

**TESTS**

PERBEDAAN KADAR CRP DAN KADAR IgA ANAK  
BALITA GIZI KURANG BERDASARKAN KADAR SENG DI  
WILAYAH KERJA PUSKESMAS PENELEH KECAMATAN  
GENTENG KOTA SURABAYA



**OLEH:  
TREES**

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## SUMMARY

### ZINC-BASED DIFFERENCE OF CRP AND IgA LEVELS IN UNDERFIVES WITH UNDER NUTRITION AT THE WORKING AREA OF COMMUNITY HEALTH CENTER <sup>PENELEH</sup>, SURABAYA

Problems of malnutrition remains a public health problem in Indonesia. However, up to the moment the government focuses the attention only to the problem of macronutrient, particularly the problem of Protein Energy Malnutrition (PEM). In one hand, current studies on nutrition have disclosed more serious problems in micronutrient, particularly the deficiency of iron, iodine, vitamins, especially vitamin A, and zinc, while such nutrition problems are still emphasized on the underfives.

The deficiency of micronutrients, such as zinc, remains a public health problem in developing countries, including Indonesia. However, the prevalence of small-scale zinc deficiency had been disclosed through studies conducted in various places. Scattering data and survey, involving relatively small samples, have provided indication of the challenging problem in micronutrient.

In the small scale of studies in Central Java, West Java, and Lombok (West Nusa Tenggara) between 1997-1999 revealed that zinc deficiency in infants was ranging between 6%-39%, and the latest survey in nine provinces revealed that the mean of zinc deficiency prevalence in underfives was 31.9%, with a range from 11.7% (West Sumatra) to 44.6% (West Nusa Tenggara). In Indonesia, zinc deficiency in breastfeeding mothers was 25%, and in infants 17%.

The effect of zinc deficiency may have negative influence on immune response that takes place during the critical growth period. An experimental study on immune system involving humans was performed by Prasad (1998). The result showed revealed that T-cell function became unreliable when moderate deficiency occurs in human. Disordered immune system may lead to the increased risk of infectious diseases, while in the immune system the role of zinc is vital to undergo the function of cell-mediated immunity (CMI), particularly in Thymic Dependent Lymphocytes (T-cell).

Immunoglobulin A (IgA) has a function as the first barrier against microorganisms and cell proliferation within immune system, which is also highly influenced by zinc. In children with malnutrition, including zinc, disorder, the production of secretory IgA within their digestive system is also disturbed. The reduction of IgA level may lead to the entrance of gram negative bacteria into intestinal wall, facilitating the occurrence of septicemia.

Sepsis manifestations, such as fever, leucocytosis and tachycardia, are sufficiently sensitive, but they are not specific indicators of infection, since those signs cannot be employed as the marker of infection (Povoa, et al, 2004). Therefore, to ascertain the prognosis and monitoring of a disease, accurate information should be obtained on the estimation of the disease, quantitative

examination should be performed to identify acute phase protein (CRP) within the plasma or serum as the marker of inflammation.

Several literatures write that zinc has an important role in immunity system as a potential moderator of body defense against infection. Zinc plays a role in adaptive immunity, in which IgA hold the vital function. Infection may upset children's nutritional status, since infection may reduce food intake, impair nutrient absorption, and lead to direct loss of nutrients. Acute-phase infection and inflammation may result in lower level of serum zinc and reduce hepatic methalotionein, in which protein plasma itself is bound by CRP.

The study was an analytic observational, and the design was comparative study with cross-sectional data collection. Population in this study comprised all underfives with undernutrition aged 12-60 months at the working area of Community Health Center, Peneleh. They were screened to obtain underfives sub-population, aged 24-60 months, with undernutrition status based on Z score BW/A (-3SD to -2SD), and willing for blood sampling and interview. This sub-population comprised 101 infants, and the result of serum zinc levels were normal (13.00-19.00  $\mu\text{mol/L}$ ) and abnormal ( $<13.00 \mu\text{mol/L}$ ). Sampling was done using simple random sampling, with sample size of 28 underfives with undernutrition grouped into two groups, 14 underfives with normal zinc level and 14 underfives with abnormal zinc level. Collected data were processed manually using computer, and then the data were tabulated, analyzed statistically with descriptive statistics and Chi-Square analysis for data with nominal scale, Mann Whitney for data with ordinal scale, and independent T test for data with interval/ratio scale with difference significance level of  $p < 0.05$ .

Result showed no significant ( $p > 0.05$ ) in underfives' characteristics (age and sex), and family characteristics (occupation, education, income, expense for food, number of family members, mothers' level of knowledge), nutrient consumption pattern (energy, carbohydrate, protein, fat, and zinc) in underfives with undernutrition based on zinc level. There was no difference ( $p > 0.05$ ) in food taboo, environmental sanitation, housing and self-hygiene, and illness frequency in underfives with undernutrition based on zinc level.

The results of study using Chi-Square statistical analysis showed no difference between CRP level in underfives with undernutrition based on zinc with  $p = 1.000$  and the result of independent two-sample T test showed significant difference between IgA level in underfives with undernutrition based on zinc with  $p < 0.005$ . It is suggested in this study to provide nutrient dense foods such as shredded oyster or oyster-rich snack content, also considering the consumption of vegetables and fruits that are low in children under five with undernutrition, it is necessary to make alternative processing of vegetables and fruit as kovur.

## ABSTRACT

The effect of zinc deficiency may have negative influence on immune response that takes place during the critical growth period. Disordered immune system may lead to the increased risk of infectious diseases. Immunoglobulin A (IgA) has a function as the first barrier against microorganisms and cell proliferation within immune system, which is also highly influenced by zinc. In children with malnutrition, including zinc, disorder, the production of secretory IgA in their digestive system is also disturbed. The objective of this study was to analyze the difference of zinc-based CRP and IgA levels in underfives with undernutrition at the working area of Community Health Center, Peneleh, Surabaya.

The study was an analytic observational, and the design was comparative study with cross-sectional data collection. This sub-population comprised 101 infants, and the result of serum zinc levels were normal ( $>13.00$  pmol/L) and abnormal ( $<13.00$   $\mu$ mol/L). Sampling was done using simple random sampling, with sample size of 28 underfives with undernutrition grouped into two groups, 14 underfives with normal zinc level and 14 underfives with abnormal zinc level. Collected data were processed manually using computer, and then the data were tabulated, analyzed statistically with descriptive statistics and Chi-Square analysis for data with nominal scale, Mann Whitney for data with ordinal scale, and independent T test for data with interval/ratio scale with difference significance level of  $p < 0.05$ .

Result showed no significant ( $p > 0.05$ ) in underfives' characteristics (age and sex), and family characteristics (occupation, education, income, expense for food, number of family members, mothers' level of knowledge), nutrient consumption pattern (energy, carbohydrate, protein, fat, and zinc) in underfives with undernutrition based on zinc level. There was no difference ( $p > 0.05$ ) in food taboo, environmental sanitation, housing and self-hygiene, and illness frequency in underfives with undernutrition based on zinc level.

The results of study using Chi-Square statistical analysis showed no difference between CRP level in underfives with undernutrition based on zinc with  $p = 1.000$  and the result of independent two-sample T test showed significant difference between IgA level in underfives with undernutrition based on zinc with  $p = 0.005$ . It is suggested in this study to provide nutrient dense foods such as shredded oyster or oyster-rich snack content, also considering the consumption of vegetables and fruits that are low in children under five with undernutrition, it is necessary to make alternative processing of vegetables and fruit as koyur.

**Keywords:** CRP level, IgA level, underfives, undernutrition, zinc level