

## RINGKASAN

Anak SD merupakan tunas bangsa yang perlu mendapat perhatian dari segi pendidikan maupun gizi. Prevalensi anemi anak SD (6-12 tahun) di Indonesia masih cukup tinggi 24-35 % (Depkes RI, 1995) dan 47,2 % (BPS, 1996).

Penelitian ini adalah suatu penelitian *eksperimental*, dengan tujuan mempelajari pertambahan status hemoglobin (Hb) dan status gizi dari anak sekolah dasar kelas I-III (usia 7-9 tahun) di daerah endemis malaria yang mendapat suplement zat besi (Fe) dan suplement seng (Zn).

Sampel yang menjadi subyek penelitian dalam penelitian ini adalah anak sekolah dasar kelas I-III (usia 7-9 tahun) Di SD Inpres Panite II Kecamatan Amanuban Selatan Kabupaten Timor Tengah Selatan Propinsi Nusa Tenggara Timur, memiliki riwayat penyakit malaria setahun terakhir, terdapat pembesaran limpa, Hb < 12 g/dl. Subyek penelitian dibedakan atas 3 (tiga) kelompok yakni, kelompok Perlakuan I (standar) yang diberi Zn saja, kelompok Perlakuan II yang diberi Zn + Fe secara bersama-sama, dan kelompok Perlakuan III yang diberi Zn + Fe secara berselang-seling, masing-masing kelompok sebanyak 10 orang. Data yang dikumpulkan meliputi karakteristik keluarga (pekerjaan orang tua, pendidikan orang tua, pendapatan orang tua, dan jumlah anggota keluarga), riwayat kejadian penyakit penyerta lain, nafsu makan subyek penelitian, Kadar Hb (dengan metode cyanmethaemoglobin), pola makan, konsumsi zat gizi (energi, protein, zat besi, vitamin C dengan pendekatan DKBM), Tinggi Badan dan Berat Badan.

Hasil yang diperoleh ada perbedaan yang sangat bermakna kadar Hb *pre test* dan *post test* pada masing-masing kelompok yaitu, kelompok I (standar) yang diberi suplement Zn saja, kelompok II yang diberi suplement Zn + Fe secara bersama-sama, dan kelompok III yang diberi suplement Zn + Fe secara berselang-seling didapatkan pada semua kelompok masing-masing dengan  $p=0,000$  ( $p<0,05$ ).

Selisih rata-rata pengukuran kadar Hb meningkat dari kelompok I (standar) yang diberi suplement Zn saja sebesar  $2,7110 \pm 1,1943$  g/dl ke kelompok II yang diberi suplement Zn + Fe secara bersama-sama sebesar 3.8930

$\pm 1,6163$  g/dl, dan tertinggi pada kelompok III yang diberi Zn + Fe secara berselang-seling sebesar  $4,5900 \pm 1,8549$  g/dl.

Perbedaan pengukuran kadar Hb *post test* dengan uji *t* 2 sampel bebas di antara kelompok I (standar) dan kedua perlakuan (kelompok II dan kelompok III) menunjukkan ada perbedaan yang bermakna. Kelompok yang menunjukkan ada perbedaan yang bermakna terhadap pengukuran kadar Hb adalah kelompok I (standar) yang diberi Zn saja dengan kelompok III yang diberi Zn + Fe secara berselang-seling, nilai  $p = 0,002$  ( $p < 0,05$ ).

Pengukuran Berat Badan dan Tinggi Badan pada semua kelompok (kontrol maupun perlakuan) umumnya menunjukkan ada perbedaan yang sangat bermakna ( $p < 0,05$ ) sebelum dan sesudah perlakuan. Kenaikan selisih rata-rata pengukuran Berat Badan tertinggi dijumpai pada kelompok III sebesar  $1,0500 \pm 0,8317$  g dan terendah dijumpai pada kelompok I (standar) sebesar  $0,6000 \pm 0,3162$  g. Kenaikan selisih rata-rata pengukuran Tinggi Badan tertinggi dijumpai pada kelompok III sebesar  $1,1000 \pm 0,8000$  cm dan terendah dijumpai pada kelompok I (standar) sebesar  $0,5000 \pm 0,7630$  cm.

Perbedaan pengukuran rata-rata konsumsi zat gizi energi, protein, zat besi dan vitamin C di antara kelompok kontrol dan kedua kelompok perlakuan menunjukkan tidak ada perbedaan yang bermakna nilai  $p > 0,05$ .

Selisih rata-rata energi dan protein *pre test* dan *post test* pada semua kelompok menunjukkan ada perbedaan yang bermakna sebelum dan sesudah perlakuan ( $p < 0,05$ ). Selisih rata-rata Fe dan vitamin C *pre test* dan *post test* pada kelompok I (standar) yang diberi suplement Zn saja dan kelompok II yang diberi suplement Zn + Fe secara bersama-sama menunjukkan tidak ada perbedaan yang bermakna sebelum dan sesudah perlakuan ( $p > 0,05$ ).

Rata-rata protein hewani yang dikonsumsi subyek penelitian pada semua kelompok masih sangat rendah yaitu, berada di bawah angka kecukupan protein hewani yang dianjurkan ( $< 60$  % AKG protein hewani).

Terjadi peningkatan nafsu makan subyek penelitian pada semua kelompok (kontrol maupun perlakuan) yakni, terjadi kenaikan nafsu makan sebesar 46,6 % dari total subyek penelitian yang memiliki nafsu makan kurang/tidak baik menjadi baik.

Pemberian suplemen seng (Zn) saja, seng (Zn) + zat besi (Fe) secara bersama atau berselang-seling (interval waktu) dapat menurunkan angka kejadian penyakit sebesar 66,7 % , dan 100 % menghilangkan pembesaran limpa pada anak-anak SD yang anemia di daerah endemis malaria.

Mengingat cukup banyaknya sisi positif dari penelitian ini, maka perlu dikaji kemungkinan perlunya suatu program pemberian suplemen Zn dan Fe pada anak sekolah dasar yang mengalami anemia di daerah endemis malaria.



## SUMMARY

Elementary school children are those who will play important role in the future of this country. Their education and health deserve a serious attention. Unfortunately, the prevalence of anemia among Indonesian elementary school children (aged 6-12 years) remains high 24-35 % (Depkes RI, 1995), and 47,2 % (BPS, 1996).

This was an experimental study, This study was aimed to investigate the increase of hemoglobine (Hb) status and nutrition status in elementary school children year I - III (aged 7 - 9 years) in malaria endemic area who received iron (Fe) and zinc (Zn) supplements.

Samples were elementary school children year I - III (aged 7 - 9 years) in Elementary School Panite II, South Amanuban Subdistrict, District of Timor Tengah Selatan, Province of East Nusa Tenggara, with the criteria of having history of malaria in the last one year, showing spleen enlargement, and Hb less than 12 g/dl. Subjects were divided into three groups, i.e., group I (standard) that received Zn only, group II received Zn + Fe simultaneously, and group III received Zn + Fe alternately. Each group consisted of 10 subjects. The data collected was the characteristics of subjects' family (parents' occupation, education, income, and size of the family), history of accompanying disease, and subject's appetite, subject's Hb level (using cyanmethaemoglobine method), subject's diet pattern, subject's nutrient consumption (energy, protein, iron, and vitamin C using DKBM approach), height, weight, and nutritional status using WHO-NCHS standard approach.

Results showed a highly significant difference in pretest and posttest Hb level in each group, with p values in all groups of  $\alpha = 0.05$ ,  $p = 0.000$  ( $p < 0.05$ ). The difference of Hb level was found to increase from group I (standard) that received Zn supplement only ( $2.7110 \pm 1.1943$  g/dl), to group II that received simultaneous Zn + Fe ( $3.8930 \pm 1.6163$  g/dl), and finally to group III that received alternate Zn + Fe ( $4.5900 \pm 1.8549$  g/dl). Posttest Hb level between group I (standard) and treatment

groups (group II and III) showed significant difference with  $p = 0.010$ . Significant difference in Hb level was found between group I (standard) that received Zn only and group III that received alternate Zn + Fe, with  $p = 0.003$  ( $p < 0.05$ ).

Body weight and height in all groups also showed significant difference. The highest and lowest increase of average body weight difference was found respectively in group III ( $1.0500 \pm 0.8317$  g), and group I (standard) ( $0.6000 \pm 0.3162$  g), while those of average body height difference was found respectively in group III ( $1.1000 \pm 0.8000$  cm) and group I ( $0.5000 \pm 0.7630$  cm). Average nutrients consumption of energy, protein, iron and vitamin C in those groups, however, showed no significant difference ( $p > 0.05$ ). Pretest and posttest average energy and protein difference in all groups demonstrated highly significant difference ( $p < 0.05$ ). Pretest and posttest average energy and protein difference in group I (standard) and group II showed no significant difference ( $p > 0.05$ ), while that in group III showed significant difference ( $p < 0.05$ ).

Average animal protein consumed by the respondents in all groups remained lower ( $< 60\%$ ) than the recommended animal protein sufficiency rate. The appetite of the respondents in all groups increased 46.6% from low/moderate appetite to high appetite. The administration of Zn and Zn + Fe supplement, either simultaneously or alternately, reduce the incidence of the disease as much as 66.7%, and eradicated spleen enlargement in anemic elementary school children in malaria endemic area.

In view of numerous positive aspects in this study, a program to provide Zn and Fe supplement for anemic elementary school children in malaria endemic area is worth to consider.

## ABSTRACT

The objective of this study was to investigate the influence of iron (Fe) and zinc (Zn) administration on the increase of hemoglobine (Hb) level and nutrition status in anemic elementary school children in malaria endemic area.

This cohort experimental study was undertaken for 3 months using pretest and posttest control group design. Population consisted of 131 elementary school children of year I - III (aged 7 - 9 years) in Elementary School Panite II, South Amanuban Subdistrict, District of Timor Tengah Selatan, Province of East Nusa Tenggara. The samples were screened using the following criteria: having history of malaria in the last one year, showing spleen enlargement (spleen rate), and Hb of less than 12 g/dl (as measured by Cyanmethemoglobin method), and receiving Zn therapy. Screening by simple random sampling revealed 30 subjects. Using allocation random sampling they were divided into three groups, i.e., group I (standard) that received only Zn, group II received Zn + Fe simultaneously, and group III received Zn + Fe alternately. Before being given with supplement, those groups received antimalarial and anthelmintic drugs.

Results showed highly significant difference in pretest and posttest Hb level in each group with p values in all groups showed  $p = 0.000$  ( $p < 0.05$ ). The difference of Hb level was found to increase from group I (control) that received Zn supplement only ( $2.7110 \pm 1.1943$  g/dl), to group II that received simultaneous Zn + Fe ( $3.8930 \pm 1.6163$ ), and finally to group III that received alternate Zn + Fe ( $4.5900 \pm 1.8549$  g/dl).

Posttest Hb level between group I (standard) and treatment groups (group II and III) showed significant difference with  $p = 0.010$ . Significant difference in Hb level was found between group I (standard) that received Zn only and group III that received alternate Zn + Fe, with  $p = 0.003$  ( $p < 0.05$ ). However, group II and III showed no significant difference in posttest Hb level.

In view of numerous positive aspects in this study, a program to provide Zn and Fe supplement for anemic elementary school children in malaria endemic area is worth to consider.

**Keywords:** malaria endemic area, anemia, Hemoglobine(Hb), iron (Fe), zinc (Zn)