Fortified condiments and noodles to improve health problems in children and adults – a literature review and meta-analysis

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Objectives
Micronutrient deficiencies imply a considerable burden of disease for many middle and low income countries. Examples are reduced growth, high anemia prevalence or increased infection rates. Several strategies have shown to be effective in improving micronutrient deficiencies in different target populations and with different nutrient carriers [1-3]. However, the impact of fortified condiments as well as fortified noodles is less well documented. Our aim was to assess the impact of micronutrient fortified condiments and noodles on patient relevant outcomes in children and adults.

Material and methods
We conducted a literature review in electronic databases (Medline and Cochrane-Library; from inception to December 2013). In addition, we screened homepages of relevant organisations (e.g. Global Alliance for Improved Nutrition, United Nations) and relevant journals with developing country focus. We included randomised controlled trials which assessed the impact of micronutrient fortified condiments or noodles on patient relevant outcomes (e.g. anemia rates, morbidity, cognition) in children and adults (5-50 years). We defined condiments as salt, seasonings, soy sauce, fish sauce, bouillon, sprinkles and powder. Two reviewers extracted data and assessed risk of bias. Data was pooled with meta-analysis.

Results
Of 1046 retrieved studies, 14 RCT were included for analysis. Micronutrient fortification of condiments and noodles increased haemoglobin levels by 0.68 g/dl (95%-CI: 0.51 to 0.85; 15 comparisons in 14 RCT with 8845 included children and adults) [Figure 1]. Thus, micronutrient fortification led to a reduced risk of having anemia (risk ratio 0.59 [95%-CI 0.44 to 0.80]; data of 11 comparisons in 10 RCT) [Figure 2]. Morbidity and cognition were rarely assessed in the primary studies. Due to poor reporting, the risk of bias is unclear. However, two RCT with low risk of bias led to similar results for the investigated outcomes haemoglobin change and anemia rates compared to those of the main analysis.

Key findings
Micronutrient fortified condiments and noodles can be a strategy to improve health problems in children and adults due to micronutrient deficiencies, beyond supplementation programs and fortification of staple food. Risk of bias in the included studies is unclear and should be considered in the final conclusion.

References

Competition interests
The authors declare that they have no competing interests. The study was supported by the Nestlé Research Centre. The supporting source had no influence on study design; in the collection, analysis and interpretation of the data; in the writing of the abstract and the decision to submit the abstract for publication.