

The nutritional status of pregnant women is one of the indicators to measure the nutritional status of society. If the intake of nutrition for pregnant women from food is not balanced with the needs of the body, there will be a deficiency. Maternal and infant mortality rate in Indonesia are the highest in Southeast Asia. According to the Indonesian Demographic Health Survey in 2007, Maternal Mortality Rate (MMR) in Indonesia is 228 per 100,000 live births, while the Infant Mortality Rate (IMR) is 32 per 1,000 live births. Widyakarya Nasional Pangan dan Gizi VIII which took place in Jakarta, 17 to 19 May 2004 stated that one of nutritional problems in Indonesia is high

Keywords: Zinc supplementation; Newborn physical size

Introduction

Nutritional problems happened in every life cycle, starting in the womb (fetal), infant, child, adult and elderly. The period of the first two years of life is a critical period, because in this period, growth and development occurs very rapidly. Nutritional disorder that occurs in this period is permanent, cannot be recovered even nutritional needs during the next period fulfilled.

In Indonesia, many cases of malnutrition especially are likely due to the imbalance of nutrient intake, and the prevalence of anemia is still very high at 51%, and 45% in post-partum mothers. While the prevalence of women of childbearing age (WUS) suffered malnutrition in 2002 was 17.6% [3]. Malnutrition and anemia in pregnant women are

consumption rate of pregnant women in third trimester. Fat intake at most respondents obtained from fried foods. According to one respondent, egg and other animal side dish which usually consumed by fried. Increased rate of fat in third trimester may result in mobilization of fat. Decreased rate of fatty acids in early pregnancy and then increases will reflect the high intake of mothers during pregnancy and decrease of fat storage and lipogenesis towards the end of pregnancy.

Zinc: The average zinc consumption rate of respondents in treatment and control groups were still below RDA standard. Low intake of zinc in early pregnancy can contribute to growth retardation, low birth weight and premature birth. Zinc is very important because it is essential for cell division and tissues growth of the developing baby. Zinc deficiency also has long term effects on the baby such as immune system more susceptible to infection than also manifestation of developmental and behavioral problems in the future. Zinc deficiency which shown by the low zinc concentrations in plasma on pregnant women lead to 3-7 times an increase in premature rupture cases, 3 times greater occurrence of placental abruption and 9 times higher prevalence presence of normal plasma zinc. So intake of zinc in pregnant women should really be considered because it can affect the outcome at the time of delivery.

Physical Size of Born Babies and Apgar Score

Body length: Average body length of the born babies in treatment group was greater than control group.

Statistically, apart from food consumption rate of pregnant women, birth body length can be influenced by supplementation that given during the third trimester of pregnancy. Danesh et al [13] investigated the effects of high-dose zinc supplementation in pregnant women who have a history of preterm birth, given zinc supplements 50 mg / day in the zinc sulfate form. The study says the average weight of born babies in the zinc group is greater than the placebo group (2960.6g vs. 2819.0g). Average body length of born babies in the zinc group is also greater than the placebo group (49.8cm vs. 49.1cm). Results of other studies conducted in Jogja by Damayanti [14] showed pregnant women who have malnutrition status 4.4% gave birth to a short baby while 4.4% gave birth to babies with normal body length. Based on the statistical test, there is a relationship between nutritional status of pregnant women with body length birth ($p < 0.01$).

According to Cunnane [15] zinc affects the activity of several hormones such as human growth hormone, gonadotropins, sex hormone, prolactin, thyroid and corticosteroids. Levels of insulin-like growth factor 1 (IGF-1) increases in pregnant women who get zinc supplement. Increased of growth velocity due to zinc supplementation is associated with increased levels of IGF-1, it is suspected that effect of zinc on growth stimulation is done through changes of IGF-1 which circulating in the pregnant women body and get into the fetus through placenta, so it can affect the growth of the born baby's body length. Zinc interacts with important hormones which involved in bone growth, such as somatomedin-C, osteocalcin, testosterone, thyroid hormone, and insulin. Hence, zinc is closely associated with bone metabolism, so zinc acts positively on the growth and development that affect the

score of born babies in treatment group and the control group. The results of the analysis using Paired Test showed significant difference of weight gain, hemoglobin level, and consumption of nutrients (energy, protein, and Fe) before and after treatment ($p < 0.05$). The analysis also showed there are significant differences of post protein consumption ($p < 0.014$), birth weight ($p < 0.010$), and the baby's body length ($p < 0.006$) between the control group with treatment group 1 and 2. However, between treatment groups 1 and 2 found no significant difference. Considering that zinc supplementation can affect an increase of Hb and mother's appetite, increase the weight and length of born baby, it is recommended that iron supplementation program, which is given to