

Simplifying the WHO Guidelines for Managing Severe Malnutrition

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In this issue, Hossain, *et al.*(1) compare the outcome of 30 severely malnourished children managed according to the protocol of the Institute of Child and Mother Health (ICMH) with those of 30 children at another hospital treated according to WHO guidelines(2). They claim that the ICMH protocol is as efficacious in terms of rate of recovery and survival as the WHO guidelines, and simpler. They report four ‘adaptations’:

- (i) F-100 milk was given from admission onwards at a constant rate of 100kcal/kg/day, instead of having two phases with F-75 milk (100kcal/kg/day) in the initial phase and F-100 *ad libitum* (150-220kcal/kg/day) in the rehabilitation phase;
- (ii) standard ORS was given for oral rehydration, instead of ReSoMal;
- (iii) locally-prepared mineral solutions and multivitamins were given separately, instead of a combined mineral-vitamin mix (CMV); and
- (iv) feeds were made with liquid cows’ milk instead of milk powder.

Only the first two of these ‘adaptations’ are substantive as the WHO guidelines already provide recipes for local preparation of mineral solutions (K, Mg and Zn) and for making feeds from fresh cows’ milk(2).

Finding simpler ways to manage severely

malnourished children is desirable, but can we be confident that the ICMH feeding and rehydration adaptations are safe and efficacious on the evidence presented in this paper? I do not believe so, due to limitations in design and interpretation.

First it is not clear if the children in the two groups were comparable at admission. For example, no comparative anthropometric or morbidity data are reported. If the ICMH children were less wasted or fewer had severe infections or diarrhea or anorexia, then this would lead to bias which could invalidate the findings.

Second, the sample size is too small to detect an increased risk of mortality with any confidence, as the authors correctly indicate.

Third, although the ICMH protocol provides an energy intake from F-100 of 100kcal/kg/day in keeping with the WHO target for the initial phase, the protein and lactose intakes are 2.5 times higher. High lactose at admission may cause or exacerbate diarrhea, and high protein intake stresses the liver and kidneys and may increase the risk of death in children with a compromised metabolic state. According to the WHO guidelines, children are considered ready for the rehabilitation phase and F-100 only when they demonstrate a good appetite and no or reduced edema. Whether the ICMH’s omission of the initial phase poses dangers will depend on the children’s metabolic state and too few details are provided about the proportion with medical complications or poor appetite, or the degree of edema.

Fourth, the number of children who received oral rehydration is not reported and no specific outcome measures related to rehydration were included, apart from mortality. Severely malnourished children have excess body and intracellular sodium, even though plasma sodium may be low. The WHO guidelines state that sodium should be restricted and a low-sodium rehydration solution (ReSoMal) containing 45mmol Na/L is advised. The new standard ORS contains 75mmol Na/L. When the WHO guidelines were first developed, the standard ORS had 90mmol Na/L. In a randomized double-blind therapeutic trial of ReSoMal vs 90mmol ORS in 130 severely malnourished children with acute diarrhea, fewer in the ReSoMal group developed overhydration (5% vs 12%) but the difference was not significant(3). A trial to compare ReSoMal with the new 75mmol ORS, with a sample large enough to detect differences in mortality, has been recommended to determine the optimum Na concentration(4). It would be inappropriate to draw conclusions regarding the efficacy of this particular adaptation from the evidence in this study.

Fifth, the authors report rapid weight gain (average 11g/kg/day) in the ICMH children with a fixed intake of F-100 of 100kcal/kg/day. The reason for the rapid weight gain is that children were allowed as much family food as they could eat. Intakes of at least 150kcal/kg/day are needed to support this rate of weight gain.

Efficacious simplifications to the WHO guidelines would be welcomed but they must be based on sound evidence, and this requires robust methodology and sufficient sample size. In severe malnutrition, cells, organs and systems cease to function normally. Repairing the damaged metabolic machinery is best done in an orderly manner and before any attempt is made to promote

weight gain. Adaptations that do not accord with well-established principles could be harmful. Although a case fatality rate of 6.7% is encouraging, one wonders if the ICMH children who survived in this study happen to be ones whose metabolic machinery was not severely compromised and who were able to withstand the additional stress imposed on them by the feeding and rehydration adaptations.

I do not consider that this study is sufficiently robust to warrant a switch to standard ORS or omitting the initial phase of treatment.

Competing interests: None stated.

Funding: None.

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