

# A Retrospective Study to Evaluate the Maternal and Fetal Outcome in Patients of Heart Disease in Pregnancy at a Tertiary Rural Hospital

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## ABSTRACT

**Background:** Heart disease(HD) in pregnancy remains an important cause of maternal, fetal morbidity and mortality especially in a developing country like India, where incidence of cardiac disease that complicates pregnancy is between 1% to 4% & Rheumatic heart disease (RHD) still remains the most common type of heart disease complicating pregnancy due to Poor socioeconomic condition. **Methods:** This is a retrospective observational study carried out in Department of Obstetrics and Gynaecology at S.M.B.T. Institute of medical sciences, Dhamangaon during the period of 24 months to assess the maternal and fetal outcome on patients of heart disease with pregnancy. **Result:** Among the 3182 patients delivered in the study 35 had cardiac disease with prevalence of 1.1%, all patients were booked and diagnosed with heart disease during ANC checkup. Rheumatic Heart disease (70%) was the commonest form of heart disease with MS with MR predominating (22%). NYHA grade 2 patients (41%) were maximum with Anemia as the associated complicating factor. 4 patients with severe MS required balloon mitral valvotomy (BMV) of them 1 patient went into pulmonary edema. There was no maternal mortality. 2 patients underwent medical termination of pregnancy (MTP) for cardiac reason and there was 1 neonatal mortality. **Conclusion:** RHD is still the commonest heart disease in pregnancy; BMV can be performed in third trimester on patients with severe MS reducing intra and postpartum complications. Giving good and timely antenatal, Intranatal and postnatal care at a tertiary care hospital with good cardiac, obstetric & Neonatal care setup reduces maternal and fetal morbidity in patients of heart disease with pregnancy.

**KEY WORDS:** Rheumatic heart disease in pregnancy, Congenital heart disease in pregnancy, Balloon Mitral Valvotomy in pregnancy.

## Introduction

The process of human pregnancy & child birth is affected by maternal physiological changes which occur during pregnancy. The normal hemodynamic changes occurring during Antenatal period and labour cause a significant burden on the maternal cardiovascular system and these changes are

exacerbated if patient has any previous cardiac disease/surgery eventually leading to decompensation and death of mother and fetus.

Heart disease (HD) is a leading cause of maternal deaths in the United States and other developed countries<sup>[1]</sup> and 0.2-0.4% of all pregnancies in western countries are complicated by cardiovascular disease<sup>[2]</sup> of these congenital heart disease(CHD) is the most frequent cardiovascular disease during pregnancy (75- 82%), with a predominance of shunts (20-65%).<sup>[3]</sup> However In developing countries like India, incidence of cardiac disease that complicates pregnancy is between 1% to 4%<sup>[4]</sup> & Rheumatic heart disease (RHD) still remains the most common type of heart disease complicating pregnancy in developing world due to Poor socioeconomic condition

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Website: [www.jmsh.ac.in](http://www.jmsh.ac.in)

Doi: 10.46347/jmsh.v8i2.21.192

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associated with overcrowding, high prevalence of endemic streptococcal infection, decrease affordability and lack of access to quality medical facilities.<sup>[5]</sup> The World Health Organization (WHO) has recently released a statistics, which states that in developed economies the maternal mortality is around 0.012% as compared to 0.2% in emerging economies. This shows there is large disparity in Essential Health care services between developed and developing countries.<sup>[6]</sup>

Roos-Hesselink JW (2013) et al stated that among women with HD, those with cardiomyopathy and pulmonary hypertension had the highest rates of prematurity and small-for-gestational age birth weight & Mothers with congenital heart disease had the highest rate of congenital heart disease in their infants.<sup>[7]</sup>

The objective of the study was to estimate the prevalence of heart disease in pregnancy & determine maternal and foetal outcomes in pregnant women with heart disease at a tertiary care hospital serving in a Tribal area of Maharashtra with well-equipped cardiac care and obstetric setup.

## Material & Methodology

This is a retrospective observational study carried out in Department of Obstetrics and Gynaecology at S.M.B.T. Institute of medical sciences, Dhamangaon. This was done during a period of 24 months starting from January 2018 to December 2019. Institutional ethical committee approval was obtained for this study. Telephonic Informed consent from all the patients involved in this study was obtained and Data was collected in structured format from Hospital records.

**Inclusion Criteria:** All pregnant women with heart disease delivering at S.M.B.T. Institute of medical sciences during study period. Heart disease was confirmed by cardiologist after scrutinizing Present and previous Medical, Surgical, echocardiography & ECG records.

**Exclusion Criteria:** Pregnant women with Heart disease delivered at study centre but refusing to give consent to be enrolled in the study.

**Sample size:** 35 pregnant women with heart disease.

## Methodology

A detailed history including history of rheumatic fever, cardiac failure, pulmonary oedema etc. during antecedent pregnancies or details of recognised heart disease with history of any surgical or medical management was undertaken. A thorough clinical examination was done. Clinical diagnosis was made & the pregnant mothers were investigated. Complete blood count, renal function test, liver function test, routine urine analysis, thyroid function test and coagulation profile were done for indicated cases. ECG and Echocardiogram was done for all patients. Maternal cardiovascular risk assessment was performed by classifying patients according to the NYHA classification by cardiologist.

## Antenatal care

The patients with functional NYHA grade I & II were treated on regular OPD basis & the frequency of antenatal visits was determined by their cardiac status. They were advised rest, salt restricted diet, avoid strenuous work and avoid stress. Any infection was treated vigorously. Patients with NYHA grade III and IV or with the evidence of decompensated heart were admitted in maternity intensive care unit and treated as advised by cardiologist. The patient with NYHA grade IV and severely decompensated heart were advised for the early termination of pregnancy. Balloon mitral valvotomy was done in cases of severe mitral stenosis as advised by cardiologist.

## Intrapartum and postpartum care

Spontaneous vaginal delivery was preferred mode of delivering HD patients. Prophylactic antibiotics were given routinely during labour. Vitals of the patient and foetal heart rate were monitored throughout the course. Instrumental delivery was used to cut short the second stage. Episiotomy and perineal lacerations were sutured under local anaesthesia and strict asepsis maintained. LSCS was done for obstetric indications under epidural anaesthesia. Post-delivery, the patients were kept in the intensive care unit for 24 hrs. and carefully monitored for the signs of failure and postpartum haemorrhage. Later they were kept in postnatal ward for 14 days and were discharged after getting fitness for discharge from the cardiologist. Babies were followed with the help of paediatrician and investigated for congenital heart disease. Breast feeding was allowed except in grade IV patients with failure. Patients were advised about contraception and postnatal follow up advice was given.

## Results

Total number of deliveries during the study period was 3182 and among these 35 had cardiac disease, prevalence of cardiac disease being 1.10% . The average age of the women enrolled in the study was 25 years and majority of the patients were booked. Among 35 patients, 21 were multigravida and rest were primigravida (Table 1).

**Table 1: Demography and Obstetric score**

Prevalence of heart disease in pregnancy		
Total No. of deliveries	Heart disease deliveries	Prevalence of heart disease
3182	35	1.10
Age of patients		
Age	Number of cases	Percentage %
20-24	8	22.8
25-29	18	51.42
30-34	7	20
>35	2	5.71
Total	35	100
Earliest ANC visit		
Ist visit to ANC clinic	Number of cases	Percentage %
Before pregnancy	6	17.14
During pregnancy-		
1st trimester	18	51.42
2nd trimester	6	17.17
3rd trimester	5	14.28
Total	35	100
Obstetric score		
Parity	Number of cases	Percentage %
Primigravida	14	40
Multigravida	21	60

Most common type of cardiac lesion was RHD i.e. 71.42% and among them severe MS with MR with Pulmonary hypertension (PHT) was the most common type (8 cases i.e. 22.85% of RHD patients) of these 8 cases, 4 underwent Balloon mitral valvotomy during their ANC period. CHD was seen in 7 cases i.e. 20 % of cases, with half of them operated for the same in the past. Remaining 3 cases were of mitral valve prolapse with mitral regurgitation, Paroxysmal supraventricular tachycardia (PSVT) and primary pulmonary hypertension. (Table 2)

**Table 2: Heart diseases details**

Type of cardiac lesion			
Types of lesion		Number of cases	Percentage %
Rheumatic disease(RHD)	heart	25	71.42
Congenital disease(CHD)	heart	7	20
Other		3	8.57
Total		35	100
Specific Heart Disease			
Specific Heart Disease		Number of cases	Percentage %
Mild MS		6	17.14
Moderate MS with mild MR		4	11.42
Severe MS with MR with PHT		8	22.85
Mild AS		2	5.71
Mild AS with AR		1	2.85
Mild PR with TR		3	8.57
ASD		2	5.71
VSD		1	2.85
PDA		1	2.85
TOF		2	5.71
Pentalogy of Fallot		1	2.85
MVP with MS		1	2.85
MVP with MR		1	2.85
PSVT		1	2.85
Primary pulmonary hypertension		1	2.85
Total		35	100

Majority of the patients belonged to NYHA Grade II (15 cases) at the time of admission followed by grade I (10 cases), grade III (6 cases) and grade IV (4 cases) respectively (Figure 1).

In terms of obstetrical outcome, out of 35 patients, 2(5.7%) underwent early medical termination of pregnancy (The indications for early termination of pregnancy were primary pulmonary hypertension and severe mitral stenosis with mitral regurgitation), 15(42.85%) had LSCS (lower segment caesarean section) and rest were delivered vaginally (37.14%) instrumental application was done for 4(11.4%) deliveries (Table 3).

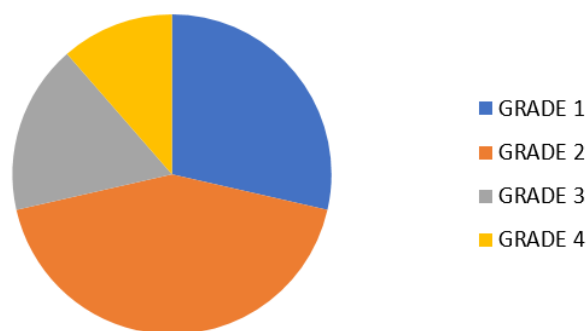


Figure 1: NYHA GRADES

Table 3: Obstetric outcome

Obstetric Outcome	Number of cases	Percentage %
Vaginal delivery	13	37.14
Instrumental delivery	4	11.42
LSCS	15	42.85
Termination of pregnancy for Cardiac cause	2	5.71
Suction Evacuation for Obstetric cause	1	2.85
Total	35	100%

Most common cause for LSCS was repeat emergency LSCS in case of previous LSCS with premature rupture of membranes (53%)

Complications of pregnant women with the heart disease were as follows: Table 4

Table 4: Maternal Complications

Maternal Complications	Number of cases	Percentage %
Acute pulmonary oedema	2	13.30
Atrial fibrillation	1	6.66
PPH	1	6.66
Cardiac Failure(CCF)	2	13.30
Anaemia	6	40
Gestational hypertension	1	6.66
Abruption	1	6.66
Missed Abortion	1	6.66

Table 4 patients were referred to our hospital in 3<sup>rd</sup> trimester with severe mitral stenosis & underwent Balloon mitral valvotomy (BMV) for the same among them 1 patient was taken for Elective LSCS 48 hrs after the BMV & developed Acute pulmonary oedema in postpartum period which was treated successfully the rest, 3 cases were uneventful (2 delivered vaginally & 1 LSCS). This justifies the role of BMV in the cases of severe mitral stenosis (MS) (with due risk) in reducing the maternal mortality. One patient with MS undergoing LSCS went into Atonic Postpartum Hemorrhage (PPH) after 2 hrs post-operative and was managed by concentrated oxytocin infusion for 4 hrs and 800mg of misoprostol per rectally. One patient of MS with MR and Gestational hypertension developed Abruptio which was immediately diagnosed on ultrasonography (USG), and Emergency LSCS was done baby shifted to NICU and blood transfusion under cover of diuretics was given in ICU. Atrial fibrillation developed in one patient of MS with MVP, post-delivery which was treated in ICCU by cardiologist. In terms of perinatal complications, IUGR was most common i.e. in 40.00% of cases followed by respiratory depression, prematurity and meconium aspiration. Neonatal death was seen in 1 baby at 5th day of life due to the sepsis. (Table 5)

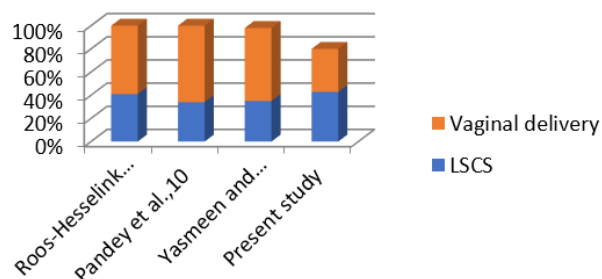
Table 5: Perinatal complications

Perinatal complications	Number of cases	Percentage %
Prematurity	3	20
IUGR	6	40
Respiratory distress	3	20
Meconium aspiration	2	13.3
Neonatal death	1	6.77

Average gestational age at delivery in our study was 34 wks, and average birth weight of babies born to mothers having heart disease was 1.9 kg in our study

## Discussion

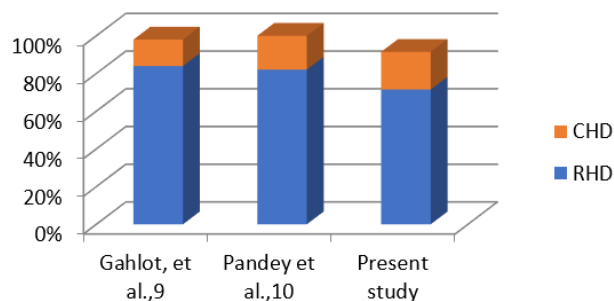
The present study provides a contemporary assessment of maternal and neonatal complications in patients with cardiac disease and the prevalence is found to be 1.10%. The prevalence varies in developed and developing countries due to different geographical locations, seasons and incidence of Rheumatic fever, varying between 0.2–3.6% in India, 1–3% in USA, 0.5–1.8% in London and 0.8% in South Africa.<sup>[7]</sup>



**Figure 3: omparative chart showing percentage obstetric outcome in HD with pregnancy as per different studies**

RHD is still the most common type of heart disease in the developing countries due to the inadequate antibiotic treatment for Streptococcal infection in childhood and adolescence. The incidence of RHD in present study is 70% as compared to 82% to 88% in other Indian studies. [7–11]

In the study by Hiralal konar<sup>[12]</sup> 31% patients were diagnosed to have heart disease for the first time during labour, however ours being a referral centre 100% patients were diagnosed during Antenatal visits Figure 2 .



**Figure 2: Comparative chart showing percentage of RHD & CHD in HD with pregnancy as per different studies**

In a study done by Sharma, Jai Bhagwan et al<sup>[13]</sup> BMV was done prior to pregnancy in 14 women and during pregnancy in 10 women, they concluded that NYHA deterioration was seen in 10 women in whom the BMV was done during pregnancy we also found that there was deterioration in 1 patient out of 4 in whom BMV was done during pregnancy. The mean birth weight in their study was 2.3 kg which is more than our study as we cater to a tribal population having poor nutritional status.

In a study by Khanna et al<sup>[14]</sup> they concluded that preterm labour, abortions were increased in patients when BMV was done during pregnancy. In our study BMV was done in all patients after 36 wks and hence no preterm labour was seen.

In terms of obstetrical outcome, LSCS rate was found to be 42% which is comparable with Roos-Hesselink et al study Figure 3.

Highest maternal morbidity was found to be anaemia in the present study i.e 42.86% followed by CCF and arrhythmia which was comparable with the Pandey et al., study. There was no maternal mortality however neonatal mortality was seen in 1 case (7.14%) which was comparable with Pandey et al., study(7.7%) Table 6.

**Table 6: Comparative chart showing percentage of cardiac complications in HD with pregnancy as per different studies**

Study	CCF	Anaemia	Arrhythmia
Roos-Hesselink JW <sup>7</sup>	10%		
Gahlot et al., <sup>9</sup>	16%		4%
Pandey et al., <sup>10</sup>	19.6%	46.2%	2.56%
Present study	13.29%	40%	3.70%

## Conclusion

Cardiac disease in pregnancy is a high risk condition which has a major impact on pregnancy and its outcome. This study results conclude that Rheumatic heart disease is still a predominant cardiac problem affecting the pregnancy and its outcome. Maternal and perinatal outcome in women with heart disease depends mainly on the functional cardiac status during pregnancy, the risk being greater in NYHA III and IV. Our study shows that surgical intervention or medical management in pregnancy improves the functional class. Pre pregnancy diagnosis, counselling, routine antenatal supervision, delivery at an equipped centre, early detection and management of cardiac failure throughout the course of pregnancy, labour and puerperium is of prime importance to determine the favourable maternal and fetal outcome in patients with heart disease.

**Conflict of interest-** Nil

**Acknowledgments-** DEAN SMBT IMS & RC

**Source of funding-** self



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**How to cite this article:** Naik AS, Naik SA, Shinde S, Vaje MC. A Retrospective Study to Evaluate the Maternal and Fetal Outcome in Patients of Heart Disease in Pregnancy at a Tertiary Rural Hospital. J Med Sci Health 2022; 8(2):113-118

Date of submission: 27.11.2021

Date of review: 02.02.2022

Date of acceptance: 25.03.2022

Date of publication: 29.08.2022