Author’s response to reviews

Title: Severely malnourished children with a low weight-for-height have a higher mortality than those with a low mid-upper-arm-circumference: I. Empirical data demonstrates Simpson's paradox

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Author’s response to reviews:

Dear Dr Kirkpatrick,

Thank you for reviewing our manuscript entitled “Severely malnourished children with a low weight-for-height have a higher mortality than those with a low mid-upper-arm-circumference: Nutrition community deceived”.

We are grateful for your insightful comments. We have complied with the Editor's request to remove any comments that could be construed as overtly confrontational from our paper, as well as complying with the other instructions i.e. dividing our paper into 3 shorter papers. We have resubmitted our revised manuscript as the following series of articles, entitled:

1. “Severely malnourished children with a low weight-for-height have a higher mortality than those with a low mid-upper-arm-circumference: I. Empirical data demonstrates Simpson’s paradox”
2. “Severely malnourished children with a low weight-for-height have a higher mortality than those with a low mid-upper-arm-circumference: II. Systematic review of the literature”

3. “Severely malnourished children with a low weight-for-height have a higher mortality than those with a low mid-upper-arm-circumference: III. Effect of case-load and case-fatality-rate on malnutrition related mortality”

In the first paper, we examine the mortality experience of 76,887, 6-60 months old children admitted for treatment of SAM, of whom 3,588 died. They were divided into 7 different diagnostic categories for analysis of mortality rates. Our results show that the mortality rate was higher in those children fulfilling the WHO2006 WHZ criterion than the MUAC criterion.

In the second paper, we report the results of a literature search of reports which examined the mortality associated with WHZ and MUAC to diagnose SAM. Twenty-one reports from the literature were analysed and these studies were all flawed in various ways and do not support the abandonment of WHZ as an important independent diagnostic criterion for the diagnosis of SAM.

In the third paper, we combine the results case-fatality rates with case-loads derived from community studies to examine the potential preventable deaths of SAM children from the community that would be identified by either WHZ or MUAC criteria alone. Application of the mortality rates to the caseload predicted from community surveys shows that elimination of either diagnostic criterion would lead to an unacceptable number of SAM children being denied treatment.

We believe this series of papers deserves consideration in Nutrition Journal, as the findings of this study provide clarity that all the criteria for the diagnosis of malnutrition need to be retained and methods found to identify those children with a low WHZ with a MUAC above the cut-off in the
community so that they will not be abandoned. If MUAC only programs are promoted then, in some countries, more than half the malnourished children will be denied treatment and will be at high risk of death.

We thank you for your consideration of our work.

Sincerely,

Emmanuel Grellety & Michael Golden