



## REVIEW ARTICLE: THE COMBINATION USING OF ZN, FE AND CU MAY IMPLICATED IN INDUCED ANEMIA IN PREGNANCY

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<b>Received:</b> October 20 <sup>th</sup> 2022 <b>Accepted:</b> November 20 <sup>th</sup> 2022 <b>Published:</b> December 28 <sup>th</sup> 2022	Iron (Fe), copper (Cu), and zinc (Zn) are microelements which important for suitable function of human body. These element are necessary for pregnancy and for normal Fetus development. The rate of complications during pregnancy such as anemia, low birth weight and other depend on normal concentration of these elements. This review aims to verify anemia development in pregnant women due to combined supplementation of Fe, Cu, and Zn. Results :The data exhibit at certain combination dose of these element anemia could be development in pregnancy.

**Keywords:** Anemia , Iron ,Zinc, Copper

### INTRODUCTION:

Many physiological changes occur during pregnancy. One of them is anemia. According to the World Health Organization (WHO) data, anemia during pregnancy is observed in 51% of pregnant women. (1).The prevalence of anemia during pregnancy is quite high. The majority of them is anemia due to iron deficit, rate of anemia in all pregnancy has been determined as between 2% and 26% due to iron insufficient (2). Several complication can arise from this anemia (3).

Iron is involved in many metabolic processes in the body. In iron deficiency, pregnant women and fetuses are negatively affected. As a result of iron deficiency, myelination disorder in the fetus and brain development are disrupted, and cognitive development is affected by hypoxia occurring in the brain due to hemoglobin deficiency (4). Iron deficiency anemia has been shown to cause low birth weight and prematurity (5).

Also, iron deficiency anemia can cause diseases such as hemorrhage, heart failure, and increases the risk of death (6).

Zinc is another trace element, is very important for both mother and baby. A positive correlation was found between serum zinc levels of mothers and infants. (7). In studies, it has been shown that zinc deficiency in the mother causes adverse effects in the mother and baby, such as early membrane rupture, early and unexpected sudden abortions, prematurity, retardation of intrauterine growth, fetal neurological defects (8).

Deficiency of iron can associated with zinc deficiency. Zinc play catalytic role in iron metabolism through

activation the alpha- aminolevulinic- acid dehydratase enzyme which important for heme path way synthesise (9).

Copper is an essential micronutrient, its involve in structure of many enzyme, meta-analysis

Demonstrated that the ,reduction level of copper at starting of gestation were linked with increment rate of occurrence high blood pressure in these pregnant(10).

Several studies indicated that the prevalence of fetal disorders during developmental were higher in those with low level of Cu compare with pregnant with normal Cu level(11).

Different report indicated that the pregnancy during first period of gestation may undergo later pregnancy and increase the gestational diabetes incidence when has higher level of Cu (12).

The bioavailability of these elements will be influenced due to their intercalated because they share the same physicochemical properties. This interaction usually occurs during absorption process with in intestine due to these elements will compete on the same transport system at the site of binding(13).

Method: a study is designed to study some complications as anemia in pregnancy that may result due to use a combination dosage form of these elements.



**RESULT:**

In the marked there are different combination of dosage form has been contain these three element in addition to other nutritional substance which require during the gestational age of pregnancy and the probability of interaction will increase hence there is not

accurate dose for each of these element has been included in this formula so that ,the Fe, Zn and Cu interaction may occur in different dose and rout of administration .The flowing data which obtain from different article has been summarized these interaction as in (Table1).

Table 1:Consequence result of the interaction between Fe, Zn, Cu during pregnancy	Reference
Higher than 100 mg/day of iron for pregnancy lead to reduction in serum of Zn	14
Administration of Fe and Zn in 2:1 ratio, could not exhibit negative effect among them	15
one: one ratio of Fe/Zn within diet results in inhibition absorption of Zn	16
A dose of forty mg) Fe plus Zn, will enhance ferritin and Hb values	17
Less one-handed mg of Ferrous during meal, has not effect Zn metabolism	18
60 mg of Fe supplementation ,results in reduction Zn absorption	19
Cu requirement in pregnancy elevated from1 mg/day to four mg in the 1st trimester and more15 mg daily through third trimester	20,21
When Fe intake from the diet is more than ten times higher the normal Fe administration mention by WHO, the Cu metabolism is impaired	22
Supplementation three mg of Cu and 100 - 400 mg of iron preparation ,there is no effeteness role for Fe on Cu absorption	23

**DISCUSSION**

The micronutrients demanding during pregnancy period specially for iron,B12, folate , calcium, copper and zinc will increase (24). Concerted of zinc and iron deficiencies implicated in increased risk of anemia, infections, and poor pregnancy (25).

Zinc and iron are the common trace elements involve in homeostasis. Iron and zinc exhibit competitive inhibition in transporter and bioavailability (26).

The most common nutritional problem which influenced pregnancy is deficiency of iron.

Many factors participated in etiology of this problem such as decrement socioeconomic status, malnutrition, infection due to parasite , increase blood losing specially during menstrual cycle and other it is not surprising to discover a strong federation between both iron and zinc dearth (27).

Several studies guided to that both zinc and iron deficiency are linked together .The inhibition action by zinc on absorption of iron (and vice versa) because of the antagonize zinc action throughout mechanism of intestinal iron absorbable (28).and this due to both

element have same transport and absorption mechanisms (29). There interactions usually based on relative amount of two elements (30) and concentrations gradient of zinc and iron (31). The antagonism activity enclosed by zinc and iron occurs when both used in a solutions state, food and supplemented dosage form (32).

It was found that the zinc supplementation will reduced hemoglobin and ferritin value at delivery due to lowering serum (33).

Copper is a trace element which involve in the structure of many enzymes is part of cytochrome oxidase which crucial for oxidation- phosphorylated process, which let adding Fe to structure of heme. Al so the life span of erythrocyte may shorten when there is reduction in Cu concentration (34). Cu deficiency can lead to pancytopenia and development anemia that not response to Fe treatment(35 ).

The utilization and absorption capacity for ferrous could be facilitated by adding Cu .Cu involve facilitator absorption and employ of Fe ,which participated in RBC regeneration (36) and synthesis from bone (37).

During a study included cu requirement in pregnancy ,it decided that when these woman administer with 1gram



/day of Cu from the 16th week of gestation, the result will be decreased symptoms of depression in second and third trimesters of gestation when compared with control group (38).

Andersen et al. verify the indirect and direct influence of Cu insufficiency on concentration, transporters and delivery of iron to the fetus (39). It has been reported that during pregnancy, there was increased copper levels in some studies and decreased copper levels in others and this will be reflected on iron status (40).

From other hand it was noted the zinc interferes with copper absorption (41) and thus will reduce its blood level (42) and this will be reflected on iron transport and consequences; anemia may develop (43).

### CONCLUSIONS

Our observation decided that Fe, Cu, and Zn are decisive for the appropriate program of healthy pregnant. The data of the researchers demonstrate great communication among Fe, Cu, and Zn. An elevation or decrement of one of these elements may have a significant role on the action of other elements. It should be recognized that these elements do not show an antagonism effect among them when used at reference range.

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