



TO DETERMINE FETOMATERNAL OUTCOME IN RH NEGATIVE PREGNANCY

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ABSTRACT **Background:** The present study was conducted to determine the fetomaternal outcome among Rh-negative pregnancies presenting to a secondary care hospital of North India. **Methods:** A prospective observational design was carried out among Rh negative mothers presenting to the Department of Obstetrics and Gynecology of Swaroop Rani Hospital, Prayagraj, from December 2021 to July 2022. On admission each mother was interviewed using a questionnaire. ABO/Rh grouping of the mothers as well as their husbands/partners were done. Rh antibody titers of the patients were done at first visit and repeated at 28 and 32 weeks respectively. The labor of each of the mothers was monitored carefully, with the mode of delivery and outcome of labor being recorded in the proforma. For the Rh typing of the neonate, cord blood was collected after delivery and sent for ABO/Rh grouping. Both the mother and the neonate were followed up till their discharge/death, and any adverse maternal or neonatal outcome in this period were noted. **Results:** During the study period, 46 mothers were assessed. The mean age was 23.9±1.4 years. Most of the mothers were multipara. 4.4% of them had a raised Rh antibody titer. Of the mothers, 13% delivered preterm and most required lower segment cesarean section (56.5%). 93.5% of the deliveries resulted in live births. The incidence of Rh incompatibility among the Rh-negative mothers was 83.7%. The mean birth weight was 2.8±0.4 kgs, with most of the babies being male (60.5%). The most common complications developing in the neonates was anemia (21%) and neonatal hyperbilirubinemia (9.3%). Only one (2.3%) of the neonates born to the mothers died due to post-birth complications. **Conclusions:** Rh incompatibility was observed to be high among the mothers assessed in the study, with 4.4% having raised anti-D titers. Anemia and neonatal hyperbilirubinemia were found to be the most common problems associated with such pregnancies.

KEYWORDS : isoimmunization, Rh incompatibility, Rh negative pregnancy, erythroblastosis foetalis

INTRODUCTION

Rhesus (Rh) incompatibility is one of the most important types of high-risk pregnancy that are encountered in general obstetric practice. Rh incompatibility refers to the discordant pairing of maternal and fetal Rh type. This can lead to and Rh-negative mother's sensitization to the D antigen following the admixture of Rh-positive fetal and maternal blood during an abortion, trauma, invasive obstetric procedures, or delivery. Once alloimmunization occurs, the mother starts producing anti-D antibodies, which can lead to severe consequences for the fetus, ranging from mild hemolytic anemia to hydrops fetalis. This risk is higher for future pregnancies with a Rh-positive fetus, who have been found to be at a high risk of developing severe hemolytic anemia and hydrops fetalis.¹

The global incidence of Rh incompatibility is around 10% of all Rh-negative pregnancies, with sensitization being reported in around 5% of these cases. With recent advances in the field of obstetrics, especially with regards to antenatal diagnostics the incidence of this condition has seen further decline, with current estimates varying from 0.4% to 2.7% among pregnant women. Once the sensitization occurs, however, management of the condition is difficult. While Rhesus immunoglobulin transfusion to the Rh incompatible mothers has been found to be effective in reducing the severity of the condition, a large number of these pregnancies still have to be terminated, and are still associated with significant morbidity and mortality for the neonate.

In India, only few studies have examined Rh incompatibility and alloimmunization in pregnancies and its effect on the fetomaternal outcomes, with significant variation between regions and populations being reported.² Therefore, the present study was conducted to determine the fetomaternal outcome among Rh-negative pregnancies presenting to a secondary care hospital of North India.

MATERIALS AND METHODS

A prospective observational design was adopted for the present study. It was carried out among Rh negative mothers presenting to the Department of Obstetrics and Gynecology of Swaroop Rani Hospital, Prayagraj, Uttar Pradesh, from December 2021 to July 2022. Women with singleton pregnancy and gestational age beyond 30 completed weeks as per last menstrual date or earliest ultrasound, with a live fetus and intact membrane were considered for the present study. The exclusion criteria included mothers with multiple gestation, severe anemia, or premature rupture of membranes. A total of 52 mothers were admitted during this time period meeting these criteria, all of

whom were approached for the purposes of the study. Of them, 46 provided written informed consent to take part in the study, and were therefore recruited for assessment.

On admission to the Obstetric department of the study institution, each mother was interviewed using a pre-designed, pre-tested, structured questionnaire. The sociodemographic parameters, clinical examination findings, and obstetric history of the patients were recorded in the questionnaire. Regarding the Rh status assessment of the mother and the neonate, at the time of admission, the ABO/Rh grouping of the mothers as well as their husbands/partners were done along with the routine blood investigations. Rh antibody titers of the patients were done at first visit and repeated at 28 and 32 weeks respectively. The labor of each of the mothers was monitored carefully, with the mode of delivery and outcome of labor being recorded in the proforma. For the Rh typing of the neonate, cord blood was collected after delivery and sent for ABO/Rh grouping. The neonate was thoroughly examined for any congenital anomalies, and birth weight, and other clinical parameters were observed and recorded in the proforma. If the baby was found to be Rh positive, the mother was given postpartum prophylaxis with Anti-D immunoglobulin within 24 hours of the delivery.

Both the mother and the neonate were followed up till their discharge/death, and any adverse maternal or neonatal outcome in this period were noted.

Statistical Analysis

The data obtained was recorded in a Microsoft Excel spreadsheet and analyzed using the statistical package for the social sciences (SPSS) program v.20. The analyzed data was presented by means of frequency and percentages in case of categorical variables, and using mean and standard deviation for continuous variables.

RESULTS

During the study period, a total of 52 Rh negative mothers presented to the study institution for their delivery. Of them, 46 provided written informed consent, and were therefore included in the study. In these mothers, the mean age was 23.9±1.4 years, with the majority of the mothers belonging to the 18-24 years age group (67.4%). Most of the mothers were multipara, with the majority having parity of more than 3 (26.1%), 17.4% of the mothers had a previous history of abortion at the time of their presentation to the study institution. It was observed that 89.1% of the mothers had a Rh-positive husband, and only 4.4% of

them had a raised Rh antibody titer. (Table 1)

Of the mothers, 13% delivered preterm, and 4.4% delivered post-term, while the rest delivered at term. Regarding the mode of delivery, it was observed that most mothers required lower segment cesarean section (56.5%). 93.5% of the deliveries resulted in live births, and 3 babies were stillborn (6.5%). When the Rh typing of the neonates was done using cord blood sample, it was observed that the incidence of Rh incompatibility among the Rh-negative mothers was 83.7%. (Table 2) The mean birth weight of the live newborns was 2.8±0.4 kgs, with most of the babies being male (60.5%). It was seen that the 67.4% and 90.7% of the babies had APGAR score at 1 min and 5 mins after birth of 7 or more respectively. The most common complications developing in the neonates was anemia (21%), with the mean serum hemoglobin in the neonates being 14.1±1.7 gm/dl. The incidence of neonatal hyperbilirubinemia was 9.3%, with the mean total serum hemoglobin levels among the live neonates being 2.2±1.2 mg/dl. Only one (2.3%) of the neonates born to the mothers died due to post-birth complications. (Table 3)

DISCUSSION

Rh isoimmunization is a major obstetric problem. However, it is quite solvable by means of proper pre-conception counselling and prophylactic immunoglobulin administration, which has been utilized to reduce the burden of the problem in most developed countries. However, it still remains a problem in developing countries such as India as evidenced by the high incidence of Rh incompatibility among Rh-negative pregnancies in observed in the present study (83.7%), findings consistent with those reported by Yadav et al. in a similar population. Prophylaxis with anti-D immunoglobulins don't yield expected outcomes if an Rh incompatible mother is already is alloimmunized. Therefore, the American College of Obstetricians and Gynecologists advises routine antibody testing before administering Rh IG.10 However, most mothers in India do not have access to such testing services at the primary and secondary care levels, which means that Rh isoimmunization in the first pregnancy often remains underdiagnosed and undermanaged. This was also found to be the case in the present study, as the incidence of raised Rh titers was also observed to be relatively high, similar to other studies conducted in the country. These findings suggest a need to increase efforts in improving health infrastructure and health education to reduce the burden of the condition.

Rh isoimmunization has been found to be associated with higher maternal age and multiparity. Both were observed to be the case in the present study too. The mean age of the mothers was 23.9±1.4 years, and the majority of the mothers were found to have a parity of 3 or more. The proportion of mothers with a history of previous abortion was also relatively high (17.4%). These findings are consistent with those reported by authors such as Gothwal et al., Schonewille et al., and Verduin et al. in their studies, indicating that the factors associated with the condition remains largely similar regardless of the study population.13

While most of the mothers in the present study delivered at term, 13% had preterm deliveries, and 3 of the deliveries resulted in stillbirths. Even when Rh antibodies are not raised, Rh incompatibility has been shown to precipitate physiological and biochemical phenomena that may lead to fetal distress and thus precipitate preterm delivery, and in some cases, intrauterine fetal death. This has been reported by similar studies conducted on the topic by authors such as Tripathi et al., and Yadav et al.10 These aforementioned phenomena also have been shown to precipitate intrauterine fetal distress, thus necessitating operative modes of delivery such as lower segment cesarean section, as was observed in the present study as consistent with that reported by Sreelatha et al., and Bondagji et al. in their research.

While it was observed that most of the neonates born to the mothers with Rh incompatibilities were healthy, with normal birth weight and APGAR scores of 7 or more at 1 and 5 mins of birth, it was also observed that the incidence of neonatal hyperbilirubinemia as well as neonatal anemia was substantially high among them (9.3% and 21% respectively). The major adverse event in an Rh incompatible pregnancy is the development of the hemolytic disease of the fetus and the newborn, the most serious of which is erythroblastosis fetalis. However, even in the absence of erythroblastosis fetalis, the consequences of Rh incompatibility, especially in multipara women can lead to the destruction of the RBC of the fetus and newborn at a rate higher than the erythropoiesis. This leads to both the fall of their serum

hemoglobin levels as well as the rise of indirect bilirubin levels, which predisposes them to developing anemia and hyperbilirubinemia, as was observed in the present study as well as reported by other studies on the topic.2510

Table 1. Sociodemographic Parameters Of The Participants (n=46)

Parameters	Frequency	Percentage
Maternal age (completed years)		
18-24	31	67.4
25 and above	15	32.6
Parity		
1	7	37
2	9	19.6
3	8	17.4
>3	2	26.1
Previous history of abortion	8	17.4
Rh status of husband		
Positive	41	89.1
Negative	5	10.9
Rh antibody titer raised	2	4.4

Table 2. Delivery Related Characteristics Of The Study Participants (n=46)

Parameters	Frequency	Percentage
Type of delivery		
Preterm	6	13
Term	38	82.6
Post-term	2	4.4
Mode of delivery		
Spontaneous vaginal delivery	20	43.5
Lower segment cesarean section	26	56.5
Delivery outcome		
Live birth	43	93.5
Stillbirth	3	6.5
Rh status of the fetus		
Rh positive	36	83.7
Rh negative	7	16.3

Table 3. Neonatal Outcome Related Characteristics Of The Study Participants (n=43)

Parameters	Frequency	Percentage
Birthweight (kgs)		
Low birth weight (<2.5 kg)	6	14
Normal birth weight	37	86
Sex of the neonate		
Male	26	60.5
Female	17	39.5
APGAR at 1 min		
<7	14	32.6
≥7	29	67.4
APGAR at 5 mins		
<7	4	9.3
≥7	39	90.7
Total serum bilirubin (mg/dl)		
<2.8	29	67.4
2.8-4	10	23.3
>4	4	9.3
Hemoglobin (g/dl)		
<10	2	4.7
10-14	7	16.3
>14	34	79.1
Neonatal death	1	2.3

CONCLUSION

The study observed that the incidence of Rh incompatibility among Rh negative pregnancies in the study institution was 83.7%, and that of Rh isoimmunization was 4.4%. While severe hemolytic disease of the fetus and newborn was not observed, Rh incompatible pregnancies were found to result in stillbirth, increased need for operative delivery, anemia and hyperbilirubinemia among the newborns.

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