

FULL ABSTRACT

Efficacy of the Multiple Micronutrients Sprinkle to Improve Iron Status of Adolescent Girls in Islamic Religious School (Pondok Pesantren).

The dissertation is written in Indonesian.

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Anemia is one of nutrition problems in adolescent school girls and the highest prevalence in Indonesia was found in Tangerang which was 46 – 61%. This research aimed to formulate multiple micronutrients sprinkle (MMS) and to investigate their efficacy to improve hemoglobin (Hb), ferritin serum (SF) and transferrin receptor serum (STfR) levels of adolescent girls. A randomized, double blind, placebo-control trial were conducted for 150 anemic adolescent school girls, grade 9 – 12, aged 14 to 18 years old. The study was conducted in five Islamic Religious School (Pondok Pesantren) in Tangerang. All selected subjects were randomly allocated into 4 groups, each group received MMS twice a week for 16 weeks of 30 mg (Fe30), 25 mg (Fe25) and 20 mg (Fe20) elemental iron of ferrous fumarate plus other micronutrients contain (Se, Zn, Cu, ascorbic acid, riboflavin, pyridoxine, folic acid, cobalamine, vitamin A, vitamin E, malto dextrin and citric acid) and placebo (malto dextrin and citric acid) respectively. One-way ANOVA and ANCOVA were applied to analyze difference in variables tested. Before treatment, the results showed that there were no significant difference among the groups in ages, menarche, duration of menstruation, hemoglobin level, nutrition knowledge and BMI ($p > 0.05$) as well as nutrient intake except for iron and copper. Nutrition knowledge of the subjects were low and all nutrients intake were far below their RDAs. After treatment, there were no difference among the groups in compliance, the changes of α 1-acid glycoprotein, cytokine interleukin-6 and hepcidin ($p > 0.05$). A significant difference was found in the changes of hemoglobin (Hb), ferritin serum (SF), transferrin receptor serum (STfR) and body iron ($p < 0.05$). After controlling with confounding variables (ANCOVA test), the changes of Hb, SF and STfR was not related to potential determinants ($p > 0.05$) and the effects of MMS on the changes of Hb, SF and STfR is significant ($p < 0.05$). The prevalence of anemia decreased into 59.4 % and 35.1% for Fe20 and control groups, respectively. This study conclude that MMS was effectively improve Hb, SF and STfR levels and decrease the prevalence of anemia in adolescent girls and MMS contained 20 mg of elemental iron was the best to increase the iron store and to decrease the prevalence of anemia in anemic adolescent girls.

Keywords: efficacy, multiple micronutrients sprinkle, adolescent girls, iron status