Original Research Article

Fetomaternal outcome of rheumatic heart disease in pregnancy: an observational study

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ABSTRACT

Background: Rheumatic heart disease (RHD) remains a significant global health burden, particularly among pregnant women in regions with limited access to healthcare. Pregnancy exacerbates the risks associated with RHD due to increased cardiac demand, potentially leading to adverse fetomaternal outcomes. This study aims to investigate the fetomaternal outcomes associated with RHD during pregnancy. Specific objectives include assessing the maternal outcome of patients with rheumatic heart disease in pregnancy and investigating the fetal outcome.
Methods: It was a retrospective observational study to assess the outcomes of pregnant women and neonatal outcomes.
Results: The findings reveal a significant burden of adverse fetomaternal outcomes associated with RHD during pregnancy. Maternal complications, such as maternal mortality (4%), mean gestational age 39.17 years, valvular disorder and mode of delivery, and fetal complications, including preterm birth, low birth weight, intrauterine growth restriction, and neonatal mortality, were also elevated in this population.
Conclusions: Moving forward, further research is essential to enhance our understanding and optimize care for pregnant women with RHD.

Keywords: RHD, Pregnancy, Neonatal outcomes, Maternal complications

INTRODUCTION

Rheumatic heart disease (RHD) continues to be a major global health concern, especially in areas where access to healthcare and preventative measures is restricted. Rheumatic fever causes this chronic illness, which damages and eventually malfunctions the heart valves. While the prevalence of RHD has decreased in many affluent nations, it still presents significant issues in low- and middle-income countries, primarily affecting young adults, especially those who are pregnant.[1] Pregnancy-related physiological changes in mothers have an impact on the natural processes of human development, which include pregnancy and childbirth. These hemodynamic fluctuations place a heavy load on the cardiovascular system. Patients with cardiac illness have an increase in their symptoms, and their sick hearts are unable to adapt, which may ultimately result in decomposition and the death of the fetus and mother.[2]

Obstetricians face a hurdle when diagnosing heart disease during pregnancy since frequent clinical signs of cardiac lesions, such as pedal edema, murmur, and dyspnea, mimic normal pregnancy. Heart disease prevalence in expectant mothers' ranges from 0.3% to 3.5%. During pregnancy, there is an additional 30–50% increase in cardiac output. This strain on an already-diseased heart during labor and delivery can result in problems or even death. About 20.5% of maternal fatalities are caused by cardiac problems.[3]

Recognizing significant circulatory changes occur during pregnancy to suit the developing embryo, making pregnancy a distinct physiological state. Pregnancy can aggravate pre-existing symptoms of cardiac disorders, such as RHD, and raise the risk of negative outcomes for the mother and the fetus. To maximize prenatal treatment, enhance maternal health, and lower perinatal morbidity

and death, it is imperative to consider the fetomaternal outcomes of RHD during pregnancy.[4]

A retrospective observational study on the effects of RHD on fetomaternal outcomes throughout pregnancy offers important new information about the clinical course, complications, and approaches to managing this susceptible group. These studies aid in the creation of evidence-based guidelines and therapies specific to pregnant women with RHD by analyzing the relationships among maternal cardiac state, obstetric management, and newborn outcomes.[5]

This study aims to investigate the fetomaternal outcomes of RHD during pregnancy through a comprehensive observational analysis. By evaluating factors such as maternal outcomes like gestational age, mode of delivery, fetal well-being, and neonatal outcomes, we seek to identify predictors of adverse events and assess the impact of multidisciplinary management approaches on clinical outcomes.[6] Healthcare practitioners can optimize risk categorization, implement prompt therapies, and enhance pregnancy outcomes for afflicted women by gaining a better understanding of the fetomaternal consequences associated with RHD throughout pregnancy.[7] The ultimate goal of this research is to contribute to clinical practice guidelines and public health campaigns that attempt to lessen the global impact of RHD on mother and newborn health.

Aims and objectives

The aim of the study was to investigate the fetomaternal outcomes associated with RHD during pregnancy.

Objectives include assessing the maternal outcome of patients with rheumatic heart disease in pregnancy and investigating the fetal outcome.

METHODS

Study design

It was a retrospective observational study.

Study setting

The study was conducted at the Department of Obstetrics and Gynaecology, Rohilkhand Medical College and Hospital Bareilly.

Study duration

The duration of the study was for 2 years (December 2021 to December 2023).

Study population

All the pregnant females with RHD were admitted to a tertiary care center.

Sample size

A total of 50 patients were selected with a clinical diagnosis of RHD pregnant women at the Department of Obstetrics and Gynaecology, Rohilkhand Medical College and Hospital, Bareilly. The sample size was calculated based on the below-mentioned formula.

$$n = \frac{z^2 \times p \times q}{d^2}$$

Here, n is sample size, z is 1.96 (considering confidence as 95%), p is incidence, q is 100 – p, d is absolute error, and p is incidence rate of RHD is (70.25%). In a study, pregnancy with heart disease in South Asia: a systematic review and meta-analysis of prevalence and outcome (2022).

$$So, p = 70.25$$

$$q = 100 - p = 100 - 70.25 = 29.75$$

We took 13% as absolute error, represented as d.

$$n = \frac{(1.96)^2 \times p \times q}{(13)^2} = \frac{3.84 \times 70.25 \times 29.75}{(13)^2} = 47.48 \approx 50$$

So, a sample size of 50 was taken for our study.

Sampling technique

Simple random sampling was used.

Inclusion criteria

All the pregnancy cases with RHD were admitted to the tertiary care center, and willing to participate in the study after informed written consent were included.

Exclusion criteria

Patients not willing to participate in the study, loss to follow up, and patients below the age of 18 years were excluded.

Approval of study

Written approval from IEC RMCH, Bareilly was obtained. After obtaining informed verbal consent from all pregnant patients with rheumatic heart disease admitted to the Obstetrics and Gynaecology department was included in the study and a detailed history of the patient including symptoms and signs was obtained.

Various types of heart disease depending on electrocardiography (ECG) and echocardiography (ECHO) findings were enlisted and the pregnancy outcome (both maternal and fetal) and complications among them were studied.

Statistical analysis

Data from the collected questionnaires was added to the Microsoft excel sheets and was analyzed by statistical package for the social sciences (SPSS) version 27 IBM Corp. Descriptive statistics were used in this study. The discrete variables are measured as frequencies and percentages and the continuous data as Mean and standard deviation. Bar diagrams and pie charts are also used for visualization of the data.

RESULTS

In this present study, the mean age of the mother was found to be 29.62 with 3.96 years of standard deviation. The average gestational age was calculated as 39.17 with 1.17 SD and 4% were under the category of maternal mortality (Table 1).

Table 1: Distribution of maternal outcome according to age, mean gestational age, and mortality.

Variables	Mean±SD
Age	29.62±3.96
Gestational age	39.17±1.17
Maternal mortality n (%)	2 (4)

Almost 70% of mothers deliver through the vaginal and 30% have elective and emergency lower segment cesarean section (LSCS) delivery (Table 2 and Figure 1).

Table 2: Distribution of maternal outcome according to the mode of delivery.

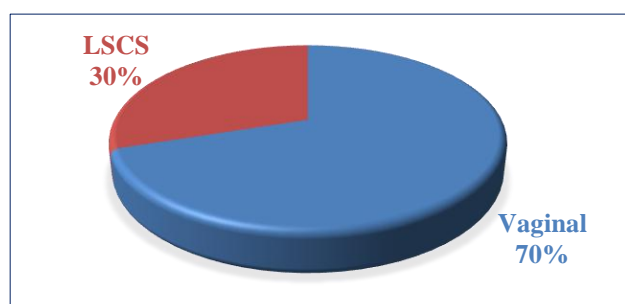| Mode of delivery	N (%)
Vaginal	35 (70)
LSCS	15 (30)

Figure 1: Maternal outcome according to the mode of delivery.

According to valvular distribution, the majority of mothers had 58% MS followed by MR with 16% and 12% AS (Table 3).

46% of neonatal are found to be low birth weight whereas the remaining 54% are normal (Table 4 and Figure 2).

Table 3: Distribution of maternal outcome according to valvular disorder.

Valvular	N (%)
MS	29 (58)
MR	8 (16)
AS	6 (12)
AR	4 (8)
MR + AS	1 (2)
MR + AR + AS	2 (4)

Table 4: Distribution of fetal outcome according to birth weight.

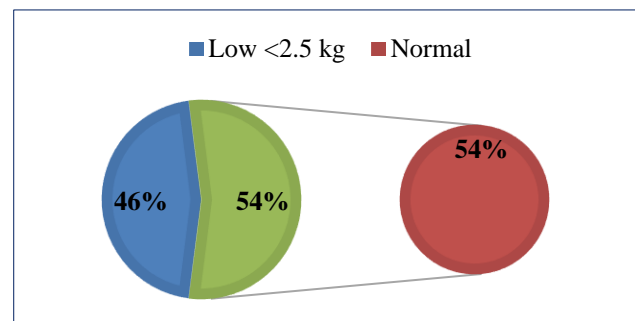| Fetal birth weight (kg)	N (%)
Low <2.5	23 (46)
Normal	27 (54)

Figure 2: Fetal outcome according to birth weight.

According to neonatal outcomes, 1 baby died due to pre-term delivery and the weight of the baby was very low. 4% of neonates have IUND. However, the average weight of the neonates is under 2.5 kg. 18% of babies were pre-term and 82% had term deliveries. 72% of neonates are spontaneous and 28% are induced in nature (Table 5 and Figure 3).
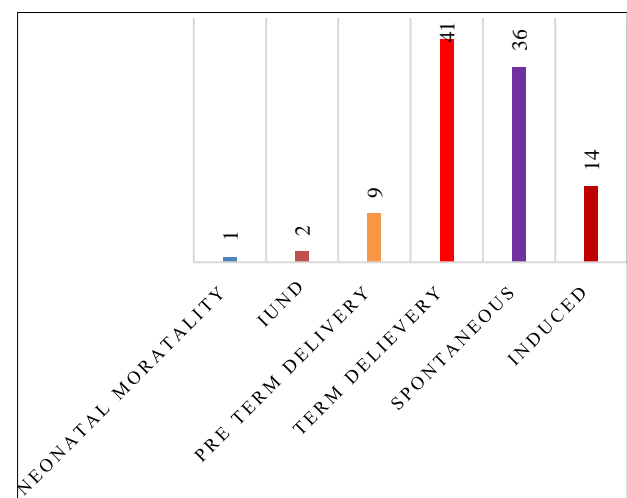

Figure 3: Neonatal outcomes.

Table 5: Distribution of neonatal outcomes.

Variables	N (%)
Neonatal mortality	1 (2)
IUND	2 (4)
Birth weight (mean±SD)	2.45±0.40
Pre-term delivery	9 (18)
Term delivery	41 (82)
Spontaneous	36 (72)

DISCUSSION

In our study, the mean age of the mother was found to be 29.62 with 3.96 years of standard deviation. In contrast to our study, Raut et al found that the mean age of the mother was found to be 37.22.[8]

The study shows that 4% of participants were under the category of maternal mortality approximately similar findings were found in the study conducted by Patil et al.[9]

In our study almost 70% of mothers were delivered by vaginal and 30% were having elective and emergency LSCS delivery. Similar findings were found in the studies conducted by Doshi et al, Pandey et al, Yasmeen et al, and Devabhaktuni et al, whereas in contrast to our study, Patne et al found that 47% mothers were delivered through vaginal and 45% were having elective and emergency LSCS delivery.[3,10-13]

In the present study, according to valvular distribution, the majority of mothers had 58% MS, similar findings were found in the study conducted by Pandey et al.[3] Whereas in contrast to our findings, study conducted by Mohan et al found that only 7.5% of mothers had MS type of lesion.[2]

CONCLUSION

In conclusion, our observational study sheds light on the fetomaternal outcomes of RHD during pregnancy. Through meticulous analysis, we have highlighted the significant challenges and potential complications faced by both mother and fetus. Our findings underscore the importance of comprehensive management strategies and close monitoring throughout pregnancy to mitigate risks and ensure favorable outcomes for both the mother and her child. Moving forward, further research is warranted to refine our understanding and improve the care provided to pregnant women with RHD.

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