Volume 2 • Issue 5 • 2019

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Research Article

Gynaecology and Perinatology

ISSN: 2576-8301

The Role of Zinc in Pregnant Women Suffering from Anaemia

Shpresa Thomaj* and Bledar Benja

American Hospital, University Hospital "Mbreteresha Geraldine", Tirana, Albania

***Corresponding Author:** Shpresa Thomaj, American Hospital, University Hospital "Mbreteresha Geraldine", Tirana, Albania.

Received: July 17, 2019; **Published:** July 27, 2019

Abstract

There is a Zinc insufficiency in the serum during pregnancy. Supplementary needs for Zinc are at least 15—20 mg in day and cannot be fulfilled from diet. As a consequence there is Zinc insufficiency real and it is manifested during pregnancy. Zinc insufficiency puts pregnant mother at risk of spontaneous aborts, preeclampsia, premature or extended delivery, prolonged labor amnionitis and postpartum infection.

The purpose of this study is too evident the changes of seric zinc and iron in pregnant women in their third trimester (i.e. pregnant women with congenital anemia Hb <10 gr%, HCT <30 % compared with the control group where Hb >10 gr. % and HTC >30%. Serum zinc level was determined by atomic absorption spectroscopy.

A measurement of serum zinc is made in 24 pregnant women in their third trimester, who suffered from anemia Zn=48mcg% ±15.4mcg%. Also, we measured the level of seric zinc in 20 pregnant normal women where Zn=112.5 mcg% ±30.2mcg%. When we compared the data, it resulted a lower serum zinc amount in pregnant anemic women than in normal pregnant women. There is a significant difference between them: P < 0.001, T= 6.6. Seric zinc is lower in anemic pregnant women than in normal pregnant women.

In addition, seric zinc is much lower in pregnant women which suffered from sickle cell disease - where seric zinc was < 40mcg%. The lower level of zinc in pregnant women which suffered from sickle cell disease is linked to their hemolytic crises which caused an increase in elimination of zinc through their urinary tract.

Key words: *Pregnancy; Zinc; Anemia*

Volume 2 Issue 5 July 2019

Introduction

Zinc is an important micro-element for a human's organism. There is usually about 2500 mg. of zinc in our body which is to be found as it follows: 30% in our bones, 60% in our muscles, and the remaining quantity is to be found in our tissues. Our hair, eyes, prostaglandins, etc. are the tissues which contain most of the zinc. The following factors lower the zinc level in the serum:

- Mal absorption in the pipes (chronic enteropathie)
- Low zinc intake because of going on diets (i.e. vegetarian diets)
- Specific conditions of the organism which increase the need for more zinc such as: unique pregnancy, twins, or three embryos.

- Diseases which increase the hemolytic erythrocytes such as: sickle cell disease, spherocytosis, deficit of glucose, 6 phosphate dehydrogenises [16].

Zinc plays an important role in the synthesis of nucleic acids, in cell's division, in strengthening our immune system [3, 12, 13, 15].

There are factors who modify the absorption of zinc:

- Proteins and amino acids increase the absorption of zinc.
- Glucides do not affect in the absorption of zinc, but they lower its quantity through urine.
- Use of alcohol decreases zinc's absorption and stimulates its excretion through urine [15].

Unsaturated fatty acids and animal proteins increase the absorption of zinc. Excretion of zinc by our organism is done through sweat, faeces, biliary fluid and urine. Zinc is composed of about 300 metalo-enzims which are synthesized in liver and they take part in many metabolic processes of our organism [13-15].

Synthesis of metalo-enzims is increased under the influence of gluco-corticoid hormones (glucagon and epinephrine]. This explains the decrease of zinc in the serum in a state of stress (cold or low temperatures, heat or high temperature, or strong emotions). Acute infections through interleukin 2 increase the synthesis of metalo-enzims.

Zinc serves as a catalyst of several reactions of dehydrogenating and dehydration. It stimulates hormones by activating the co-factors of the hormones. Zinc stabilizes the tertiary structure of peptide hormones by making them active, stabilizes the insulin (by creating the zinc-insulin complex), it prohibits the sickle cell creation of erythrocytes, and it affects the stability of polypeptides chains of hemoglobin [16].

Zinc has an effect on ovulation, our cell's immunity, cutan integrity in the metabolism of nucleic acids by influencing the polymerase RNA, sintetase RNA, reverse transcriptase and thymidine kinase [3,12,14]. Some foods that are rich in zinc are: meat, fish, integrated bread, sea food, etc.

Material and Method

We surveyed 24 pregnant women suffering from anemia. 14 of them suffered from hemoglobinopathies (10 of them from homozygous sickle cell and trait sickle cell and 4 of them were carriers of thalasemia) and the other ones suffered from ferro-deficit anemia. In addition, we surveyed 20 pregnant women who did not suffer from anemia.

The collected data was analyzed according to Fisher Student Test.

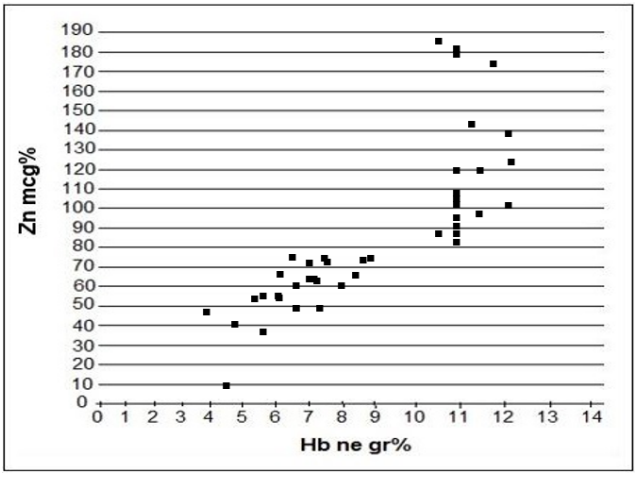
Congenital anemia			**Ferro-deficit anemia**	**Total**
Sickle cell trait cases	Sickle cell disease	The trait thalassemia		
6	4	4	10	24

Table 1: *Pregnant women according to their type of anemia.*

We measured the zinc level in the serum in the third trimester of pregnancy in 24 women who suffered from anemia (Hb. level was lower than 10 gr. % and HCT lower than 30%) and in 20 pregnant women who did not suffer from anemia.

Normal pregnant women in third trimester (No)	Zn seric (mcg %)	Hb in gr%	Pregnant women suffering from anemia (No)	Zn seric (mcg %)	Hb in gr%
1	87	10.5	1	60	8
2	122	12,4	2	75	6.5
3	172	11,9	3	54	6.1
4	102	11	4	72	7.1
5	120	11,4	5	55	6.1
6	90	11	6	63	7.2
7	81	11	7	66	8.5
8	85	11	8	72	7.8
9	120	11	9	50	6.8
10	88	10.5	10	50	7,2
11	105	11	11	48	4
12	144	11.7	12	53	5,4
13	108	11	13	10	4.5
14	105	11	14	50	6,8
15	106	11,5	15	72	8,8
16	140	12	16	66	7.2
17	104	11	17	38	5,6
18	180	11	18	41	4. 8
19	182	11	19	75	9
20	100	12	20	67	7,2
		21	60	6,8	
		22	57	5,8	
		23	73	7,4	
		24	66	6,1	

Table 2: *Data measurement for seric ZN in normal and anemic pregnant women.*



Graphic 1.

The indicator that shows the difference between two groups is significant. Zinc level is lower in pregnant women suffering from anemia than in pregnant women who do not suffer from anemia i.e. P 0.001 T 6.66. The lowest zinc level in the serum is noticed in women who suffer from Sickle Cell Disease. When there is a hemolytic crisis in SCD, there is a higher zinc elimination through urine. [12,15, 16]. As a result, the zinc level in those women's blood decreases.

According to many authors, preeclampsia is higher in pregnant women who suffer from zinc deficit than in those pregnant women with a normal zinc level [3,4,5, 8,9,10,13,15,16].

Congenital anemia	No. of pregnant women	Preeclampsia (nr or %)
Sickle cell trait	6	3
Sickle cell disease	4	3
The trait thalasemia	4	1
Ferro-deficit anemia	10	N/A
Total	24	7 28%
Normal pregnant women	20	1 5 %

Table 3: *Frequency of Preeclampsia in anemic and normal pregnant women.*

Preeclampsia is more frequent in anemic pregnant women than in normal pregnant women. Zinc deficit during a pregnancy leads to: involuntary abortions, congenital anomalies, premature delivery, fetal hypotrophy, fetal sufferance, distacco placenta, serotonin pregnancy, and hemorrhage after delivery, and postpartum infections [1, 3].

Conclusion

With reference to our patients in this study, we came to the conclusion that the zinc level was low in those pregnant women who suffered from anemia. It was lower in pregnant women who suffered from hemogobinopathies (thalassemi and sickle cell disease). In addition, preeclampsia is more common in pregnant women who have a lower zinc level compared with the level of normal pregnant women.

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