

## Effects of vitamin A and iron fortified supplementary food on vitamin A and iron status of rural preschool children in Vietnam

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### Abstrak

Vitamin A deficiency, iron deficiency anemia and growth retardation have long been three of the main health problems in Vietnam. The National vitamin A distribution program for preschool children started since 1988. However, some studies outside Vietnam showed that this method does not maintain the retinal status until the next vitamin A capsule distribution. (Bloem et al 1989). Iron intervention and fortified supplementary feeding have not been done in preschool children. The objective of the study was to investigate the effects of vitamin A and iron fortified soybean milk (SBM) supplementary feeding on nutritional status of Vietnamese preschool children. The study consisted of 5 parts: The relative bioavailability test of iron in SBM fortified with 300 EtgRE and 5 mg of iron pyrophosphate, the acceptability test of fortified SBM by preschool children, the study in the per/-urban area, the study in the rural area and the intervention study in the rural area. The fortified SBM with a relative bioavailability of 45% was very well accepted by the rural preschool children attending day-care centers. The studies in the peri-urban and rural areas were done at day-care centers on boys and girls aged respectively 15-72 and 8-62 months, 438 and 417 children. Inadequate dietary intake, high infectious diseases and high worm infestation were detected in both areas. The rural children had significantly worse nutritional status in terms of serum retinol (SR) and physical growth status. However, the prevalence of anemia was about 20% in both areas. Considering this condition, the 5 months intervention study was carried out in the same rural area with the same subjects and number. Before randomly allocated into three groups, the stool of all subjects was examined and Mebendazole was given to those parasite egg positive subjects. The groups received respectively fortified SBM (FSBM), unfortified SBM (UFSBM), and cassava cookies (CC). The FSBM, UFSBM, CC contained respectively 150, 150, 45 kcal; 300, 50, 0 pgRE and 6.8, 1.8, 0.7mg of iron. These supplementary foods were given daily, 6 days a week, at the DCC and provided an additional in percentage of RDA the following: FSBM 12% of energy, 70% of vitamin A, 30% of iron; UFSBM 12% of energy, 12% of vitamin A, 8% of iron; CC about 3% of energy, 0% of vitamin A and iron. The daily food of the subjects provided 88.8% energy, 104% iron, 78.5% vitamin A in percentage of (FAO/WHO/UNU 1985, FAO/WHO 1988) 's RDA.

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Five months of intervention significantly increased serum retinol (SR), hemoglobin (Hb), and physical growth status of all three groups. The best effect was found in the FSBM group. The difference in effect between groups was marginal for SR ( $p=0.07$ ) and significantly different for Hb ( $p=0.02$ ). The serum ferritin (SF) significantly increased in the FSBM group only. The mean values of the FSBM group for weight, height, WAZ-score, HAZ-score were significantly higher than the CC group.

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The best effect found in the FSBM group could be the effect of vitamin A and iron fortification but also of the protein and fat of SBM. The last also explains the improvement found in the UFSBM group. The

increase of SR in all the three groups could be the effect of the "intervention" (Hawthorn) but also of deworming which was also shown by other studies. The increase in Hb and SF of the three groups could be related to age increase considering the length (5 months) of the intervention. The increase in Fib concentration could be related to the improvement of vitamin A status.

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The supplementary feeding using FSBM, preceded with deworming had an excellent effect on the improvement of SR and Hb concentration of preschoolers. Both fortified and UFSBM led to improved physical growth status of preschool children.

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As bioavailability of iron was low and the serum ferritin did not increase significantly, further research is needed: to identify iron compound suitable for fortification and higher level of iron (3 mg of elemental iron/30 g soybean milk powder), in combination of vitamin C for better effects of supplementation.