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ADJUSTING PLASMA CONCENTRATIONS OF FERRITIN, RETINOL, AND ZINC AFFECT THE PREVALENCE OF MICRONUTRIENT DEFICIENCIES IN CHILDREN BUT NOT IN WOMEN

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Background and objectives: The nutritional biomarkers plasma ferritin, zinc and retinol concentrations are influenced by subclinical inflammation/infection leading to over or under-estimate the real prevalence of iron deficiency (ID), zinc deficiency (ZD), and vitamin A deficiency (VAD) in populations. The aim of this study was to assess changes in ID, ZD, and VAD prevalence among women 15-49 years, and children 12-59 months old after adjusting for subclinical infection/inflammation.

Methods: Infection/inflammation was assessed by the measurement of plasma C-reactive protein (CRP) and alpha 1-acid-glycoprotein (AGP) by immuno-turbidimetry in 1496 children, and 1082 women recruited during a national representative cross sectional nutritional survey in Senegal. Plasma ferritin, plasma zinc, and plasma retinol concentrations were measured by ELFA, AAS, and HPLC, respectively. Published correction factors were used to remove the influence of infection/inflammation from each biomarker and the prevalence of ID, ZD, and VAD were compared before and after adjustment.

Results: In the children, inflammation decreased the prevalence of ID by 27% (56% vs. 82%; n= 1431; P<0.0001), increased the prevalence of ZD by 7% (50% vs. 43%; n=1148; P<0.0001), and the prevalence of VAD by 7% (24% vs. 17%; n=1418; P<0.0001). In contrast, although acute and chronic infections were detected in 11%, and 10% among the women, respectively, the adjusted prevalence was for ID 39%, for ZD 58%, and for VAD 1.9%, and was not significantly different from the measured one.

Conclusions: Measures of acute phase proteins (CRP and AGP) are needed to estimate the real prevalence of iron, zinc, and vitamin A deficiency in children but not in adolescent and adult women in Senegal.

Key words: micronutrients deficiency, inflammation, children, women, Senegal.