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IMPACT OF PRECONCEPTION MICRO NUTRIENTS SUPPLEMENTATION ON ANEMIA DURING PREGNANCY

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Abstract:
Hb concentrations during pregnancy were significantly lower among women who were anemic before 273 million children under five years are anemic around the globe. The burden of anemia during pregnancy is high in South East Asia and more than 4 women suffer from anemia during their pregnancy. There could be various reasons of anemia but iron deficiency anemia has been the most common among them and it has high association with increased risk of maternal and perinatal mortality and adverse birth outcomes.
The study has demonstrated that with combination preconception supplementation with MM or IFA in comparison to FA alone resulted in modest increases in prenatal plasma ferritin. Regardless increased compliance with the interventions both before and during pregnancy, anemia remained prevalent and did not respond to the micronutrient interventions.

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INTRODUCTION:

No evidence was found about the effect modification by maternal nutrition status for hematological indicators either prenatally or during the post-partum period. Mean Hb concentrations during pregnancy were significantly lower among women who were anemic before 273 million children under five years are anemic around the globe. The burden of anemia during pregnancy is high in South East Asia and more than 4 women suffer from anemia during their pregnancy. There could be various reasons of anemia but iron deficiency anemia has been the most common among them and it has high association with increased risk of maternal and perinatal mortality and adverse birth outcomes. To cope up with anemia iron supplementation during pregnancy is a common strategy. Literature has shown that improved birth outcomes by this procedure can minimize the incidence of anemia and iron deficiency anemia by nearly two-third. The most significance public health problem across the globe is maternal anemia. Women who had pregnancy with minimal suboptimal iron state are at high risk for poor maternal and infant outcomes. WHO recommends that in settings where the prevalence of anemia in the population is more than 20% intermittent IFA supplementation for menstruating women as one of the strategies to reduce anemia and improve iron status among women of reproductive age. Randomized controlled trials provide the evidence that that intermittent IFA reduced the risk of anemia by an average of 27%, in addition to improving hemoglobin and ferritin concentrations. By following this procedure there has been decrease in the average range of incidence of anemia. An effective strategy for improving pregnancy and birth outcomes there is growing evidence on the potential of providing IFA supplements, preconception multiple micronutrients. The overall poor diet quality and limited access to sufficient nutrient rich foods women suffer from the living in the regions endemic anemia. A review was conducted in 2015 on MM supplementation during pregnancy which included 17 trials involving primarily in in low and middle-income countries and concluded that compared to IFA or folic acid (FA), MM supplementation significantly decreased LBW (12%), small-for-gestational age and stillbirth. The use of daily MM supplements during pregnancy has also been associated with a significant increase of 52.6 g in birth weight compared to IFA supplementation alone. The use of MM supplements before and during the time of conceptions there is strong association with minimized risk of fetal growth restriction, preterm birth and low birth weight. While there is strong evidence about using MM supplements during pregnancy that there is very low evidence about preconception from a well-designed randomized controlled trial. No evidence was found based on interventions in the preconception period.

The aim of the current study is to evaluate the impact providing additional pre-pregnancy weekly iron-folic acid (IFA) or multiple micronutrients compared to only folic acid (FA) on improving iron status.

Methods and material

It was a randomized, double-blind controlled trial. 105 participants were included in the study on the basis of inclusion criteria with age ranges from 18-40 years. Exclusion criteria included being pregnant at the time of recruitment, consuming IFA or MM supplements in the previous 2 months, being severely anemic (Hb < 7 g/L), and having history of high risk pregnancy. All the women who met the inclusion criteria were divided into three groups. Group 1 folic acid, group 2 iron and folic acid and in group 3 multiple micronutrients (MM). After conceiving they stopped weekly preconception supplementation and started receiving daily through delivery as recommended by World Health Organization WOH prenatal supplements containing 60 mg of iron and 400 ug of FA. From capillary blood samples the outcomes Hemoglobin concentrations were measured. Hb value less than 13 g/dL was defined as maternal anemia. For children, anemia at 3 months was defined as Hb < 11 g/dL. Maternal iron status was assessed at baseline, during the first prenatal visit and 3 months post-partum. At delivery by using cord blood samples child iron status was assessed.

Means (± SD) and proportions for selected baseline variables were compared between treatment groups using Analysis of Variance (ANOVA) and chi-square test, respectively.

RESULTS:

105 women were participated into this study. In the baseline characteristics including age, education, occupation, ethnicity, dietary intakes and anthropometric measurements there was no significant difference across three groups. There were no differences in baseline characteristics by treatment group at any time point (enrollment, pregnancy cohort, women with known birth outcomes, women with measurements at 3 month postpartum and women with cord blood measurements. Almost 24% women had anemia but only 12% had low iron stores and 2 % had iron deficiency. No significance association was found by treatment group at baseline

for the various biomarkers of iron status, hemoglobin concentrations, inflammation, gestational age or time between preconception enrollment and first prenatal visit. The duration of preconception supplementation was 2 weeks shorter in the MM group. Compliance was relatively high; 78% of the women consumed more than 80% of the preconception supplements and there were no differences in compliance by intervention group both before conception and during pregnancy. In the intent to treat analysis, the ferritin concentrations at first prenatal visit were significantly higher in the MM and IFA compared to control. There was no significant difference between hemoglobin and anemia. Among women who consumed preconception supplements for at least 26 weeks, plasma ferritin was not different between treatment groups during pregnancy, but it was significantly higher in cord blood and for mothers at 3 month postpartum in the MM or IFA groups compared to FA group. conception compared to those who were not, but there was no evidence of effect modification by baseline anemia status. Overall, the prevalence of anemia doubled from 20% at baseline and the first prenatal visit to 40% in the second trimester and then reduced to 33% at the third trimester, with no differences by treatment group. Plasma ferritin concentrations were 10.6 µg/L and 7.3 µg/L higher at the first prenatal visit in the MM and IFA group, respectively, compared to FA. No differences however were observed for high ferritin or high hemoglobin concentrations by treatment group (results now shown).

DISCUSSION:

The current study has found that weekly supplementation with MM or IFA had no impact on the prevalence of anemia or mean hemoglobin concentrations during pregnancy or postpartum compared to only FA. These results are opposite to a study conducted in 2010 showing that weekly consumption of iron containing supplements before conception increased hemoglobin concentrations and prevented anemia during pregnancy. Women had significant increase in plasma ferritin in cord blood who received preconception MM or IFA. Women who consumed MM or IFA supplement at least 26 weeks they.

The difference in hemoglobin among anemic and non-anemic women at baseline remained throughout gestation despite the supplementation before and after pregnancy.

This may be due in part to the fact that only 3% of women had iron-deficiency anemia. All the participants were less responsive to micronutrient supplementation, and examining genetic causes or implementing other interventions targeting malabsorption may be needed. There was no significant association found between the intervention group in the proportion of women with ferritin concentrations over 150 mg/L or elevated hemoglobin (>13g/dL). The 20% anemia among WRA in this population is at the borderline of WHO recommendations for weekly IFA supplementation. However it is very important to know there were statistically significant differences in plasma ferritin, these differences were small and the biological significance may be limited. There could be implications for preeclampsia and intra-uterine growth retardation with the high use of preconception nutrition for fertility, embryogenesis, implantation and placentation.

The study has demonstrated that with combination preconception supplementation with MM or IFA in comparison to FA alone resulted in modest increases in prenatal plasma ferritin. Regardless increased compliance with the interventions both before and during pregnancy, anemia remained prevalent and did not respond to the micronutrient interventions.

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