

Abdulmalik Khafilat

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Zinc is a trace metal that is present in the brain and contributes to its structure and function. Limited evidence from both animal and human studies suggests that zinc deficiency may lead to delays in cognitive development.

Potential contribution of maternal zinc supplementation during pregnancy to maternal and child survival:

The importance of maternal zinc deficiency as it relates to fetal growth and development, complications of pregnancy, labor and delivery, and maternal and infant health, the mechanisms through which zinc deficiency could influence health outcomes are well described.

It has been suggested that maternal zinc deficiency may compromise infant development and lead to poor birth outcomes. Low plasma zinc concentrations reduce placental zinc transport and may affect the supply of zinc to the fetus.<sup>1</sup> Zinc deficiency also alters circulating levels of a number of hormones associated with the onset of labour, and because zinc is essential for normal immune function, deficiency may contribute to systemic and intra-uterine infections, both major causes of pre-term birth.<sup>1,2</sup> Low birth weight and prematurity are significant risk factors for neonatal and infant morbidity and mortality. It has been hypothesized that zinc supplementation may improve pregnancy outcomes for mothers and infants. Zinc deficiency in humans is widespread and is more prevalent in areas where the population subsists on cereal proteins. Conditioned deficiency of zinc is seen in many diseased states. A mild deficiency of zinc in pregnancy is associated with increased maternal morbidity, abnormal taste sensation, prolonged gestation, inefficient labor, atonic bleeding and increased risks to the fetus. Among the urban poor, a marginal zinc intake during pregnancy was associated with increased risk of preterm and very preterm delivery. Factors responsible for zinc deficiency in premature infants include high fecal losses of zinc, low body stores of zinc at birth, and increased zinc requirement during rapid growth. Zinc supplemented infants demonstrated improved linear growth velocity and maximum motor development scores. Marginal and moderate growth impairment in children as a consequence of inadequate zinc intake has been reported from many developed and developing countries. In one study from Japan, 21 prepubertal children were diagnosed to have zinc deficiency. The caloric intake, growth velocity, serum zinc, and plasma insulin-like growth factor-1 increased significantly in the zinc supplemented group. The clinical manifestations of zinc deficiency include growth retardation, hypogonadism in males, neurosensory disorders, cell-mediated immunological dysfunctions, and skin changes.

Ways to alleviate zinc deficiency

1. The overall nutritional status of the mother during pregnancy is a significant contributor to both maternal and perinatal mortality and morbidity and improving the quality, or nutrient density, of the mother's diet is known to improve pregnancy outcomes.
2. Given the limited effect observed for zinc supplementation on pregnancy outcomes, it may be more prudent to focus research on identifying ways of improving the overall nutritional status of

women in low-income areas.

3. UNICEF should help in promoting antenatal multiple micronutrient supplements which include zinc, iron and folic acid, for all pregnant women in developing countries, given that they are likely to have low micronutrient intakes from diet alone.

4. Zinc supplementation.

5. Public health benefit of zinc supplementation in pregnancy should be encouraged in developing and underdeveloped countries.