International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

FETO - Maternal Outcome in Pregnant Women with Hemoglobin E Trait in a Tertiary Care Hospital: An Observational Study

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Abstract: ***Introduction: The NE India and the state of Assam in particular has a very high prevalence of HbE trait. The incidence of HbE in the Bodo Kachari population of Assam has been reported to be 64.5%, the highest observed frequency of this mutation in the world. Objective: To assess the pregnancy outcome among women with HbE trait. Methods and Materials: A hospital based prospective longitudinal study was conducted in a tertiary care hospital for a period of 1 year to identify singleton pregnant women with HbE trait by High performance liquid chromatography and to study their pregnancy outcome. Study was observed on the maternal variables of gravida , mode of delivery , sepsis , degree of anemia, Antepartum hemmorhage , postpartum haemmorhage, asymptomatic bacteriuria ,prolonged hospitalisation, shock, need for blood transfusion, maternal death. Fetalvariables were IUFD, FGR, LBW, abortion, neonatal death, jaundice, birth asphyxia, preterm, NICU admissions, macrosomia and the need for phototherapy. Result: During the study period, 190 pregnant women with HbE trait were included and were followed up till delivery. Hundred percentage of participants were found to be anemic. Most of them were mildly anemic. Fifty percent subjects were primigravida. There was1.05 % abortions, 15.2 % preterm births, 5.7 % Fetal growth restriction, 14.2% Low birth weight. 12.1 % needed NICU admission, Neonatal jaundice was present in 10.5%.3.3 % neonatal death were observed. Conclusion: There were no serious adverse maternal outcomes. Whereas fetal outcomes showed a significant number of preterm births,fetal growth restrictions, low birth weight, neonatal jaundice and neonatal intensive care .***

Keywords: haemoglobinopathy, HbE, anemia in pregnancy, northeast India

1. Introduction

Anemia in pregnancy is a global health problem. In developing countries like India where 50% of pregnant women are anemic, it demands a considerable attention from every clinician. However, anemia caused by some genetic defects is not manageable by commonly available therapies. Therefore, it needs special attention.

Hemoglobinopathies are the most common genetically inherited disorders. The figures of World Health Organization (WHO) estimate that approximately 5% of world's population are being carriers for the genetic hemoglobin (Hb) disorders.[1]

HbE disease is the most common hemoglobinopathy in Southeast Asia. A high incidence of hemoglobin E (HbE) is noted in Northeast Indian population.[23]

In Assam, the incidence of HbE in the Bodo Kachari population has been reported to be 64.5%, the highest observed frequency of this mutation in the world. It is found that women who are homozygous for HbE presents with more spontaneous abortions and infant mortality compared to women who are heterozygous for HbE and homozygous for normal HbA. Very few studies have been undertaken to evaluate the maternal and neonatal outcome in this part of India where the disease is highly prevalent. Keeping in mind the above facts, this study was undertaken to find out the effect of HbE trait on pregnancy outcome.

2. Methods and Materials

A Hospital based prospective longitudinal study was carried out in a tertiary care hospital in the rural region of North east India , for a period of 1 year from June 2021 to May 2022 with a study population of 190 Pregnant women diagnosed with HbE trait attending Department of Obstetrics and Gynaecology, fulfilling the following criteria were included in the study.

Inclusion Criteria ➔Pregnant women diagnosed with HbE trait as per High performance liquid chromatography.

Exclusion Criteria ➔ Women having any major medical condition, present at first contact, that may independently influence pregnancy like a) multiple pregnancy b) gestational diabetes mellitus, c) gestational hypertension, d) grand multiparity, e) morbid obesity, f) post caesarean section pregnancy, g) acute fatty liver of pregnancy h) Received blood transfusion in last 3 months or any major medical illness,i) those who didn't give written consent.

ETHICAL CLEARANCE was obtained from the institutional ethics committee.(AMC/EC/PG/5462)

3. Data Collection Method

All Pregnant women presenting with Hemoglobin level less than 11 gm/dl were subjected to HPLC , of which, only those who were detected with HbE trait were included in the study and those who were already known cases ofHbE trait were also included. A Standardised questionnaire was given and the maternal characteristic like age, parity, sepsis, Antepartum and Postpartum hemorrhage, maternal death ,prolonged hospitalization, shock, blood transfusion, asymptomatic bacteriuria were observed. Fetal outcomes were evaluated in terms of birth weight, route of delivery, term of delivery, intra uterine death, Fetal growth restriction, abortions, macrosomia, neonatal jaundice, neonatal death, neonatal intensive care unit admissions, phototherapy.

Detailed systematic history was taken with particular attention to age, ethnicity, socio-economic status, number of antenatal checkups, relevant past obstetric history and presenting complaints.

Clinical assessment done by general examination and obstetric examination

Laboratory investigations were done with Complete haemogram, Ultrasonography obstetrics for assessment of fetal wellbeing, Screening for haemoglobin variants by using cation exchange high performance liquid Chromatography

Statistical Analysis

Continues data were presented as mean ± SD and Categorical data was expressed as frequency and percentages. Pictorial presentation were made in terms of bar diagram and pie diagram. Data from the case record proforma was entered into Microsoft Excel spreadsheet version 2021 and analyzed using IBMSPSS version 26.

4. Results

The results and observations are summarized as follows:

The most prevalent age group was found to be in the range of 25-29 yearsas shown in the table below. The mean age of the subjects was 28±5 years.

Most of the participants were on 3rd trimester at the time of diagnosis. The mean gestational age at the time of diagnosis was 39±2 weeks.

Most of the participants were from rural locality ie; 105(55.30%) and 85 (44.7%) were from urban community.

Most of the participants belonged to lower economic status ;60(31.5%), followed by middle and upper lower-class subjects ; 50(26.3%) each.

Only 30(15.25%) subjects were of upper or upper middle class

Table 1: Degree of anemia among the participants

Hemoglobin(g/dl)	Number (n)	Percentage (%)
9 – 10.9	140	73.6
7- 8.9	30	15.7
< 7	20	10.5
Total	190	100

The tableno.1 shows 100% participants were found to be anemic. Most of them were mildly anemic and had haemoglobin level of 9-10.9, 140(73.6%).

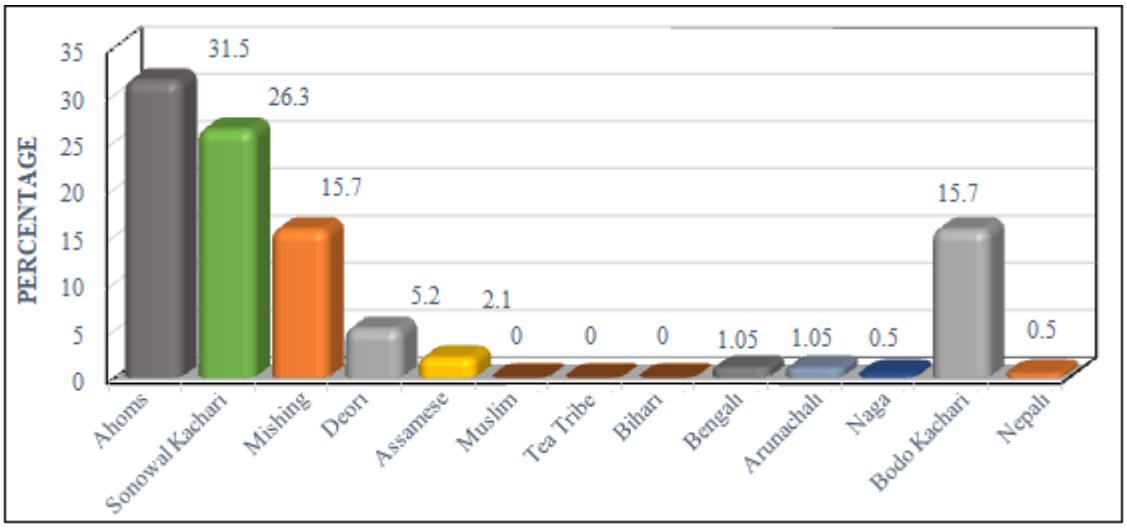

Figure 1: Community distribution of HbE trait

The fig no.1 shows HbE trait was most prevalent among Ahoms, 60(31.5%), followed by SonowalKachari, 50(26.3%), and Mishing, and Bodo Kachari Community 30(15.7%) each

Table 2: Maternal Outcome

Maternal outcome	Percentage (%)
Primi	64
Multi	36
Cesaerean section	26
Sepsis	1.05
APH	5.2
Asymptomatic bacteriuria	5.2
PPH	7
Maternal death	0
Prolonged hospitalisation	3.1
Shock	1.5
Blood transfusion	5.2

64% subjects were primigravida and 36% were multigravida. 74% had normal vaginal delivery. Caesarean delivery was observed in 26% ,Asymptomatic bacteriuria was present in 10 (5.2%).Antepartum haemorrhage was present in 10 (5.2%).There were 10 (5.2%) participants who received blood transfusion Postpartum haemorrhage was present in 13 (7%). ICU admission was present in 02 (1.05%) participants. Prolonged hospitalization was present in 06 (3.1%). Heart failure was absent in the study. Sepsis present in 2 (1.05%). Shock was present in 3 (1.5%) .Abortion was present in 2 (1.05 %There were no maternal death during the study.

Table 3: Fetal Outcome

Fetal outcome	Percentage
IUFD	2.2
FGR	5.7
LBW	14.2
Abortion	1.05
Preterm	15
NICU	12
Birth asphyxia	10.6
Macrosomia	2.6
Neonatal jaundice	3.3
Phototherapy	7.8

Still birth or IUFD was seen in 2 (2.2%). Preterm births were present in 29 (15 %). Fetal growth restriction was present in 11 (5.7 %) participants. Low birth weight was present in 27 (14.2%). Fetal macrosomia was present in 5 (2.6%) Birth asphyxia was present in 7 (3.6%). NICU admission was present in 23(12 %). Neonatal jaundice was present in 3.3 participants. Phototherapy was present in 15(7.8%). Neonatal death was present in 5(3.3 %)

5. Discussion

Our study showed a high prevalence of HbE trait in the respective communities with HbE trait being most prevalent among Ahoms, followed by SonowalKachari, and Mishing, and Bodo Kachari Community which is similar to the findings of Baruah et al [5]

The study by Jan kasparek et al with pregnant women with haemoglobinopathy trait shows higher prevalence of vaginal delivery 50.6 % and 49.4 % had caesarean section. [6]Kemthong et al in a study with HbE trait observed 16.6 % of caesarean delivery, with vaginal delivery being the most common mode of delivery.[7]Supatra et al in a study with HbE disease had most common mode of delivery as vaginal delivery ie: 79 %.[8] In our study,141 women (74.2%) had vaginal and Caesarean delivery was present in 49 (25.7%) subjects. Thus, vaginal delivery is the most common mode of delivery in most of the studies done on haemoglobin E trait and diseases.

Supatra et al on HbE disease, Jan kasparek et al on haemoglobinopathy traits and kemthong et al on HbE trait, there was no incidence of maternal death .In our study also there was no incidence of maternal death. Thus concluding that the maternal mortility is very low with haemoglobin E traits.[867]

Kemthong et al observed the prevalence of APH in Pregnant women with Hbe trait to be 1.6 %. Supatra et al in 2016 found the outcome to be good with no incidence of APH with HbE disease. Our study shows an incidence of 5.2 % [7,8]

Hc Ong in 1972 showed incidence in PPH of 10 % withhbe trait.[9]Kemthong et al onHbE trait observed PPH in 1.3 %and supatra et alin 2.6% . In our study the incidence was 7 % which is higher than the previous studies but the association of other risk factors to the mother might have had an influence to it.[7,8]

Our study shows most of the study population were mildly anemic which was 73.6%. About 10 .5 % had severe anemia. Rest were moderately anemic . 12% of the participants had received blood transfusion which includes those with severe anemia, Anterpartum and postpartum hemmorhage.

Asymptomatic Bacteriuria had a minimal but significant increase among women with HbE trait in the study done by Kemthong et al and Kasparek et al in 2021 also showed a significant increase in incidence of UTI and bacteriuria in pregnant women with hemoglobinopathy trait. Our study correlates with the above studies and has a similar incidence of 5.2 %. [6,7]

Kasparek et al in 2021 found an incidence of 2.3 % of postpartum infection pregnant in women with hemoglobinopathy trait , which is comparable to our study where the incidence of sepsis among hbetrat pregnant women is 1.05%.[6]

In Kaspareket al, the incidence of abortion was 31.4 % which was much higher than the control group. [6]Our study shows an incidence of 1.05% which not very high. Thus showing a good outcome. In Kemthong et al 0.8% was the incidence for stillbirth which is very low. Our study shows an incidence of 2.2 % in pregnant women with HbE trait .[7]

Kemthong et al showed the incidence of stillbirth among HbE trait to be 12.7 %. Supatra et al showed 15.8% and Kasparek showed 12.5 %. In Our study, a similar higher incidence was observed i;e 14.2%. [6–8]

In Kemthong et al the incidence of FGR was 6.1 % and Kasparek et al had a similar finding of 5.1% which is very much relatable to the incidence of 5.7 % in our study in HbE trait mothers. Thus FGR is a significant outcome in the HbE trait cases.[6,7]

Preterm percentage in the study was 15 % which is very much comparable to the previous studies which showed similar incidences of 10.5 % in kasparek et al in hb traits and 13.8% in Kemthong et al on HbEtrait .Hbe trait being a significant contributor to it as our study gives an incidence of 15.2 % which is very high.[6,7]

Kasparek et al shows incidence of NICU admission in women with hemoglobinopathy trait to be 10.4 % in 176 size study group which is very relatable to our study with a similar incidence of 12.1 % in 190 HbE trait mothers. [6]The factors like LBW, Preterm have to be the contributors to this high incidence. Thus HbE trait mothers have a significant no. of babies undergoing NICU admissions.

In our study, 3.3 % of women had baby with macrosomia which is comparable to the previous studies done by Kasparek et al in 2021 on 176 mothers in which hemoglobinopathy trait had a 2.2 % incidence.[6]

6. Conclusion

The study showed that 100 % of the participants were anemic, of which most of them had mild anemia, thus shows that the burden of HbE trait on anemia is less. There were no maternal deaths and no adverse maternal outcomes during the study. Though no adverse fetal outcome was observed, but there were a significant number of preterm births, IUGR, low birth weight and NICU admissions

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