

The Impact of Maternal Micronutrient Levels on Risk of Offspring Neural Tube Defects in Egypt

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Abstract : Neural tube defects (NTD) are important causes of infant mortality. Poor nutrition was essential factor for central nervous system deformation. Mothers gave NTD offspring had abnormal serum levels of micronutrients. The present research was designed to study the effect of maternal micronutrient levels and oxidative stress on the incidence of NTD in offspring. The study included forty mothers; twenty of them of 30.9+7.28 years had conceived fetuses with NTD were considered as cases; and twenty mothers of 28.2 + 7.82 years with healthy neonates. We determined serum vitamin B12 and folic acid by using radioimmunoassays. Also, serum zinc was assessed using atomic absorption spectrophotometry. While serum copper and iron were measured colorimetrically and serum ceruloplasmin was analyzed by radialimmunodiffusion. Cases showed significantly lower levels of folic acid, vitamin B12 and zinc ($P < 0.0005, 0.01, 0.01$ respectively) than that of the control. Concentrations of copper, ceruloplasmin, and iron were markedly increased in cases as compared to controls ($P < 0.01, 0.01, \text{ and } 0.05$ respectively). In conclusion, the current study clearly indicated the etiology of NTD cannot be explained with one strict etiologic mechanism, on the contrary, an interaction among maternal nutritional factors and oxidative stress would explain these anomalies. Vitamin B12, folic acid, and zinc supplementations should be considered for further decrease in the occurrence of NTD. Preventing excess iron during pregnancy favors better pregnancy outcomes.

Keywords : ceruloplasmin, copper, folic acid, iron, neural tube defects, oxidative stress, vitamin b12, zinc

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