

# RH Negative Pregnancy and its Feto-Maternal Outcome in a Tertiary Care Center in South India

## Shruthi SS1\* and Sreelatha S2

<sup>1</sup>Assistant Professor, Department of Obstetrics and Gynaecology, ESICMC and PGIMSR, Bangalore, India <sup>2</sup>HOD and Unit Head, Department of Obstetrics and Gynaecology, ESICMC and PGIMSR, Bangalore, India

\*Corresponding Author: Shruthi SS, Assistant Professor, Department of Obstetrics and Gynaecology, ESICMC and PGIMSR, Bangalore, India.

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#### Abstract

**Background:** Rh-negative pregnancies represent a significant clinical concern due to the potential for Rh alloimmunization, a condition that can lead to various neonatal complications. Prevalence of Rh negative pregnancy in Western countries is 15%, but in India it varies from 3% to 8%. It can lead to perinatal loss of 1 to 2.5%. The objective of our study is to assess the fetomaternal outcomes in Rh negative pregnancies in our institution.

**Materials and Methods:** This prospective observational study was conducted at the Department of Obstetrics and Gynaecology, ESIC Medical College and Post Graduate Institute of Medical Sciences and Research, Rajajinagar, Bangalore from April 2023 to October 2024 involving 200 Rh negative women. Fetal outcomes like blood group, bilirubin levels, hemoglobin, NICU admissions, exchange transfusions, phototherapy and maternal outcomes like age, gravida, mode of deliveries, Rh anti D Ig status, indications of caesarean section and associated comorbidities were assessed.

**Results:** Mean age of the women was 26 years, with 120 being multigravida and 80 primigravida. 57.5% of them underwent LSCS and rest delivered vaginally. 165 women delivered Rh positive fetus. Only 12 patients received antenatal anti D with ICT being positive in 5 cases of which one was hydrops fetalis, 4 were fetal anemia requiring exchange transfusions and one baby also requiring phototherapy for hyperbilirubinemia.

**Conclusion:** In our study, no adverse outcomes were seen in primigravida whereas multigravida without anti D administration in previous pregnancies had outcomes like hydrops fetalis, fetal anemia and hyperbilirubinemia leading to neonatal morbidity indicating need for promoting awareness about anti D in all Rh negative pregnant women right from their first antenatal visit.

Keywords: Rh Isoimmunisation; Anti D; Sensitization; Hydrops Fetalis; Exchange Transfusion; Phototherapy

### Introduction

The Rh blood group system, particularly the D antigen, plays a crucial role in maternal-fetal compatibility. If the fetus is Rh-positive, then there is a risk of feto-maternal haemorrhage, particularly during miscarriage, trauma, invasive prenatal procedures or delivery [1]. In response, the maternal immune system may develop anti-D antibodies, a process known as sensitization [2]. These antibodies cross the placenta in subsequent pregnancies, attacking the red blood cells of a Rh-positive fetus and causing hemolytic disease of newborn (HDN) with Rh causing 97% of all HDN.

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The role of 300 mcg Anti-D immunoglobulin prophylaxis at 28 - 32 weeks and postnatally within 72 hours [3] has significantly reduced the incidence of Rh sensitization and its associated complications, cases still occur, particularly in settings with limited access to prenatal care or prophylaxis. The consequences of Rh incompatibility can range from mild anemia to severe fetal hydrops, stillbirth, or neonatal death. In addition, affected neonates may require intensive interventions such as intrauterine transfusions or exchange transfusions after birth.

Beyond physical complications, Rh-negative pregnancies can also bring emotional and psychological stress for expectant mothers, especially when there is a history of miscarriage, stillbirth, or previous sensitization. The uncertainty surrounding fetal outcomes and the need for repeated monitoring and interventions can significantly impact maternal well-being.

This study explores the outcomes and complications of Rh-negative pregnancies, with a focus on both sensitized and non-sensitized cases. By looking at clinical data and relevant literature, this research aims to deepen our understanding of Rh-negative pregnancies and contribute to better outcomes for mothers and their babies-particularly in settings where healthcare resources are stretched thin.

#### Methodology

This prospective observational study was conducted at the Department of Obstetrics and Gynaecology, ESIC Medical College and Post Graduate Institute of Medical Sciences and Research, Rajajinagar, Bangalore. The study period extended from April 2023 to October 2024. The study population included pregnant women with Rh-negative blood group who attended the antenatal clinic or were admitted for delivery during this period.

A total of 200 participants were included, with the sample size calculated using Epi Info software based on a prevalence rate of Rhnegative pregnancies ranging from 5% to 8%, as reported in the reference study by Agarwal S., *et al.* 

**Inclusion criteria:** All pregnant women with Rh-negative blood group above 18 years; Husband with Rh-positive blood group, Informed consent.

#### Exclusion criteria: Husband with Rh negative blood group.

A detailed history was taken including Age, Gravida, Obstetric history involving details of present pregnancy like associated comorbidities and previous pregnancies, miscarriages, stillbirths and Anti D injection.

General physical examination and per abdominal examination along with systemic evaluation was done and noted in every Antenatal visit. All antenatal investigations like blood group, complete blood counts, thyroid profile, urine routine microscopy, serology were done along with husband blood group. Indirect Coombs test was done at first visit and at 28 weeks again. Per vaginal examination was done at term when indicated or when patient was in labour.

After delivery, mode of delivery and any complication were noted. Baby's cord blood was sent for ABO/Rh typing, haemoglobin and bilirubin levels and direct Coombs test. Those requiring any management or observation were monitored in NICU.

If the baby was Rh positive, the mother was given 300 mcg of Anti D injection within 72 hours and both mother and baby were followed up till delivery.

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#### Results

In our study, 200 Rh negative women were included. Mean age of women was 26 years, of which were 80 Primigravida and 120 Multigravida. Only 6% of the patients received Antenatal Anti D injection whereas all 165 patients who delivered Rh positive foetuses received postpartum Anti-D Rh IgG immunoprophylaxis within 72 hours. 26% of the women had Hypothyroidism, 24% had Anaemia, 6% had GDM and around 8% had Hypertensive disorders.

Out of these,190 had term delivery (> 37 weeks) whereas 10 women had preterm delivery (< 37 weeks). 57.5% of these women underwent LSCS due to various maternal and fetal indications of which the most common indications for LSCS were Failed induction (35%) and fetal distress (32%).

Mode of Delivery	Total	%
Full term Normal vaginal delivery	76	38
Forceps Vaginal delivery (Term)	2	1
Vacuum Delivery (Term)	2	1
Preterm Vaginal delivery	5	2.5
LSCS	110	55
Preterm LSCS	5	2.5

Anti D prophylaxis	Number	%
Antenatal	12	6
Postnatal	165	82.5

Comorbidity	Number	%
Pre-Eclampsia	5	2.5
Gestational Diabetes Mellitus	12	6
Hypothyroidism	52	26
Anaemia	48	24
Gestational hypertension	10	5

Table 3: Associated comorbidities.

Indication	N	%
Previous LSCS	20	16.6
Failed Induction	42	35
Fetal distress	38	31.6
Malpresentation	4	3.3
Severe Oligohydramnios	2	1.6
Placenta previa	2	1.6
Meconium stained liquor	12	10

Table 4: Indication of caesarean section (N = 120).

165 women delivered Rh positive fetus and 35 Rh negative. 77% of fetuses were > 2.5 kgs and rest were low birth weight.

There were 5 cases of isoimmunisation with indirect Coombs test positive (2.5%) all of whom were multigravidas with no history of Anti D injection in previous pregnancies of which one presented as hydrops fetalis.

15 babies had anaemia which accounted to 9%, of which 4 had severe anaemia (ICT positive) requiring NICU admission and Exchange transfusion postnatally. 46% of the babies had neonatal jaundice of which 6 babies had Bilirubin > 4 mg/dl (3.5%) which required sun exposure and double strength phototherapy and NICU admission.

The incidence of NICU admissions was 17% of which 41% due to RDS, 29% was related to prematurity, 17% due to hyperbilirubinemia and 11% due to Anaemia.

<b>Blood group of Neonates</b>	Total	%
Rh Positive	165	18
Rh Negative	35	82

Baby Birth Weight	Number of Neonates	%
< 2.5 kg	47	23
> 2.5 kg	153	77

Table 5: Blood group of neonates.

<b>Table 6:</b> Baby birth weight	Table	6: Baby	birth	weight
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Neonatal Outcomes	Total	%
Neonatal Jaundice	92	46
Neonatal anemia	3	1.5
Hydrops Fetalis	1	0.5
IUD	0	0
Respiratory Distress	14	7
Healthy Mothers side	90	45

Table 7: Distribution of cases according to neonatal outcomes.

Hb	Ν	%
<10	3	1.8
10-14	12	7.2
14-16	122	73.9
16-18	28	16.9

Table 8: Distribution according to Hb (g/dl) in Rh negative neonates (N = 165).

Bilirubin	N	%
< 2.8	135	81.8
2.8 - 4.0	24	14.5
> 4.0	6	3.5

*Table 9:* Distribution of cases according to serum bilirubin level (mg/dl).

Neonatal Outcomes	Ν	%
Prematurity	10	29.4
Severe anaemia for Exchange transfusions	4	11.7
Respiratory Distress	14	41.1
Double strength Phototherapy	6	17.6

Table 10: Distribution of cases according to NICU admission (N=34).

#### Discussion

In our study population, 60% were Multigravida similar to studies by Shradha., *et al.* [4] 2016 and Yadav., *et al.* [5] Majority of the women underwent LSCS in contrast to a study by Tripathi., *et al.* [6] where Vaginal deliveries were higher. 40% of the women in our study did not know their Blood group before visiting our institution which shows lack our awareness among them.

Only 6% of our cases had antenatal Anti D prophylaxis which may be due to institutional constraints, lack of awareness among the patients or lack of a standardized protocol in the institution whereas postnatally all 165 patients with Rh positive fetuses were covered with Anti D prophylaxis with similar results in studies by Haripriya., *et al.* [7] and Shradha., *et al.* [4].

In our study, it was seen that 2.5% cases were ICT positive of which all were multigravida without any history of Anti D injection in any of the pregnancies. Agrawal., *et al.* [8] also showed similar results with 5% cases being sensitized.

In our study it was seen that 58% babies required routine bedside total serum bilirubin monitoring whereas 17% babies required NICU admissions mainly for phototherapy, exchange transfusion for anaemia and respiratory distress. Studies done by George., *et al.* [9] and Shradha., *et al.* [4] also showed similar results where 78% and 65% babies respectively required bedside bilirubin monitoring and 22% and 35% babies required NICU admission for phototherapy and exchange transfusion.

Introduction of Anti D immunization has reduced the neonatal morbidity and mortality to a great extent but still India has a long way to go due to Cost restraints, lack of standardised institutional protocols, illiteracy and lack of medical facilities in rural India.

#### Conclusion

Rh isoimmunization remains a preventable cause of perinatal morbidity and mortality, if patient has regular Antenatal visit in a tertiary care center. Universal antenatal ICT and administration of Anti-D immunoglobulin at 28 weeks and in postpartum in Rh-negative women must be made mandatory in all institutes and regular programmes should be conducted to create awareness among women to reduce the associated complications. Future research should focus on cost-effective strategies to enhance Anti-D prophylaxis coverage and evaluate long-term interventions.

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