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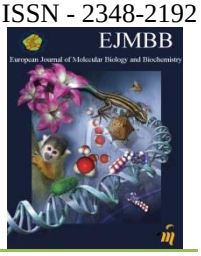

A STUDY ON ZINC AND VITAMIN SUPPLEMENTATION TO RETINOL AND ZINC LEVELS OF BREAST MILK IN THE MALNUTRITION PREGNANT WOMEN IN THIRD SEMESTER

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ABSTRACT

In India most of the places due to poverty, women's are suffering with malnutrition problem. Malnutrition problems were associated with different factors, which include various macro and micronutrients and vitamins. Various nutritious factors play the important role in growth and development of infants and children's. These nutrients involved in various functions at cellular levels especially in pregnant woman. In the present study we identify the levels of Zinc and retinol levels in malnutrition pregnant woman after supplementation. Zinc and high-dose vitamin A supplementation in the malnutrition pregnant women in third trimester could increase retinol and zinc levels in breast milk. This research applied an experimental design of double blind randomized tests (pre-test and post-test) on two groups (trial and control groups) to analyze the effect of zinc and high-dose vitamin A supplementation. Variables of interest were measured two times, pre-test and post-test. Methodology: Data were collected through questionnaire-based interviews, laboratory tests of blood samples and breast milk. Based on the inclusion criteria, 42 malnutrition pregnant women were selected as samples. The samples were randomly assigned to two groups, trial and control groups. Based on t-tests, the effects of supplementation were analyzed. Results: The results showed that there was no significant differences of zinc ($p < 0.386$) and retinol levels ($p < 0.948$) of breast milk between pre and post-tests within control group and trial group. The conclusion is there was no difference on zinc and retinol levels of breast milk between the control and trial groups. These results suggested that zinc and high-dose vitamin A supplementation has effect on retinol and zinc levels of breast milk in the trial groups when compared with control group.

INTRODUCTION

In Developing countries most of the pregnant women's under nourished due to inadequate intake of food supplements because of their socio economic conditions. During pregnancy mother should pay attention to the food consumed by eating nutritious foods which are foods that contain power, builder substances and regulators in accordance with nutritional needs. Nutritious food is required to fulfill fetus needs and increase breast milk production. Nutritional needs during pregnancy have a direct impact on the journey of pregnancy and the baby to be born. Capacity and development of the embryo to survive, poor nutrition during pregnancy affects fetal growth [1].

Different studies stated that physical features of pregnant woman indicate the malnutrition problem during pregnancy. Upper arm circumference measurements in

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women of child bearing age group is one of the easy early detection and can be implemented by common people, to determine risk groups of malnutrition[2]. Chronic energy deficiency in pregnant women is malnutrition in pregnant women which last long (several months or years) . Risk of malnutrition is a state where girls/ women have a tendency to suffer from malnutrition with upper arm circumference less than 23.5 cm [3, 4]. Malnutrition in pregnant women have direct impact on the health of the mother and child in the womb, such as increasing risk of babies with low birth weight, miscarriage, premature birth and mortality in mothers and newborn baby.

The supplementation of vitamin does decrease the mortality rates in different aged group of infants. In most of the studies supplements of high doses of 3,00,000 IU in pregnant woman to improve the content of vitamin A in breast milk and serum retinol in breastfed will reduce infant mortality by about 30% [5].

Micro and Macro nutrients play the important role in metabolism of various bimolecular and essential for the mechanism of action of enzymes.

Zinc is an essential element that makes up more than 200 enzymes which involved in the metabolism of carbohydrates, lipids and protein and synthesis and degradation of nucleic acid [6]. Therefore, zinc is important for some functions, including growth and development, reproduction, immunity and sensory function, antioxidant protection and membrane stability [6]. Enzyme deficiency in pregnant women will greatly affect fetus immune function; it will stay after the fetus born and also during his/her lifetime. Therefore, it is important to consume zinc in pregnant women.

Zinc is one of essential minerals that must consumed by mother. Diets low in zinc will increase the risk of fetal prematurity, low birth weight and congenital defects. Zinc is considered able to increase birth weight and head circumference [7].

Vitamin A deficiency is closely associated with increased morbidity and mortality in infants. Women who breastfeed are at risk of vitamin A deficiency due to a number of vitamin A that comes out will be entered into the breast milk. Intake of vitamin A which are not sufficient to replace the vitamin A that secreted and transferred to the baby through breast milk will reduce vitamin A reserves in the mother, thus the mother will experience depletion and quality of vitamin A in her breast milk will reduced [8, 9].

Zinc and vitamin A is closely related to each other in growth and development of pregnant woman. Deficiency of Zinc can also lead to the deficiency of vitamin A.

This study applied an experimental design of double blind randomized tests (pre-test and post-test) on two groups (trial and control groups). Based on the inclusion criteria, samples of this study are 42 malnutrition pregnant women in their third trimester. The sample was randomly assigned to two groups, trial and control groups.

This study has obtained ethical clearance from ethical committee of concerned institute. Any woman who is the subject of this study has been agreed to completing a written informed consent form.

Supplement

Zinc and high-dose vitamin A supplementation were given to respondents who are malnutrition pregnant women in their third trimester.

Data collection

Data were collected through questionnaire-based interviews, laboratory tests of blood samples and breast milk.

Biochemistry assessment

Blood samples and breast milk were collected by medical analyst to know retinol and zinc levels in the breast milk of respondents.

Statistical analysis

To analyze the differences each of the variables in two groups, independent samples T-test was used for ratio data scale. Normality of data distribution was tested with ANOVAs variance.

RESULTS

The results of this study showed that average of serum albumin in trial group was higher (3.94 ± 0.20 µg/dl) with minimum 1.50 µg/ dl and maximum 4.30 µg/dl than control group (2.91 ± 0.21 µg/dl) with minimum 3.50 µg/dl and 2.30 µg/dl as maximum value. Test results using the ANOVAs variance analysis showed p-value > 0.05 which means that data distribution is normal, data in both group is homogeneous. Based on T-test results with p-value < 0.797 concluded that there was no difference of serum albumin between trial group and control group (Table 1).

Table 1. The results of Albumin values in control and Trial groups.

No of Individual (42) Pregnant woman	Values	Minimum (Pre)	Maximum (Post)
Trial group	3.94+0.20	1.50 ug/dl	4.30ug/dl
Control group	2.91+0.21	3.50ug/dl	2.30 ug/dl

Table 2. The Average values of Serum retinol levels in Pregnant woman

Frequency No (42) Pregnant woman	Values	Minimum	Maximum
Trial Group	8.72±7.7ug/dl	0.67 ug/dl	24.35 ug/dl
Control Group	7.57±3.83 ug/dl	4.25 ug/dl	16.53 ug/dl

Table 3. The Average values of Serum retinol levels in Pregnant woman

Frequency No (42) Pregnant woman	Values	Minimum	Maximum
Trial Group	38.7± 11.60	22.92 ug/dl	62.74 ug/dl
Control Group	46.31±10.64	28.45ug/dl	66.80 ug/dl

Based on the Table-1, we showed that average retinol levels of breast milk in trial group was higher (8.72±7.07 µg/dl) with minimum 0.67 µg/dl and maximum 24.35 µg/dl than control group (7.57 ± 3.83 µg/dl) with minimum 4.25 µg/dl and maximum 16.53 µg/dl. After statistical test using T- test to see the difference, it can be concluded that there was no difference retinol levels of breast milk between the trial and control groups ($p < 0.948$) (Table 2). The average zinc levels of breast milk that obtained from this study in the trial group 38.7 ± 11.60 µg/dl with minimum value of 22.92 µg/dl and 62.74 µg/dl as maximum value whereas in the control group, the average was 46.31 ± 10.64 µg/dl with minimum value of 28.45 µg/dl and maximum value of 66.80 µg/dl. Different with albumin and retinol level, zinc levels of breast milk in trial group is lower than control group. Result of T-test showed that there was no difference in zinc levels of breast milk between the trial and control groups ($p < 0.386$) (Table- 3).

DISCUSSION

Albumin

Result of t-test showed that there was no difference of serum albumin between the trial group and the control group ($p < 0.797$). Foodstuffs that contain a lot of albumin from animal sources such as beef, fish, chicken, eggs and milk containing high levels of protein. High biological value protein that contains all essential amino acids in proportions which adapted to the growth [10]. It is associated with low serum albumin in this study so that the content of protein source that has high biological value also decreases.

Retinol levels of breast milk

The statistical results showed that there was no difference in retinol levels of breast milk between the trial and control groups ($p < 0.948$). Vitamin A is needed by the baby and mother to reduce the mortality of children aged 6 months or more [5]. Retinol concentration in breast milk may be an indication when current status of mother's vitamin A suboptimal, breastfeeding mothers produces breast milk with decreased retinol levels. This condition illustrates the inadequacy of food intake during pregnancy and the insufficiency of vitamin A reserves in the body. Retinol concentration of breast milk can also be used for indirect indicators of vitamin A status of breastfed babies [11]. In the present study there was no significant difference in vitamin A levels in between trial group and control group.

During lactation period, mothers with good nutritional status provide approximately 750 µmol of vitamin A through breast milk that consumed as much as 130 L, with vitamin A in breast milk by 1.92 µmol/L. While the postpartum mothers in developing countries only give half of that number, because the content of vitamin A in breast milk is less than 1.05 µmol/L (Equivalent to 30 µmg/dL) [12]. The content of vitamin A in breast milk varies related to vitamin A status and lactation period. In a healthy mother, colostrums contains 151 µg/100 ml, breast milk in transition period contains 88 µg/100 ml and mature breast milk were 75 µg/100 ml [13]. Giving vitamin A in postpartum mothers expected can increasing the amount of vitamin A in breast milk which also expected to have other potential that is increase immunity factors in breast milk.

Zinc levels of breast milk

The statistical results showed that there was no difference zinc level of breast milk between the trial and control groups. Other studies concluded that zinc supplementation has effect on zinc levels of breast milk after supplementation of 13 mg zinc/day for 6 months. But some studies have concluded that poor micronutrient intake and micronutrient status in mothers resulted in low levels of micronutrients in breast milk. In contrast, other studies concluded that there was no relationship of micronutrients intake in mothers to micronutrients levels in breast milk. Various parts of the placenta actively participate in the transfer, processing and synthesize of nutrients in the influence of mother hormones, the fetus and placenta. Air and water diffuse freely through the placenta, but it is still unknown how it mechanical. Nutrients are not directly from the mother's blood to fetal blood, but from maternal blood to the placenta, where the proteins, enzymes and nucleic acids are synthesized. Conversion and next synthesis occurs in the fetal side of the placenta [12]. Carbohydrates are the main source for the fetus and obtained continuously from blood glucose transfer through the placenta. While fat is not the main energy source, only limited transferred in the form of fatty acids across the placenta. Fetal cell growth is the result of protein synthesis from amino acids which transferred through the placenta [12]. Consumption patterns of mother during pregnancy will determine the content of zinc in breast milk. Zinc is widely available on the animal side

dish, vegetable side dishes, fruit, vegetables and cereals. However, in these foods also contain phytic acid so that zinc from food cannot be absorbed completely Based on the results of the study, zinc supplementation and high-dose vitamin A to retinol and zinc levels of breast milk in the malnutrition pregnant women in third trimester does not affect the increase of retinol and zinc level in breast milk between the groups which given zinc supplement with the group which not given zinc supplement. This is due to the lack consumption of animal protein which consumed by mother that would affect zinc levels in the body. Low consumption of animal protein will affect albumin concentration. Albumin is a tool transport of zinc. When albumin values are low, it will interfere synthesis of Retinol Binding Protein (RBP). This will disrupt the presence of retinol in breast milk.

CONCLUSION AT THE END OF STUDY

There was no significant difference of zinc levels ($p < 0.386$) and retinol levels ($p < 0.948$) of breast milk between pre and post-tests within control group and trial group. These results suggested that zinc and high-dose vitamin A supplementation has no effect to retinol and zinc levels of breast milk in the control and trial groups.

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