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# AN OBSERVATIONAL STUDY OF FETO-MATERNAL OUTCOME IN PREGNANCY WITH HEART DISEASE

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## ABSTRACT

**Background:** Cardiac disease in pregnancy is still a major problem worldwide, particularly in developing countries like India. The reported incidence varies between 0.1 - 0.4% and responsible for about 10 - 25% of maternal mortality. The child bearing women with heart disease are the unique challenge to the health care provider as common features of cardiac lesions like breathlessness, pedal edema and murmur that mimic normal physiological changes of pregnancy and pose diagnostic difficulties. Both women with pre-existing yet undiagnosed heart disease and those with new (whether or not pregnancy-related) disease are likely to present primarily to obstetricians or primary caregivers and not to a cardiologist. A timely diagnosis therefore depends on adequate awareness on the part of their obstetrician. **Aim:** To determine feto-maternal outcomes in pregnant patients with heart disease. **Material & methods:** A descriptive type of observational study of 110 patients with heart disease from March 2016 to December 2017 in Department of Obstetrics and Gynaecology, Sawai Man Singh Medical College, Jaipur. **Conclusion:** Cardiac diseases during pregnancy need to be given utmost priority. Good antenatal care combined with obstetric and gynecologist, neonatologist, cardiologist and anesthesiologist i.e. a multi-disciplinary combined approach can bring about successful outcome in pregnancies complicated by heart disease.

**KEYWORDS:** Observational study, pregnancy with heart disease, feto-maternal outcome.

## INTRODUCTION

Cardiac disease in pregnancy is still a major problem worldwide, particularly in developing countries like India. The reported incidence varies between 0.1 - 0.4% and responsible for about 10 - 25% of maternal mortality. The incidence of clinically significant cardiac disease during pregnancy has remained same for decades.[1]

Major changes occur in the cardiovascular hemodynamics during pregnancy which are well tolerated by healthy women but those with heart disease can decompensate, resulting in significant morbidity and mortality.

Cardiac diseases are divided into two categories; congenital and acquired. Congenital heart disease includes atrial septal defect and ventricular septal defect and acquired comprises rheumatic heart disease (RHD), cardiomegaly, ischemic heart disease. In India and other developing countries RHD is the most common.

The child bearing women with heart disease are the unique challenge to the health care provider as common features of cardiac lesions like breathlessness, pedal edema and murmur that mimic normal physiological changes of pregnancy and pose diagnostic difficulties. In addition co-morbidities such as pedal edema, anemia, preterm labor and fetal growth restriction are commonly associated with heart disease.

A risk assessment of any woman with heart disease or any history of heart disease should be carried out early in pregnancy by multidisciplinary approach by obstetrician and cardiologist as the hemodynamic burden of pregnancy, labor and delivery can aggravate symptoms and precipitate complications in these women.

Increased prevalence of cardiovascular disease (CVD) has been found in women of childbearing age. Pregnant women with cardiovascular disease create a tough clinical picture in which the treating doctor is responsible for feto-maternal morbidity and mortality. Hemodynamic changes occurring in the maternal circulation can adversely affect maternal and fetal health, especially in the patients with underlying heart conditions.[2]

In the Western world, congenital heart disease accounts for approximately 80% of cardiac disease during pregnancy. In developing countries, RHD remains the most common cardiac disease during pregnancy (75%), whereas congenital heart disease is much less common (15%).[3]

We need to know why pregnant women are still dying so that we can provide better care. It can be done by identifying important strategies to reduce maternal deaths due to cardiac disease in pregnant women.

These patients must be managed with a multidisciplinary approach, with the collaboration of an obstetrician and cardiologist. Furthermore, this management must commence before conception, the family should be counseled about the possible risks and optimal conditions must be maintained for conception. If possible, pregnancy should be avoided in patients with uncorrected severe valvular lesion or those requiring anticoagulation which may lead to increased feto-maternal morbidity and mortality.

Both women with pre-existing yet undiagnosed heart disease and those with new (whether or not pregnancy-related) disease will present primarily to obstetricians or primary caregivers and not to a cardiologist. A timely diagnosis therefore depends on adequate awareness on the part of their GP or obstetrician. Main aims and objective of this study were to determine feto-maternal outcomes in pregnant patients with heart disease.

## MATERIAL AND METHODS

This is a descriptive type of observational study undertaken at department of Obstetrics and Gynecology, SMS Medical College and attached hospitals, Jaipur from March 2016 to December 2017.

### Sample Size

Sample size was calculated at 95% confidence level assuming 50% caesarean section in patients with cardiac disease as found in reference study. At the precision (absolute allowable error) of 10%, 96 patients were required as sample size, that was further enhanced and rounded off to 110 patients as final sample size, expecting 10% dropouts / attrition / loss to follow.

### Inclusion Criteria

- Patients coming with documented heart disease.
- Patients diagnosed during Ante-natal checkup (ANC).

### Exclusion Criteria

- When termination indicated in heart disease.

- Associated with medical disorder e.g. Diabetes mellitus, Hypertension, anemia etc.

**METHODOLOGY**

- All the patients attending ANC or referred from Cardiology Department were selected.
- After applying exclusion & inclusion criteria, study group was decided.
- Informed & written consent taken.
- ANC follow-up was done with: -

* Regular check-up

* Specialized Cardiology Investigation:

- ECG

- 2D ECHO

- Coagulation profile etc.

* Referred to Cardiology Department for:

- Any medical or surgical intervention

- Cardiologist review

- Patient were classified according to NYHA classification and treated accordingly: -

Grade I - Uncompromised or no limitation of physical activity

Grade II - Slightly compromised with slight limitation of physical activity

Grade III - Marked compromised with marked limitation of activity

Grade IV - Severely compromised with discomfort event at rest

- Patient coming under Grade I & II: -

* Follow-up was done

* Admitted at 36 wks of gestation

* Vaginal delivery (if no Obstetric intervention)

* Caesarean section (if any Obstetric intervention required)

- Patient coming under Grade III & IV: -

* were monitored

* Preterm - were delivered by
  - Vaginally
  - Caesarean section

* 36 wks
  - Vaginally
  - Caesarean section

- Fetal outcome evaluated by: -

* Any congenital heart disease
* Birth weight
* Perinatal mortality
* APGAR score
* NICU stay

- Maternal outcome evaluated by: -

* Hospital stay
* Morbidity
- Any secondary PPH
* Mortality

Data collected was pooled, tabulated and subjected to statistical analysis using the SPSS Version 21.0.

**RESULTS**

In this study, 110 cases of pregnancy with heart disease delivered from January 2016 to December 2017 over a period of two years. During this period there were a total of 19876 births giving an incidence of 0.55%.

Out of 110 cases 13 (11.8%) were teenage pregnancies, 57 (51.8%) were in the age group of 21-25 years, 29 (26.3%) were in the age group of 26-30 years, 7 (6.3%) in the age group of 31-35 years and 4 cases (3.6%) were in the age group of >35 years (Table 1).

In this study, out of 110 women, 63 (57.27%) were from rural area and 47 (42.72%) from urban area. Also, out of 110 patients 53 (48.19%) were booked and 57(51.81%) were unbooked.

Table No. 1 shows that majority of the women belonged to Hindu religion 74 (67.27%) and 36 (31.83%) belonged to Muslim religion and 0.9% to others.

It was also evident that majority of the patients were literate (70%) and out of 110 patients, 55 women belonged to middle class (50%), 39 (27.4%) belonged to lower class and rest to upper class.

Table No. 1 shows that 34 patients (30.09%) were in NYHA class I and 66 patients (60.0%) were in NYHA class II, NYHA class III included the lowest, 2 patients (1.82%) and 8 patients (7.27%) were in NYHA class IV.

Analysis of the type of cardiac pathology found in this study showed rheumatic heart disease to be the predominant lesion in 68 cases (61.8%). Congenital heart disease was found in 19 cases (17.27%) and 23 cases (20.09%) had other heart lesions.

Out of 110 cases of pregnancy with heart disease; 60 patients (54.54%) had a normal vaginal delivery, 31 patients (28.37%) underwent a caesarean section. 19 patients (17.09%) had an instrumental delivery mainly to cut down the 2$^{nd}$ stage of labor

**Table: Demographic data of all patients.**

| | | No. of patients | Percentage (%) |
|---|---|---|---|
| Age distribution (yrs.) | <20 | 13 | 11.8 |
| | 21-25 | 57 | 51.8 |
| | 26-30 | 29 | 26.3 |
| | 31-35 | 7 | 6.3 |
| | >35 | 4 | 3.6 |
| Status | Rural | 63 | 57.27 |
| | Urban | 47 | 42.72 |
| Booking status | Booked | 53 | 48.19 |
| | Unbooked | 57 | 51.81 |
| Religion | Hindu | 74 | 67.27 |
| | Muslim | 35 | 31.83 |
| | Others | 1 | 0.9 |
| Literacy status | Literate | 77 | 70 |
| | Illiterate | 33 | 30 |
| Socioeconomic status | Lower | 39 | 27.4 |
| | Middle | 55 | 50 |
| | Upper | 26 | 22.6 |
| Gravida | Primi | 84 | 76.36 |
| | Multi | 26 | 23.64 |
| Time of diagnosis | Before pregnancy | 64 | 58.18 |
| | After pregnancy | 46 | 41.82 |
| NYHA Class | NYHA I | 34 | 30.9 |
| | NYHA II | 66 | 60.0 |
| | NYHA III | 2 | 1.82 |
| | NYHA IV | 8 | 7.27 |
| Type of cardiac lesion | Rheumatic heart disease | 68 | 61.8 |
| | Congenital heart disease | 19 | 17.27 |
| | Other acquired disease | 23 | 20.09 |
| Obstetrical complications | Anemia | 45 | 60.8 |
| | Pre-eclampsia | 7 | 9.9 |

| | | | |
|---|---|---|---|
| | Pre-term | 11 | 14.8 |
| | Breach | 5 | 6.9 |
| | Hypothyroidism | 6 | 8.6 |

**Table 2: Maternal outcome in terms of mode of delivery.**

| Outcome | Number of patients | Percentage (%) |
|---|---|---|
| Normal vaginal delivery | 60 | 54.54% |
| Operative vaginal delivery | 9 | 8.18% |
| Elective LSCS | 22 | 20.00% |
| Emergency LSCS | 14 | 12.72% |
| Spontaneous abortion | 4 | 3.83% |
| MTP | 1 | 0.90% |
| Total | 110 | 100.0 |

**Table 3: Fetal outcome in patients with heart disease.**

| Outcome | Number | Percentage (%) |
|---|---|---|
| Preterm | 26 | 45.6% |
| IUGR | 7 | 12.2% |
| Intrauterine fetal death | 6 | 10.5% |
| Neonatal mortality | 2 | 3.7% |
| NICU stay | 16 | 28.00% |
| Total | 57 | 100% |

## DISCUSSION

In the present study, we determined the type of cardiac lesion and assessed the feto-maternal outcome in pregnant women with cardiac disease. Cardiac disease continues to be a risk factor for maternal and neonatal mortality and morbidity.

Most of them were primigravida (62.7%) and (80.39%) were booked cases. The study done by Sheela et al, showed similar results.[4] Majority of the patients (88.2%) were in NYHA class I and II. Similar findings were seen in other studies.

Hsieh et al in their study reported that out of the total feto-maternal deaths, 75% were in patients with NYHA class III and IV.[5] In our study, predominant lesion was rheumatic heart

disease (86.3%), mitral stenosis being the most common (41.2%). Similar results were noted in the studies by Mahesh et al (44.6%) and by Nilajkumar et al (55%).[6,7]

Congenital heart disease accounted for 9.8% of cases, among which atrial septal defect was most common (5.9%). Similar results were seen in studies by Sheela et al and Nilajkumar et al. In our study, 47.1% women had spontaneous vaginal delivery. The Caesarean section was performed in 41.2% cases mostly for obstetrical indications. The second stage was cut short by instrumentation in 9.8% of patients. Majority of cases were associated with anemia (47.1%) followed by preeclampsia (21.6%) that worsened the underlying cardiac lesion during pregnancy.

Thus, the early diagnosis and treatment of complications as anemia and preeclampsia can improve the outcome. Studies done by various authors have shown similar results. The cardiac complications were noted in 15 (29.4%) patients out of which 9 (17.6%) developed congestive cardiac failure, two developed atrial fibrillation and another three had pulmonary edema. Overall maternal outcome showed 76.5% patients were discharged with advised, 9.8% needed CCU, 5.9% were referred to ICU and maternal mortality was in two cases. Similar finding were seen in studies done by Mahesh et al.[6]

The small for gestation age was seen in seven (13.7%) babies. Total 13 (25.5%) babies were admitted to NICU. The perinatal mortality was 2% in our study. The results were comparable to the studies done by Mahesh et al, Hanania et al and Suri at al.[8] Despite the potential for significant maternal morbidity in most patients with cardiac disease, satisfactory outcome can be expected with careful antenatal, intrapartum and postpartum management.

## CONCLUSION

Heart disease in pregnancy has a major impact on pregnancy outcome. Rheumatic heart disease being the prominent cardiac lesion. An improvement in modern techniques of monitoring, better understanding of pathophysiology of cardiac disease and multi disciplinary care can lead to substantial improvement in the feto-maternal outcome and can reduce maternal and fetal mortality and morbidity.

**Conflict of interest:** We have no conflict of interest.

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