Role of Zinc in Child Health and Survival

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Zinc deficiency is a prevalent global condition with serious consequences for child health and development. When severe, it causes short stature, immune compromise, infectious disease complications and shortened life expectancy. Even less severe zinc deficiency results in important health problems. Zinc deficiency is one determinant of stunted linear growth, and may impede children from reaching their developmental potential. Children with zinc deficiency are more susceptible to infections. Numerous trials comparing oral zinc supplements with placebo have been done. A recent meta-analysis found that zinc-supplemented children had a 20% lower incidence of diarrhea than unsupplemented children. The benefit appears to be greatest for preschool children 12 months of age or greater and for those who were more stunted at enrollment. Children with zinc deficiency are also more susceptible to acute lower respiratory infections (ALRI)/pneumonia. Meta-analysis of randomized controlled trials of daily or weekly zinc supplementation found a 35% reduced incidence of ALRI using specific clinical criteria for the outcome. As with diarrhea, children who are stunted may benefit more. Zinc deficiency may also put children at risk of more severe clinical malaria, although the data are still limited for this outcome. Stimulated by the proven preventive effects of zinc for diarrhea and ALRI, zinc has also been tried as adjunctive treatment for diarrhea and pneumonia. The most recently published systematic review found that the duration of diarrhea is shortened by 20% by providing zinc along with oral rehydration solution. Several of these diarrhea treatment trials have also shown a reduction in the incidence of diarrhea and pneumonia in the 2–3 months following the treated diarrhea episode. An initial trial in children with severe pneumonia showed that zinc as adjunctive treatment along with antibiotics shortened the duration of the illness; however, two subsequent trials have not replicated this benefit. Several additional trials are underway to determine if there is a therapeutic benefit for pneumonia. Large trials
of zinc for treatment of diarrhea over a 1–2 year period in Bangladesh and India have shown a reduction in hospitalizations and child deaths. Additional evidence for an effect of zinc supplementation comes from preventive trials conducted in Zanzibar and Nepal. These trials along with several smaller ones have been subjected to a meta-analysis. While there was no effect on child mortality in infants 1–11 months of age, preschool children 12 months old or more had an 18% reduction in all-cause mortality. Further analysis suggests that there is a reduction in diarrhea and pneumonia cause-specific mortality in these trials. Zinc deficiency is an important contributor to stunting and increased risk for infectious diseases morbidity and mortality.