

# Clinical study of maternal and perinatal outcome in heart disease complicating pregnancy at tertiary referral center of Telangana State

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## Abstract

**Background:** Heart disease remains a leading cause of indirect maternal deaths during pregnancy accounting for 20% of all cases. Many significant circulatory changes accompany pregnancy in women with preexisting cardiovascular disease, these alterations in haemodynamics can be dangerous. Therefore, patients should be evaluated for underlying cardiac disease to select appropriate management. **Aims:** The aim of this study is to evaluate the influence of biological factors in Maternal and Perinatal Outcome in Heart Disease Complicating Pregnancy. **Materials and Methods:** This study was conducted in Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, Hyderabad from December 2014 to December 2016. Prospective and descriptive study. Sample size is 75. **Results:** Incidence of heart disease complicating pregnancy is 0.5%. RHD constituted for 64% of cases, CHD for 32% of cases. The ratio of 330+2 RHD: CHD was 2:1. Incidence of peripartum cardiomyopathy was 2.6% and that of cardiac arrhythmias was 1.3%. In patients with RHD, MS was seen in 40% of cases either alone or in combination with other valvular lesions. Severe MS was seen in 6 cases whereas mild MS was seen in 4 cases. In CHD group, most common lesion was ASD (41%). NYHA class I/II was seen in 70% and III/IV was seen in 30% of patients at the time of registration. Hypothyroidism was the commonest associated medical disorder. IUGR was most common obstetric risk factor. A total of 8% of patients developed cardiac complications, 5.3% of patients had CHF and 2.6% had pulmonary edema. Two patients developed CHF in third trimester. 32% of babies required NICU admission for prematurity (12%) and growth restriction (20%). Live birth rate was higher in cases with NYHA class I/II than in those with NYHA class III/IV (98% Vs 90.9%). IUGR (15% Vs 31%), Preterm birth (9.4% Vs 18%), were higher in patients with functional class III/IV than in those with class I/II. Maternal mortality rate was 2%. **Conclusion:** Preconceptional counselling, accurate risk assessment, regular antenatal checkups, prevention, early recognition and aggressive treatment of complications during pregnancy are crucial in reducing the morbidity. Surgical correction of the cardiac lesion prior to pregnancy is associated with better pregnancy outcome.

**Key Words:** heart disease, Pregnancy.

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## INTRODUCTION

Previously, the high maternal mortality in cardiac patients who became pregnant prompted the assertion: Women with an abnormal heart should not become pregnant.<sup>1</sup> This long-standing notion needs to be revised today. Perloff<sup>2</sup> reported a progressive and substantial reduction in maternal death and improved fetal outcome in pregnant women with heart disease. Nevertheless, heart disease remains a leading cause of indirect maternal deaths during pregnancy accounting for 20% of all cases. Many significant circulatory changes accompany pregnancy in

women with preexisting cardiovascular disease, these alterations in haemodynamics can be dangerous. The pregnant state offers increased opportunities for early diagnosis of heart lesion. 50% of women with heart disease were unaware of their lesion when they entered the obstetric department for antenatal care. A thorough understanding of these basic haemodynamic changes is essential to provide optimal care for the pregnant women with heart disease. Prevalence of heart disease in pregnancy varies from 0.3–3.5% [3, 4]. As the saying goes “Rheumatism is a disease which licks the joints but bites the heart”. Rheumatic heart disease has been the most important cardiac lesion in relation to pregnancy even today. Clinical observations indicate that the severity of the cardiac lesion during the initial attack of carditis and the extent of the residual valve lesion after cessation of rheumatic activity are the major factors determining the pattern of evolution of chronic rheumatic heart disease. The clinical pattern of congenital heart disease as seen in pregnancy has also changed over the years. Since the introduction of curative cardiac surgery, more women have been reaching the childbearing age in a more favorable condition to tolerate the haemodynamic burden of pregnancy. <sup>5</sup>With increasing experience, it has become clear that not all clinical situations carry the same ominous prognosis. While pregnancy remains prohibitive under some conditions (e.g., pulmonary vascular disease) or associated with significant maternal morbidity (e.g., mitral stenosis), other conditions such as mitral valve prolapse, have a benign course during gestation. There is a definite place for cardiac surgery during pregnancy. Current trends in cardiac surgery favor the use of open heart techniques and percutaneous balloon valvoplasties. In addition, medications used during pregnancy may influence outcome. Many cases are being reported after cardiac valve replacements that are maintained on oral anticoagulants. The effect of heart disease on the outcome of pregnancy can be greatly modified by the good medical management of the complications and by undertaking cardiac surgery whenever indicated. Therefore, patients should be evaluated for underlying cardiac disease to select appropriate management. Clearly, risk stratification influences therapeutic decisions during pregnancy as does counseling about future gestations. There are few studies available in India that are prospective, focused particularly on heart disease in pregnancy. In this study, we have evaluated 75 cases of pregnant women with heart disease in Modern Government Maternity Hospital, Petlaburj over a period of 2 years, for maternal and perinatal outcome.

## METHODOLOGY - PATIENTS AND METHODS

This Prospective and descriptive study was conducted in Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, and Hyderabad from December 2014 to December 2016 in 75 Pregnant women with heart disease, admitted to the Department of Obstetrics and Gynaecology, MGMH, Petlaburj, Osmania Medical College. Ethical clearance and informed obtained

### Inclusion Criteria

- Pregnant women
- Booked and Unbooked Cases
- Diagnosed either before or during pregnancy
- Delivered at or > 28 weeks of gestation.

### Exclusion Criteria

- I trimester termination of pregnancies
- Severe anemia

At first antenatal visit, detailed history regarding maternal age, parity, gestational age, nature of the underlying cardiac lesion, functional class using the criteria of New York Heart Association (NYHA) was recorded. A note was also made of history of Rheumatic fever in the childhood or adolescence, functional status before present pregnancy, prior cardiac intervention followed by thorough obstetrical and cardiac examination.

**Investigations:** Haemoglobin, haematocrit, total and differential leukocyte count, blood glucose estimation, complete urine examination, urine for culture and sensitivity, obstetrical ultrasonography, and Doppler studies (wherever indicated) were done. ECG and Echocardiography were done to know the type and severity of cardiac lesions.

**Follow Up:** After making definitive diagnosis, these women were divided into three broad groups –Rheumatic heart disease, congenital heart disease and other cardiovascular diseases. These groups were subdivided into surgically corrected and uncorrected groups. Patients were regularly followed up with multidisciplinary approach. Antenatal monitoring schedule varied on the basis of the severity of the cardiac lesion, functional class and period of gestation. At each subsequent visit, evaluation of functional status, haemoglobin estimation, search for any foci of dental infection, upper respiratory tract or urinary tract infections and signs of heart failure was done. They were advised to take adequate rest of 8 hours at night, 2 hours in afternoon and regular haematinics. They were also advised for early consultation if there are signs of decompensation like increasing dyspnoea on exertion, orthopnea, paroxysmal nocturnal dyspnoea, progressive oedema, palpitations, and haemoptysis. Follow- up data was obtained from clinical visits during 2nd trimester, 3rd trimester, peripartum period, and at 6 weeks postpartum.

**Management:** Injection Benzathine penicillin 1.2 million IU intramuscular injections were given in patients with Rheumatic heart disease. Cardiac complications were treated in conjunction with cardiologist. Cardiac failure was treated with bed rest, salt restriction, digoxin, verapamil, beta blockers, diuretics, and hydralazine with or without nitrates. Patients with pulmonary oedema were treated with furosemide. Patients with prosthetic heart valves received heparin in the first trimester, and this was converted to warfarin at 13-36 weeks, again converted to heparin after 36 weeks of gestation. Labour was induced only for the most stringent obstetric indications and likewise caesarean section was performed only when there was a clear obstetric indications and for cardiac indications in some patients.

#### Cardiac indications

- Severe LV dysfunction
- Marfan's syndrome with aortic root dilatation
- Coarctation of aorta,
- Severe aortic stenosis,
- Severe pulmonary stenosis.
- Severe Pulmonary hypertension

All women were given antibiotic prophylaxis against infective endocarditis. Patients in labour were kept in semi recumbent position and given nasal oxygen. Second stage of labour was cut short either by using forceps or vacuum. Perineal infiltration was the usual mode of analgesia. Methyl ergometrine was avoided during the third stage. After the delivery, placental delivery by controlled cord traction and counter traction, gentle uterine massage, and immediate suturing of episiotomy were used to minimize blood loss. Newborns of mothers with congenital heart disease were examined for inheritance of heart disease. After delivery patients were encouraged to breastfeed, and early ambulation was advised. Patients were observed for 2 weeks following delivery for signs of deep vein thrombosis, infective endocarditis and congestive heart failure. At the time of discharge, primiparas were advised contraception with barrier contraceptives and low dose OC pills after 6 months to limit the number of children to two. If the patient already had two children, her husband was advised to undergo sterilization.

**Evaluation of Maternal and Perinatal Outcome:** All these patients were evaluated for Obstetrical events like preterm delivery, precipitate labour, antepartum haemorrhage, mode of delivery, (spontaneous vaginal delivery / forceps / caesarean section), maternal morbidity, mortality and for fetal events like prematurity, IUGR, intrauterine foetal death, neonatal death, and perinatal mortality. All neonates less than 2.5 kg were taken as low birth weight and deliveries between 28 and 37 weeks were taken as preterm. Effects of pregnancy on

heart disease like worsening of functional cardiac status, congestive heart failure, pulmonary oedema, arrhythmias, pulmonary hypertension, infective endocarditis, were also studied.

## RESULTS

A total of 75 pregnant women with heart disease were studied and the outcome was analyzed. Total number of heart diseases delivered during the study period at our institute was 145 out of 25,345 deliveries. Hence, the incidence of heart disease in this study is 0.5%. Incidence of heart disease in pregnancy varies from 0.5 -3%. In the present study, the incidence is 0.5%. In spite of low incidence, heart disease remains a leading cause of indirect maternal deaths during pregnancy accounting for 20% of all cases.

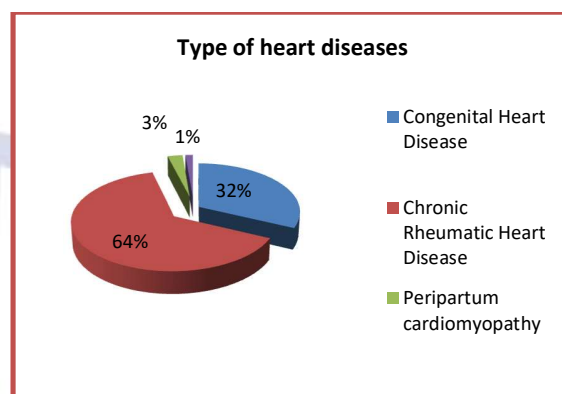


Figure 1: Incidence of heart disease

In the present study chronic rheumatic heart disease contributes to 64%, followed by congenital heart disease 32%, peripartum cardiomyopathy 2.6% and cardiac arrhythmias 1.3%. The ratio of CRHD: CHD is 2:1. The decrease in the ratio from 10:1 in the past to 2:1 shows that more number of women with congenital heart disease getting lesions surgically corrected and entering the child bearing age.

Table 1: Demographic Distribution

Age in Years	No of cases	Percentage (%)
<20 Years	5	6
20-25 Years	44	58
26-30 Years	14	18.6
31-35 Years	7	9.3
36-40 Years	3	4
<b>Booking Status</b>		
Booked	27	36%
Unbooked	48	64%
<b>Parity</b>		
Primi	30	40%
2 <sup>nd</sup>	31	41%
3 <sup>rd</sup>	10	13%
≥ 4	4	5.3%

In the present study, age distribution varied from 20-40 yrs. majority of women(58%) are in the age group 20-25 years, followed by 18.6% in the age group of 26-30 years, 9.3% in the age group 31-35 years and 4% in the age group 36-40 years.64% of cases are unbooked cases and 36% of cases are booked cases.41% are second gravida followed by primigravida (40%). There is nearly equal distribution of primigravida and multigravida.

**Table 2:** Congenital Heart Disease - Type of Lesion

CHD –Type Of Lesion (n=24)	Uncorrected	Corrected	Percentage
ASD	5	5	41.6%
VSD	2	1	12.5%
PDA	1	1	8.3%
TOF	-	1	4.1%
POF	1	-	4.1%
Ebstein’s Anomaly	1	-	4.1%
MVP	4	-	16.6%
AS	2	-	8.3%

**Atrial Septal Defect (ASD)** was the predominant lesion in the present study-41%. Corrected lesions were 33%.

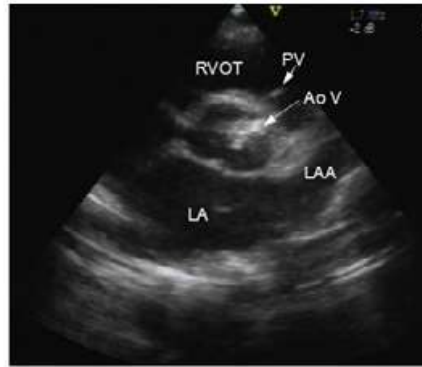
**Table 3:** Chronic Rheumatic Heart Disease –Type of Lesion

CRHD - Type Of Lesion(n=48)	No of cases	Percentage
Isolated MS	10	20.83%
MS(Post PBMV)	5	10.41%
MS+MR	8	16.66%
MS+MR+PAH	2	4.16%
MR	5	10.41%
MR+PAH	4	8.33%
MR+TR+PAH	2	4.16%
MR+AR	2	4.16%
PS(PBPV)	2	4.16%
<b>Prosthetic Heart Valves</b>		
MVR	6	12.5%
AVR	1	2.08%
MVR+AVR	1	2.08%

Mitral Stenosis is the predominant valvular lesion in the study. Severe MS is seen in 6 cases and mild MS is seen in 4 cases.



**Figure 2**



**Figure 3**



**Figure 4**

**Figure 2:** Echo film showing mitral stenosis; **Figure 3:** Echocardiogram in parasternal short axis view showing aortic stenosis with thickened aortic valve in closed position; **Figure 4:** Mechanical artificial heart valve with a pivoting disc.

**Table 4:** Obstetric Risk Factors and Medical Complications

Obstetric Risk Factors	No of cases	Percentage
Gestational HTN	8	12.12%
Preeclampsia	3	4.54%
GDM	2	3.03%
Prior LSCS	12	18.18%
Elderly Gravida	3	4.54%
PROM	5	7.57%
CPD	4	6.06%
IUGR	15	22.72%
Twins	2	3.03%
Breech	4	6.06%
Oligohydromnios	8	12.12%
<b>Medical Complications</b>		
Hypothyroidism	7	9.3%
Anemia	6	8%
Asthma	1	1.3%

IUGR (22%) was the major obstetric risk factor. Incidence of hypothyroidism is 9.3% followed by anemia

8% and asthma 1.3%. Incidence of Congestive heart failure is 5.3% of cases and pulmonary edema in 2.6%.12% were preterm deliveries.60 cases delivered vaginally. Among them, outlet forceps was applied in 30 cases and ventouse was applied in 10 cases. Remaining cases had spontaneous delivery. Epidural was given in 10 cases.

37% of babies are of low birth weight. Live birth rate was 97%, perinatal mortality rate was 4%, IUGR was seen in 20% of cases and prematurity is seen in 12% of cases. There were two maternal deaths in the group of CRHD. First case was undelivered unbooked case admitted through emergency at 32 weeks of gestation in view of anemia with congestive cardiac failure. In spite of resuscitation, death occurred.



**Table 5: Birth weight and perinatal outcome**

Birth Weight	No of cases	Percentage
1.5 - 1.9 Kgs	13	17%
2 - 2.4 Kgs	15	20%
2.5 - 2.9 Kgs	35	46%
≥ 3 Kgs	13	17%
Perinatal Outcome		
Preterm	9	12%
IUGR	15	20%
Alive	72	97%
NICU	24	32%
IUD	3	4%
Perinatal Mortality	3	4%

Second case was G4 P3L3 with MS and severe PAH collapsed immediately after delivery due to pulmonary oedema. Both cases were uncorrected lesions associated with PAH and were in NYHA III and IV. Two cases of peripartum cardiomyopathy were managed during the period of study. First case was a Primigravida at 34 weeks of gestation with dilated cardiomyopathy EF 33% and severe preeclampsia, monitored with  $spO_2$  throughout the labor, vacuum assisted delivery was done and postpartum monitoring was done for 6 hours. Second case was P<sub>2</sub>L<sub>2</sub> underwent normal delivery, 1 month after delivery women had sudden onset of shortness of breath, was admitted through emergency, treated with 100% O<sub>2</sub> at the rate of 6 litres /min and Inj. furosemide was given. After the acute attack, she was investigated and 2D Echo showed EF Of 51%. She was kept on Tab.Metoprolol 25mg OD. Ejection Fraction is an important predictor of maternal complications.

**Table 6: Obstetric Outcome as per NYHA classification in total study group**

Obstetric Outcome	NYHA CLASS I and II (n=53)	%	NYHA CLASS III and IV(n=22)	%
Live Births	54 (2 twin deliveries)	98.1%	20	90.9%
IUGR	8	15%	7	31%
Preterm	5	9.4%	4	18%
IUD	1	1.8%	2	10%
Maternal Mortality			2	10%

Live birth rate was 98.1% in the NYHA I and II, whereas in the NYHA III and IV it was 90.9%. Incidence of IUGR was 15% in NYHA I and II, 31% in NYHA III and IV. Perinatal mortality rate was 1.8% in NYHA I and II, 10% in NYHA III and IV. Maternal mortality was 10% in NYHA III and IV.

## DISCUSSION

It is estimated that 0.3 -3.5 % of all pregnancies are complicated by heart disease and it accounts for 15 % of pregnancy-related mortality. Teaching institutes in our country, being referral centres, may not reflect the actual prevalence of this medical disorder in pregnancy. It is an important cause of maternal mortality in India. Heart disease in pregnancy has re-emerged as one of the leading causes of maternal mortality.

**Table 7: Comparison of incidence of heart disease in different studies**

Study	Incidence
Asghar F <i>et al</i> 53754+ <sup>5</sup> (2005)	0.98
Wasim <i>et al</i> 53754+ <sup>6</sup> (2008)	1
Naila Yasmeen <i>et al</i> 53754+ <sup>7</sup> (2012)	1
Bangal <i>et al</i> 53754+ <sup>8</sup> (2012)	1.3
Suman Puri <i>et al</i> 53754+ <sup>9</sup> (2013)	4.3
Vijaya Balasaheb <i>et al</i> 53754+ <sup>10</sup> (2014)	1
Kavitha Gayak <i>et al</i> 53754+ <sup>11</sup> (2015)	0.39
Hema Gayathri <i>et al</i> 53754+ <sup>12</sup> (2015)	1.82
Lubna Latif <i>et al</i> 53754+ <sup>13</sup> (2015)	1.3
Present study (2016)	0.5

Total number of heart diseases delivered during the study period at our institute was 145 out of 25,345 deliveries. Hence, the incidence of heart disease in this study is 0.5%. Incidence in the present study is comparable to the study of Asghar F *et al* 53754+<sup>5</sup> (0.98%).

**Table 8:** Ratio of cases of CRHD and CHD in different studies

STUDY	% OF CRHD	% OF CHD	RATIO OF CRHD:CHD
Avila WS <i>et al</i> 53754+ <sup>14</sup> (2003)	55.7	19.1	2.9:1
Asghar F <i>et al</i> 53754+ <sup>5</sup> (2005)	66	28	2.3:1
Wasim <i>et al</i> 53754+ <sup>6</sup> (2008)	82	18	4.5:1
Pratibha <i>et al</i> 53754+ <sup>15</sup> (2010 )	60.9	32.18	1.9:1
Doshi <i>et al</i> 53754+ <sup>16</sup> (2010)	68	21	3.2:1
Hiralal Konar <i>et al</i> 53754+ <sup>17</sup> (2012)	69.4	21.3	3.2:1
Subbaiah M <i>et al</i> 53754+ <sup>18</sup> (2013)	64	36	1.7:1
Vijaya Balasaheb <i>et al</i> 53754+ <sup>10</sup> (2014)	73.4	17.4	4.2:1
Mainak Sen <i>et al</i> <sup>19</sup> (2014)	70	30	2.3:1
Kavitha Gayak <i>et al</i> 53754+ <sup>11</sup> (2015)	72	22	3.2:1
Jigar Kanubai <i>et al</i> 53754+ <sup>20</sup> (2016)	72	16	4.5:1
Present study (2016)	66.6	33.3	2:1

In the present study, the ratio of Rheumatic heart disease to congenital heart disease is **2:1**. Although the incidence of cardiac abnormalities in pregnancy as a group has remained more or less unchanged, the relative contribution of the different causes of heart disease diagnosed during pregnancy varies with the study population and study period. Present study shows rheumatic heart disease is two times more common than congenital heart disease. In this aspect, the present study coincides with the study of Pratibha *et al* 53754+<sup>15</sup> and Asghar F *et al* 53754+<sup>5</sup>. However, the incidence of rheumatic heart disease in developed countries has been greatly reduced by the widespread use of antibiotics effective against the streptococcal bacterium which causes rheumatic fever. Thus, present study indirectly indicates inadequate treatment of girls suffering from streptococcal infection in their childhood and adolescence. Cardiac arrhythmia and cardiomyopathy are seen frequently during pregnancy. It may be due to increased association of medical disorders like obesity, diabetes, hypertension, and stress during pregnancy. 84% of the cases in our study were in the age group 20-30 years. It coincides with the studies of Hiralal Konar *et al* 53754+<sup>17</sup> and Lubna Latif *et al* 53754+<sup>13</sup>. In the present study, 64 % of cases were unbooked which coincides with the study of Naila Yasmeen *et al* 53754+<sup>7</sup>. In the present study, there was near equal distribution of multigravida (60%) and primigravida (40%) which correlates with the studies done by Hiralal Konar *et al* 53754+<sup>17</sup> and Asghar F *et al* 53754+<sup>5</sup>. With increasing gravidity, the rate of complications associated with heart disease increases due to indirect association with increasing age, duration of heart disease, progression of disease process. In the present study, distribution of parity coincides with the study of Hiralal Konar *et al* 53754+<sup>17</sup>.

**Table 9:** Comparison of incidence of congenital cardiac lesions with other studies

Study	ASD	VSD	PDA	TOF
Pratibha <i>et al</i> 53754+ <sup>15</sup> (2010)	29.4	25	6	2.6
Hiralal Konar <i>et al</i> 53754+ <sup>17</sup> (2012)	25	20	11.7	18.4
Indira <i>et al</i> 53754+ <sup>21</sup> (2015)	45	18	27	
Present study (2016)	40	12	8	4

In the present study, among the CHD group, ASD was the most common congenital cardiac lesion (40%), which correlates with the studies done by Pratibha *et al* 53754+<sup>15</sup> (29.46%), Indira *et al* 53754+<sup>21</sup> (45%). In the present study, Mitral stenosis was the predominant valvular lesion (42%) in RHD group which correlates with other studies done by Pratibha *et al* 53754+<sup>15</sup> Konar *et al* 53754+<sup>17</sup> and Bangal *et al* 53754+<sup>8</sup>. This shows that mitral stenosis is most commonly valvular lesion in patients with rheumatic fever. 7 women underwent percutaneous balloon valvotomy before pregnancy. 8 women entered the pregnancy with prosthetic heart valves. Women with prosthetic heart valves were given anticoagulant therapy to reduce the risk of thromboembolic complications. There was no difficulty in managing women with heparin (SC) during the first trimester and last 2 weeks of pregnancy and using warfarin during the rest of pregnancy and puerperium. All women breast fed their children as the routine use of anticoagulants in therapeutic doses during puerperium is not a contraindication of breast feeding.

**Table 10:** Comparison of different Acquired Cardiac Lesions

Cardiac Lesion	Hiralal Konar <i>et al</i> 53754+ <sup>17</sup> (2012)	Kavitha Gayak <i>et al</i> 53754+ <sup>38</sup> (2015)	Indira <i>et al</i> 53754+ <sup>11</sup> (2015)	Present Study (2016)
MS	26.7	36	25	<b>30</b>
MR	11.3	4	4	<b>10</b>
MS+MR	7.7	8	35	<b>16</b>

In the present study, 53 (70%) cases belonged to NYHA functional class I-II and 22(30%) cases belonged to Class III-IV and is correlating with the studies done by Wasim *et al*53754+6. NYHA functional class is one of the major determinants for fetomaternal outcome, and functional grading should be assessed in each antenatal visit. In our study, 5% of pregnant women developed CHF and 2.5% developed pulmonary oedema. This incidence of cardiac complications is in concurrence with studies by Konar *et al*53754+17 (7.4%). Cardiac failure is a major complication in pregnancy and is often associated with maternal death. In this study, most cases had cardiac failure during labour. One women in this group was further complicated with anaemia, and she died. It emphasizes the preventive aspect of cardiac complications in pregnancy, labour, or puerperium with early detection. In the present study, 12% were preterm deliveries, and 88% progressed to term. The pregnancy outcome in the present study correlates with the study by Asghar *et al*53754+5. Incidence of preterm delivery is more in congenital heart disease (13%) compared to chronic rheumatic heart disease (10.6%). 9.4% of preterm deliveries are in NYHA I and II, 18% are in NYHA III and IV. In the present study, incidence of low birth weight babies was 37%, which coincides with other studies. Pre-term birth and low birth weight babies are known as the major neonatal complications in women with heart disease in pregnancy. Perinatal outcome was more dependent on severity of symptoms during pregnancy rather than the duration and type of heart disease .37% babies in this study weighed <2.5 kg. The neonates born to the women with congenital heart disease also run the risk of inheriting congenital heart disease. Overall, the risk of such inheritance is quoted to be 3–5 % compared to 1 % risk in general population. In this study, no such inherited neonatal heart disease was observed though 32% women in this study suffered from congenital type of cardiac lesions. Most of the women with heart disease in pregnancy go into spontaneous labour and deliver vaginally. In the present study, Majority of cases delivered vaginally (80%), LSCS was performed in 20%, which is close to the study of Pratibha *et al*53754+15

**Table 11: Comparison of incidence of maternal mortality in different studies**

STUDY	Maternal mortality (%)
Avila WS <i>et al</i> 53754+14 (2003)	2.7
Asghar <i>et al</i> 53754+5 (2003)	2
Abdel Hady ES <i>et al</i> 53754+22 (2005)	1.16
Stangl V <i>et al</i> 53754+23 (2008)	1.1
Naila Yasmeen <i>et al</i> 53754+7 (2012)	2.5
Suman Puri <i>et al</i> 53754+9 (2013)	3
Alireza <i>et al</i> 53754+24 (2013)	4
Present study (2016)	2.6

In the present study out of 75 cases there were two maternal deaths which contributes to 2.6% which is close to the studies of Naila Yasmeen *et al*53754+7. Two maternal deaths were in women with unsupervised pregnancy and emergency admissions with complications. It is emphasized that pre-pregnancy diagnosis, counselling, appropriate referral, routine antenatal supervision, and delivery at an equipped centre to improve the pregnancy outcome for both the mother and the baby.

**Table 12: Maternal and Perinatal outcome in CRHD - Comparative studies**

Name and Year	No of cases	CCF	Preterm	IUGR	ALIVE	Still birth	IUD	NND	MM
Hameed <i>et al</i> 53754+25 (2001)	66	38%	Nil	21%	98%	2%	Nil	Nil	2%
Pratibha <i>et al</i> 53754+15 (2010)	200	11%	9.35%	9.35%	93.50%	0.98%	3.44%	1.97%	0.89%
Present study 2016	<b>50</b>	<b>6%</b>	<b>12%</b>	<b>20%</b>	<b>96%</b>	<b>Nil</b>	<b>4%</b>	<b>Nil</b>	<b>4%</b>

The incidence of preterm deliveries was 12% which is comparable to the study of Pratibha *et al*53754+15. Incidence of IUGR was 20% which is close to the study of Hameed *et al*53754+. Live birth rate was 96% which is close to the study of Hameed *et al*53754+25.

**Table 13: Maternal and Perinatal outcome in CHD - Comparative studies**

Name and Year	No of cases	CCF	Preterm	IUGR	Alive	NICU	IUD	NND	MM
Khairy <i>et al</i> 53754+26 (2004)	90	16%	20.80%	8.30%	95.8%		2.80%	1.40%	Nil
Pratibha <i>et al</i> 53754+17 (2010)	112	0.91%	10%	38.18%	98.18%	40.91%	0.91%	0.91%	1.78%
Present study (2016)	<b>25</b>	<b>4%</b>	<b>12%</b>	<b>20%</b>	<b>96%</b>	<b>16%</b>	<b>4%</b>	<b>Nil</b>	<b>Nil</b>

Incidence of preterm deliveries was 12% which is comparable with the studies of Khairy *et al*53754+16 and Pratibha *et al*53754+17. Incidence of IUGR was 20% which is lower than the study of Prathibha *et al*53754+17. Incidence of IUGR

is more in the cyanotic heart disease when compared to acyanotic heart disease. Lower incidence in this study is due to more number of cases of acyanotic heart disease and better NYHA class. Live birth rate was 96% which is close to the other studies. There was one Intra uterine fetal death in this group which was an unbooked referred in view of intrauterine fetal death due to severe oligohydramnios.

**Table 14:** Maternal and Perinatal outcome in Total STUDY GROUP - Comparative studies

Name and Year	No of cases	CCF	Preterm	IUGR	Still birth	IUD	NND	MM	PNM
Asghar <i>et al</i> 53754+ <sup>5</sup> (2005)	50	20%	14%	42.55%	Nil	Nil	2%	2%	2%
Hiralal Konar <i>et al</i> 53754+ <sup>17</sup> (2012)	281	7.40%		42.18%	1.77%	0.71%	2.13%	1.06%	4%
Present study (2016)	75	5%	8%	20%	Nil	2.7%	Nil	4%	4%

Perinatal mortality rate coincides with the study of Hiralal Konar *et al* 53754+<sup>17</sup>. In view of the high risk of low birth weight, preterm delivery, intra- uterine growth restriction IUD and still birth antenatal fetal surveillance becomes mandatory and should be offered to these women with rheumatic heart disease and with other cardiac disease.

## CONCLUSIONS

In conclusion, preconceptional counselling, accurate risk assessment, regular antenatal checkups, prevention, early recognition and aggressive treatment of complications during pregnancy are crucial in reducing the morbidity. Surgical correction of the cardiac lesion prior to pregnancy is associated with better pregnancy outcome. Functional cardiac status is the most important factor affecting maternal and perinatal outcome. Termination/sterilization should be considered in women with advanced NYHA functional class, severe PAH. A multidisciplinary approach involving skilled Obstetricians, cardiologists, Anaesthetists, and Neonatologists in a tertiary care centre with well equipped fetomaternal units has utmost importance in improving the fetomaternal outcome.

## REFERENCES

- Peter M. Accidents pulmonaires gravido-cardiaques. In *Leçons de Clinique Médicale* 3rd ed. (Ed. Peter M), p. 180–201. Paris, France: Asselin, 1880.
- Perloff JK: Congenital heart disease and pregnancy. *Clin Cardiol* 1994; 17:579–587.
- Surge D, Blake S, McDonald D. Pregnancy complicated by maternal heart disease at the National Maternity Hospital, Dublin; 1969–1978.
- McFaul P, Dornan J, Lamki H, et al 53754+. Pregnancy complicated by maternal heart disease. A review of 519 women. *Br J Obstet Gynaecol*. 1998; 95:861–867.
- Asghar F, Kokab H, Evaluation and outcome of pregnancy complicated by heart disease. *J Pak Med Assoc* 2005; 19: 1-2.
- Wasim R, Amer W, Majroh A, Siddiq S. Foetomaternal outcome of pregnancy with cardiac disease. *J PMA* 2008; 58: 175-8.
- Naila Yasmeen, Mahmood Aleem, Nasir Iqbal Feto-Maternal Outcome in Patients with Cardiac Disease in Pregnancy. *PJMHS Oct-Dec* 2011; 5(4):748-51.
- B Bangal V. Clinical Study of Heart Disease Complicating Pregnancy. *IOSR Journal of Pharmacy (IOSRPHR)*. 2012; 2(4):25-28.
- SumanPuri, Aman Bharti, Sandeep Puri, Bishav Mohan, Vidush iBindal, Sumati Verma, 2013. Maternal heart disease and pregnancy outcomes. *JK Sci.*,15(1)[4]. CrossRefMedlineWeb of Science.
- Vijaya Balasaheb. Maternal Outcome in Heart Disease in Pregnancy. *J of medical and health sci*. 2014; 3(3):86-91.
- Kavitha Gayak et al 53754+. A Study on The Prevalence of Cardiac Diseases Among The Pregnant Women. *Indo American Journal of Pharm Research*. 2015; 5(02):810-5.
- Hema Gayathri Arunachalam, Prabha Devi Kodey, Gangadhara Rao Koneru, John Satish R and Mounica E. Prospective Study on Heart Disease Complicating Pregnancy. *Int.J.Curr.Microbiol.App.Sci*. 2015; 4(8): 215-222.
- Latif L. Iqbal U. PREVALENCE OF CARDIAC DISEASES; DURING PREGNANCY AND ITS FETO-MATERNAL OUTCOME. *The Professional Medical Journal*. 2015; 22(11):1443-1448.
- Avila W.S., Rossi E.G., Ramires J.A., et al 53754+. Pregnancy in patients with heart disease: experience with 1000 cases. *ClinCardiol* 2003; 26:135-142.
- Devabhaktuni P, Dev'neni K, Vemuri UR, Naman GV. Pregnancy outcome in chronic rheumatic heart disease. *J obstet Gynecol India* 2009; 59(1):41-46.
- Doshi HU, Oza HV, Tekani H, Modi K (2010) Cardiac disease in pregnancy-maternal and perinatal outcome. *J Indian Med Assoc* 108(5):278–280.
- Konar H, Chaudhuri S. Pregnancy Complicated by Maternal Heart Disease: A Review of 281 Women. *Journal of Obstetrics and Gynaecology of India*. 2012; 62(3):301-306.
- Subbaiah M, Sharma V, Kumar S. Heart disease in pregnancy: cardiac and obstetric outcomes. *Arch Gynecol Obstet*. 2013; (288) :23–7.
- Mainak Sen, Parnamita Bhattacharyya, Nilanjana Chowdhury. Pregnancy with Heart Disease Fetomaternal Outcome. *Journal of Evolution of Medical and Dental Sciences*. 2014; 3(5):1178-1183.
- Dr Jigar Kanubhai Thakkar, Dr Pushpa A Yadav, Dr Rupa C Vyas. A Study of Pregnant Women with Cardiac Disease. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. [cited Mar 2016]; 15(3)[III]:27-29.
- Indira I, Sunitha K and Jyothi Study of Pregnancy Outcome in Maternal Heart Disease, *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. July, 2015; 14(7)[IV] :06-10.
- Abdel-Hady ES1, El-Shamy M, El-Rifai AA, Goda H, Abdel-Samad A, Moussa S. Maternal and perinatal



- outcome of pregnancies complicated by cardiac disease. *Int J Gynaecol Obstet.* 2005 July; 90(1):21-5.
23. Stangl V., Baumann G., Stangl K. Pregnancy risks in acquired heart diseases. *Z Kardiol* 2001; 90:16-29.
  24. Yaghoubi A, Mirinazhad M., Maternal and neonatal outcomes in pregnant patients with cardiac diseases referred for labour in northwest Iran. *J Pak Med Assoc.* 2013 Dec; 63(12):1496-9.
  25. Hameed A, Karaalp IS, Tummala PP et al 53754+. The effect of valvular disease on maternal and fetal outcome of pregnancy. *J Am Coll Cardiol.* 2001; 37: 893-9.
  26. Khairy P., Ouyang D.W., Fernandes S.M., et al 53754+ Pregnancy outcomes in women with congenital heart disease. *Circulation* 2006; 113:517-524.

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