The Management of Nutritional Emergencies in Large Populations

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WORLD HEALTH ORGANIZATION, GENEVA

THE MANAGEMENT OF NUTRITIONAL EMERGENCIES IN LARGE POPULATIONS

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A/1/78

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WORLD HEALTH ORGANIZATION
GENEVA

1978

ISBN 92 4 154131 8

PRINTED IN SWITZERLAND

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Preface

This guide is intended for use by health personnel responsible for the field management of nutritional emergencies in populations, namely, the medical or allied personnel from national or provincial health services or from relief agencies in the country affected.

It is particularly concerned with severe nutritional emergencies, that is, mass starvation caused by the interruption of food supplies to the population over a long period. Unusual food shortages may be caused by major crop failures, war and civil conflicts, or natural disasters. Relief personnel responsible for short-term food distribution following a major disaster such as an earthquake or cyclone may also find these guidelines useful, although they were specifically prepared for the management of situations in which populations suffer from widespread and severe malnutrition.

No mention is made of social, cultural, or political factors that are critical during famines, nor of rehabilitation. The guide is concerned, as it were, with fire-fighting rather than fire prevention or reconstruction.

No short booklet can provide guidelines applicable to each and every situation. Adaptation and improvisation will be necessary to some extent. All the examples given are based on experience, and it is hoped that they will be helpful in the preparation of local procedures and guides for the on-site training of relief workers in each country.

ACKNOWLEDGEMENTS AND REFERENCES

Acknowledgement is due to many individuals both in and outside WHO for their valuable advice and criticism based upon long experience of field work. The authors are also grateful to the League of Red Cross Societies, the Catholic Relief Services, and Oxfam for their valuable assistance in the preparation of this guide.

Material and ideas have been drawn from many sources, but particularly from the following publications:

Guide to food and health relief operations in disasters. New York, Protein-Calorie Advisory Group (PAG) of the United Nations System, 1977.

BLIX, G., HOFVANDER, Y. & VAHLQUIST, V., ed. *Famine: a symposium dealing with nutrition and relief operations in times of disaster.* Uppsala, Almqvist & Wikell for Swedish Nutrition Foundation and Swedish International Development Authority, 1971.

KING, M.H. *Nutrition for developing countries.* Nairobi, Oxford University Press, 1972.

Food emergency manual. Rome, World Food Programme (new edition in preparation).

CAMERON, M. & HOFVANDER, Y. *Manual on feeding infants and young children.* 2nd edition, New York, Protein-Calorie Advisory Group of the United Nations System, 1976.

A debt of gratitude is also owed to the Literary Executor of the late Sir Ronald A. Fisher, F.R.S., to Dr Frank Yates, F.R.S., and to Longman Group Ltd, London, for permission to reprint Table A in Annex 6 from their book *Statistical Tables for Biological, Agricultural and Medical Research* (6th edition, 1974).

1. Normal and emergency needs

Basic facts about food and nutrition are given in Annex 1, which should be consulted by readers who are not thoroughly familiar with nutritional concepts. Energy and protein requirements in normal and emergency situations are briefly summarized below.[1]

Normal situations

Recommended intakes

The energy and protein intakes considered as safe by WHO/FAO for each age group and physiological condition[2] are shown in Annex 1.

Vulnerable groups

The energy and protein requirements of women are increased during pregnancy—by +1.5 MJ (350 $kcal_{th}$) and +15 g protein per day—and during lactation—by +2.3 MJ (550 $kcal_{th}$) and +20 g protein per day—over and above their normal requirements.

Preschool children (0–5 years) require proportionally more energy and protein for each kg of body weight than adults. They are more vulnerable to malnutrition.

Emergency situations

The WHO/FAO safe intakes of energy and protein[2] have not yet been attained by the majority of people in developing countries. In nutritional emergencies caused by food shortage, relief planning based on these standards is unrealistic. The maintenance of energy intake at a level adequate for survival must be the primary consideration.

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[1] Energy values are expressed in the SI unit, the megajoule (MJ). The equivalents in the superseded unit, the thermochemical kilocalorie ($kcal_{th}$) are given in parentheses. 1 MJ = 239 $kcal_{th}$. 1000 $kcal_{th}$ = 4.184 MJ.

[2] PASSMORE, R. ET AL. *Handbook on human nutritional requirements*, Geneva, World Health Organization, 1974 (Monograph Series, No. 61).

Table 1 shows the minimum amount of energy required to sustain life.

TABLE 1. EMERGENCY ENERGY INTAKE PER PERSON[a]

Group	Height (cm)	Emergency subsistence (for a few weeks) MJ ($kcal_{th}$) per day	Temporary maintenance (for many months) MJ ($kcal_{th}$) per day
0–1 years[b]	under 75	3.4 (800)	3.4 (800)
1–3 years	75– 96	4.6 (1 100)	5.4 (1 300)
4–6 years	96–117	5.4 (1 300)	6.7 (1 600)
7–9 years	117–136	6.3 (1 500)	7.5 (1 800)
10 years or over:	over 136		
male		7.1 (1 700)	8.4 (2 000)
female		6.3 (1 500)	7.5 (1 800)
Pregnant or lactating women		8.0 (1 900)	9.2 (2 200)
Average per day per person		about 6.3 MJ (1 500 $kcal_{th}$)	about 7.5 MJ (1 800 $kcal_{th}$)

[a] Adapted from Mayer, J. Famine relief: what kind of organization and what types of trained personnel are needed in the field. In: Blix, G. et al. *Famine: a symposium...*, Uppsala, 1971.
[b] Levels for infants are similar to those recommended for normal situation.

The emergency subsistence level is the estimated level below which large-scale starvation and death should be expected if the population is of normal body size and is required to perform some work.

A prolonged maintenance diet at the level indicated above is likely to result in some loss of body weight. Supplementary feeding of vulnerable groups is essential to provide extra energy and nutrients.

Even under "normal conditions", without any emergency, the energy intake of some populations is comparable to or less than the temporary maintenance level—7.5 MJ (1800 $kcal_{th}$). When resources are scarce, it may not be justifiable to provide this amount to some segments of the population, and a level as low as 6.3 MJ (1500 $kcal_{th}$) will have to be maintained for extended periods. The decision will depend on local conditions.

2. Major deficiency diseases in emergencies

- **Protein-energy malnutrition** (PEM) is the most important health problem during a nutritional emergency.
  Severe PEM can present several forms:
  - *Nutritional marasmus* is characterized by a severe wasting away of fat and muscle ("skin and bone"). It is the commonest form in most nutritional emergencies.
  - *Kwashiorkor* is characterized by oedema, usually starting at the lower extremities.
  - *Marasmic kwashiorkor* is a combination of wasting and oedema. The treatment of severe forms of PEM is presented in Chapter 5.

- **Mineral and vitamin deficiencies** may also be important.
  - *Severe anemia* is common and requires a daily intake of iron for an extended period of time.
  - *Vitamin A deficiency,* the most important vitamin deficiency, is characterized by night blindness and/or eye lesions which may lead to permanent total blindness. The severe forms are usually associated with PEM.
  - Other deficiency conditions are less common: beriberi, pellagra, scurvy, rickets.
  - Mineral and vitamin deficiencies must be identified and the individuals affected or at risk treated by administration of the missing nutrient.

Protein-energy malnutrition (PEM)

Protein-energy malnutrition is a problem in many developing countries, even in normal times. Most commonly it affects children between the ages of 6 months and 5 years (especially around 18–24 months), i.e., at the time when they are most vulnerable to the common infectious diseases such as gastroenteritis and measles. PEM may simply be due to shortage of food, or it may be precipitated by lack of appetite and an increase in nutrient requirements and losses caused by infection.

Chronic PEM has many short- and long-term physical and mental effects, including growth retardation, a malnourished child being lighter and shorter than a better-fed child of the same age.

In times of nutritional emergency it is primarily the more acute forms of PEM that have to be dealt with. These are characterized by a rapid loss of weight and may be evident in a much wider range of age groups than usual. For example, significant numbers of older children, adolescents, and adults may also be affected.

Past experience has shown that many emergencies affect the supply of food to only a proportion of the population concerned. The situation will obviously vary from place to place, but it is often the case that only a small proportion of the total population presents clinical signs of severe PEM. For each case of severe clinical PEM there may well be 10 moderate cases and 100 children of "near normal" nutritional status. Progression from moderate to clinically severe forms is rapid.

Severe forms of PEM [1]

The severe forms of PEM are:

nutritional marasmus
kwashiorkor
marasmic kwashiorkor

Nutritional marasmus results from prolonged starvation (see Fig. 1).

The main sign is a severe wasting away of fat and muscle. The child is very thin ("skin and bone"), most of the fat and muscle mass having been expended to provide energy. It is the most frequent form of PEM in cases of severe food shortage.

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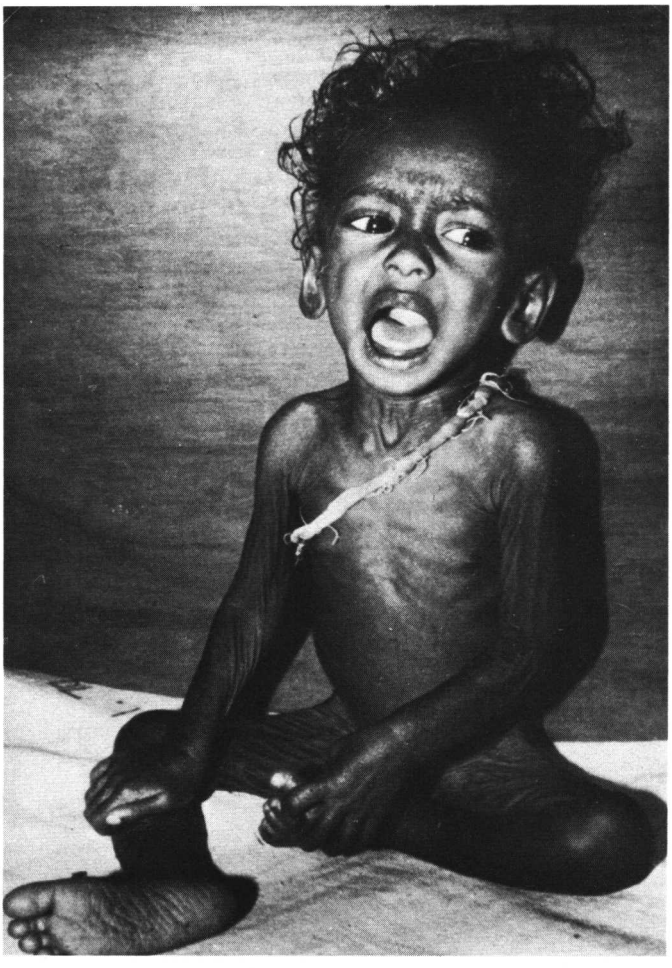
[1] For treatment, see Chapter 5.

Associated signs can be:

- A thin "old man" face.
- "Baggy pants" (the loose skin of a child's buttocks hanging down).
- The children concerned are usually active and may appear to be very alert in spite of their condition.
- There is no oedema (swelling that pits on pressure) of the lower extremities.

FIG. 1. CHILD SUFFERING FROM NUTRITIONAL MARASMUS



Kwashiorkor (see Fig. 2 and Fig. 3). The main sign is oedema, usually starting at the lower extremities and extending, in more advanced cases, to the arms and face. Oedema may be detected by the production of a definite pit in the pretibial region as a result of moderate pressure for three seconds with the thumb over the lower end of the tibia.

The child may look "fat" so that the parents regard him as well-fed.

Associated signs can be:

- Hair changes: loss of pigmentation, curly hair becomes straight (an African child may appear to have much longer hair), easy pluckability (the hair comes out easily with a very gentle pull).

FIG. 2. A SEVERE CASE OF KWASHIORKOR SHOWING OEDEMA AND SKIN AND HAIR CHANGES