Small-quantity lipid-based nutrient supplements, together with malaria and diarrhea treatment, improve growth and development in young Burkinabe children

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Background
Preventive zinc supplementation reduces the incidence of diarrhea and increases growth1-3. The impact of zinc is less certain when provided as fortified food or home fortification products4. The optimal dose of zinc in lipid-based nutrient supplements (SQ-LNS) remains to be determined.

Objectives
To assess the appropriate dose of zinc in SQ-LNS by comparing biochemical and zinc-related functional responses among young children who receive different zinc doses in SQ-LNS or tablets.

Methods
- Community-based, partially double-blind, placebo-controlled, randomized clinical trial in rural Burkina Faso
- Inclusion criteria: 9 mo of age, parental consent
- Exclusion criteria: Hemoglobin (Hb) <50 g/L, weight/length <70% NCHS median, edema, chronic or congenital diseases, history of peanut allergy or anaphylactic reaction
- Cluster randomization of 34 communities to intervention (IC) or non-intervention (NIC) cohort
- Eligible children in IC were randomly assigned by concession to 1 of 4 intervention groups (Figure 1)
- Hemoglobin and rapid diagnostic test for malaria (RDT) at 9 mo
- Length and weight at 9 and 18 mo in both cohorts
- Plasma zinc at 9 and 18 mo in randomly selected subgroup in both cohorts
- Neurobehavioral development at 18 mo in a sub-group (4 grps only)

In intervention groups only:
- Weekly home visits for morbidity surveillance and distribution of LNS and tablets
- Free treatment of reported diarrhea, fever and confirmed malaria

Results

Table 1: Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Age (mo)</th>
<th>Boys (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIC</td>
<td>3220</td>
<td>9.4 ± 0.4</td>
<td>50.3</td>
</tr>
<tr>
<td>LAZ</td>
<td>-1.21 ± 1.10</td>
<td></td>
<td></td>
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<tr>
<td>WAZ*</td>
<td>-1.42 ± 1.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WLZ*</td>
<td>-0.99 ± 1.05</td>
<td></td>
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</tr>
<tr>
<td>Hemoglobin (g/L)</td>
<td>89 ± 15</td>
<td></td>
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<tr>
<td>Malaria RDT (%) positive</td>
<td>61.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low plasma zinc (&lt;65 µg/dL, %)</td>
<td>35.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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References

Conclusion
SQ-LNS along with malaria and diarrhea treatment reduced stunting prevalence from 39% to 29%, decreased wasting and anemia prevalence and resulted in higher motor, language, and personal-social development scores compared with the non-intervention cohort.

Lack of impact on plasma zinc concentration suggests inadequate adherence to zinc tablet and/or inadequate absorption.

Unable to answer original research question on optimal dose of zinc because biochemical and functional responses to zinc were not detected.

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