

Abstract

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Vitamin A supplementation in iodine-deficient African children decreases thyrotropin stimulation of the thyroid and reduces the goiter rate.

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BACKGROUND: Vitamin A (VA) deficiency (VAD) and iodine deficiency (ID) often coexist in children in Africa. VAD may affect thyroid function and the response to iodine prophylaxis.

OBJECTIVE: The aim was to investigate the effects of supplementation with iodine or VA alone, and in combination, in children with concurrent VAD and ID.

DESIGN: A 6-mo randomized, double-blind, 2 x 2 intervention trial was conducted in 5-14 y-old South African children (n = 404), who, on average, had mild-to-moderate VAD and ID. At baseline and after 3 mo, children received 1) iodine (191 mg I as oral iodized oil) + placebo (IS group), 2) VA (200000 IU VA as retinyl palmitate) + placebo (VAS group), 3) both iodine and VA (IS+VAS group), or 4) placebo. At baseline, 3 mo, and 6 mo, urinary iodine (UI), thyroid volume, thyrotropin (thyroid-stimulating hormone; TSH), total thyroxine (TT(4)), thyroglobulin, serum retinol (SR), and retinol-binding protein (RBP) were measured.

RESULTS: SR and RBP increased significantly with VA supplementation ($P < 0.05$). For UI, SR, and RBP, there were no significant treatment interactions between iodine and vitamin A. The 3-factor and all three 2-factor interactions were significant for thyroid volume, TSH, and thyroglobulin ($P < 0.001$), whereas none of these interactions were significant for TT(4). There was a clear effect of VAS without IS on TSH, thyroglobulin, and thyroid volume; all 3 variables decreased significantly ($P < 0.05$).

CONCLUSIONS: Iodine prophylaxis is effective in controlling ID in areas of poor vitamin A status. VA supplements are effective in treating VAD in areas of mild ID and have an additional benefit-through suppression of the pituitary TSHbeta gene, VAS can decrease excess TSH stimulation of the thyroid and thereby reduce the risk of goiter and its sequelae.

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