

Maternal and Foetal Outcome of Heart Disease in Pregnancy- A Tertiary Care Centre study

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Abstract:

Aim & Objective: To study Incidence of different types of heart disease in pregnancy and Maternal and Foetal Outcome of Heart Disease in Pregnancy in A Tertiary Care Centre.

Material & Methods: Prospective observation study was conducted in the Department of Obstetrics and Gynecology tertiary care hospital in Aurangabad district of Maharashtra state from October 2019 to September 2021. All patients who fulfilled the inclusion and exclusion criteria during the study period were included in the study analysis.

Observations & Results: In present study, the incidence of heart disease was 0.53%, maximum cases 38.6% were from age-group of $\geq 25-29$ years. 51.3% cases were reported from rural area and 41.9% belonged to upper lower class. 93.6% were booked. 51.3% of cases were having Class II of NYHA classification. The most common heart disease was rheumatic 101(53.4%) followed by congenital heart disease i.e 84(44.4%). Among congenital cardiac lesion the most common was ASD 36(42.9%). In Rheumatic cardiac lesion the most common was Mitral stenosis 65(64.3%). Maternal mortality was reported in 05(2.6%) cases, causes of mortality were due to CCF in 3(1.6%) and pulmonary Embolism Sec to RHD and Left Ventricular Failure in CHD in Severe Pre-eclampsia. 01(0.5%)

Conclusion: This study concluded that pre-pregnancy diagnosis, counselling, appropriate referral, routine antenatal supervision and delivery at an equipped centre improve the pregnancy with heart disease outcome for both mother and baby. The study also observed the improved maternal and fetal outcomes in women who had undergone corrective cardiac surgeries before the pregnancy.

Keywords: Cardiac disease, rheumatic heart disease, maternal heart diseases.

Introduction:

Pregnancy is a hyper dynamic state that is associated with severe hemodynamic changes like high cardiac output, increased blood volume, redistribution of regional blood flow and increased oxygen consumption that are well tolerated by normal women and many women with cardiac disease. But it can be challenging for some cardiac patients especially with severe and complex disease. About 287000 maternal deaths occur each year worldwide ^[1]. Cardiac disease is one of the important causes of maternal mortality and morbidity both in antepartum and postpartum period. Pregnancy makes a significant demand on the cardiovascular system. The circulatory changes of pregnancy in the presence of maternal heart disease may result in adverse consequences, even death of the mother or fetus^[2]. About 15-52% of cardiac abnormalities are first diagnosed during routine antenatal examination or because of symptoms brought about by the physiological changes of pregnancy ^[3].

There is an increased prevalence of heart disease in pregnant women, due to increased age at first pregnancy, increased prevalence of diabetes, hypertension, obesity. Prevalence of heart

disease in pregnancy is found to vary between 0.3-3.5% [4]. Heart diseases are now the leading cause of indirect maternal deaths accounting for 20.5% of all cases [5]. In developing countries like India, rheumatic heart disease (RHD), despite its declining trend still accounts for majority of such cases comprising 56% to 10% of all cardiovascular disease in pregnancy [6].

In India, the most commonly reported heart disease during pregnancy is mitral stenosis occurring secondary to rheumatic fever. RHD accounts for > 90% maternal cardiac diseases worldwide [7].

In pregnancies complicated with cardiac disorders, maternal and perinatal mortality and morbidity not only depends on the type of disorder, but also the functional status of the patient and the complications associated with the pregnancy. Maternal morbidity is characterized by increased chances of cardiac failure, pulmonary edema, shock (cardiogenic), arrhythmia, thromboembolism and even maternal mortality. The high maternal morbidity and mortality is due to pre-existing compromised cardiac function and subsequently their inability to cope with the physiological changes imposed by pregnancy, stress of labour, and hemodynamic changes of the puerperium. Maternal heart diseases also have adverse outcomes on the growing fetus.

Keeping this in mind this study was conducted at a tertiary care hospital with 20,000 deliveries per year including many high risk pregnancies. The primary objective of the present study was to study the Incidence of different types of heart disease in pregnancy, to study the clinical presentation and maternal and neonatal outcomes in different types of heart disease in pregnancy.

Objectives:

- I To study the Incidence of different types of heart disease in pregnancy.
- II To study the clinical presentation of different types of heart disease in pregnancy.
- III To study the Major Types of heart disease in pregnancy.
- IV To study the maternal and perinatal outcomes of heart disease in pregnancy.

Material & Methods:

This was a prospective observational study conducted from 1st October 2019 to 30th September 2021 in the department of Obstetrics & Gynecology of Government medical college and Hospital Aurangabad, a tertiary care hospital in Marathwada region of Maharashtra India, with approximately 20000 deliveries annually with many high risk referrals from the peripheral hospital. Ethical approval for the study was obtained by the Medical Ethical Committee of the Hospital.

Inclusion criteria:

- Pregnant women with heart disease who delivered in our tertiary care centre or diagnosed with heart disease in the postpartum period.
- Pregnant women with heart diseases who underwent delivery in other hospital and referred to tertiary care centre for further cardiac management.
- Women willing to participate in study.

Exclusion criteria:

- Pregnant women with heart disease who underwent medical termination of pregnancy.
- Refusal to consent.

- Loss to follow up

After applying inclusion and exclusion criteria women will be included in the study. Detail sociodemographic information was obtained. Clinical examination and appropriate treatment was initiated including Gynecologist, Cardiologist, Anaesthetist and Pediatrician. The New York heart Association [NYHA] classification was used to classify the severity of heart disease. Mode and outcome of delivery were noted. Previous obstetric history and presence of non cardiac comorbidities were also noted. Maternal outcomes recorded in terms of Congestive Cardiac failure requiring ICU Care, Pregnancy Induced Hypertension, Antepartum Haemorrhage, Postpartum Haemorrhage, Deep vein Thrombosis, Anaemia, Maternal death. Fetal outcomes recorded in terms of Birth, Pre-Term, Low Birth Weight, Intrauterine Death, Neonatal Death, Acute Fetal distress and Abortion.

Statistical Analysis:

The data was compiled in master chart i.e. in MS-EXCEL Sheet and for analysis of this data; SPSS (Statistical package for social sciences) Version 20th was used.

Observation & Results:

Total number of deliveries in the study period were **35,428** the incidence was recorded **189(0.533%)**. Out of 189 cases, maximum cases i.e. 73(38.6%) were from age-group of ≥ 25 -29 years. The mean age of cases was 26.39 ± 4.67 years. Majority 79(41.8%) of the cases were primigravida. Maximum 97(51.3%) cases were reported from rural area and 79(41.98%) were belongs to upper lower class. Majority 177(93.6%) of cases were booked.

Out of 189 cases, maximum 73(38.6%) cases were diagnosed at birth, 58(30.7%) cases were diagnosed before pregnancy, 47(25.3%) diagnosed during pregnancy and 11(5.8%) were diagnosed during postpartum period.

Table 1: Distribution of cases according to Heart Disease

	No of Cases	Percentage
Type of Heart Disease		
Rheumatic	101	53.4
Congenital	84	44.4
Cardiomyopathy	04	2.2
Congenital Heart Disease (n=84)		
Atrial Septal Defect	36	42.9
Ventricular Septal Defect	27	32.1
Tetralogy of Fallot	14	16.7
Coarctation of Aorta	07	8.3
Rheumatic Cardiac Lesion [n=101]		
MS	65	64.3
MS+MR	15	14.8
MS+MR+PAH	9	4.8
MS+MR+AR	7	3.7
MS+TR+AF	5	2.6
NYHA Classification		
I	57	30.1
II	97	51.3

III	24	12.6
IV	11	5.8

The most common heart disease was rheumatic 101(53.4%) followed by congenital heart disease i.e 84(44.4%) and 4 (2.2%) cases were of cardiomyopathy.

Amongst the cases of congenital cardiac lesion the most common was ASD 36(42.9%) followed by 27(32.1%)VSD , 14(16.7%) cases were TOF and 7(8.3%) cases were coarctation of aorta.

Amongst the cases of Rheumatic cardiac lesion the most common was Mitral stenosis 65(64.3%).15(14.8%) cases were has MS+MR and 9(4.8%) cases has MS+MR+PAH and 12(6.3%) cases were multiple lesion.Out of 189 cases, maximum 97(51.3%) of cases were having Class II of NYHA classification and 11(5.8%) of case were reported from Class IV .

Table 2: -Distribution according to associated Medical Disorder /Co-morbidity

Associated co-morbidities	No of Cases	Percentage
Anaemia		
Mild	103	54.5
Moderate	14	7.4
Severe	5	2.6
Hypertensive Disorder In Pregnancy		
Gestational hypertension	27	14.3
Severe pre eclampsia	7	3.7
Eclampsia	2	1.1
Hypothyroidism	19	10.0
Epilepsy	2	1.1
Gestational Diabetes Mellitus	2	1.1
Covid 19	3	1.6
Fibroid	2	1.1
Uterine Anomaly	1	0.6

In present study there were few cases who presents with more than 2 medical co morbidities anemia 122(64.5%) were associated with heart disease and hypertensive disorder in pregnancy was observed in 36(19.0%) and 19(10.0%) cases diagnosed Hypothyroidism.3(1.6%) cases were Covid-19 positive along with moderate anemia and 2(1.1%) cases had diabetic mellitus and uterine fibroid.

Table 3 : - Maternal outcome-

Mode of Delivery	No Of Cases [n=189]	Percentage
Vaginal Delivery		
FTVgD-A)forcep	59	31.3
B)vacuum	45	23.8
PTVgD	15	7.9
Caesarean Section		
Emergency	23	12.2
Elective	43	22.7
Antepartum Complication		
CCF	1	0.6

Arrhythmia	2	1.1
Complications Related To AF-PE	1	0.6
Prosthetic Heart Valve Related Problems (Stenosis)	1	0.6
Cardiogenic Shock	1	0.6
Intrapartum complication		
Atrial Fibrillation	2	1.1
CCF	2	1.1
Obstetrics Related Complications-Atonic PPH	3	1.7
Anesthesia Related Complications	4	2.2
Postpartum Complications		
Anesthesia Related Complications -Post Puncture Dural Headache	7	3.7
Obstetrics Related Complications - Surgical Site Infection	6	3.2
Mortality	5	2.6
Atrial Fibrillation	5	2.6
CCF	3	1.6
Cardiogenic Shock	3	1.6
Indication for ICU admission		
Pain Management	20	10.6
Post Operative Mechanical Ventilation	19	10.0
Post Operative Hemodynamic Monitoring	17	8.99
Massive Blood Transfusion	3	1.6
GA related Complications	4	2.1
Maternal Mortality (n=5)		
CCF	3	1.6
Pulmonary Embolism Sec to RHD	01	0.5
Left Ventricular Failure in CHD in Severe Pre-eclampsia	01	0.5

In present study out of 189 cases 119(63%) had vaginal delivery, among 119 cases 59(31.3%) had forceps delivery and 45(23.8%)vacuume deliveries. Caesarean was done in 66(34.9%) cases and Cesarean was performed in obstetric indications and high risk heart disease patients.

Inantepartum complications, 1 case had CCF and 1had cardiogenic shock and 2 cases had arrhythmia, 1 Atrial fibrillation with pulmonary embolism in prosthetic heart valve .

In intrapartum complications, 3 cases had PPH managed medically, 4 had CCF and 2 were having anesthesia Related Complications. Patients with atrial fibrillation responded to pharmacological rate control therapy (b blockers, c calcium channel blocker ,digoxin. None of the patients required cardioversion

The most common indication of ICU admission were observed to be pain management i.e.20(10.6%) followed by post Operative Mechanical Ventilation i.e. 19(10.0%) and 17(8.99%) cases were for post operative hemodynamic changes were 3(1.6%) were massive blood transfusions.

Out of 189 cases, 05(2.6%) of maternal mortality was reported, Most common reason of mortality was due to CCF i.e 3(1.6%) and 01(0.5%) pulmonary Embolism Sec to RHD and Left Ventricular Failure in CHD in Severe Pre-eclampsia.

Table 4: Perinatal Outcome

	No of Cases	Percentage
Low birth weight	23	17.9
NICU Admission	39	20.6
Still Birth	07	3.8
NICU Admission and Indications		
Prematurity	6	3.2
Low Birth Weight	9	4.8
Hyperbilirubinemia	6	3.2
Separation From Mother	7	3.7

Out of 39 NICU admissions, Most common NICU admission was due to respiratory distress syndrome i.e 11(5.8%) followed by low birth weight i.e 09(4.8%).6(3.2%) had hyperbilirubinemia and 7(3.7%) cases had separation from mother.

Discussion:

In present study, incidence of heart disease in pregnancy was recorded 0.53%. Whereas Aamir Rashid et al^[11] [2020], the incidence of heart disease in pregnancy was recorded to be 0.785%. Pujitha KS et al^[9] [2017] found incidence as 0.21% in their study.

In this study maximum cases i.e. 73(38.6%) were from age-group of 26-30 years. The mean age of cases was 26.39±4.67 years. Similarly Aamir Rashid et al^[11] [2020], also noted maximum cases i.e. 32% & the mean age of patients was 27.46±4.4 years. Dina Aisha Khan et al^[10] [2018] reported mean age of women with heart disease was 27.58±5.6 years. In present study, majority 79(41.8%) of the cases were primigravida. Similarly Aamir Rashid et al^[11] [2020], also noted maximum cases i.e. 45% were primigravida whereas Moushmi B. Parpillewar et al^[12] [2020] reported majority of the patients 42% primigravida were second gravida and 40% were primigravida.

In this study majority of 177(93.6%) of cases were booked at our tertiary care center similarly, Aamir Rashid et al^[11] [2020], noted 68.49% of cases were booked, Nagamani G et al^[8] [2015] reported most women were booked. whereas Dina Aisha Khan et al^[10] [2018] reported (45.45%) were booked. Moushmi B. Parpillewar et al^[12] [2020] noted 29% of booked cases.

Maximum 97(51.3%) of cases were having Class II of NYHA classification followed by 50(26.4%) of cases of Class I. 24(12.6%) and 18(9.5%) of case were reported from Class III & Class IV respectively. Aamir Rashid et al^[11] [2020], reported 36 (50%) patients were in NYHA Class I, 22 (30.13%) were in NYHA Class II, 9 (12%) were in NYHA Class III and 6 (8%) were in NYHA Class IV. Dina Aisha Khan et al^[10] [2018] divided cases on the basis of their NYHA status in four classes. Maximum patients belonged to Class 1 and 2 (69.09%), 9.09% were classified as NYHA Class 3 and 21.82% as Class 4. Moushmi B. Parpillewar et al^[12] [2020] found that Most of the patients (69.4%) were in NYHA grade I when they reached our hospital, 14.8% were in grade II, 14.2% in grade III and 1.6% in grade IV.

These observations were comparable with the study done by Pujitha KS et al^[9] and Indira et al^[14]. This is mostly because the patients symptoms are relieved due to surgical correction and multidisciplinary team approach with the cardiology department.

The most common type of heart disease was rheumatic 101(53.4%) followed by congenital heart disease i.e 84(44.4%) and 4 (2.2%) cases were cardiomyopathy. RHD was the common {36 (46.5%)} cardiac disorder.

Dina Aisha Khan et al^[10] [2018] observed Congenital heart disease was the most common encountered type 49.09% followed by RHD 41.82%. Arpita Jain et al^[13] [2020] found that the Rheumatic Heart disease was the principal cause of heart disease amongst all pregnancies seen in 44.9% followed by Congenital heart disease present in 11.5% patients and peripartum cardiomyopathy in 6.4%.

In this present study 119(63%) cases had vaginal delivery as compared to 35.6% Saima Salam et al^[15], 76.2% Mazhar et al^[16]; 73.5% Hameed et al^[17];

Caesarean was done in 66(34.9%) cases, 9.5% reported by Mazharet al^[16]; Saima Salam et al^[15], 2.2% had to undergone MTP which was comparable to Suman et al^[15] and Mazhar et al^[16] studies also which is comparable to our study.

Mortality in pregnant females with cardiac disease were 5(2.6%). whereas Saima Salam et al^[15], reported 4.4% of mortality and mainly due to cardiac failure, sepsis and shock. Godawari Josh et al^[18] also found mortality of 4.8%.

In the present study, 7(3.7%) were still birth whereas Saima Salam et al^[15], reported 14.4 % of still birth. Godawari Josh et al^[18] reported 9.5%. Present study observed that 17.9% of low birth weight of babies Godawari Josh et al^[18] found higher percentage of low birth weight i.e. 42.1%.

Conclusion:

The incidence of heart disease among pregnant women was found to be 0.553%. Rheumatic heart disease was the commonest condition followed by congenital heart disease. The most common Symptoms of Heart Disease in cases was breathlessness followed by palpitations. Mitral stenosis was the most common lesion among the Rheumatic heart disease group and atrial septal defect among the congenital heart disease group. The most common indication of ICU admission were observed to be pain management followed by post Operative Mechanical Ventilation. This study concluded that pre-pregnancy diagnosis, counselling, appropriate referral, routine antenatal supervision and delivery at an equipped centre improve the pregnancy with heart disease outcome for both mother and baby. The study also demonstrate the improved maternal and fetal outcomes that are observed in women who undergo corrective cardiac surgeries before there pregnancy. In addition to this there was no relationship between the maternal cardiac disease and presence of congenital defects in the neonate ruling out the limited possibility of a genetic transfer. Cardiac failure is a serious complication and often leads to maternal death. Early diagnosis by proper antenatal care and intervention could be the key to prevention. Also joint management by obstetrician, cardiologist, anaesthesiologist and neonatologist will help in ensuring a good prognosis among the patients of heart disease.

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