



## Original Article

# Estimation and Evaluation of Micronutrients and Vitamins Intake during Pregnancy

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## **Abstract**

**Background:** Iron deficiency anemia, folic acid deficiency, and calcium deficiency during pregnancy can lead to adverse outcomes for both the mother and the infant in developing countries. Preventive measure before and during pregnancy can control the rate of maternal and child mortality and morbidity.

**Objective:** The purpose of the current research work was to find out the prevalence and outcomes of Iron deficiency anemia, folate deficiency, and Calcium deficiency during as well as the steps to prevent and control them.

**Method:** A whole of 50 blood trials (samples) of pregnant women were drawn into EDTA tubes from December, 2019 to February, 2020, from the Dhaka Medical College Hospital of Dhaka during the visits of the pregnant women to the Obstetrics & Gynaecology Department by using Sysmex XN-2000.

**Result:** Among 50 pregnant women, total 13(26%) pregnant women had moderate iron deficiency anemia, 5(10%) pregnant had severe iron deficiency anemia, and total 32(64%) pregnant women had mild iron deficiency anemia during pregnancy, it is also shown from the result that, total 32(64%) pregnant women had mild folate deficiency anemia, 13(26%) pregnant women had moderate folate deficiency anemia, and total 5 (10%) pregnant women had severe folate deficiency anemia. and total 38(76%) pregnant women had normal calcium level and total 12(24%) pregnant had hypocalcemia or Calcium deficiency.

**Conclusion:** Iron deficiency, folic acid deficiency and calcium deficiency during pregnancy lead to potential threats to the mothers such as miscarriage, pre-eclampsia, hemorrhage. pregnancy induced hypertension (PIH) and also brings out negative outcomes to the infants such as prematurity, low birth weight, growth retardation, cleft lip, cleft palate and neural tube defects. Increasing awareness, proper diagnosis and management of iron, folic acid, calcium deficiency during pregnancy will fill the nutritional gap and control the major causes of mortality and morbidity and poor maternal and fetal outcomes of pregnancy in Bangladesh.

**Keywords:** Anemia, iron deficiency anemia in pregnancy, folic acid deficiency in pregnancy, hypocalcemia in pregnancy, Dhaka Medical College, Hospital, Bangladesh.

## Introduction

Globally, maternal anemia increases the risk of pre-term delivery and low birth weight, and iron deficiency anemia underlies 115,000 maternal deaths and 591,000 perinatal deaths each year.<sup>1</sup> According to the Bangladesh Demographic and Health Survey- BDHS in 2011, approximately 49.6%(one-half) pregnant women and 48 % of lactating mothers are anaemic.<sup>2</sup> Anaemia is recognized as a major public health problem in Bangladesh,<sup>3</sup> affecting nearly half of the pregnant women in the country<sup>4</sup> and iron deficiency is the major cause of anaemia in the Bangladeshi population.<sup>5</sup> Low- calcium diet or hypocalcemia during pregnancy is associated with significant increases in arterial BP, systemic and uterine vascular resistance, proteinuria, and significant reductions in cardiac output and UBF (uterine blood flow), these changes are reported as Pregnancy Induced Hypertension (PIH).<sup>6</sup> Pregnancy Induced Hypertension (PIH) triggers preeclampsia which is associated with high perinatal morbidity and mortality.<sup>7</sup> Preeclampsia is associated with an increased incidence of intrauterine growth retardation as high as 40%.<sup>8</sup> In Bangladesh, a high prevalence of Folic acid deficiency during pregnancy exists.<sup>9</sup> Folic acid deficiencies during pregnancy can lead to neural tube defect (NTD), congenital heart disease and oral clefts (cleft lip, cleft palate), and possibly preterm birth.<sup>10-13</sup>

## Methods and Materials

**Study Place:** Ward no-212, Obstetrics & Gynaecology Department, Dhaka Medical College Hospital, Dhaka.

**Study Population:** A whole of 50 blood samples of pregnant women were collected into EDTA tubes by using Sysmex XN-2000 from December, 2019 to February, 2020, from the Dhaka Medical College Hospital of Dhaka during the visits of the pregnant women to the Obstetrics & Gynaecology Department.

**Statistical Analysis:** Collected data were analyzed by using SPSS version 22.0.

**Table 1: Blood Collection**

Trimester	Number of Pregnant mother Samples collection	Time Period under sample collected
1st	23	December'2019 - 9sample
		January'2020 - 6sample
		February'2020 - 8sample
2nd	13	December'2019 - 4sample
		January'2020 - 5sample
		February'2020 - 4sample
3rd	14	December'2019 - 6sample
		January'2020 - 3sample
		February'2020 - 5sample
Total	50	100%

The first trimester yielded 23 pregnant womens blood samples, the second trimester yielded 13 pregnant Women's blood samples, and the third trimester yielded 14 pregnant womens blood samples. 19 pregnant mothers blood samples were taken in December 2019, 14 pregnant mother's blood sample were collected on January 2020 and 17 pregnant women's blood samples were collected on February 2020. During the month of December 2019, 9 blood samples were taken from pregnant women in their first trimester, 4 blood samples from pregnant women in their second trimester, and 6 blood samples from pregnant women in their third trimester. During 2020, 6 blood samples were taken from pregnant women in their first trimester, 5 blood samples from pregnant women in their second trimester, and 3 blood samples from pregnant women in their third trimester. During February 2020, 8 blood samples were taken from pregnant women in their first trimester, 4 from pregnant women in their second trimester, and 5 from pregnant women in their third trimester.

**Table 2: Pregnancywith3trimesterstimeduration**

Trimesters	Time periods (in months)	Time periods (in weeks)
1st	1-3	1-12
2nd	4-6	13-26
3rd	7-9	27-70

## Results

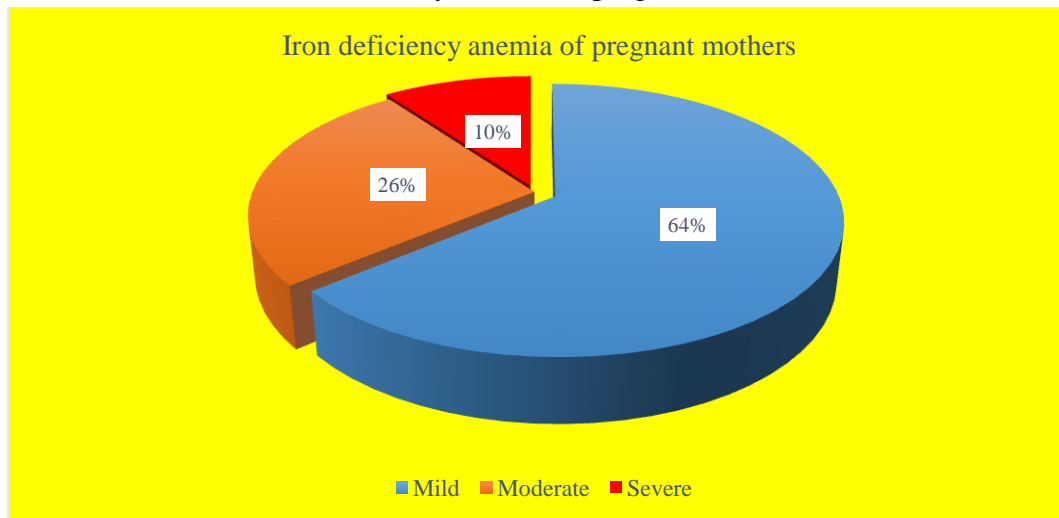
Out of 50 pregnant women, it is shown from the result that, Total 32(64%) pregnant women's Hb level was in between 10-11 mg/dl and Serum Iron

Level Women 40-50 µg/dl, which refers to mild iron deficiency anemia.

Total 13(26%) pregnant women’s Hb level was in between 7-10 mg/dl and Serum Iron Level Women 30-40 µg/dl, which refers to moderate

iron deficiency anemia. Total 5(10%) pregnant women’s Hb level was in between <math>7</math>mg/dl and Serum Iron Level Women <math>30</math> µg/dl, which refers to severe iron deficiency anemia.

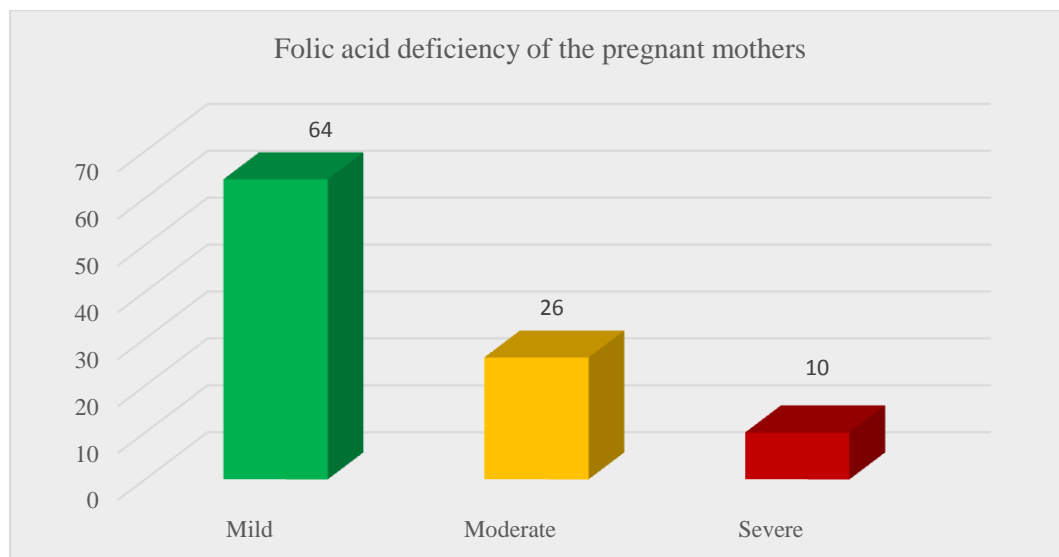
**Table1:** Mild, moderate, severe iron deficiency anemia of pregnant mothers (N=50)



**Figure: I** Iron Deficiency Anemia of Pregnant Mothers (N=50)

Figure I showed that, 32(64%) pregnant women’s Serum Folic acid level was in between 3.0-4.0 µg/L, which refers to mild Folate deficiency anemia. 13(26%) pregnant women’s Serum Folic acid level was in between 2.0-3.0 µg/L which

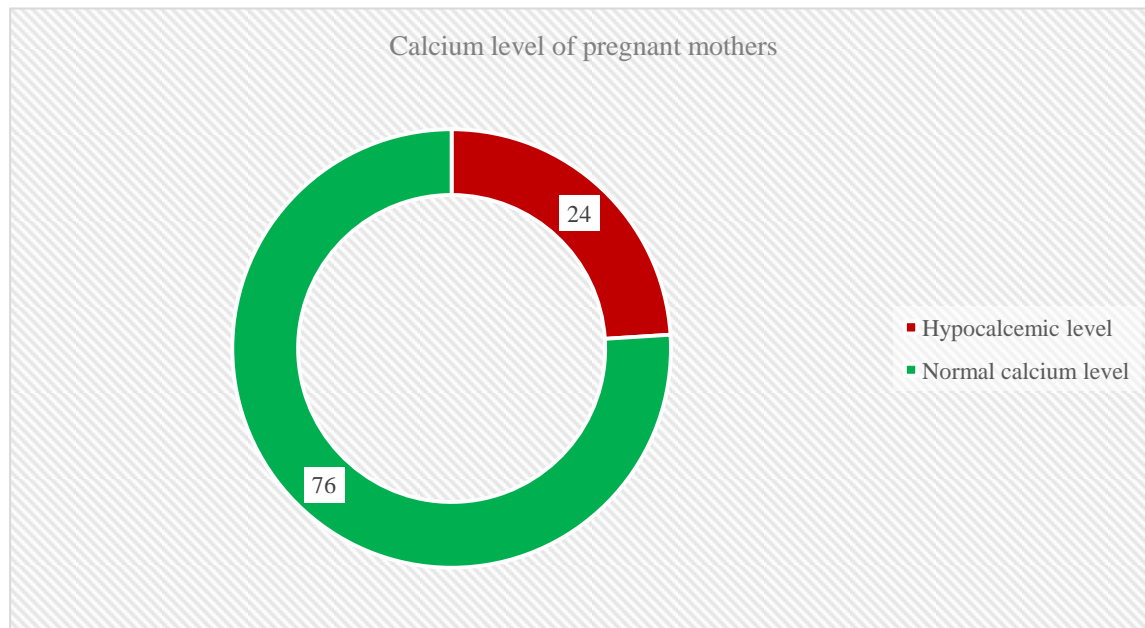
refers to moderate Folate deficiency anemia. 5(10%) pregnant women’s Serum Folic acid level was in between 1.0-2.0 µg/L, which refers to severe Folate deficiency anemia.



**Figure: II** Folic Acid Deficiency of Pregnant Mothers (N=50)

Figure II showed that, 32(64%) pregnant women’s serum Folic acid level was in between 3.0-4.0 µg/L, which referred to mild Folate deficiency anemia. 13(26%) pregnant women’s Serum Folic acid level was in between 2.0-3.0 µg/L which

referred to moderate Folate deficiency anemia. 5(10%) pregnant women’s serum Folic acid level was in between 1.0-2.0 µg/L, which refers to severe Folate deficiency anemia.



**Figure: III** Calcium Level of Pregnant Mothers (N=50)

Figure III showed out of 50 pregnant women total 38(76%) pregnant women's Calcium level were in between 8.5-10.5 mg/dL which refers to normal calcium level, and 12(24%) pregnant women's Calcium level were below the range of 8.5-10.5mg/dL, which refers to Hypocalcemia or Calcium deficiency. Total 38(76%) pregnant women who has normal calcium level but still they need calcium complement or supplement in addition to the antenatal vitamins.

### Discussion

All the collected statistics and surveys and related literature indicate that iron deficiency anemia, folate deficiency, and calcium deficiency during pregnancy is a community health hazard that distresses both emerging and advanced states, with serious human health, communal, and financial consequences. It has now become apparent that early recognition and proper diagnosis and management will play a crucial role in resolving the overall iron, folic acid, and Ca deficiency of pregnant mothers in poor countries such as Bangladesh. But because of our indifference and lack of knowledge, we do not feel much pride in gathering more and more data and sampling and disseminating awareness to avoid and handle. According to statistics, nearly half of Bangladeshi pregnant mothers have

present haematological values that reflect anaemia, iron deficiency, folic acid deficiency, and vitamin C deficiency: effects on pregnancy outcome. Anemia during pregnancy is a nationwide health issue both in developed countries and in Bangladesh, which is a significant cause of co-morbidities and increasing death. Bangladesh is among the world's highest prevalence of stunting and micronutrient deficiency. Effects of anemia on the mother: Decreased cell-mediated immunity, reduced ability to withstand postpartum hemorrhage or bleeding, the strain of even uncomplicated labor may cause cardiac failure, predisposition to PIH and preterm labor due to associated malnutrition, reduced enjoyment of pregnancy and motherhood owing to fatigue, potential or possible threat to life. Effects to fetus/ baby: intrauterine hypoxia and growth retardation, prematurity, LBW, anemia a few months after birth due to poor stores, augmented danger of perinatal sickness, and death rate.<sup>14</sup> Outcomes of Mild, Moderate, Severe Folic acid deficiency: miscarriage, poor growth in the womb, cleft lip and palate, preterm birth, small birth weight.<sup>15</sup> Outcomes of Calcium deficiency during pregnancy: Pregnancy Induced Hypertension (PIH), fetal growth disorders, maternal mortality in developing regions, pre-eclampsia.<sup>16</sup> Management of mild to severe Iron

Deficiency Anemia (IDA) during pregnancy can include Accurate history of food intake and food habits, accurate history of medicine intake (if any), proper history of obstetric and social life, early detection of falling hemoglobin level, dietary advice with iron-enriched food and fruits, supplementary iron therapy, avoidance of frequent childbirth, adequate treatments to eradicate illnesses which may cause anemia.<sup>17</sup> Management of Mild, Moderate, Severe Folic acid deficiency during pregnancy: For most women of reproductive age, the prescribed dosage is 400 µg of folate per day. According to the Centers for Disease Control and Prevention (CDC), one can take folic acid daily for as a minimum of a month before getting pregnant and each day after giving birth. The CDC also advises, however, that folic acid be taken every day by all women of childbearing age. So, a pregnant mother would be okay to even start taking it sooner.<sup>15</sup> Management of Mild, Moderate, Severe Folic acid deficiency during pregnancy: According to a new World Health Organization (WHO) recommendation, pregnant women in Bangladesh who consume 1.5 to 2.0 g of essential calcium per day from 20 weeks of pregnancy to the last day of pregnancy have a 14 percent lower risk of pre-eclampsia.<sup>18</sup> Clinical guidelines: In Bangladesh, Ca be added to critical medicine lists.<sup>19</sup> Global clinical recommendations should be revised in addition to the provision of Ca in antenatal care to incorporate an informative aspect in antenatal care as to signs of pre-eclampsia, to implement dietary guidance, and to improve the correct timing of the supplement.<sup>20</sup> The Results of this present study indicate that- iron deficiency, folic acid deficiency, and calcium deficiency during pregnancy lead to, potential threats to the mothers such as miscarriage, pre-eclampsia, hemorrhage. pregnancy-induced hypertension (PIH), also brings out negative outcomes to the infants such as prematurity, low birth weight, growth retardation, cleft lip, cleft palate, and neural tube defects. Hence, our current slogan should be to increase awareness, proper diagnosis and

management of iron, folic acid, calcium deficiency during pregnancy in order to fill the nutritional gap and to control the major causes of mortality and morbidity and poor maternal and fetal outcomes of pregnancy in Bangladesh We already came to know that about half of Bangladesh's population are undernourished. As we feel concerned about filling the nutrition gap and controlling the key causes of morbidity and death in childbearing women, we should give priority to widespread awareness, proper diagnosis, and management of iron, folic acid, Ca deficiency during pregnancy.

### Conclusion

The results of this present study indicate that iron deficiency, folic acid deficiency, and calcium deficiency during pregnancy lead to potential threats to the mothers such as miscarriage, pre-eclampsia, hemorrhage, pregnancy-induced hypertension (PIH), and also brings out negative outcomes to the infants such as prematurity, low birth weight, growth retardation, cleft lip, cleft palate, and neural tube defects too. Hence, our current slogan should be to increase awareness, proper diagnosis, and management of iron, folic acid, calcium deficiency during pregnancy in order to fill the nutritional gap and to control the major causes of mortality and morbidity and poor maternal and fetal outcomes of pregnancy in Bangladesh.

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