The Prevalence of Premature Rupture of Membranes (PROM) in Anemic and Non-anemic Pregnant Women at a Tertiary Level Hospital

Nusrat Mahjabeen, Shaikh Zinnat Ara Nasreen, and Safinaz Shahreen

ABSTRACT

The incidence of maternal and fetal morbidities and mortalities are very high in anemic patients. According to WHO anemia is the most common medical disease in pregnancy in south east Asian region. 18-20 pregnant women are anemic in developed countries as compared to the incidence is as high as 40% to 75% in south east Asian region. According to Center of Disease Control (CDC) anemia in pregnancy means hemoglobin is less than 11 g/dl (Hematocrit; [Hct] < 33%) in the first and third trimester and less than 10.5 g/dl (Hct < 32%) in the second trimester. According to World Health Organization (WHO), anemia in pregnancy is defined as Hb level is less than 11gm/dl. As physiological hemodilution occurs during pregnancy, pregnant women are at higher risk of anemia and more commonly iron deficiency anemia. The aim of the study is to compare the risk of PROM between anemic pregnant women and non-anemic pregnant women. It is a prospective observational study held in Z.H.Sikder women’s medical college & hospital from April, 2020 to March, 2021. 100 cases of anemic and 100 cases of non-anemic pregnant women were purposively taken as study population. The prevalence of PROM equaled to 64% in pregnant anemic group. In bivariable analysis, the risk factors of anemia such as, maternal working condition, socio economic status and maternal age were studied. The risk of PROM is higher in anemic pregnant women than in non-anemic pregnant women. Doctors and healthcare workers should be more careful to prevent and treat anemia in pregnancy to avoid the adverse outcomes.

Keywords: Anemia, hemoglobin level, hematocrit, PROM.

I. INTRODUCTION

PROM is a very common phenomenon during labor and delivery. PROM means rupture of the fetal membranes before the onset of labor after the viable age. When PROM occurs, we should expedite the delivery process, because there is risk of ascending infection and chorioamnionitis, which are more dangerous than the risk of prematurity considering the risk-benefit ratio. But if PROM occurs after 37 weeks of gestational age, labor may be started spontaneously within 24 to 72 hours. Or it is induced safely. The treatment of preterm PROM, which occurs prior to 37 weeks of gestational age, is more complicated and riskier. In preterm PROM complications occur in about 2% to 20% of all deliveries and perinatal deaths occurs in 18 to 20 percent of cases [1]. PROM may increase the maternal morbidities and mortalities by causing serious complications as chorioamnionitis, endomyometritis, postpartum hemorrhage, pelvic abscess, and more operative deliveries [2].

Anemia in pregnancy is a very common problem specially in developing countries and may end in causing maternal and fetal adverse outcomes during and after labour and pregnancy [3]. According to World Health Organization (WHO) the hemoglobin (Hb) concentration of less than 11 g/dl is defined as anemia in pregnancy [4]. In developing countries, there are various types of reasons causing anemia during pregnancy. Among them some common reasons are micronutrient deficiencies as iron, folic acid, and vitamin B12 and parasitic infections such as malaria and hookworm and chronic infections like TB and HIV [5]-[8]. Pregnancy with anemia is associated with increased risk of maternal and perinatal morbidities and mortalities by impairing immune system [9], [10]. Therefore, the aim of the study is to determine the prevalence of premature rupture of membranes (PROM) in anemic and non-anemic pregnant women at a tertiary level hospital.

II. METHODS

A. Study Design

It is a prospective observational study.

B. Study Population

The study was held in Z. H. Sikder women’s medical
college & hospital from April, 2020 to March, 2021. 100 cases of anemic and 100 cases of non-anemic pregnant women were purposively taken as study population. Both groups used the data collection sheet.

C. Inclusion Criteria
- Mothers who delivered at term (37-42 weeks);
- Single fetus alive.

D. Exclusion Criteria
- Pregnant women with multiple pregnancies;
- Infants with a congenital anomaly;
- Intrauterine fetal death;
- Pregnant women who had the chronic disease (diabetes mellitus, hypertension, asthma, heart diseases).

E. Ethical Considerations
The research was reviewed and approved by the director and ethical committee of Z. H. Sikder women’s medical college & hospital. There was no breach in maintaining the confidentiality.

F. Data analysis
The information was tabulated using univariable, bivariable and multivariable analysis. The statistical significance level of \( p \) was <0.05.

III. RESULTS

TABLE I: FREQUENCY OF ANEMIA IN THE STUDY POPULATION

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Anemia classification</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mild anemia</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>2</td>
<td>Moderate anemia</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

TABLE II: THE DEMOGRAPHIC STUDY OF THE RESEARCH POPULATION

<table>
<thead>
<tr>
<th>Variables</th>
<th>PROM (n=121)</th>
<th>Without PROM (n=69)</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s occupation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Working</td>
<td>80</td>
<td>26</td>
<td>106</td>
<td>75</td>
</tr>
<tr>
<td>- Unemployed</td>
<td>41</td>
<td>53</td>
<td>94</td>
<td>43.6</td>
</tr>
<tr>
<td>Mother’s age:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &lt;18 to 35 years</td>
<td>39</td>
<td>69</td>
<td>108</td>
<td>36</td>
</tr>
<tr>
<td>- &gt;35 years</td>
<td>82</td>
<td>10</td>
<td>92</td>
<td>89</td>
</tr>
</tbody>
</table>

TABLE III: DISTRIBUTION OF PROM IN THE STUDY POPULATION

<table>
<thead>
<tr>
<th>Numbers</th>
<th>Preterm PROM (&lt;37 weeks)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PROM</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>PROM (≥37 weeks)</td>
<td>89</td>
<td>73.5</td>
</tr>
</tbody>
</table>

TABLE IV: CORRELATION OF ANEMIA WITH PROM

<table>
<thead>
<tr>
<th>Channels</th>
<th>Anemic (n=100)</th>
<th>Non-anemic (n=100)</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROM</td>
<td>78 (64%)</td>
<td>43 (35%)</td>
<td>121</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Without PROM</td>
<td>12 (17%)</td>
<td>57 (82%)</td>
<td>69</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Anemia causes various adverse pregnancy outcomes by different mechanisms [11]. In TABLE I, we see the frequency of anemia in our research population. Mild anemia is 72%, which is very high.

Anemia in pregnancy, most commonly, iron deficiency anemia can cause various antenatal and postnatal diseases such as antepartum hemorrhage, urinary tract infection, postpartum hemorrhage, puerperal sepsis etc. Iron deficiency anemia affects immune function. Anemia can cause alteration in the modulation of the immune cells as T cells and B cells. As a result, their proliferation, phagocytic and bactericidal activities may be reduced. The presence of infection increases the chances of PROM and premature delivery by releasing more cytokines in the amniotic fluid and the amniotic membranes. And these cytokines cause easy breakage in the membranes [11]-[13], [16].

Maternal occupation has great effects on PROM. The working environment and the maternal stress act concomitantly with anemia. Stress increases the release of epinephrine and nor-epinephrine. Iron deficiency anemia also increases the release of these stress hormones. The anxiety and stress also cause stimulation of corticotropin releasing hormone (CRH). The combined effects of elevated epinephrine, nor-epinephrine and CRH lead to gestational hypertension, pre-eclampsia, eclampsia, premature delivery, and PROM. The low hemoglobin level also causes hypoxia at the tissue and cellular level. This incident results into free radical cell injury and ultimately increases the risk of PROM [14], [15], [17]. Physical activities which is too heavy, and more than eight hours also may result into PROM [19], [20]. This study shows that maternal occupation has significant relationship with PROM. Table II shows that working women have 75% more chances of PROM.

Age is directly correlated with reproductive function in females. With the increasing age, the efficiency of the reproductive organs reduces. For these compromised functioning, fertility, quality and quantity of ovum and embryogenesis may be hampered. That is why, during pregnancy, symmetrical and asymmetrical intrauterine fetal growth restrictions, congenital abnormalities, PROM, and preterm birth may occur [12], [14]. Pregnancies which occur in adolescent age group also likely cause maternal and fetal complications. At these age group, immature reproductive organs unable to support pregnancy, amniotic membranes are less exposed immune cells and more susceptible to break in the membranes causing PROM [18], [19]. The results of this study present that maternal age has a significant relationship with the prevalence of PROM. Table II shows that there are 89% PROM in <18 and >35 years group.

Anemia in pregnancy also likely to cause preterm deliveries [19], [20]. Table III shows that, there is 26% chances of preterm PROM. Approximately 59% anemic pregnant women suffers from PROM [20]. This study indicates that there is a significant relationship between anemia and PROM. Table IV shows that 64% anemic pregnant women had PROM.

IV. DISCUSSION
Iron deficiency anemia may be caused by an imbalance between the requirement and intake of iron during pregnancy.

V. CONCLUSION
The risk of PROM was higher in the pregnant anemic women than the pregnant non-anemic women. The maternal
age and working condition had significant impacts with the prevalence of PROM. To prevent the rupture of membranes we need to correct anemia cautiously and try to ensure a healthy environment for the mothers.

REFERENCES

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