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Research Article

## Study of pregnancy outcome in women with cardiac disease: a retrospective analysis

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### ABSTRACT

**Background:** Cardiac disease complicates 1% of all pregnancies. It is one of the 3 major indirect causes of maternal mortality in India. Objective of the study is to evaluate the maternal and fetal outcome in patients with cardiac disease in pregnancy.

**Methods:** A retrospective analysis was carried out in 117 pregnant women with known or newly diagnosed heart disease from January 2013 to December 2015 at a tertiary care hospital.

**Results:** In the present study, the incidence of cardiac disease was 0.8%. Majority 66 (56.4%) were of 23-27 years of age, 72 (61.5%) were primigravida. Mostly 84 (71.8%) belonging to New York Heart Association (NYHA) Class I and II. Rheumatic heart disease seen in 96 (82.1%) and congenital heart disease in 17.9% subjects. Among RHD Mitral stenosis was the most common, seen in 51 (53.1%) cases. Majority 78 (66.6%) had vaginal delivery and caesarean section in 28 (23.9%) cases. Most common maternal complication was anaemia seen in 54 (46.2%) cases, congestive cardiac failure complicated 23 (19.6%) cases. 18 patients required ICU care and maternal mortality in 6 cases (5.12%). The live births in (94.8%) cases, 33 (28.2%) babies required NICU admission and perinatal mortality was 7.7%.

**Conclusions:** Heart disease in pregnancy is a high risk condition and has a major impact on pregnancy outcome. Rheumatic heart disease being the prominent cardiac lesion. Fetomaternal mortality and morbidity can be reduced with proper antenatal, intrapartum and postnatal care in conjunction with cardiologist and neonatologist.

**Keywords:** Cardiac disease, RHD, Outcome, Pregnancy, Retrospective, NYHA class

### INTRODUCTION

Cardiac disease during pregnancy is a challenge to obstetrician as common clinical features of cardiac lesions like breathlessness, pedal edema and murmur mimic normal pregnancy posing a diagnostic difficulty.<sup>1-4</sup> Prevalence of heart disease in pregnancy vary from 0.3-3.5%.<sup>6</sup> Cardiac output increases by 30-50% during pregnancy and a further increase during labour and delivery imposes a burden on diseased heart leading to complications and death. Cardiac disorders contribute to approximately 20.5% of maternal deaths.<sup>1-5</sup> The ratio of RHD:CHD is decreasing due to improved paediatric care

and improved surgical interventions early in childhood. Increasing number of women with cardiac disease is reaching the reproductive age due to modern therapeutic options and moreover these patients are now attempting pregnancy multiple times due to improved availability of life saving modern therapy.<sup>7</sup>

Development of obstetric complications like anaemia, preeclampsia, preterm labour and fetal growth restriction are commonly seen in patients with heart disease, that further worsens the outcome and complicate the management. It is essential to thoroughly evaluate patients for underlying cardiovascular disease in order to

promote optimal care during pregnancy that plays a major role in the outcome.<sup>8</sup> Objective of the study was to evaluate the maternal and fetal outcome in patients with cardiac disease in pregnancy.

## METHODS

The retrospective study was conducted in the department of obstetrics and gynaecology of GSVM medical college Kanpur, Uttar Pradesh, India. Total 117 pregnant women with history of cardiac disease or newly diagnosed for the first time in pregnancy admitted to obstetrics ward from January 2013 to December 2015 were included in the study. The data were obtained from review of medical records. Baseline data recorded including age, parity, gestational age, type of lesion, duration of disease, time of diagnosis, treatment history, New York heart association (NYHA) functional class, maternal complications, mode of delivery and indication of caesarean section, neonatal outcome and admission to NICU were noted. In case of maternal mortality the cause of death was noted. Patients were discharged after 10 days with proper postnatal advice.

## RESULTS

A total of 117 pregnant women with cardiac disease were included in the study. Total no. of patients admitted for delivery during the study period were 14967, including 117 patients with cardiac disease.

**Table 1: Demographic characteristics (n=117).**

Characteristics	No (%)
<b>Age (years)</b>	<b>No (%)</b>
18-22	15 (12.8%)
23-27	66 (56.4%)
28-32	27 (23.1%)
>32	09 (7.69%)
<b>Gravida</b>	<b>No (%)</b>
Primigravida	72 (61.5%)
Gravida 2	30 (25.6%)
Gravida 3 Or more	15 (12.8%)
<b>Booking status</b>	<b>No (%)</b>
Booked	78 (66.6%)
Unbooked	39 (33.3%)
<b>Time of diagnosis</b>	<b>No (%)</b>
Before pregnancy	74 (63.2%)
After pregnancy	43 (36.7%)
<b>Gestational age at delivery</b>	<b>No (%)</b>
Term	102 (87.2%)
Preterm	15 (12.8%)
<b>NYHA class</b>	<b>No (%)</b>
I and II	84 (71.8%)
III	21(17.9%)
IV	12(10.3%)
<b>Habitat</b>	<b>No (%)</b>
Urban	48 (41.02%)
Rural	69 (58.9%)

Thus incidence of cardiac disease at our centre was 0.8%. Out of 117 patients, majority 66 (56.4%) were in the age group of 23-27 years. Among the 117 pregnant women 72 (61.5%) were primigravida, 25.6% were second gravida and 12.8% were gravida 3 or more.

Most of the patients 84 (71.8%) presented in NYHA Class I and II. In the study population, it was seen that the outcome worsened as the class of the disease increased, complications being more in NYHA class III and IV. Majority 102 (87.2%) had term delivery and 15 (12.8%) had preterm delivery. Out of 117 patients, 78 (66.6%) were booked and 39 (33.3%) were unbooked, 48 (41.02%) from urban and 69 (58.9%) from rural area. Most of the patients 74 (63.2%) were diagnosed before pregnancy, 11(9.40%) were diagnosed during labour (Table 1). Majority of the patients 96 (82.1%) in the study had Rheumatic heart disease and rest had congenital heart disease (17.9%) (Figure1). Most of the patients had single lesion 75 (64.1%) and 42 (35.9%) patients had more than one lesion.

**Table 2: Distribution of cardiac lesions.**

Cardiac lesion	No (%)
<b>Rheumatic heart disease</b>	96 (82.1%)
MS	51 (53.1%)
MR	12 (12.5%)
MS+MR	30 (31.3%)
AS	09 (9.4%)
MS+MR+PAH	36 (37.5%)
MR+TR	24 (25%)
<b>Congenital heart disease</b>	21 (17.9%)
ASD	09 (42.9%)
VSD	06 (28.6%)
MVP	06 (28.6%)

**Table 3: Indications of caesarean section (n=28).**

Indications	Elective (21)	Emergency (07)
Previous LSCS	10 (35.7%)	-
Cephalopelvic disproportion	01	01
Non-progress of labour	-	02
Breech presentation	02	-
Bad obstetric history	02	-
Twin pregnancy	02	-
Intrauterine growth restriction	01	-
Severe preeclampsia	01	02
Non-reassuring fetal heart rate	-	02
Severe MS	01	-
Severe AS	01	-

The most common lesion in patients with RHD was mitral stenosis seen in 51 (53.1%) followed by mitral stenosis with mitral regurgitation with PAH in 36

(37.5%) patients. The surgical correction was done prior to pregnancy in 6 patients, 4 underwent closed mitral valvotomy for MS and 2 had ASD closure. Among congenital heart disease, most of them 9 (17.9%) were ASD (Table 2).

Most of the patients, 78 (66.6%) had spontaneous vaginal delivery, 3 patients had VBAC. In 12 patients, ventouse was applied to cut short the second stage of labour (Figure 2). Caesarean section was done in 28 (23.9%) patients. Majority of them were elective, done for obstetric indications. Previous caesarean section was the most common indication in 10(35.7%) cases (Table3).

The maternal complications were seen in 69 (58.9%) pregnant women. Majority of cases 54 (46.2%) were associated with anaemia followed by preeclampsia in 20.5% and preterm in 12.8% cases. The other obstetric complications seen were previous LSCS (11.1%), Placenta previa (2.56%), hypothyroidism (5.12%), breech (2.56%), twin pregnancy (1.71%), postpartum haemorrhage (5.12%). Cardiac complications were seen in 29 (24.8%) cases out of which 18 required ICU care. The most common cardiac complications seen was congestive cardiac failure (CCF) in 23 (19.6%) cases. Among the 23 patients with CCF, 12 patients had anaemia, 6 had preeclampsia. Of the 18 patients requiring ICU care, 12 patients recovered and there were 6 maternal deaths (5.12%).

**Table 4: Associated maternal complications.**

Obstetrics complications	Booked	Unbooked	Total
Anaemia	21	33	54 (46.2%)
Preeclampsia	09	15	24 (20.5%)
Preterm	08	07	15 (12.8%)
Previous LSCS	09	04	13 (11.1%)
Placenta previa	03	00	03 (2.56%)
Hypothyroidism	02	04	06 (5.12%)
Breech	02	01	03 (2.56%)
Twin pregnancy	02	00	02 (1.71%)
Postpartum Haemorrhage	02	04	06 (5.12%)
Cardiac complications	Booked	Unbooked	Total
Congestive cardiac failure	08	15	23 (19.6%)
Atrial fibrillation	02	01	03 (2.56%)
Pulmonary arterial hypertension (PAH)	01	02	03 (2.56%)
Maternal mortality	02	04	06 (5.12%)

Among these four were cases of term pregnancy with severe mitral stenosis with severe anaemia in CCF, two

being unbooked cases presented in labour. The other two were unbooked cases of severe MS+MR+PAH with severe preeclampsia with intrauterine fetal demise in labour. Complications were seen more among unbooked patients in contrast to booked cases (Table 4).

The small for gestation age was seen in 15 (12.8%) babies. A total of 33 babies required NICU care. There were 9 perinatal deaths, of which 4 were intrauterine deaths (2 at term, 1 at 36 weeks, 1 at 28 week) and 5 neonatal death (3 had severe birth asphyxia, died within 72 hour of birth, 2 were preterm with low birth weight with jaundice). Two IUDs were seen in mothers with RHD with PAH with severe preeclampsia, other two were unexplained. Poor neonatal outcome seen in unbooked patients with associated obstetric complications (Table 5).

**Table 5: Neonatal outcome.**

Complications	Booked	Unbooked	Total
Small for gestation age (SGA)	06	09	15 (12.8%)
NICU admission	11	22	33
Birth asphyxia			12 (28.2%)
Prematurity			09
IUGR			06
APGAR <7			06
Perinatal mortality	03	06	09 (7.7%) (04-IUD) (05-Neonatal death)

## DISCUSSION

In the present study, we determined the type of cardiac lesion and assessed the fetomaternal outcome in pregnant women with cardiac disease. Cardiac disease continues to be a risk factor for maternal and neonatal mortality and morbidity. The incidence of cardiac disease at our centre was 0.8%. In the study by Sheela et al, the incidence of cardiac disease in pregnancy was 1%.<sup>9</sup> Most of them were primigravida (61.5%) and (66.6%) were booked cases. Majority of the patients (71.8%) were in NYHA class I and II. Similar findings were seen in other studies.<sup>11,12</sup> Hsieh et al in their study reported that out of the total foeto maternal deaths 75% were in patients with NYHA class III and IV.<sup>13</sup> In our study, predominant lesion was rheumatic heart disease (82.1%), MS being the most common (53.1%). Similar results were noted in the studies by Mahesh et al (44.6%) and by Nilajkumar et al (55%).<sup>7,10</sup> Congenital heart disease accounted for 17.9% of cases, among which ASD was most common (42.9%). Similar results were seen in studies by Sheela et al and Nilajkumar et al patients underwent surgical correction before pregnancy out of them 4 underwent closed mitral

valvotomy and 2 had ASD closure.<sup>6,7,9</sup> In our study, most of the women had spontaneous vaginal delivery. The Caesarean section was performed in 28 (23.9%) cases mostly for obstetrical indications. The second stage was cut short by instrumentation in 10.3% of patients, 3 (2.56%) patients had VBAC.

Majority of cases were associated with anaemia (46.2%) followed by preeclampsia (20.5%) that worsened the underlying cardiac lesion during pregnancy. Complication being more in unbooked patients in contrast to booked cases. Thus, the early diagnosis and treatment of complications as anaemia and preeclampsia can improve the outcome. Studies done by various authors have shown similar results.<sup>7-10,14-16</sup> The cardiac complications were noted in 29 (24.8%) patients out of which 23 (19.6%) developed congestive cardiac failure, 3 developed atrial fibrillation and another 3 had pulmonary arterial hypertension (PAH). Among 18 patients treated in intensive care unit, 12 patients recovered and 6 died. Out of the 6 maternal mortality seen, 4 were cases of term pregnancy with severe mitral stenosis with severe anaemia in CCF, two being unbooked cases presented in labour. The other two were unbooked cases of severe MS+MR+PAH with severe preeclampsia with intrauterine fetal demise in labour which could have been prevented by early detection and timely intervention. The above finding suggest lack of awareness among the community about the heart disease and complications during pregnancy. Similar finding were seen in studies done by Mahesh et al.<sup>10</sup>

The small for gestation age was seen in 15 (12.8%) babies. Total 33 (28.2%) babies were admitted to NICU. The perinatal mortality was 7.7% in our study. The results were comparable to the studies done by Mahesh et al, Hanania et al and Suri et al.<sup>10,17,18</sup> 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.<sup>19</sup>

## 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. The early detection, treatment, proper follow up and correction prior to pregnancy shall improve the outcome and decrease the maternal morbidity and mortality in heart disease. Maternal and perinatal morbidity and mortality can be reduced with early and frequent antenatal care in co-ordination with the cardiologist. The early detection and management of non-cardiac complications shall have a major impact on improvement of outcome.

Educating the community about the cardiac disease and its complications, need for early detection of cardiac

lesion, close follow up during antenatal period, intrapartum and postpartum care plays a vital role.

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