4 SOME ASPECTS OF NUTRITION IN DISASTERS

4.1 Consequences of malnutrition

Chronic PEM has severe consequences for physical and mental development. In times of disaster, the transition from minor to severe forms of malnutrition can occur quite quickly it is therefore important to perceive and treat acute forms of malnutrition. They are indicated by rapid weight losses not only within the most endangered groups. Acute undernourishment is quite easily recognised, the diagnosis of chronic PEM, however, requires special methods of analysis.

The various forms of malnutrition generally occur in combination, and, because of their interactions with infectious and parasite diseases, they are quite complex cases.

Figure 5: Important forms of malnutrition and their consequences

1. Protein-energy-malnutrition (PEM)	Consequences, symptoms
Marasmus	atrophy
Kwashiorkor	muscular atrophy, oedema
2. Vitamin deficiencies	
Vitamin A	visual disturbance, blindness
Vitamin D	osteomalacia
Niacin	skin irritations, diarrhoea, severe mental deterioration
Vitamin B_1 (Thiamin)	Beri-Beri, diminished concentration, polyneuropathia
3. Mineral deficiencies	
iron	anaemia

Marasmus is the consequence of long-term undernutrition. Fat- and muscle tissues are diminished; victims show the typical "old man's face". Marasmus is the most prevalent form of malnutrition and is frequently found with infants who are not at all, or insufficiently, breast-fed and then fed with diluted baby-food.

Kwashiorkor is due to an interaction of various factors of which severe protein deficiency is a quite important one. The symptoms, such as oedema, skin changes, diarrhoea and apathy are most frequently found with children who are weaned too early or who receive food low in protein (e.g. cassava).

Vitamin-A-deficiency is widely prevalent in developing countries and is due to long-term nutritional insufficiency. This leads to severe visual obstructions and (finally) blindness. Vitamin A itself is only found in animal food products; it can, however, be synthesized by the human metabolism from its precursor carotene which is found in yellow and green parts of plants. By eating sufficient amounts of fresh vegetables and fruits vitamin-A-deficiency can be prevented or treated.

Vitamin-D-deficiency can interfere with bone-formation or lead to osteomalacia. Only a few animal products contain vitamin D in large amounts. An increased intake of such food is not necessary if uncovered skin is exposed to the sun, since vitamin D can be synthesized in the skin with UV-radiation. This requires only small skin areas (e.g. face, arms) and quite short exposure to the sun.

Niacin-deficiency only occurs if the diet is low in the amino acid tryptophan, which can happen with a very monotonous nutrition of maize and sorghum products. Tryptophan is the physiological precursor of niacin. Lack of niacin leads to pellagra, skin infections, severe diarrhoea and anaemia.

Thiamin-deficiency is a very common consequence of severe undernutrition. The thiamin-deficiency disease, Beri-Beri, is usually limited to regions where the diet consists mainly of polished rice or starchy tubers like cassava. Thiamin is found in many animal and vegetable foods, particularly in the outer layers or germs of cereals. First indications of deficiency are general weakness, neuritis and finally oedema.

Iron-deficiency (anemia) is prevalent within almost all undernourished children, as well as with many women in developing countries. The causes are manifold: iron- or vitamin-deficiency in the diet, but also infections and parasites. Iron is found mainly in meat, pulses and various vegetables.

4.2 Food-needs in disasters

The WHO recommendations for the nutrition of different age-groups are given in the appendix (tables 7-9). With children and adolescents it has to be considered that they - because of their physical growth - have an increased need for food energy and nutrients per kg bodyweight. In many developing countries such amounts are not reached even in normal times; nevertheless they should serve as a target in disasters. PAG (1977) and VILLE de GOYET et.al. (1978) give three levels of food energy needs.

At emergency subsistence level, about 6.7 MJ (1,600 Kcal)/day/person should be provided, which will help to keep people alive until further relief is organized. This level of energy intake will only support body basal functions; no productive work is possible at this time since this low energy intake results in weight losses and the cut-off point to undernutrition is easily reached. Thus, the emergency subsistence level should only be applied for very short time periods, for a maximum of a few weeks.

At temporary maintenance level about 7.5 - 8.0 MJ (1,800-1,900 Kcal)/day/person will be provided. This level will maintain life and health of the victims and will permit slow recovery with graded physical activity. In the long run this energy intake will also result in weight losses and therefore should only be applied as long as necessary. For physiological risk groups (chapter 3.4.1.1) a supplementary feeding programme must be implemented in order to prevent severe undernutrition.

The normal rehabilitation level conforms to the full WHO-recommendations, at least 10.0 - 12.6 MJ (2,400 - 3,000 Kcal)/day/person. This allows a rapid recovery and heavy physical activities, such as reconstruction of buildings, farm-work etc..

Protein requirements are given in the WHO recommendations (see appendix, table 7). With extreme food shortages, physiological risk groups need an additional protein ration, particularly in cases of insufficient energy intake. For children, pregnant and lactating women this additional requirement is estimated at 15 - 20 g protein/day. Nevertheless, the diets provided should always be sufficient in energy since with insufficient energy intake protein will be employed for energy purposes instead of supplying the synthesis of various body tissues (energy metabolism has absolute priority). Extreme protein intakes are a physical stress for the renal system and can create some disorders in the long run; as an immediate effect water requirement will be increased which can create problems when there are drinking water shortages (DRECOLL 1968, p. 436).

Because of the varying content of nutrients in food, a diversified diet containing many different foods is the best guarantee for a regular provision of all essential nutrients. Food energy intake should be supplied by the three main foodstuffs as follows:

- protein, appr. 10 %
- fat/oil, 20 - 30 %
- carbohydrates, more than 50 %

4.3 Comment on the nutritive value of food relevant to emergency relief

4.3.1 Local food

The local food patterns in all countries of the world provide sufficient amounts of essential nutrients for a healthy adult if the energy requirements are covered by such a diet. Most often this is also true for children and adolescents. Therefore local foods, instead of unusual (or even unfamiliar) foods, should be preferably chosen as often as possible. Organisations in charge of food distribution should be familiar with what is usually eaten in different countries and regions in order to choose appropriate commodities in times of disaster (see appendix, table11). Doing so has considerable advantages:

- The beneficiaries are familiar with the foods supplied and will accept them.
- People know how to handle and prepare the food delivered.

Further advantages of the strategy of employing local foods are given in chapter 6. The energy- and protein-content of some foods frequently used in disaster relief are listed in table 2.

4.3.1.1 Cereals

The different kinds of cereals (rice, wheat, sorghum, maize, oat, barley, rye) represent the quantitatively most important proportion of most diets in the world. They serve as staple foods and as the main source of carbohydrates

Table 2: Nutritive value of some foods frequently used in emergency relief (according to DANISH RED CROSS et al. 1978, annex 6)

item	food energy		protein	fat	amounts		
	KJ/100 g	Kcal/100 g	g/100 g	g/100 g	g/1000 KJ	g/1000 Kcal	g/20 g protein
cereals	1,460	350	10	1- 5	68	285	200
pulses	1,460	350	20	1- 2	68	285	100
oilseeds/nuts	2,090-2,390	500-700	20-25	34-65	48-34	200-145	100-80
milk, fresh or reconstituted 1)	270	64	3.3	3.6	370	1,560	600
milk powder, full cream	2,090	500	25.5	27.5	48	200	78
skim milk, fresh or reconstituted 1)	140	34	3.4	0.1	715	2,940	590
dried skim milk	1,500	360	36	4	67	280	55
fish-meal	1,550	370	70-75	8-10	65	270	27-29
dried fish with bones	1,300	310	63	6.3	77	320	32
oil	3,760	900	-	100	26	110	-
sugar	1,670	400	-	-	60	250	-
suppl. food mixtures for children (CSM,WSB,FAFFA 2))	1,550	370	20	6	65	270	100

1) milk prepared from milk powder

2) see table 3

(food energy) and protein. Cereals contain considerable amounts of protein (7-15 %) which are usually of good quality. Limiting amino acids[1)] can easily be supplemented by combining cereals with other protein-containing foods. Therefore deficiency diseases, such as pellagra with maize- or sorghum-diets (poor in tryptophan), can occur only with extremely monotonous diets.

Cereals contain appreciable amounts of iron and other minerals, as well as various vitamins of the B group. All minerals and vitamins of the cereal grain are mainly located in the outer layers and the germ; when the grains are polished and low-extraction (light coloured) flour is produced, these minerals and vitamins will be separated with the bran. The lighter the flour, the higher the nutrient losses. Nutrients could later be supplemented or fortified by special processes but this would make sense neither economically nor (at least partially) physiologically. Above all, cereals are a good source of dietary fibres, which play important roles in regulating the bowel function and detoxicating the intestinal contents.

4.3.1.2 Pulses (legumes) and oilseeds

Pulses (beans, peas, lentils, sweetpeas, lupines, soya beans, peanuts) have a very high protein content (20-30 % on an average; soya up to 40%). Their protein is of good quality and combines ideally with cereal protein so that some mixtures reach the biological value of milk protein. Besides that, pulses provide an appreciable amount of food energy because of their high carbohydrate and fat content. Thus, pulses are an important constituent of weaning foods.

1) An essential amino acid which, referring to human requirements, has the lowest concentration in a given protein and, therefore, represents a limiting factor in the protein-biosyntheses of metabolism.

Also, pulses contain remarkable amounts of iron and B-vitamins; quite high amounts of carotenes (pro-vitamin A) are found in beans, peas and lentils. Beans, peas and lentils are very easy to store. Nevertheless, pulses high in fat (e. g. peanuts), are, in tropical climates, susceptible to fungi; some mould fungi (Aspergillus flavus) produce the highly toxic and carcinogenous aflatoxin. Peanuts, therefore, must be stored under good air circulation and should not be injured.
Oilseeds (sesame, sunflowerseeds) also have a remarkably high protein and a very high fat/oil content.

4.3.1.3 Roots and tubers

Roots and tubers (yams, cassava, sweet potatoes,potatoes etc.) primarily serve as sources of carbohydrates; they contain only a little protein (1 - 2 %) which can lead to a lack of protein in the diet and an increased incidence of kwashiorkor in regions where they are the staple food in a very montonous diet. In such cases, supplementation of the diet with foods high in protein (pulses, animal foods) is advisable. This is particularly true for infants in the weaning period because they have relatively high protein and energy requirements. The leaves of the cassava plant contain substantial amounts of protein and, consumed as vegetable or salad, they are a good (additional) source for iron, calcium, carotene (pro-vitamin A) and vitamin C.

4.3.1.4 Vegetables and fruits

Vegetables and fruits are very high in moisture and consequently very low in energy content. They are rich in minerals and vitamins, particularly vitamin C and carotene (pro-vitamin A).Green, leafy vegetables, such as cassava-leaves, are also fairly rich in protein.

4.3.1.5 Animal food

Animal food (meat and meat products, fish and other sea foods, milk and milk products,eggs)are in most developing countries only rarely consumed; in times of disaster even less. Except for fish, these products, have only little importance in supplying nutrients for the people mentioned. In some countries fish are dried and salted and are then easy to store over a long time. Fish are an important source of protein, calcium and iron.

Animal proteins generally have a higher biological value than single proteins of vegetable origin. Quite small amounts already increase the nutritive value and palatability of almost any meal. In some countries the consumption of animal products is prohibited temporarily or even permanently for religious or traditional reasons.

In times of disasters, animal products are usually not necessary in order to provide adequate amounts of nutrients to the stricken population. When available, fish, eggs or milk can be a useful supplement. A cautious and appropriate handling, particularly with milk, is however a necessary pre-condition.

4.3.1.6 Oils and fats

Oils and fats are high-concentrated sources of food energy and increase the energy content of any meal considerably. Milk fat - but not vegetable fat, in general - contains vitamin A and small amounts of vitamin D. An exception is red palm-oil with its very high content of carotenes. Thus, it is an important source of vitamin A in some West African countries.

4.3.2 Foods, frequently employed in disaster relief

Previous food aid has brought some foods into countries where, up to that time, they were totally unfamiliar or only accessible for small segments of the population. This leads to problems if these foreign foods are not accepted or their proper method of preparation is unknown. Besides, sometimes this provokes changes of food patterns which are not always sensible in their nutritional aspects and quite often associated with detrimental economic consequences when creating a dependency on imported foods (e.g. wheat, milk powder ; STEVENS 1978, p. 57; BETHKE 1980; p. 328).

4.3.2.1 Milk powder

Milk powder (full cream- and skim milk powder), a surplus commodity of the European Economic Community, has frequently and in substantial amounts been employed in food aid. This finds its explanation not only in the assumption of a general protein gap within developing countries (an assumption strongly held until recent years), but also in the free provision of milk powder to the aid organisations.

From a physiological and nutritional point of view, milk has to be considered a valuable food. It is a good source of food energy, protein (of high biological value), fat, vitamins and minerals.

Full cream milk powder has a fairly high energy content; yet on account of the separation of the milk fat, the energy content of dried skim milk (DSM) is reduced substantially (full cream milk: 570 Kcal/l, skim milk: 240 Kcal/l). Because of its low energy content, DSM is not suitable for weaning babies and toddlers. Therefore, DSM should only

- if at all necessary - be used as a protein fortification of normal meals, e.g. in supplementary or therapeutic feeding programmes (see chapters 3.4.4.2 and 3.4.4.3 resp.).

In the process of skimming, the fat-soluble vitamins A und D are also removed. DSM is therefore usually fortified with these vitamins which, nevertheless, can not always guarantee a sufficient supply. Analyses of dried skim milk being used in some health centers of North-Sumatra found no vitamin A activity at all although the label claimed the milk was fortified with this nutrient(KUSIN 1976, p. 291).

Milk powder contains the carbohydrate lactose. Because of lactose intolerance, which is widely prevalent in developing countries, severe problems can appear when milk powder is employed in emergency relief. Milk powder should, therefore, not be used in relief programmes, particularly if it is likely that people will have to consume substantial amounts of it over a fairly long time (see chapter 4.3.3).

Despite its obvious popularity among aid organisations and its abundant use, milk powder is only to a certain extent a suitable product in rational food aid and in disasters it should be employed only very cautiously. Being aware of these problems, the Swiss Department of Foreign Affairs, Division of Humanitarian Aid, published in 1980 guiding principles for shipments of milk products to developing countries (SCHERTENLEIB 1981, p. 91 ff.). In accordance with them, the following general instructions for the employment of milk and milk products can be formulated:

1. The employment of milk products may at no time impede or even prevent measures which are suitable for a solution of the causes of a given food or protein shortage.
2. Milk powder must not be generally employed when basic food requirements of the population are not yet covered.
3. Pregnant and lactating women and infants should have priority.

4. Milk donations must, at no time, compete with breast-feeding, the local food production, or the local market system; the latter, if it is capable of providing those in need with the necessary items.

5. Shipments of milk products should be understood as supplementary to the provision of local staples.

6. Apart from urgent relief actions in acute crises, the provision of milk powder and other milk products must not alter the local food patterns, nor provoke trade-dependencies for foods which have to be imported.

7. Milk powder may only be distributed by qualified personnel, who must be able to teach the beneficiaries the proper way of preparing and consuming milk products.

8. With the distribution of milk products all precautions must be taken to guarantee the necessary hygiene, as well as the quality and proper constitution of drinking milk. This is particularly important with milk for babies and toddlers.

4.3.2.2 Sweetened condensed milk

Sweetened condensed milk (SCM) was originally meant to sweeten coffee or tea, but in many developing countries it is nowadays increasingly (mis)used to feed babies and toddlers (DALIBOR 1982). However, sweetened condensed milk, because of its very poor nutrient content, is no suitable substitute for breastfeeding or special infant foods. The admixture of sugar certainly increases the energy content above that of skim milk, but protein and vitamin contents are still far below the nutritional requirements of infants. In addition, it is quite likely that because of the sweet flavour, this product will be heavily diluted which will result in a energy-deficient diet for the child. Since the sweet flavour determines food habits in a - nutritionally speaking - negative way, it is advisable to use oil or fat instead of sugar as sources of food energy. Therefore, sweetened condensed milk should be used neither for feeding children nor for any other group of the population, even in disasters.

4.3.2.3 Meat extract

Meat extract is of minor nutritive value. In some African countries, it is consumed as a substitute for locally eaten locust bean balls (rich in energy and protein), without reaching their fairly high nutritious value. Besides, meat extract contains substantial amounts of salt, a high intake of which is disadvantageous.

4.3.2.4 Processed baby food

Imported processed baby foods are much more expensive and not always of better quality than locally produced, well-balanced weaning-foods. Therefore, they should not be included in imported food aid commodities.

4.3.2.5 Processed food mixtures

Processed food mixtures basically consist of local foods and are sometimes supplemented with dried skim milk in order to increase the protein content. Nevertheless, even without using DSM, it is possible to achieve a high protein content of good quality. These food mixtures consist of cereals (60 - 70 %), pulses (20 - 30 %) and various other foods (see table 3).

Processed food mixtures provide about 1,470 - 1,680 KJ (350 - 400 Kcal)/100g and on an average 15 - 20 g protein/100g. They are particularly valuable for supplying the specific nutrient needs of the physiological risk groups (chapter 3.4.1.1), and this makes them ideal for use in emergencies. They should not be used for the general population since these people are primarily short in food energy. Employing high protein food mixtures in these cases is not necessary and usually a waste of scarce resources.

Table 3: Ingredients and nutritive value of some processed food mixtures (according to PAG 1977, p. 78; DANISH RED CROSS et.al. 1978, annex 5; VILLE de GOYET et.al. 1978, p. 60)

Food mixture and its ingredients	Average nutritional values per 100g MJ/Kcal	protein	fat
Blend of cereals, vegetables and DSM[1)]			
CSM (Corn Soy Milk) 25 % soy beans, 5 % corn, 68 % rice, DSM[1)], vit.and min.	1.6 / 370	20	6
WSM (Wheat Soy Milk) 20 % soy beans, 73 % wheat, DSM[1)], vit. and min.	1.5 / 360	20	6
SUPERAMINE (Algeria) - 10 % DSM[1)], 56 % pulses, 28 % wheat, vit.and min.	1.4 / 340	20	3,5
FAFFA (Ethiopia) - 18 % soy beans, 5 % DSM[1)], 10 % pulses, 57 % wheat	1.4 / 340	20	2,5
Blend of cereals and vegetables			
BALAHAR (India) - 25 % peanuts, 10 % DSM[1)], 10 % pulses, 65 % wheat, vit. and min.	1.5 / 360	22	4
INCAPARINA (Central America) corn flour, cotton seed flour, vit. and min.	1.6 / 370	28	4
Other blends and concentrates			
SEF(Supplement-Enriched-Food) - 69 % wheat, 10 % DSM[1)], 7 % fish-protein concentrate, 9 % sugar, 4 % oil	1.6 / 400	20	5
SEMPER I - cereals, DSM[1)], fish-protein concentrate, oil	2.0 / 480	15	18
FPC (fish-protein concentrate)			
Type A	1.5 / 360	75	8
Type B	1.4 / 340	65	8

1) DSM = dried skim milk

4.3.3 Lactose intolerance

4.3.3.1 Introduction

With good reason, the topic of lactose intolerance has gained popularity, illustrating in a very impressive way that also physiologically speaking, Europeans and North-Americans cannot always be taken as a representative example of the world population. To question euro-focused manners of acting is even more urgent, if - as it is the case with milk-consumption - a threat to health and well-being of the people concerned can occur.

It is possible to comment on this often-controversial matter by taking into account some basic aspects of digestion-physiology and by considering the relevant literature. This latter usually reports on surveys carried out in clinics. Hardly documented, on the other hand, are the practical experiences of the employment of milk or milk-products with people who are lactose intolerant. Experts of organisations with experience in emergency relief (e.g. WFP, FAO) stated in personal discussions, that lactose intolerance did not become a problem even under disaster-assistance-conditions. In order to come to a experience-based estimation of this problematic subject in the future, every reader is kindly asked to contribute with any relevant information or literature.

4.3.3.2 Etiology, causes and symptoms

In infant nutrition, milk has similiar importance all over the world. In adulthood, however, only for Caucasians[1)]

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1) Caucasians: ethnic group, originating from the indo-european (-german) language-area = Europeans in the Old and New World.

does it serve as a source of different nutrients. Most non-Caucasians, starting during infancy, partially or totally lose the capability to split the milk carbohydrate lactose into its two components (glucose and galactose), which is done by the enzyme lactase, being located in the mucosa-layer in the small intestine.

The cause of this inability, called lactose intolerance, is either a total lack of lactose, or its deficient activity. In these cases lactase will not be split and therefore not be absorbed. Unchanged lactose, passing into the large intestine, creates an increase in the osmotic pressure, followed by an influx of water and minerals into the intestine and an expansion of the faecal matter. Symptoms of lactose intolerance are:

- liquid stool; diarrhoea with severe mineral- and water-losses
- unchanged lactose will be fermented in the large intestine by bacterial flora; the gas of this process gives the patient intestinal disturbance, flatulences and colics (FICKLER and LEITZMANN 1980, p. 395).

4.3.3.3 Forms of lactose intolerance; diagnosis and therapy

The congenital form of lactose intolerance describes a pathological, genetically determined enzyme deficiency which is effective from the first day of life and, therefore, will even with mother's milk create the above mentioned symptoms of intolerance. This form is very rare and is only of little global importance.

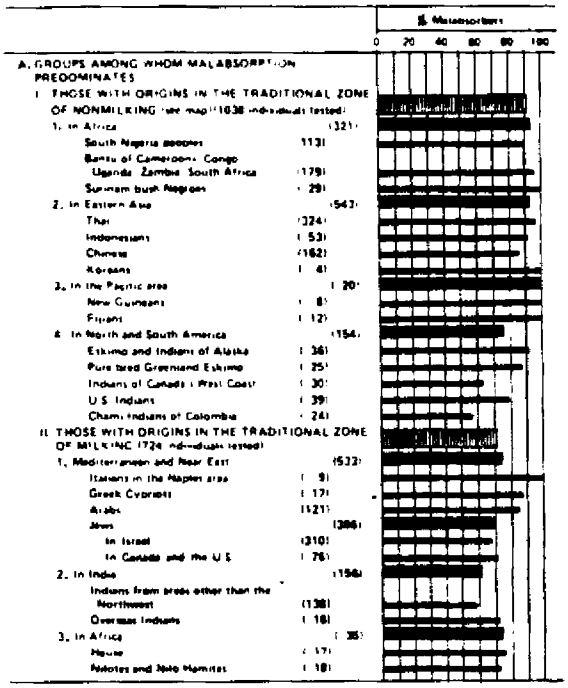
The primary form of lactose intolerance becomes apparent at the age of 1 to 4 years, during infancy (JONES and LATHAM 1974, p. 262). The underlying decrease of lactase activity is genetically determined and can be seen as a normal, physiological state of development. Only in a

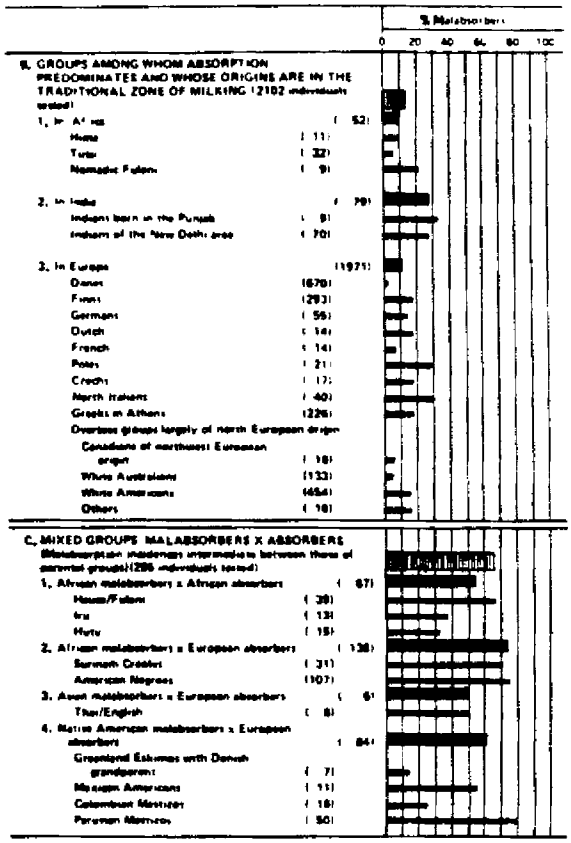
few ethnic groups, such as the Caucasians and some African nomads, is the capability to utilize milk as a nutritious food beyond weaning (probably by mutation) retained. Within 60 to 100 % of all other ethnic groups this genetically determined decrease of lactase activity (figure 6) is prevalent, thus being the most important form of lactose intolerance in developing countries. If milk is regularly consumed after weaning, adaption to certain amounts of lactose is possible. Symptoms of intolerance only appear when more than a certain amount of milk is consumed. Thus, e.g. one glass of milk, not drunk on an empty stomach, but during a meal, will not cause any problems in most cases. Gastro-intestinal diseases, as well as a poor milk consumption can precipitate and/or aggravate the decrease of lactase activity.

The secondary form of lactose intolerance is caused by all diseases impairing the mucosa-layer of the intestine. Such illnesses are e.g. diarrhoea, infections and parasite diseases. The secondary form is most frequently associated with protein-energy-malnutrition (PEM), since the aspects of the case are, besides diarrhoea and infections, determined by severe lack of protein; this leads to a general lack of enzymes with lactase most severely affected. With PEM highly prevalent in developing countries, in addition to the genetically determined primary lactose intolerance, this secondary induced disappearance of lactase has to be reckoned with. Studies in infants recovering from (PEM induced) gastroenteritis showed, that diarrhoea was prolonged with a lactose formula (JONES and LATHAM 1974, p. 262). Therefore, it seems advisable to employ only low lactose diets in the treatment of PEM, despite statements of milk's harmlessness in the treatment of kwashiorkor (ROTHMAN et al. 1980, p. 196).

The diagnosis of lactose intolerance is usually made by the lactose tolerance test. This is done by measuring the response of blood glucose after giving 50 g lactose or 2 g lactose/kg body weight in a 10 % water-dilution.

Figure 6: Incidence of lactose malabsorption among adults of various ethnic groups (JOHNSON et al. 1974, p. 218)





A flat curve of the blood glucose response (less than 20 mg/100 ml) almost always indicates a lack of lactase (RENNER 1974, p. 134). However, lactose intolerance, diagnosed by this test, does not prove that those persons cannot drink any milk at all, since 50 g of lactose correspond to 1 l of milk. Such an amount is very rarely drunk at one time, and the average daily consumption in developing countries is much lower. Additionally, it was found that the severity of intolerance symptoms decreased, in correspondence to a spectrum stretching from lactose-dilution over skim milk to full-cream milk. This effect is explained by the various constituents of milk, especially by its fat content, which extends the transit time through the stomach and, hence, mitigates the intolerance symptoms. Solid food which is consumed together with milk has a very similiar effect. Various studies give evidence, that even individuals, found to be lactose intolerant by the lactose tolerance test, are capable of drinking small, nutritionally appreciable amounts of milk, without suffering the above mentioned intolerance symptoms (STEPHENSON and LATHAM 1974, p. 302, JACKSON and LATHAM 1978, P. 301).

An adequate therapy for lactose-induced symptoms is to reduce the consumption of lactose-containing foods, whereby the diet is designed according to the severity of the symptoms.

4.3.3.4 Relevance of lactose intolerance in developing countries

Lactose intolerance only then becomes a problem when the amount of lactose consumed with the food is not tolerated. The tolerance level of milk for lactose intolerant persons differs from individual to individual; it lies between 60 ml (= 3 g lactose) and 1 l (= 47 g lactose), with an average of 200-250 ml (FICKLER and LEITZMANN 1980, p. 397),

which makes it possible to drink 1-2 glass of milk without any trouble (JONES and LATHAM 1974, p. 270). The average milk consumption in developing countries is less than 100 ml/person/day (industrialized countries: 200-400 ml). It must be considered though that in cities, because of higher income and availability of milk, the consumption can be higher than in rural areas.

Problems, which are existent in developing countries despite the usually very small milk-consumption, are partially caused by the food aid-promoted increase of milk-consumption, partially by treatments of PEM after infancy, using food mixtures which contain milk powder as the main protein source. With the limited ability of the enzyme lactase to adapt, side effects, such as diarrhoea, are the consequence. This not only causes rejection of milk (FICKLER and LEITZMANN 1980, p. 397; JONES and LATHAM 1974, p. 270), but also prolongs diarrhoea when it is employed in the treatment of PEM, and leads to heavy nutrient losses and dehydration, endangering infants in particular.

These problems can be solved by the following (FICKLER and LEITZMANN 1980, p. 397f.):

1. Abandonment of large amounts of milk and milk products, particularly in the treatment of PEM (kwashiorkor and marasmus) after infancy. Instead, local, lactose-free protein sources, such as pulses etc. and in the PEM-therapy lactose-free protein formulas should be preferably used.
2. The use of fermented milk products such as yogurt, kefir, cheese (in which lactose is already split by various bacteria and fungi). In many developing countries a number of various milk products is already used, and these are much better tolerated by the people than pure milk.
3. Using milk powder with its lactose already split by enzymatic processes. Because of the high cost of production and the nutrient losses during storage, its employment neither became popular, nor can it be recommended.

Referring to the use of milk powder in emergency assistance, the following statements, or respectively recommendations, can be given (see also chapter 4.3.2.1):

Lactose intolerance is a considerable obstacle to the use of milk powder in emergency relief in developing countries, since it is (under such circumstances) quite likely that large amounts of the delivered foods, e.g. milk powder, will (have to) be exclusively consumed for many days. The nutritional and general health status of the victims could then be drastically worsened. Therefore, the lactose content of foods for emergency assistance should be low enough to prevent lactose intolerance symptoms even with a long-term, exclusive consumption of this food. This means that milk powder should not be employed in disaster relief, especially not for feeding the total affected population. For the use in supplementary and therapeutic feeding programmes, other products are recommended, which additionally have the advantage of consisting of locally available foods. Amount and quality of protein in such already quite common food mixtures is comparable to products using milk powder as a protein source (see table 3).

If milk (powder) has to be employed in a given relief action, it should only be used either for babies who cannot be breast-fed (considering their specific nutritional needs), or as a supplementary food in amounts which will not cause any lactose intolerance symptoms.

In the PEM-therapy of children older than 2 years, one should, as a precaution, refer to protein sources which are not based on cow's milk. With a moderate consumption of milk products, immediate and severe effects are quite unlikely to occur.

Further information on milk and milk products is given in chapter 4.3.2.1. In case a delivery of milk products is unavoidable or even suitable to the given situation, the guiding principles for the shipment of milk products to developing countries (see chapter 4.3.2.1) must be closely watched.

5 FOOD AND CULTURE

In the past it has been too often neglected that food aid in disaster areas also must include psychic, mental and religious, i.e. cultural aspects of nutrition. It seems to be necessary and reasonable to make this important aspect much more well known, since the largest proportion of the food aid donated by western nations is determined either by purely physiological or market-political considerations (e.g. milk powder, milk products, sugar, wheat; all surplus commodities). Besides, it is rather the exception than the rule that a disaster means an immediate, direct danger to life, which could justify aid actions that , exclusively or firstly, aim to cover the purely physiological (material) needs. Even with a given threat to life, this acute emergency phase generally comprises only a short time period within the whole event (see chapters 2.3 and 3.1).

Nevertheless, it is the reality of the situation and in accordance with the western way of thinking that persons in charge of food aid in disasters mainly or even exclusively think about purely physiological or economic aspects; these aspects are expressed in terms of food energy - or nutrient needs, or else are determined by availability or purchase costs. The strong emphasis on physiological requirements is explained by the fact that contemporary food and nutrition sciences are dominated by the so-called causal-analytical, modern[1)] type of science, which in its experimental-quantifying way of thinking and investigating, restricts itself to establishing abstract systems of conception and rules within the functional-physical sphere of nutrition. Because of its

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1)Here, the term "modern" is used in its actual meaning of "contemporary", "current", not as the positive opposite of "backward", "behind the times".

immaterial nature, the psychic aspect is not taken into account or, at least, is of minor interest (BLASIUS 1973, p. 14 ff.).

Sometimes, those who decide on or implement emergency relief actions feel obligated to already given, material facts or confirmed and guided by certain academic statements. Nevertheless, they should consider that western societies, because of their contemporary economic supremacy, tend to transfer, without examination, their own way of thinking and explanation-patterns. These patterns are valid in industrial societies, but not necessarily in all other cultures and societies, where sometimes very different sets of values exist. The modern[1)], urbanized man in western societies is not automatically the cultural representative of all people, and this is also true of the value systems and explanation patterns in the field of nutrition. Yet most of the assessments of food habits foreign to those of the West turn out to be judgements, which describe the foreign behaviour not as a difference but as a deviation. The standard is exclusively the modern[1)] concept of food, which is limited to the physiological, economic and, to a certain extent, organoleptic properties of food (GARINE 1970, p. 9).

The fact that nutrition not only means the satisfaction of physiological food energy - nutrient needs becomes obvious by recognizing that many plants and animals are suitable foods, but every society accepts and utilizes only a small proportion of the whole range. Intensive investigations of this area of life called "nutrition" disclose that nutrition is also connected with elementary aspects of our existence, referring not only to the individual person in his physical, mental and spiritual existence, but also to the position (status) of a person in his society. Food habits[2)] can vary considerably (even

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1) see explanatory note on p. 64.
2) Food habits consist of attitudes, believes, traditions, habits, customs, preferences, avoidances, taboos ets. towards nutrition and foods.

within the same country), with various factors determining the food patterns. Such factors are (CUTHBERTSON 1964, p. 449):

- the traditional tribal structure of family groups, clans, and lineages, in that, e.g. certain food may be taboo for members of certain clans, families or groups of families, lineages etc.
- the age-group system in that each age group has its own set of taboos
- sex structure, with specific food systems for adult males, adult females, male children and female children
- occupational food systems
- traditional organizations (often called "secret societies")
- "occasional" food systems, connected with a variety of conditions such as pregnancy, death in the family, various ceremonies.

The high complexity of this area of life is generally recognized among experts who describe the cultural food preferences as the result of the interaction of food supply and tradition on the one hand, and the necessities of the material and social environment on the other. The strength of the influence of certain factors varies considerably between different cultures; in Hindu cultures for example food and meal patterns are a fundamental part of the religious system and social structure and are influenced by concepts quite alien fo Christian civilisation (AYKROYD 1961, p. 69).

These cultural characteristics are anything but voluntary, lax regulations. On the contrary, they form a rather tight net of values and guiding principles, which - particularly in traditional societies - for example determine the affiliation to certain subgroups of the society[1)]. A strong, external

1) This shows that man - as a social being - straight from his birth socializes his natural functions, which means converting them into culturally determined forms (GARINE 1970, p. 10).

alteration of food habits characterized in this way amounts to a symbolic breaking with the society (PFEFFER 1974, p. 12 f.). For example,the rice eating Bengali in 1944 preferred to starve rather than to eat wheat flour (CUTHBERTSON 1964, p. 440).

An additional, important aspect in the determination of food behaviour is - beside cultural factors - the economic situation of the people concerned. This factor gains importance especially with a marginal or even insufficient income; then, it can function as the primary factor, before social and cultural determinants (AYKROYD 1961, p. 69; LEVINSON 1974, p. 63 f.; PAYNE 1977, p. 110).

If nutrition is understood as a "total social-phenomenon", as it is called by Marcel STRAUSS (TEUTEBERG 1974, p. 44) in the sense explained above, then every intervention in the sphere of nutrition requires an intense investigation of the local circumstances and living conditions. Any judgement on the given nutrition situation and eventual formulation of measures have to be based on a thorough knowledge of the existing social customs related to food and diet (JYOTHI et al.1963, p. 410).

Here it is neither possible nor advisable to give a comprehensive list and description of all the particulars from different countries and cultures which have to be considered. It should rather be the task of the organizations involved, or their partners in the country concerned, to acquire knowledge and appreciation of this matter. By this means, it can most nearly be guaranteed that a given social structure will not be identified with a socio-cultural "vacuum", but instead the almost always existing and functioning, inter-acting and survival-ensuring socio-cultural systems will be recognized and respectfully considered. Such socio-cultural structures are for example (FISCHER 1981, p. 15):

- traditional leadership roles
- traditional forms of the social and economic organization
- traditional forms of communication
- traditional "know-how"
- traditional comprehension of cause and effect

The following examples will indicate on which levels of the social structure undesirable disorders can arise and - by considering the given situation - how actions should be designed, in order to promote and support any self-help efforts in a sensible way:

- It can be important to consider which person is generally in charge of the communal food distribution.
- Quite often the village structures are strictly hierarchical (usually patriarchal in addition), which makes it useful to integrate the heads of the village (or society) in the aid action.
- The delivery of aid commodities to individuals will collide with the conception of societies, in which even small sub-groups (such as families, clans etc.) are characterized by strictly hierarchical assignments of competence; in such cases, e.g., only the eldest (or the man, or the woman) is allowed to take the role of the representative.

A comprehensive representation of the specific food patterns, general food attitudes and special food habits of various vulnerable groups of a society (differentiated by geographical regions of the continents) is given in VEMURY and LEVINE (no date).

Those readers interested in the subject of nutrition anthropology may find FITZGERALD (1977) and JEROME et al. (1980) quite useful publications, since they deal with nutrition in its cultural context which is sometimes illustrated by examples.