

## “To Assess the Effectiveness of Zinc, Folic acid, Vitamin B Complex and C for Reducing Low Birth Weight”.

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### Abstract:

1) **Background:** Preterm premature rupture of membranes (PPROM) is one of the most important complications of the pregnancy and cause perinatal morbidity and mortality. History of PPRM is a risk factor of recurrent PPRM. **Iron, Folic acid, Vitamin B Complex and Vitamin C** plays an important role in collagen metabolism and increases resistance maintenance of the chorioamniotic membranes.

### 2) Objectives

The aim of this study is to assess the effectiveness of Iron, Folic acid, Vitamin B Complex and Vitamin C for reducing the risk of Pre-mature Ruptures of membrane in pregnancy.

### 3) Patients and Methods

This clinical trial study was performed on 100 pregnant women with the history of PPRM, with singleton pregnancy and gestational age 14 weeks in Upazilla Health complex, Muktagacha during 2015 to 2016. They were randomly divided into two groups: Case and Controls. The case patients received Folvit CI (Iron, Folic acid, Vitamin B Complex and Vitamin C) daily from 14th weeks of gestation. PPRM occurrence was compared between two groups as an indicator of the protective effect of Iron, Folic acid, Vitamin B Complex and Vitamin C Supplements.

### 4) Results

PPROM occurred in 67% of controls and 33% of cases. Rupture of membranes was significantly decreased in the case group.

### 5) Conclusions

Iron, Folic acid, Vitamin B Complex and Vitamin C .supplementations after 14th weeks of gestation can prevent from PPRM in women with the history of PPRM.

**Keywords:** PPRM, Ascorbic Acid, Pregnancy, Collagen, Premature Rupture.

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## I. Introduction

Premature rupture of membranes (PROM) refers to a patient who is beyond 37 weeks' gestation and has presented with rupture of membranes (ROM) prior to the onset of labor.<sup>i</sup> Premature rupture of membranes defined as leakage of amniotic fluid through ruptured chorioamniotic membranes that occur before starting the labor pain at any gestational age. It is one of the most common problems in obstetrics and affects 10-20% of all pregnancies. Preterm premature rupture of membranes (PPROM) is ROM prior to 37 weeks' gestation need. Eighty-five percent of neonatal morbidity and mortality is a result of prematurity. PPRM is associated with 30-40% of preterm deliveries and is the leading identifiable cause of preterm delivery. PPRM complicates 3% of all pregnancies and occurs in approximately 150,000 pregnancies yearly in the United States.<sup>ii</sup> When PPRM occurs remote from term, significant risks of morbidity and mortality are present for both the fetus and the mother. inadequate availability of some nutrients during pregnancy such as zinc, iron,  $\beta$ -carotenes, folic acid, vitamin E, and vitamin C have been identified as risk factors for PPRM and low birth-weight.<sup>iii</sup> Iron & Vitamin C is involved in collagen synthesis, collagen secretion, and collagenolysis processes.<sup>iv</sup> Occurrence of PPRM has been associated with changed patterns of collagen synthesis. **Folic acid**, or **folate**, is an **important B** vitamin for the health of unborn baby. It helps to prevent certain malformations of the brain, skull and spine called neural tube defects. Neural tube defects include spina bifida and anencephaly. It is **important** for all women who could become **pregnant** to take **folic acid**. Some studies have shown that there were lower levels of Iron, Folic acid, Vitamin B Complex and Vitamin C (ascorbic acid) in serum, leucocytes, and amniotic fluid of cases with PPRM as compared to the control group.<sup>v</sup> But they have provided little information about the relationship between

iron, folic acid, vitamin B complex and C intake and its role in PPRM. The aim of this study is to evaluate the role of Iron, Folic acid, Vitamin B Complex and Vitamin C in prevention of PPRM.

## II. Objective

The aim of this study is to assess the effectiveness of Iron, Folic acid, Vitamin B Complex and Vitamin C for reducing the risk of Pre-mature Ruptures of membrane in pregnancy.

## III. Patients and Methods

One hundred pregnant women with 14 weeks gestational age and the history of at least one PPRM with singleton pregnancy were enrolled in this clinical trial, after being completely explained about study conditions and signing informed consent. The study was approved by the Ethics Committee of Mymensingh Medical college hospital and was performed in Hospital during a time period of July 2015 to August 2016. Inclusion criteria was the history of at least one PPRM in previous pregnancies, body mass index (BMI) of 18.5-30 kg/m<sup>2</sup>, singleton pregnancy, normal fetus and normal amniotic fluid insonography, mother age of 18-35yrs, normal cervix length (more than 25mm), no Tobacco usage, and no consumption of iron, Vitamin C, folic acid and vitamin B complex. Patients were randomly divided into two groups:

For 50 women in the case group, 400µg folic acid daily was prescribed in the first trimester, then iron tablet containing 30 mg elemental iron, chewing tablet of 100 mg vitamin C, Vitamin B complex daily were added from 14th weeks of gestation<sup>vi</sup> and was continued up to 37th weeks.

In control group, 50 patients were treated similar except for chewing tablet of placebo instead of same shape of capsule. A questionnaire was completed for each woman including age, weight, history of previous disease, history of previous pregnancies, and gestational age of PPRM at previous pregnancy. The patients were evaluated for bacterial vaginosis in the first visit, moreover anytime during the survey whenever the patient has been complaining of vaginosis signs, and if discovered it was treated immediately. Sonography was performed for all of the cases during 12-14 weeks to evaluate the length of cervix and number of fetuses. All of the patients were evaluated monthly during the second trimester. At the end of second trimester, they were evaluated with sonography for the volume of amniotic fluid and fetal anomalies. The fetal membrane rupture was obtained by sterile speculum and observing amniotic fluid existing from the cervix, fern test. After delivery, the questionnaire was completed by data such as the date and cause of referring to the hospital, date and time of rupture of membranes, gestational age, neonate's sex, birth-weight, and five minute Apgar score<sup>vii</sup> (The **Apgar score** is a simple assessment of how a baby is doing at birth, which helps determine whether your newborn is ready to meet the world without additional medical assistance. Your practitioner will do this quick evaluation one minute and five minutes after your baby is born.) Data was analyzed by SPSS software (version 18). For quantitative variables, T test, and variance analysis were used if the variables were parametric. Chi-square test was used for qualitative variables.  $P \leq 0.05$  was considered statistically significant.

## IV. Results

Rupture of membranes was significantly decreased in the case group in the shape of PPRM, PROM and during term labor. Mean latency period was significantly ( $P = 0.002$ ) higher in case group (23 hours) vs. control group (12 hours). Both groups were statistically different in the view of gestational age, birth-weight, and neonatal Apgar score. In the case group, 37 patients (74%) had vaginal delivery and 39 patients (78%) underwent cesarean section. It was similar in the control group, 11 women (22%) underwent vaginal delivery and 13 women from case group was (26%) cesarean section). ( $P = 1.0$ ). In the next step we compared neonatal outcomes between case and control groups in specific patient who were involved PPRM or PROM. The mean birth-weight of women with PROM was significantly higher in the case group (3100 gram) compared to the control (2600 gram) ( $P = 0.002$ ). The mean neonatal Apgar score in patients with PROM was 8.2 in the case group and 4.6 in the control group ( $P = 0.03$ ). The mean gestational age at delivery was 37 weeks in case group and 34 Weeks in control group ( $P = 0.02$ ). All the mentioned differences were statistically significant.

## V. Discussion

PPROM has been known as the main cause of preterm delivery and associated with increased rates of neonatal and maternal morbidity and mortality.<sup>viii</sup> Although it has different causes, collagen metabolism is considered as the main factor in premature rupture of membranes. Iron, zinc, folic acid with Vitamin B Complex usage during pregnancy can modulate the collagen metabolism and cause the strength of amniochorion membranes. The results of this study showed that Iron, Folic acid, Vitamin B Complex and Vitamin C usage in case group significantly increased the gestational age at delivery, neonatal Apgar score, birth-weight, and latency period. Pregnant women after 20th weeks of gestation can significantly decrease the incidence of PROM and PPRM. Iron, Folic acid, Vitamin B Complex and Vitamin C is an essential nutrient, involved in several biochemical functions. It is an antioxidant that blocks the damaging effects of oxidative stress in vitro.<sup>ix</sup> Therefore, It can

prevent premature rupture of membranes through its role as an antioxidant or in collagen synthesis and maintenance.<sup>x</sup> The present study had some limitations, we aimed to study the independent effect of Iron, Folic acid, Vitamin B Complex and Vitamin C, but because the serum level of Iron, Folic acid, Vitamin B Complex and Vitamin C was not assayed, isolation of the effect of a multiple nutrient is difficult. We propose a relationship between Iron, Folic acid, Vitamin B Complex and Vitamin C intake and an increased risk of preterm premature rupture of membranes. Iron, Folic acid, Vitamin B Complex and Vitamin C supplement is recommended to be administered for pregnant women with the history of PPRM during pregnancy to prevent PPRM. Nevertheless, further studies with larger sample size and fewer limitations are needed to best clarify the role of Iron, Folic acid, Vitamin B Complex and Vitamin C in prevention of PPRM especially in women with other risk factors of PPRM. (More discussion may be added)

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