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Study of Zinc Deficiency in Pregnant Women

S Salimi [1], M Yaghmaei [2],* HR Joshaghani [3], AR Mansourian [4]

[1]Dept. of Biochemistry, School of Medicine, Zahedan University of Medical Sciences, Iran
[2]Dept. of Obstetrics and Gynecology, School of Medicine, Zahedan University of Medical Sciences, Iran
[3]Dept. of Medical Laboratory, School of Allied Medicine, Golestan University of Medical Sciences, Iran
[4] Dept. of Biochemistry, School of Medicine, Golestan University of Medical Sciences, Gorgan, Iran

Abstract

Zinc is one of the elements necessary for growth and health in human. Some evidences indicate that the zinc deficiency is one of real difficulties for the public health in developed and developing countries. Since the pregnant women are more at risk by the zinc deficiency, and this can cause many problems, in this study we tried to find out the rate of zinc deficiency in pregnant women within the region. This research project was analytical-descriptive study which was done on the 400 pregnant women whom referred to Zahedan Ghods hospital. A questionnaire was set up for each case which contained the following items, mother age, pregnancy age, numbers of deliveries, education, and consumption of iron tablet during pregnancy. The serum zinc level in each mother in this project was determined by atomic absorption technique. Prevalence of zinc deficiency among the pregnant women was 49%. Statistical analysis indicated that zinc deficiency had correlation with mother age, term of pregnancy and iron consumption. But zinc deficiency showed no correlation with numbers of deliveries and education.

Keywords: *Zinc deficiency, Mother Age, Pregnancy age, Iran*

Introduction

Zinc is one of the trace elements necessary for health and growth. It is present in the biological fluid as Zn^{++}. This caption has many biological functions, which is related to its main function as a co-factor in more than 300 enzymes. Zn^{++} also participates in the distribution of proteins and gene expression. It also stabilizes the structure of protein and nucleic acids. Zinc also preserves the intracellular organelles situation, plays a role in the transfusion, and immunological responses (1).

Evidences suggest that zinc deficiency is one of the important problems within the developed and developing countries (2). In 1991, a report was published which emphasized the importance of zinc and also indicated that in countries such as Iran, Egypt, Turkey, China, Yugoslavia, and Canada, due to low consumption of red meat, and high consumption of fiber, zinc deficiency was seen quiet often (2). Zinc deficiency in human was reported for the first time in Iran in 1961(3) and in Egypt in 1963 (4).

Pregnant women are facing zinc deficiency more than the other groups, due to having fetus which need zinc for its proper growth (5). Higher age, lactation, alcoholism, and high consumption of iron, and folic acid, increase the risk of zinc deficiency (1, 6). Other researches have shown that the fetus grown by zinc deficiency is end up with abnormalities in central nervous systems (6, 7). In an other study done on the zinc deficient pregnant women, it was indicated that congenital abnormalities, prolonged pregnancy, abnormal tasting sense, and other difficulties were seen in such subjects (7). A separate study in 2001 indicated that using supplementary zinc materials by pregnant

***Corresponding author:** Tel: +98 21 8058742, Fax: +98 21 8058719, E-mail: sasalimi@yahoo.com

mother, increased newborn birth weight, and decreased the mortality rate (8).

According to high zinc deficiency prevalence in the girls of Zahedan and effect of zinc deficiency on fetus, we evaluated the prevalence of zinc deficiency in pregnant women in that area.

Materials and Methods

This research was an analytical- descriptive study, which was conducted on 400 pregnant women whom referred to Zahedan Ghods hospital in 2001. According to a previous research, 400 cases were chosen (9).

Those that their pregnancy led to twin or more were omitted from this investigation. The gynecologist briefed the pregnant women in this research, and their verification was taken for the research. For each mother a questionnaire was provided which contained the following items: mother age, third trimester, numbers of deliveries, level of education, and iron consumption (yes or no).

We divided mothers according to age to three groups, group 1 (<20 years), group 2 (20-30 years) and group 3 (>30 years), and also according to fetus age to three groups, group 1 (first trimester of pregnancy), group 2 (second trimester of pregnancy) and group 3 (third trimester of pregnancy).We also divided mothers according to number of deliveries to three groups, group 1 (1-2 deliveries), group 2 (3-4 deliveries) and group 3 (>4 deliveries), and according to use of iron tablet to two groups.

Two ml blood was taken from each pregnant woman. The serum zinc was determined by atomic absorption instrument (PU9100X-Philips). Those pregnant women having zinc concentration less than 70 µg/dl marked as zinc deficient (1).

Results

The serum zinc level in 204 individuals (51%) was on the normal range and in 196 samples (49%) were less than normal. Table 1 shows the results of zinc deficiency according to the mother age. Prevalence of zinc deficiency in three groups, <20 years, 20-30 years and >30 years in this study showed a meaningful correlation (P= 0.02, DF = 1, X^2 5.2).

Zinc deficiency was also analyzed according to the fetus age (Table 2). The prevalence of zinc deficiency in this study also showed a meaningful correlation (P = 0.007, DF = 2, X^2 = 9.84). The results from X^2 study of zinc deficiency between group 1 and group 2 did not show meaningful difference. But between group 2 and group 3 there was a meaningful difference (P= 0.02, DF= 1, X^2= 5.2). There was a similar finding between group 1 and group 3 which showed meaningful differences.

The prevalent of zinc deficiency among three groups of the pregnant women according to the number of deliveries did not show a meaningful difference (P= 0.08, DF= 2, X^2= 5.5). But there was a meaningful difference between groups 1 and 3 (P = 0.019, DF = 1, X^2 = 5.5).

The prevalence of zinc deficiency among the pregnant women was also studied according to the level of education. Results from this investigation indicated that there was not any meaningful difference in this regard at all. Table 3 shows the results of zinc deficiency among the pregnant women according to use of iron tablet or not. The prevalence of zinc deficiency among the women showed a meaningful difference (P= 0.001, DF= 1, X^2= 9.6).

Table 1: Frequency distribution of serum zinc level in pregnant women according to mother age

Mother's age (Year)	zinc<70 µg/dl (n)	(%)	zinc>70 µg/dl (n)	(%)	No
< 20	40	44	52	56	92
20-30	96	59	67	41	163
> 30	62	43	83	58	145
Total					400

P=0.02, DF=2, X^2=7.8

Table 2: Frequency distribution of serum zinc level according to fetus age (trimester of pregnancy)

Term of pregnancy	zinc<70 µg/dl		zinc>70 µg/dl		No
	(n)	(%)	(n)	(%)	
First Trimester	78	61	50	39	128
Second Trimester	69	57	54	44	123
Third Trimester	61	41	88	59	149
Total					400

P=0.007, DF=2, X^2=9.84

Table 3: Frequency distribution of frequency of serum zinc level in pregnant women according to Iron consumption

Iron consumption	zinc<70µg/dl		zinc>70µg/dl		No
	(n)	(%)	(n)	(%)	
Used	127	62	78	38	105
Not used	109	56	86	44	195
Total					400

P=0.001, DF=1, X^2=9.6

Discussion

In the present study the prevalence of zinc deficiency in pregnant women was about 49%. In a study on the lactating mother in Indonesia the rate of zinc deficiency was 25% (10). The reason for this difference probably is due to nutritional regiment in these two regions. In Iran due to high consumption of fiber and little red meat, there is a high zinc deficiency comparing to other countries.

A study on the micronutrition consumption among the pregnant women in Southeast Asia showed the prevalence of iron and folic acid deficiency as 50% and 30-50%, respectively (11). There was a study among the girl high school students in Zahedan done in 1999. The results from this investigation showed that prevalence of zinc deficiency among these girls is about 42.8% (9). Mahmoudi et al reported 65% zinc deficiency in a girl high school in Tehran (12).

The results of this study showed a meaningful difference as to prevalence of zinc deficiency in different age groups. The prevalence of zinc deficiency in age group of 20-30 years mother was higher than that of less than 20 years and the mothers more than 30 years had lower zinc deficiency than mothers in age group of 20-30 years. This may be due to higher requirement of zinc for younger age due to their growth age. The finding in this study indicates that the mother age more than 30 years have higher zinc deficiency than mother age 20-30 years. The reason is not clear. The prevalence of zinc deficiency in the different age of pregnancy showed meaningful difference, and that was due to mothers increasing requirement for zinc. Without a proper nutritional requirement the person falls in the state of zinc deficiency. The zinc level was determined according to the number of deliveries, and although we expected that with increasing the number of deliveries the prevalence of zinc deficiency worsen, but we did not find any significant difference. In this study zinc deficiency was not influenced by mothers' education level. This study indicated that iron consumption increased the zinc deficiency; this is probably due to effect of iron in prevention of intestinal zinc absorption.

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