

Malnutrition and Mortality in Kohistan District, Afghanistan, April 2001

Fitsum Assefa, MSc

Mohammed Zahir Jabarkhil, MD

Peter Salama, MBBS, MPH

Paul Spiegel, MD, MPH

ACIVIL CONFLICT IN AFGHANISTAN for more than 2 decades has caused more than 3.5 million people to flee to neighboring countries, such as Pakistan and Iran, which are among the nations hosting the largest number of refugees in the world.¹ Of the approximately 24 million people living in Afghanistan in March 2001, of whom more than 1 million are internally displaced, the World Food Programme estimated that 3.8 million persons would need food aid²; this estimate increased to 6 million in October 2001.³ Afghanistan, with a life expectancy of 46 years and an infant mortality rate of 165 per 1000 live births, has some of the worst development indicators in the world.⁴ During the past 3 years, the situation has been exacerbated by a severe drought that has resulted in poor agricultural yields. In 2001, assessments in the west and north of the country indicated that the availability of food was deteriorating.⁵ However, population-based data for nutrition, food security, and mortality indicators required to guide humanitarian interventions are not available for many regions of Afghanistan because of difficulty accessing remote mountain villages.

Save the Children (SCF)-USA, which has been working in parts of Faryab province, Afghanistan, since 1995, undertook a survey, with technical support from the Centers for Disease Control and Prevention (CDC), from April 4 through April 10, 2001, in Kohistan

Context The humanitarian situation in Afghanistan has been deteriorating for more than 3 years because of civil war and severe drought. Because of recent events, the international community is predicting a severe worsening of the country's current situation.

Objective To assess the magnitude and causes of mortality and prevalence of malnutrition in Kohistan district, Faryab province, Afghanistan.

Design Two-stage, 30-cluster household survey conducted April 4 through 10, 2001, which included anthropometric measurements, assessment of food coping mechanisms, and retrospective mortality data collection for November 26, 2000, through April 4, 2001.

Setting and Participants A total of 378 households comprising 3165 people living in Kohistan district, Faryab province, Afghanistan.

Main Outcome Measures Crude mortality rate, mortality rate among children younger than 5 years, causes of death, prevalence of wasting and stunting among children aged 6 to 59 months (weight-for-height and height-for-age z scores <-2, respectively), and food coping mechanisms.

Results The crude mortality rate among the 3165 persons surveyed during the period of interest was 2.6 (95% confidence interval [CI], 1.7-3.5) per 10000 per day and the mortality rate among 763 children younger than 5 years was 5.9 (95% CI, 2.0-8.8) per 10000 per day. Diarrhea (25.0%), respiratory tract infections (19.4%), measles (15.7%), and scurvy (6.5%) caused most of the 108 deaths. The prevalences of wasting and stunting among 708 children aged 6 to 59 months were 7.0% (95% CI, 5.9%-9.0%) and 63.7% (95% CI, 58.6%-68.8%), respectively. Evidence of late-stage food coping mechanisms and pre-famine indicators existed among the population.

Conclusions These data indicate that, by April 2001, a humanitarian crisis already existed in Kohistan. Essential humanitarian services, including food aid and public health programs, are urgently required in such regions of Afghanistan and will be crucial if a worsening humanitarian crisis is to be avoided. For these services and programs to be implemented, the international community needs to create adequate humanitarian space (ie, a secure and accessible location where humanitarian organizations can provide services to emergency-affected populations) to ensure that humanitarian organizations have access to populations within Afghanistan as well as to refugees who flee to surrounding countries.

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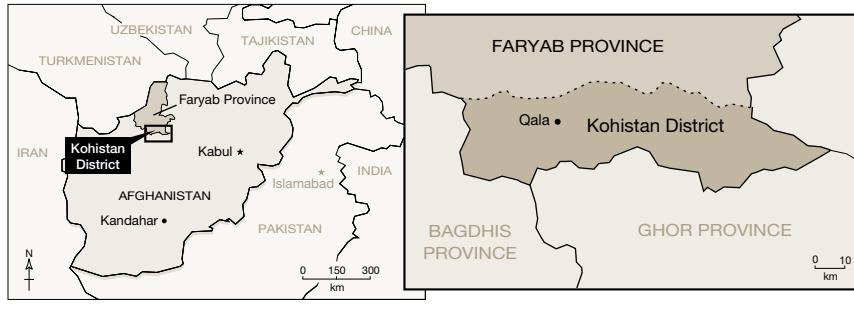
district, Faryab province (FIGURE 1). One of the remotest districts in Faryab province, Kohistan, with an estimated population size of 57 600, has few health services, no physicians, and no routine expanded program on immunization. It is representative of other highland districts within Faryab and surrounding provinces in Afghanistan that rely on rain for crop production and are normally inaccessible by car for approximately half of the year due to snow. Until the drought, Kohistan was

not only self-sufficient in food production but actually supplied food to other regions in Afghanistan. Therefore, at the

Author Affiliations: Save the Children-USA, Washington, DC (Ms Assefa and Dr Jabarkhil); International Emergency and Refugee Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, Ga (Drs Salama and Spiegel).

Corresponding Author and Reprints: Fitsum Assefa, MSc, Save the Children-USA, 2000 M St NW, Suite 500, Washington, DC 20036 (e-mail: fasssefa1@dc.savechildren.org).

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Figure 1. Kohistan District, Faryab Province, Afghanistan

time of this survey, Kohistan had not received external food aid. The objectives of the survey were to estimate mortality rates, determine major causes of death, estimate the prevalence of malnutrition, and assess the population's food coping mechanisms.

METHODS

We undertook a 2-stage, 30-cluster household survey. A sample of 392 children aged 6 to 59 months was required to achieve a 5% precision around an estimated prevalence of wasting of 15% with a 95% confidence interval (CI) assuming a design effect of 2. Therefore, 14 children per cluster aged 6 to 59 months, or 420 children in total, were needed. With an estimated mean household size of 7 persons and with children younger than 5 years comprising 20% of the population, a total sample of 285 households, or 2000 persons, was required.

Baseline crude mortality rates (CMRs) were not available by region, and the national CMR for Afghanistan, although unreliable because of the prolonged civil war and consequent poor data quality, was estimated to be 0.6 per 10000 per day.⁴ We estimated the mean CMR from November 26, 2000, through April 4, 2001, the 4-month period defined as the retrospective period of interest for this survey, to be 4 per 10000 per day, or 4 times the cutoff used to define an emergency⁶ and nearly 7 times the baseline CMR for Afghanistan. Therefore, assuming a cumulative mortality of 5% of the total population for the period

of interest and a design effect of 4, a sample size of 2000 persons would result in a precision of 2% with a 95% CI.

The sampling frame included all villages in Kohistan district under Taliban control that had more than 20 households. Six of 50 villages were excluded from the initial selection because they were too remote to access. Population data were obtained from previous national polio immunization days in 2001 and adjusted using estimates made by local religious leaders. In the first stage of the survey, 30 clusters were assigned proportionally to village population size. In the second stage, we selected households using standard immunization program methods.⁷ At the center of the village, a team member spun a pen to randomly choose a direction from which to conduct the survey. All houses in that direction were counted from the center to the periphery of the cluster and the first house to be surveyed was chosen by randomly picking a number between the first and the last house. A household was defined as a group of people who usually live under the same roof and share meals. If more than 1 household was present in the same dwelling, 1 was randomly selected. If an adult member was not home at the time of the survey, the survey team returned to the household later in the day or early the next morning. If there was still no adult present, the next household was chosen.

We used a standardized, pretested questionnaire for data collection. The questionnaire was translated from English into Farsi (Persian), the major lan-

guage of Kohistan district, and then back-translated into English. The survey instrument was tested in a district hospital among 15 parents of sick children and among 20 households in a village that was not included in the survey. Data collection involved 4 teams of 4 persons, including a supervisor. Literate people from the district were selected as surveyors and underwent 2 days of training. Because of local custom, women on the survey team were accompanied by their husband or a male relative, who also participated as a surveyor. The questionnaire was administered to the head of household or another adult member. Often, more than 1 adult member of the household participated in answering the questions. In households that did not wish women to answer questions in front of male surveyors, women would give their responses from the doorway of a room with the men situated outside of the doorway in an adjacent room.

A local calendar of events was used to determine age and date of death. We determined the total number of persons and children younger than 5 years present in each household at the beginning of the period, November 26, 2000, the first day of Ramadan and a major religious holiday in the region. Deaths in the household occurring from November 26, 2000, through April 4, 2001, the first day of the survey, were recorded and the month of death was identified. A series of structured questions were used to assign cause of death into 1 of 8 categories based on World Health Organization case definitions⁸ that were modified using qualitative methods. For instance, scurvy was well known in the communities as *seialengia*, or "black legs," and was defined as having 2 or more of the following signs and symptoms: blackness of skin (indicative of hemorrhage) (FIGURE 2), gum swelling or bleeding (FIGURE 3), joint pain and swelling, and pigmentation or hardness around the hair follicles.

We measured nutritional status for all children aged 6 to 59 months in each household and classified wasting using standard weight-for-height

z-score definitions and stunting using standard height-for-age z-score definitions. Detailed methods used in this survey has been described elsewhere.⁹ Standard questions on food coping mechanisms were included to evaluate underlying causes of malnutrition and to assess the level of coping in the population. Two mass polio vaccination campaigns in the district occurred before the survey during 2001. Because no vaccination cards were distributed, oral reports from mothers were used to define the polio immunization status of children. Since no measles vaccination campaigns have been implemented in Kohistan district and routine immunization services have not functioned for at least 20 years, we did not record measles immunization status. Data were analyzed using Epi Info software, version 6.04b (CDC, Atlanta, Ga), which includes C Sample for determining CIs for cluster surveys.

Independent representatives from the United Nations Children's Fund (UNICEF), SCF-USA, and the Northern Afghanistan Nutrition Taskforce (composed of UN agencies and various nongovernmental organizations active in the region) reviewed the survey protocol for content as well as ethical considerations. Provincial authorities of the Faryab province, Kohistan district leaders, and local mullahs gave permission to conduct the survey and encouraged participation. Informed oral consent was obtained from all study participants. No incentives were offered to study participants. Participants were told that the survey was not connected with any kind of registration for food or other items and that it was part of an effort to help international and Afghan policymakers make important decisions about nutrition and health care in Afghanistan.

RESULTS

We surveyed 378 households comprising 3165 people, of whom 763 (24.1%) were children younger than 5 years. The mean number of persons per household was 8.4. Eleven households (2.9%) refused to participate, and in approxi-

mately 8 households (2.1%), adults were not present in their households on the day of the survey; thus, substitution of the next household occurred. Overall, 108 deaths occurred in the sample during the 4-month period of interest; 59 (54.6%) were among children younger than 5 years and 21 (19.4%) were among persons aged at least 50 years. The CMR was 2.6 (95% CI, 1.7-3.5) per 10000 per day and the mortality rate for children younger than 5 years was 5.9 (95% CI, 2.0-8.8) per 10000 per day. Using the baseline CMR for Afghanistan of 0.6 deaths per 10000 per day,⁴ an estimated 1525 (95% CI, 845-2200) excess deaths occurred among the 57600 persons living in Kohistan district during the 4-month period of interest.

Of the 108 deaths, most were due to 1 of 4 causes: 27 (25.0%) were due to bloody or watery diarrhea, 21 (19.4%) were due to respiratory tract infections, 17 (15.7%) were due to measles, and 7 (6.5%) were due to scurvy (TABLE 1). Diarrhea, respiratory tract infections, and measles accounted for 39 (66.1%) deaths in children younger than 5 years. Of the 17 deaths due to measles, 14 (82.4%) occurred among children younger than 5 years and 3 (17.6%) among children aged 5 to younger than 10 years. Four of the 7 deaths due to scurvy occurred among children younger than 15 years and 3 occurred among persons aged at least 55 years.

We took anthropometric measurements on 708 children aged 6 to 59 months (TABLE 2). Overall, 50 (7.0%; 95% CI, 5.9%-9.0%) had moderate or severe wasting (weight-for-height z score < -2 or edema) and 8 (1.1%; 95% CI, 0.2%-1.5%) had severe wasting (z score < -3 or edema). Differences between sexes were not statistically significant. Reflecting the chronic nature of the malnutrition, 446 children aged 6 to 59 months (63.7%; 95% CI, 58.6%-68.8%) were stunted (height-for-age z score < -2). Of these children, mothers reported that 73.7% (95% CI, 69.2%-78.2%) were immunized against polio during the recent vaccination campaigns in the district.

During the 24 hours before the survey was administered, 26 households

Figure 2. Hemorrhages on the Back of a Leg of an Adult With Scurvy



Figure 3. Gum Swelling and Bleeding in a Child With Scurvy



(6.7%) consumed staple foods that came from their own production, 90 households (23.8%) bought food with money obtained from high-interest loans, and 321 households (85%) reported consuming wild foods, such as palangbarg (a wild root with green leaves), tartran, sirish, and other wild leaves and roots. The staple food in the region is wheat; however, during the previous 24 hours before the survey, 79 households (20.8%) consumed grass seeds normally used for animal fodder, locally known as arzan, either alone or mixed with wheat. Sixty-four households (16.8%) consumed protein foods such as milk, yogurt, and meat, and 156 households (41.3%) consumed oil. The mean household livestock holding was

Table 1. Causes of Death by Age Group, Kohistan District, Afghanistan, November 26, 2000–April 4, 2001

Age Group, y	Cause of Death, No. (%)						Total
	Bloody Diarrhea	Watery Diarrhea	Respiratory Tract Infection	Measles	Scurvy	Other*	
0-4	14 (23.7)	4 (6.8)	7 (11.9)	14 (23.7)	1 (1.7)	19 (32.2)	59 (100)
5-9	4 (40.0)	0	2 (20.0)	3 (30.0)	0	1 (10.0)	10 (100)
10-49	3 (15.8)	0	6 (31.6)	0	3 (15.8)	7 (36.8)	19 (100)
≥50	2 (10.0)	0	6 (30.0)	0	3 (15.0)	9 (45.0)	20 (100)
Total	23 (21.3)	4 (3.7)	21 (19.4)	17 (15.7)	7 (6.5)	36 (33.3)	108 (100)

*Includes chronic diseases, malnutrition, and fever of unknown origin.

Table 2. Prevalence of Wasting and Stunting Among Children Aged 6 to 59 Months, Kohistan District, Afghanistan, April 2001

	No. (%; 95% Confidence Interval)	
	Wasting (Weight/Height; n = 708)	Stunting (Height/Age; n = 700)*
Moderate (z score <−2 to −3)	42 (5.9, 3.4-8.4)	204 (29.1, 27.2-31.0)
Severe (z score <−3 or edema)†	8 (1.1, 0.2-1.5)	242 (34.6, 29.5-39.7)
Total (z score <−2 or edema)†	50 (7.0, 5.9-9.0)	446 (63.7, 58.6-68.8)

*Eight records were excluded because of poor measurements.

†Edema is included only for wasting.

14.7 goats, 25.6 sheep, 2.4 oxen/cows, and 1.7 donkeys at the beginning of drought and 1.1 goats, 1.8 sheep, 0.3 oxen/cow, and 0.7 donkey on the day of the survey. The female-male ratio among persons aged 15 to 50 years was 1.1 (n=566:523) at the beginning of the period of interest and 1.4 (n=559:407) at the end of the period, reflecting labor migration by men to neighboring Iran (n=61) and Turkmenistan (n=2) and within Afghanistan (n=46).

COMMENT

Since the September 11, 2001, terrorist attacks in the United States, the international community has warned of an impending humanitarian crisis in Afghanistan and its surrounding countries. Before the attacks, the United Nations High Commissioner for Refugees (UNHCR) estimated that there were approximately 1 million people already displaced within Afghanistan.¹⁰ Furthermore, the UNHCR predicted displacement of more than 1 million people¹⁰ across the Afghanistan border into neighboring countries after military reprisals by the United States and its allies.

Our survey findings demonstrate that a humanitarian crisis has been occurring in this part of Afghanistan since at

least April 2001; the CMR was more than 2.5 times the levels of the 1 death per 10000 per day used to define an acute humanitarian emergency⁶ and more than 4 times the best available baseline CMR for Afghanistan,⁴ causing significant excess mortality in Kohistan district. Consistent with findings from other recent emergencies, older persons accounted for a disproportionate number of deaths.^{9,11}

Although the survey showed that acute malnutrition prevalence rates among children aged 6 to 59 months were slightly elevated, rates had not yet reached serious levels. Our results are consistent with surveys from other parts of northern Afghanistan that were conducted during 2000 and 2001.^{12,13} However, prevalence rates for acute malnutrition, which often rise after food coping mechanisms begin to fail, are a late indicator of famine.¹⁴ In some countries, such as Ethiopia, famine occurs in frequent cycles, making it difficult for populations to obtain sufficient food stores and assets to help them mitigate the effects of subsequent famines. This was not the case in this region of Afghanistan, where the previous drought occurred 30 years ago and lasted for 1 year. It appears that Afghans had sufficient grain stocks and

assets to reduce the impact of the current drought during its first 2 years. However, rapidly deteriorating agricultural yields^{15,16} and late-stage and low-return food coping strategies, such as selling assets (including livestock and land), taking loans with high interest rates, extensive labor migration, and consumption of wild foods, are pre-famine indicators that suggest that the population has been failing to cope with this serious situation.

A rapid health assessment in the Kohistan district by SCF-USA in March 2001 reported widespread prevalence of scurvy.¹⁶ In our survey, scurvy was reported as the cause of nearly 7% of all deaths. It was not possible to confirm scurvy by testing blood for vitamin C levels because of the remoteness of Kohistan and the difficulty of collecting and maintaining blood samples. However, it appeared that people in the communities were aware of the disease, which they called *seialengia*, or “black legs.” Furthermore, health workers on the survey team brought ascorbic acid (vitamin C) tablets with them and treated 250 patients with suspected scurvy (Figures 2 and 3) and their families; affected persons improved with the treatment. Many patients with scurvy also had angular stomatitis and other signs demonstrating presence of other micronutrient deficiencies among the population.¹⁷ Such micronutrient deficiencies and late-stage food coping mechanisms, combined with the high prevalence of stunting, indicate a chronic food shortage and demonstrate that the population is vulnerable to an acute nutritional crisis.

Measles was an important, preventable cause of death in our survey popu-

lation. Natural immunity to measles is expected to be low because of the remote location of many Afghan communities, most of which have never received measles vaccination. Furthermore, due to recent events, population density will increase in some areas as displaced Afghans congregate in camps or around central food distribution sites. These factors may increase measles transmission among children younger than 5 years as well as older children. Therefore, measles vaccination in combination with distribution of vitamin A should be given the highest public health priority, and the target age group should be 6 months to 15 years for displaced and nondisplaced populations within Afghanistan as well as for refugees in camps outside of Afghanistan.¹⁸ The polio coverage of 73.7% is low and concerning; however, vaccination campaigns are logistically difficult to implement in Afghanistan, especially in remote districts. Although global initiatives such as polio eradication are important in the long term, they should not take scarce resources away from immediate lifesaving interventions such as measles vaccination.¹⁹⁻²² Furthermore, whenever possible, mass polio vaccination campaigns should include measles vaccination together with vitamin A distribution in hard-to-reach populations.

There are a number of limitations to this survey. First, recall bias is an important limitation in any retrospective study of mortality. However, we tried to minimize this by limiting the recall period to only 4 months and by defining the beginning of the period by a religious holiday known to the entire population. Second, very remote villages in the district and those under control of the Northern Alliance were not included in the survey. We do not know to what extent health and nutrition conditions in these villages differed from those included in our sample. Third, a selection bias may exist because only households that existed on the day of the survey were sampled; households in which all members had migrated from the district or

died could not have been selected. Last, since there was neither a death registration system nor functioning surveillance system in the district, we relied on oral reports of the responding household members to determine cause of death. We attempted to improve the accuracy of reporting by asking a series of structured questions detailing each death. The use of standardized case definitions and specific terms in Persian for cause of death also improved the accuracy of verbal reports. However, some misclassification of the cause of death may have occurred.

The health and nutrition status among the people of Kohistan was not yet as extreme as has been reported in many crises in Africa,²³ but it was worse than that of the Kosovar population during the 1999 crisis.¹¹ Nearly all humanitarian agencies evacuated their expatriate personnel from Afghanistan in September 2001 because of lack of security, and only a small quantity of humanitarian food aid remained in country. The results of our survey may be indicative of the health and nutrition status of the population in other parts of Afghanistan, especially in the highland provinces.

The access of humanitarian organizations to the Afghan people, both within and outside of Afghanistan, is critical to reducing morbidity and mortality among the civilian population. With winter approaching, the possibility is fading quickly of accessing the population remaining in Afghanistan and providing them with food and medical supplies. A long-term supply, by land or air, of a general food ration in sufficient quantities for the Afghan population needs to be established. Distribution systems within the country may need to rely on national staff, and monitoring mechanisms will need to be instituted to ensure that food aid reaches the target population. Humanitarian agencies working in camps for internally displaced persons within Afghanistan or in refugee camps in neighboring countries must undertake immediate preventative interventions. Wherever possible, we recom-

mend establishment of a functioning health information system, mass measles vaccination and vitamin A distribution, provision of adequate water and sanitation facilities, and delivery of an adequate quantity and quality of food aid (fortified foods to include needed micronutrients, along with staple foods) to prevent protein energy malnutrition and micronutrient deficiencies. Clinical interventions addressing diarrhea, respiratory tract infections, and measles, as well as micronutrient deficiencies such as scurvy, and malnutrition among children, adolescents, and even adults are crucial.

Every effort must be made by the international community to create adequate humanitarian space (ie, a secure and accessible location where humanitarian organizations can provide services to emergency-affected populations) to allow access to the population within Afghanistan as well as to refugees in the surrounding border areas. The neighboring host countries will need strong support from the UN and donor governments. Care must be taken that the health and nutrition status of the millions of Afghan refugees currently living in the long-term stable camps in host countries does not deteriorate because of the probable massive influx of new refugees. Governments, UN agencies, and humanitarian organizations must make appropriate contingency plans to avoid becoming overwhelmed.

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Acquisition of data: Assefa, Jabarkhil.

Analysis and interpretation of data: Assefa, Salama, Spiegel.

Drafting of the manuscript: Assefa, Jabarkhil, Salama, Spiegel.

Critical revision of the manuscript for important intellectual content: Assefa.

Statistical expertise: Assefa, Salama, Spiegel.

Obtained funding: Assefa.

Administrative, technical, or material support: Assefa, Jabarkhil, Salama, Spiegel.

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Intellect shows the unity of mankind; pride and contempt, lust and hatred, zeal and indifference are what divide them.

—Marc R. Gutwirth (1919-1969)