Optimal amount of dietary protein for treating adult malnutrition 1,2

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Since Cicely Williams described the syndrome of kwashiorkor more than 6 decades ago, the optimal protein intake for treating malnutrition has been a recurring topic of debate. Early on and for several years, the syndrome of kwashiorkor became closely associated with protein deficit, and both conditions became almost synonymous with malnutrition. The United Nations set up the Protein Advisory Group to assess the magnitude of the “protein gap” in the diet of developing countries, and dried skimmed milk became the staple of recovery diets around the world, resulting in diets that provided as much as 20% of energy as protein.

The tide of high-protein diets began to turn in the late 1960s and 1970s, when the need for high-protein diets came into question (1). But as recently as 1985, Ashworth (2) pointed out that “a considerable number of present-day health workers (and policy makers) still hold the view that protein-rich foods are paramount in the prevention and treatment of malnutrition.” Although historically the debate focused primarily on childhood malnutrition, the concerns applied to adult malnutrition as well. The article by Collins et al (3) shows that this issue continues to be a matter of practical relevance today.

Concerns about the potential adverse effects of high-protein diets during the early phase of recovery from severe malnutrition are well known. Severe depletion of body protein is associated with impaired protein digestion, impaired amino acid transport and oxidation, and reduced rates of whole-body protein synthesis (4). Because the only mechanism for increasing nitrogen retention is increasing its incorporation into body proteins, a high-protein diet relative to the capacity for protein synthesis would lead to amino acid overload. In turn, this would cause an increased renal solute load and high demand for urea and ammonia production, potentially leading to kidney and liver failure. For many years, guidelines for the management of severe protein-energy malnutrition in children have recommended that recovery be started with a low-protein diet, usually equivalent to 40–60% of the recommended dietary allowance and to 20–30% of the maximum goal (5). Equivalent levels for adults have not been as clearly defined, but many of the concerns about high protein intake also apply. Efficacy studies on different protein intakes in adults are certainly needed.

The aim of the study by Collins et al (3) was to compare outcomes of severely malnourished adults receiving a diet containing either 8.5% or 16% of energy as protein. But although the diets were of similar energy content, they differed substantially in composition other than protein content. The low-protein (LP) diet contained 36% of energy from oil, whereas the high-protein (HP) diet contained no oil. The LP diet also contained sugar (17% of energy), again compared with none in the HP diet. No information on actual intake of food or oral rehydration solution was collected. The study found a significant difference in mortality and rate of weight gain in favor of the LP diet only in patients with edematous malnutrition. But because more than two-thirds of all cases were nonedematous (marasmic), and 73% of the deaths occurred in this group, the actual effect of the LP diet on malnutrition mortality is uncertain. The loss to follow-up was substantially higher in the HP group (7% of the sample compared with ≈1% in the LP group). If we assume that those lost to follow-up in the HP group survived, the survival rates of both diets were not dramatically different: 77% and 81% for the HP and LP diets, respectively.

Another difficulty in interpreting these data arises from the large imbalance in treatment groups. Of the 83 edematous patients admitted to the study, 56 (68%) were included in the LP group. The reverse is true of the marasmic patients: of 377 enrolled, only 86 (23%) were included in the LP group. This imbalance resulted in part from the authors’ preferential allocation of the cases considered more severe to the “better” LP diet. In a clinical trial, a conclusion such as this would likely have led to termination of the study and universal use of the treatment considered superior. In this case, besides revealing that the authors had already formed a strong opinion about the result of their ongoing study, the decision resulted in a biased allocation to treatment groups. Reallocation of patients from the HP to the LP group also complicated interpretation of the results.

The difficulties of performing research under famine and refugee conditions cannot be overemphasized. Longitudinal studies are particularly problematic. The study population may change, with the more severe cases dying in the early stages of a famine epidemic. The relief workers become more skilled, delivering better nutritional care and improving case management as time passes. Losses to follow-up may increase during the later stages of a famine, when large numbers of people abandon their land and move. Disease outbreaks, common in refugee camps, may also increase losses to follow-up.

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Unfortunately, there is no shortcut to good data. The only answer to logistical difficulties is to develop novel experimental designs and statistical tools to deal with the constraints of the research environment, as exemplified in some recent studies (6). Descriptive studies and objective reports of personal experiences may also be valid contributions. A solid research design is particularly important when the statistical tests used involve certain assumptions about experimental design and characteristics of the sample, such as balanced or random allocation to treatment groups and independence of measurements.

It is a sad commentary on the current world situation that expertise in refugee health and nutritional management of emergency situations continues to be in high demand. Unfortunately, research in this field has been neglected for many years. Commenting on the Somali famine of 1992, Graham (7) complained that “although we will spend upward of one billion dollars for the military to protect the relief supplies... we spend next to nothing in developing and evaluating simple foods that might increase the likelihood of survival of the starving.” The author also found “unfortunate that 25 years after the famines of Bihar and Biafra, we still use exactly the same foods for rehabilitation.” I would add that these much needed field studies can and should be of equivalent scientific quality to those performed under more favorable conditions in metabolic research units.

REFERENCES