

## **Serum Copper, Zinc, Calcium and Magnesium Levels in Mothers with Offspring Affected by Neural Tube Defects: A Case-Control Study.**

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**Introduction:** Neural tube defects is a health problem in Cuban population.

**Objective:** To measure the maternal serum levels of copper, zinc, calcium and magnesium in mothers with offspring affected by neural tube defects (NTD) and to examine a possible relationship between the serum concentrations of these micronutrients and occurrence of NTD.

**Methods:** Maternal serum blood samples were obtained at delivery from 56 healthy pregnant women and 56 mothers who had NTD affected offspring, including those alive, stillbirths and elective pregnancy termination. Copper, zinc, calcium and magnesium levels in serum were measured by flame atomic absorption spectrometry and were compared between the two groups of mothers. The research was conducted in accordance with the basic principles of the Helsinki's declaration.

**Results:** Serum zinc levels were determined to be significantly lower in the study group compared with the control group, while copper levels were significant elevated in the study group (all p values < .05). There was a negative correlation between serum zinc levels and serum copper levels. However, no association between calcium and magnesium serum levels and increased risk for the development of NTD was observed.

**Conclusions:** High maternal serum levels of copper and lower level of zinc during pregnancy were associated with NTD in offspring. If folic acid supplementation is given, additional zinc supplementation should be considered for the further decrease in the recurrence risk of NTD.

**Key words:** Neural Tube Defects, zinc, folic acid supplementation.

