risk groups, such as malnourished children and pregnant women in nonimmune populations displaced into endemic areas, although the efficacy of chloroquine in areas of resistance is now questionable. Chemoprophylaxis programs are extremely labor intensive

and should be considered in relation to other public health priorities (R. Steketee, C. Campbell, M. J. Toole, unpublished data, 1989). Tuberculosis is often perceived as a major health problem in refugee camps. However, a review of published studies concluded that the incidence of active infection is no higher in camps than in the country of the refugees' origin.⁶⁴ Because treatment is prolonged and requires intensive individual follow-up, it should be limited during the emergency phase to patients who present themselves with sputum-positive infection.

4. Institute appropriate curative programs with adequate population coverage. An essential drug list and standardized treatment protocols are necessary elements of a curative program. It is not necessary to develop completely new guidelines in each refugee situation. Several excellent manuals already exist from which guidelines can be adapted to suit local conditions. (A list of such manuals is available from the authors.) The World Health Organization has also developed guidelines for the clinical management of dehydration from diarrhea and for acute respiratory tract infections that can be used by trained community health workers. Some relief programs, such as those in Somalia and Sudan, have successfully trained large numbers of refugees as community health workers to detect cases of diarrhea, malaria, and acute respiratory tract infections, provide primary treatment, and refer severely ill patients to a clinic, thereby increasing coverage by health services and diminishing reliance on expatriate health workers.⁶⁵

5. Establish a health information system. A surveillance system is an essential part of the relief program from the start. Mortality surveillance is crucial and may require creative methods such as 24-hour graveyard surveillance. In addition, surveillance of nutritional status and of important epidemic diseases such as measles and cholera should be instituted. The system should be dynamic; data analyzed centrally at frequent intervals should be disseminated promptly to field personnel for use in program decision making.

Constraints

The availability of resources and logistic support in countries with major refugee populations varies considerably. In Thailand, the availability of food and other essential relief items, transport and good roads, communications, and administrative support facilitated the relief effort. By contrast, relief programs in impoverished African states like Sudan, Ethiopia, and Somalia face

serious logistic and resource constraints. In addition, donated resources have varied in quantity according to the strategic importance of the host country to major donors, the level of media coverage, and ease of access to the affected region. Generous funds were promptly made available to the refugee program in Thailand. In 1980, the UNHCR spent approximately \$11 per refugee per month on public health in Thailand,⁵⁶ far more than the amounts available for health care of refugees in Africa. Early in the same year, over 400 expatriates worked in one Thai camp that had a population of 120 000,⁵⁶ whereas in Somalia during 1981, fewer than 200 expatriates worked in 35 camps with 700 000 refugees. The generous resources available in Thailand are unlikely to be available for many future refugee crises.

Future Strategies

Refugee relief programs are by nature complex. Although the host country has ultimate responsibility for such programs, the international community is charged with ensuring that it has the resources and technical knowledge to fulfill its responsibility. The UNHCR has the legal mandate for protection of refugees, a role that logically includes their protection from preventable causes of mortality. Nevertheless, relief programs can only succeed when host countries comply with the spirit of international refugee conventions. Reluctance to do so may have resulted in the situation in Hong Kong in mid-1989 when Vietnamese refugees were suffering from undernutrition and cholera.⁶⁶ There is currently no agency charged with the protection and assistance of internally displaced persons, although the 1948 United Nations Universal Declaration of Human Rights provides the moral framework for action by the international community.

The essential elements of a refugee relief program that can prevent excess mortality include adequate food, measles vaccination, clean water and sanitation, prompt prevention and treatment of dehydration with oral rehydration salts, effective case management of malaria and acute respiratory tract infections, a health information system that includes mortality and nutritional surveillance, and an effective outreach program that provides adequate access to health services. To ensure the prompt implementation of these programs, the following steps need to be taken.

1. Host country capacity to provide technically sound assistance should be strengthened. Both the Malawi and Somali governments, for example, were able to provide adequate and effective relief to large refugee populations with

the support of the UNHCR and several private voluntary organizations. All foreign organizations were required to conform to standard operational guidelines. It may be unwise in the long term to create separate government agencies to care for refugees since they may not be sustainable after the emergency phase. Nevertheless, specific administrative structures within existing agencies, such as the Ministry of Health, are necessary to expedite the prompt provision of emergency relief services. Health services for refugees should be consistent with the health policies in host countries, and the implementation of long-term refugee health programs should be integrated as much as possible within health programs for host country nationals.

2. The technical resources of the UNHCR should be strengthened. A sound approach by the UNHCR would ensure that host countries promptly identify and receive the resources they need and that private voluntary organizations comply with standard guidelines. Strong technical support from the beginning of the influx fully backed by the UNHCR might have ensured a more effective public health response in the huge, remote Somali and Sudanese refugee camps of Ethiopia in 1988 and 1989. Special resources need to be allocated by the UNHCR and other relief agencies, including private voluntary organizations, to adequately train and orient their personnel before assigning them to refugee relief programs.

3. Displaced communities need to be fully involved in relief programs. Prevention and health promotion programs require strong community support for their success. The training of thousands of community health workers and the high immunization coverage achieved in refugee camps in Somalia was due in part to the active support provided by refugee community health committees that were set up in each camp.

4. Relief supplies that donor governments channel through host governments and the UNHCR should reflect the real needs of refugees. The resources provided by Western donor governments often consist of surplus food commodities that lack appropriate nutrients. A better approach to the provision of relief food could avoid endemic nutritional deficiencies like scurvy, which at this time is essentially an iatrogenic disease of refugees in the Horn of Africa.

5. Alternatives to closed refugee camps should be promoted. Many of the Mozambican refugees in Malawi have been allowed to live in local villages where they have access to some land and employment and are spared the

risks associated with the crowding and poor sanitation of camp settings. Such an approach may not always be feasible; however, donor governments and agencies should financially support host governments that attempt to implement such a strategy.

6. Refugee relief programs should be systematically evaluated. This standard public health procedure is rarely performed in refugee situations; therefore, substantial lessons are not learned by the international relief community.

Important questions concerning emergency refugee relief remain unanswered. Operational research is needed to identify the most effective methods of providing adequate micronutrients to refugees, improved mortality and morbidity surveillance, effective prevention of measles outbreaks, and methods of treating chronic infectious diseases such as tuberculosis. Although mortality rates may decline in the long term, refugees face problems of impoverishment, poor access to land, hostility from the local population, and social and political vulnerability. The level of health care that refugees should receive compared with that available to the surrounding population is controversial. Certain host governments (eg, Thailand) have demanded that relief agencies provide equal services to local villagers. The complex ethical and political arguments over this issue should not be ignored by relief agencies.

Providing adequate care to internally displaced persons is an even greater challenge. Although the technical approach is basically the same as that for refugees, access to the affected communities is often hampered by political and security considerations. While health professionals may be able to achieve little direct progress in this area, they can play a strong advocacy role. Strong leadership is required from the United Nations and other humanitarian agencies to mobilize the international community. The first step in this process might be an international convention that guarantees internally displaced persons the same protection afforded to refugees who cross national boundaries.

The pursuit of effective solutions to prevent the major cause of death in displaced and refugee populations needs to be intensified. This might be accelerated by a greater recognition by the international community of the unique health risks to which these populations are exposed.

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