Association of haemoglobin level during pregnancy and iron supplementation on postpartum anaemia: a community based cross sectional study

Darshan Bhagwan¹, Ashwini Kumar², Chythra Raghavendra Rao², Asha Kamath²


Abstract

Introduction: Anaemia affects more than 50% of women in reproductive age group. India is one of the countries with high prevalence of anaemia and is one of the main contributors for maternal deaths. According to NFHS 3 data iron deficiency is seen in all the age group especially in reproductive age group. More than 70% of women are found to be anaemic in a study conducted in northern India. Around 30% of mothers became anaemic during postpartum period who were having normal haemoglobin levels during pregnancy. Methods: The present community based cross sectional study was conducted in rural field practice area of Kasturba medical College. Study population included postnatal mothers visiting our rural clinic. Details regarding iron and folic acid consumption were obtained from Proforma which was formulated after extensive review of literature and haemoglobin estimation was done by using indirect cyanomethaemoglobin method. The collected data was entered and analyzed using SPSS version17.0. Results were expressed in the form of percentages and proportions. Results: Significant association was found between anaemia during postnatal period with hemoglobin level during pregnancy.(OR=2.64, 95% CI = 1.14-8.08). No significant association was observed between type of iron supplementation, gestational age of starting iron supplementation and number of tablets consumed during pregnancy with anaemia during postnatal period. Conclusion: Higher prevalence of anaemia was noted in mothers having lower hemoglobin level during antenatal period and was found to be statistically significant. Community based educational programmes should be initiated to increase awareness among mothers regarding consumption of IFA tablets on a regular basis and to dispel the myths and misconceptions related to its consumption.

Keywords: Iron and Folic Acid, postnatal, anaemia

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Introduction

Anaemia affects more than 50% of women in reproductive age group and maximum number of victims are from south east Asian region and African region. World Health Organization (WHO) aims to reduce the anemia in reproductive age group to 50% by the year 2025. Strategies to control anaemia include fortification of food by iron supplements, provision of iron containing supplements and control of infections including malaria. WHO recommends intermittent use of iron and folic acid tablets in menstruating women and daily supplementation of IFA in antenatal women. (1)
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According to WHO, wherever prevalence of anaemia is less than 40% 60mg of iron and 400 microgram of Folic acid must be provided during pregnancy and wherever the prevalence is more than 40% 60mg of iron and 400 microgram of folic acid must be provided during pregnancy.(2)

India is one of the countries with high prevalence of anaemia and is one of the main contributors for maternal deaths. According to NFHS 3 (National Family Health Survey) data iron deficiency is seen in all the age group especially in reproductive age group. According to Government of India Guidelines all pregnant women must consume IFA tablets for 100 days during pregnancy as well as postpartum period. Nutritional education is also provided during Village Health and Nutrition days. (3) More than 70% of women are found to be anaemic in a study conducted in northern India. Around 30% of mothers became anaemic during postpartum period who were having normal haemoglobin levels during pregnancy.(4)

The objective of present study was to assess the effect of haemoglobin status during pregnancy and consumption of IFA tablets on postpartum anaemia.

Methodology

The present community based cross sectional study was conducted in rural field practice area of Kasturba medical College. Study population included postnatal mothers visiting our rural clinic. Sample size was calculated based on the assumption that 50% of pregnant women are anaemic with a relative precision of 10% and 95% confidence Interval. Details regarding iron and folic acid consumption was obtained from Proforma which was formulated after extensive review of literature and haemoglobin estimation was done by using indirect cyanomethaemoglobin method. Ethical committee approval was obtained from Institutional Ethics Committee of Kasturba Medical College Mangalore. Informed consent was obtained from the participants after explaining in detail regarding the purpose and procedure of the study. The collected data was entered and analysed using SPSS version 17.0. Results were expressed in the form of percentages and proportions.

Result

Table 1. shows cross tabulation between haemoglobin level during pregnancy and birthweight of children with postpartum anaemia. Significant association was found between anaemia during postnatal period with haemoglobin level during pregnancy (OR=2.64, 95% CI = 1.14-8.08). No significant association was noted between birthweight of children with postpartum anaemia.

Table 1: Prevalence of postpartum anaemia in association with anaemia during pregnancy

<table>
<thead>
<tr>
<th>Obstetric Details</th>
<th>Study subjects</th>
<th>Risk Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Anaemia Present</td>
</tr>
<tr>
<td>Haemoglobin level during pregnancy (gm/dl)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;11</td>
<td>63</td>
<td>15 (23.8)</td>
</tr>
<tr>
<td>&lt;11</td>
<td>47</td>
<td>21 (44.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Birth Weight (gms)**</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2501-3500</td>
<td>198</td>
</tr>
<tr>
<td>≤2500</td>
<td>60</td>
</tr>
<tr>
<td>≥3501</td>
<td>32</td>
</tr>
</tbody>
</table>

*Information available for 110 subjects
** Information available for 290 subjects

No significant association was observed between type of iron supplementation, gestational age of starting iron supplementation and number of tablets consumed during pregnancy with anaemia during postnatal period as shown in table 2.

Discussion

The present study adds significant knowledge on effect of anaemia during pregnancy on haemoglobin levels during postnatal period. It also assesses the effect of iron and folic acid consumption during antenatal period with anaemia during postnatal period.

Anemia in the antepartum period is identified as a major risk factor for developing postpartum
as an important risk factor and it recommends all women who have anaemia in antepartum period to be screened for post-partum anaemia. Compromised prenatal iron status in anaemic pregnant women would limit the amount of available iron for reconstruction of iron stores after delivery. In the present study, higher prevalence of anaemia was noted in mothers with lower haemoglobin level during pregnancy and the association was found to be statistically significant; these findings concur with a study done in America in 2001.

Anaemia during pregnancy has been found to be detrimental to foetal growth and low birth weight has been frequently associated with anaemia. Significant difference was not noted with respect to prevalence of anaemia and birth weight of babies in a study conducted at Germany. Our study was in conformity with these findings.

On average, one gram of iron is required during normal pregnancy. Iron supplementation during pregnancy has shown to be a cost effective intervention in order to reduce prevalence of anemia in pregnancy and postpartum. It also improves maternal and foetal well-being. It is also stated that if six months of treatment cannot be provided in pregnancy, iron supplementation should be continued during postpartum period or dosage should be increased to 120 mg iron during pregnancy. But systematic reviews on this topic recommend a dose of around 100 mg elemental iron and 350-500 mcg of folic acid daily for 16 weeks or more during pregnancy to be ideal. Under the Indian National Nutritional Prophylaxis Programme iron tablets are supplied to children, adolescents, pregnant and lactating mothers. Through the programme all pregnant women are supplemented with prophylactic dose of iron and folic acid tablets containing 100 mg of elemental iron and 0.5 mg of folic acid every day for at least 100 days.

Various studies have shown that between 6-12 weeks post-partum, mean hemoglobin values were significantly higher among women who were supplemented with iron prenatally than among women who had not taken iron supplements. It has been reported that women who took iron supplementation during pregnancy did not suffer the same postnatal reduction in hemoglobin as those who did not take iron supplementation. Iron supplementation improves the iron stores of mother during pregnancy and during postnatal period even among women who enter pregnancy with low iron stores.

Three postnatal women given blood transfusion during pregnancy continued to have anaemia during postnatal period. Iron supplementation was in the form of iron and folic acid tablets [340 (99.1%)] and syrup for four (1.1%) subjects.

Anaemia in postpartum mothers who had consumed <90 iron tablets was found to be 76.4% compared to 59.6% in subjects who had consumed ≥90 iron tablets in a study done at Delhi. In the present study, anaemia among mothers consuming <90 iron tablets was found to be 33.3%, in comparison with 26.2% among mothers consuming ≥90 tablets during pregnancy.

Table 2: Association of iron supplementation during pregnancy with anaemia levels

<table>
<thead>
<tr>
<th>Iron supplementation</th>
<th>Study subjects</th>
<th>Risk Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total No. (n=343)</td>
<td>Anaemia Present No (%) (n=91)</td>
</tr>
<tr>
<td>Iron supplementation</td>
<td>340</td>
<td>88 (25.9)</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>3</td>
<td>03 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gestational age of starting iron supplementation*</th>
<th>Study subjects</th>
<th>Risk Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4 months</td>
<td>112</td>
<td>28 (25.0)</td>
</tr>
<tr>
<td>≥4 months</td>
<td>226</td>
<td>62 (27.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of tablets consumed during pregnancy*</th>
<th>Study subjects</th>
<th>Risk Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;100</td>
<td>320</td>
<td>84 (26.2)</td>
</tr>
<tr>
<td>&lt;50</td>
<td>8</td>
<td>03 (37.5)</td>
</tr>
<tr>
<td>50-100</td>
<td>10</td>
<td>03 (30.0)</td>
</tr>
</tbody>
</table>

*Information available for 338 subjects

5Center for Disease Control (CDC) recognizes anaemia at third trimester of pregnancy.
Conclusion and recommendation:

Iron supplementation during pregnancy did not have any bearing on prevalence of postpartum anaemia. The gestational age at which iron supplementation was started during pregnancy did not have any effect on prevalence of anaemia during postnatal period. Higher prevalence of anaemia was noted in mothers having lower hemoglobin level during antenatal period and was found to be statistically significant. Community based educational programmes should be initiated to increase awareness among mothers regarding consumption of IFA tablets on a regular basis and to dispel the myths and misconceptions related to its consumption.

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