

Micronutrient supplementation of female factory workers : impact on micronutrient status, morbidity and work productivity

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Abstrak

ABSTRACT

The study aimed to investigate the impact of 12 weeks supplementation with multi-micronutrient and iron-folate supplements on hematological status, morbidity and work productivity. Female factory workers were selected as the subjects because: high prevalence of anemia found in this group which might have health and economic consequences since anemia was related to decrease work productivity and decrease resistance to infection, and the increasing number of female workers in developing country.

A preliminary study was conducted to investigate the bioavailability of iron from a multi-micronutrient supplement compared to watery ferrous(II)-sulfate solution. In a randomized cross over design, 14 volunteers received 108 mg elemental iron as four tablets of multi-micronutrient supplements (each tablet contained 27 mg elemental iron) or as a solution of 537.60 mg Ferrous(II)-sulfate. Serum iron concentrations were measured at 0, 2, 4, 6 and 8 hours after dosing. The maximum serum iron level was significantly lower with multi-micronutrient supplement compared to ferrous sulfate solution but the time to reach the peak serum iron level was not significantly different between those two treatments. The median relative bioavailability of iron in multi-micronutrient supplement was 32.22%

The main study was conducted in a shoe factory, West Java. A total of 308 subjects were selected and divided randomly into three groups that respectively received multi-micronutrient (each tablet contained 27 mg elemental iron), iron-folate supplements (each tablet contained 200 mg ferrous sulfate equal to 60 mg elemental iron) and placebo. Multimicronutrient supplements and placebo were given three times per week and iron-folate supplements were given once a week. All of the supplementations were supervised and last for 12 weeks. Hematological assessed in sub sample of each group based on Willingness; making a total of 140 subjects.

Significant increments in the levels of hemoglobin, serum ferritin, and serum retinol were observed in multi-micronutrient group (0.6 g/dl, 13.44 ug/l, and 0.6 pmol/l respectively) and iron-folate group (0.3 g/dl, 11.26 ug/l, and 0.4 umol/l respectively); the increments were higher in multi-micronutrient group but not statistically different from iron-folate group. In the placebo group, hemoglobin level was decreased by 0.3 g/dl, serum ferritin was increased by 4.28 ug/l, and serum retinol was relatively constant. The prevalence of anemia and low iron status were decreased after treatment with multi-micronutrient (7% and 20.5%, respectively) or iron-folate supplements (91% and 12.8%, respectively). The anemia prevalence in placebo group was increased by 6.6% while the prevalence of low iron status was decreased by 2.5%. The morbidity was increased in all groups with the lowest increment was observed in multi-micronutrient group (65% in multi-micronutrient group compared to 14.1% in iron group and 22.4% in placebo group). The work

productivity was increased by 6.3% in iron group and 3.6% in multi-micronutrient group while it was relatively constant in placebo group. In conclusion, multi-micronutrient supplement had better impact on hematological status and reducing morbidity level compared to iron-folate supplement that had better impact on work productivity.