

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20204003>

Original Research Article

Fetomaternal outcomes in pregnancy with different cardiac disease at a tertiary care center in Udaipur

Keerti Chaudhary*, Sangeeta Sen

Department of Obstetrics and Gynaecology, Ravindra Nath Tagore Medical College and Hospital, Udaipur, Rajasthan, India

Received: 15 August 2020

Accepted: 31 August 2020

***Correspondence:**

Dr. Keerti Chaudhary,

E-mail: keerti2406@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The incidence of maternal cardiac diseases has an adverse effect on pregnancy outcomes. The present study was done the objective to determine the Incidence and distribution of cardiac disease in pregnant patients, to assess mode of delivery and fetomaternal outcome in pregnancy with heart disease patients.

Methods: This was a hospital based prospective observational study that include 65 pregnant women with diagnosed cardiac disease or had symptoms and signs suggestive of cardiac disease during the period from January 2018 to December 2019. Baseline data recorded including age, parity, gestational age, cardiac lesions, New York heart association (NYHA) functional class, use of cardiac medications, thorough clinical examination including chest and cardiovascular auscultation, ECG and echocardiographic assessment of left and right ventricular systolic function. Fetomaternal outcome was analysed in the study.

Results: The mean age of the patients was 24.33 ± 2.93 years (ranging from 19-36 years). 34 patients (52.30%) were primigravida. Majority (58.46%) cases were from rural area. Majority patients (70.77%) are present between 37-40 weeks of gestational age. Most of patients had vaginal delivery (64.62%). 43 patients (66.15%) diagnosed with heart disease after pregnancy, while 22 patients (33.85%) are diagnosed before pregnancy for heart disease. Neonatal complications were seen in in 35.38% of patients. Cardiac complications were present in 40% of patients. Majority of fetal complications are in nonoperated patients (46.15%).

Conclusions: The management of pregnant women with cardiac diseases requires multidisciplinary approach to prevent morbidity and mortality. It is necessary to optimize healthcare facilities to obtain maximum maternal and fetal outcome.

Keywords: Cardiac diseases, Fetomaternal outcome, Pregnancy

INTRODUCTION

Worldwide, the frequency of pregnancy complicated by maternal heart disease does not appear to have changed over the years, with overall prevalence of less than 0.1 to 4%.¹

Cardiac disease in a pregnancy is a high-risk pregnancy which possess a significant challenge to an obstetrician. Cardiac disease in pregnancy is broadly divided into congenital and acquired. The acquired group includes

rheumatic heart disease (RHD), cardiomyopathies and ischemic heart disease. Of these, in developing countries rheumatic heart disease is the commonest type, whereas cardiomyopathies and congenital heart disease one more common in developed countries.² The congenital group include atrial septal defect (ASD), ventricular septal defect (VSD), tetralogy of Fallot (TOF), Patent ductus arteriosus (PDA), transposition of the great arteries (TGA) and Ebstein's anomaly. In India, RHD continues to be a major cause of cardiac illness in pregnancy.

Around 15-52% of cardiac abnormalities first diagnosed during routine antenatal check-ups or due to the signs and symptoms similar to physiological changes of pregnancy.³ Incidence of cardiac disease is reported in 1 to 4% of pregnancies in India.

The primary goal of care for the pregnant woman and her family when cardiac disease complicates the pregnancy is prevention of complications that may occur from the cardiac condition through performing a comprehensive assessment to identify individual needs for teaching, emotional support and physical care.

This is accomplished by education of the woman and husband; assessment of all systems involved on a routine basis; referral to appropriate nutritional, social and medical experts; and facilitation of patient participation in decisions. Early diagnoses, proper follow up and counselling are keys for reducing morbidity and mortality and this strategy requires a collaboration between obstetrician and cardiologists.⁴

The study was done with the objective to determine the Incidence and distribution of cardiac disease in pregnant patients, to assess mode of delivery and fetomaternal outcome in pregnancy with heart disease patients.

METHODS

This was a hospital based prospective observational study that include 65 pregnant women booked or non-booked, who were admitted in the department of obstetrics and gynecology PDRMC Hospital, RNT Medical College, Udaipur with diagnosed cardiac disease or had symptoms and signs suggestive of cardiac disease which were later confirmed by relevant investigations during the study period of January 2018 to November 2019 admitted and delivered during the study period of January 2018 to December 2019.

Inclusion criteria

Only those pregnant ladies with heart disease (CHD and RHD with valvular lesions) who were got admitted and delivered during the study period were included.

Exclusion criteria

Patients with associated medical disorders like diabetes mellitus, thyroid disease, pulmonary disease, renal disease, myocardial infarction (MI) and stroke were excluded from this study.

Apart from obstetric indications, women were hospitalized if they had overt symptoms and signs suggestive of worsening cardiac status, if they were in NYHA class III and IV irrespective of the period of gestation.

A pre tested semi structured proforma was used to collect the relevant information by interviewing, clinical examination of patients, relevant investigation and treatment for each case. Baseline data recorded including age, parity, gestational age, cardiac lesions, New York heart association (NYHA) functional class, use of cardiac medications, thorough clinical examination including chest and cardiovascular auscultation, ECG and echocardiographic assessment of left and right ventricular systolic function. Which will be confirmed on consultation of experts (physician, Cardiologist) by specific interventions. Fetal echocardiography was performed in patients with congenital heart disease (CHD) and in those who had received anticoagulants during pregnancy. The mode of delivery whether vaginal, use of instrumental or the caesarean will be decided as per needful management of patients. Heparin was discontinued at the onset of labor. All patients received antibiotics for prophylaxis against infective endocarditis during labor. They were kept in a propped-up position. Intermittent oxygen and analgesics were provided whenever needed. Following delivery, injection furosemide 20 mg was administered intravenously. Oxytocin was used for control of postpartum hemorrhage. Women who had been on anticoagulants were restarted on heparin within 4 h of vaginal delivery and 8 h of cesarean delivery. Oral anticoagulants were resumed and heparin discontinued when pro-thrombin time reached 1.5-2 times normal. Early ambulation was encouraged. Patients remained in hospital for 5-7 days postpartum. Maternal outcomes were analyzed on the basis of antepartum, intrapartum, postpartum new-onset or exacerbation of cardiac complications, postpartum complications. Neonatal outcome was studied.

Statistical analysis

Data were presented as Mean±SD. Statistical significance was accepted at the 95% confidence level (p=0.05). The Chi square test was applied.

RESULTS

The present study consisted of 65 pregnant patients during the study period of January 2018 to December 2019. (Table 1) presents demographic data of the patients. In our study, the mean age of the patients was 24.33±2.93 years (ranging from 19-36 years). Most commonly affected age group was 21-25 years (64.62%) followed by age group 26-30 years (23.08%). 34 patients (52.30%) were primigravida, while the 16 patients (24.62%) were gravida 2, remaining 15 cases (23.07%) were gravida 3 and more. Mean gestational age at delivery was 37.46±2.14 weeks. Majority patients (70.77%) are present between 37-40 weeks of gestational age. Majority (58.46%) cases were from rural area. Out of 65 patients, 27 patients (41.54%) were booked while 38 patients (58.46%) were unbooked. Most unbooked patients are from rural area. Most of patients had vaginal

delivery (64.62%) with spontaneous onset in 35 patients (53.85%) and induced in 07 cases (10.78%).

Table 1: Socio demographic details of study participants (n=65).

Variables	No. of patients	Percentage
Age groups (years)		
18-20	6	9.23
21-25	42	64.62
26-30	15	23.08
>30	2	3.07
Parity		
Primigravida	34	52.30
Gravida 2	16	24.62
Gravida 3 and more	15	23.07
Gestational age in weeks		
28-32	01	1.54
33-36	14	21.54
37-40	46	70.77
>40	04	6.15
Inhabitant		
Rural	38	58.46
Urban	27	41.53
Booking status		
Booked	27	41.54
Unbooked	38	58.46
Vaginal delivery		
Spontaneous	35	53.85
Induced	07	10.78
Caesarean section (LSCS)		
Elective	09	13.84
Emergency	14	21.54

Clinical findings of the study participants were shown in Table 2. 43 patients (66.15%) diagnosed with heart disease after pregnancy, while 22 patients (33.85%) are diagnosed before pregnancy for heart disease. Out of 65 cases of heart disease pregnancy, 16 patients under went cardiac surgery prior to pregnancy. Most of the patient in the study had acquired heart disease (RHD, 78.46%) distribution of valvular lesions among rheumatic heart disease cases (n=44) in the (Table 3). followed by congenital heart disease (21.54%). The most common congenital heart disease in the study population was ASD (50%). In this study, mitral stenosis is the predominant lesion 14 cases (31.82%) followed by mitral stenosis (MS) plus mitral regurgitation (MR) plus tricuspid regurgitation (TR) in 15.90%. Majority cases (44.62%) were NYHA class II.

Neonatal complications were seen in in 35.38% of patients. A total of 18 babies required NICU care including (7 IUGR+8 premature+3 birth asphyxia). 7 babies were IUGR, 12 babies are premature, 3 babies underwent birth asphyxia and 1 baby was still born

(MSL). Maternal complication was noticed in 40 patients (61.53%) (Table 4).

Table 2: Clinical observations in study participants (n=65).

Variables	No. of patients	Percentage
Time of diagnosis		
Before pregnancy	22	33.85
After pregnancy	43	66.15
Type of cardiac disease		
ASD	07	50
Congenital heart disease	14	21.54
VSD	05	35.71
Tetralogy of Fallot	01	7.1
Eisenmenger syndrome	01	7.14
Acquired heart disease	51	78.46
NYHA class		
I	21	32.31
II	29	44.62
III	11	16.92
IV	4	6.15

Table 3: Distribution of valvular lesions among rheumatic heart disease cases (n=44).

Cardiac lesions	No of patients	Percentage
MS	14	31.82
MR	5	11.36
MS+MR	4	9.09
MS+TR	4	9.09
MS+MR+TR	7	15.90
MS+MR+TR+PR	3	6.81
MS+MR+TR+AR	3	6.81
MS+AR	1	2.27
MS+TR+AR	1	2.27
MS+MR+AR	2	4.54
Total	44	100.0

Table 4: Fetal and maternal complications.

Complications	No. of patients	Percentage
Fetal complications		
IUGR	7	10.76
NICU admission	18	27.69
Prematurity	12	18.46
Birth asphyxia	03	4.62
Still birth	01	1.53
Maternal complications		
Present	40	61.53
Absent	25	38.46

Noncardiac complications were present in 35.38% of patients. Cardiac complications were present in 40% of patients (Table 5).

As given in Table 6, majority of maternal cardiac complications are seen in nonoperated patients (33.84%) as compared to operated patients (6.15%) and majority of fetal complications are in nonoperated patients (46.15%).

Table 5: Maternal cardiac and non-cardiac complications

Complications	No. of patients (n=65)			Percentage
	Antepartum	Intrapartum	Postpartum	
Non cardiac				
Anaemia	21	0	0	32.30
PIH	05	0	0	7.69
Abruption placentae	02	0	0	3.07
Preeclampsia	02	0	0	3.07
PROM	02	0	0	3.07
Fever	02	0	01	4.62
PPH	0	0	01	1.53
Wound dehiscence	0	0	02	3.07
Oligohydramnios	1	0	0	1.54
Preterm labor	0	12	02	18.46
Cardiac				
Severe PAH	5	0	0	7.69
CHF	01	01	02	6.15
Pulmonary edema	01	02	05	12.30
Peripartumcardiomyopathy	0	0	02	3.07
Arrhythmia (AF)	1	1	03	6.15
Maternal mortality	0	01	02	4.62

Table 6: Maternal complications in operated and non-operated patients.

Maternal complications	Operated	Non-operated	Total	P value
Peripartum cardio myopathies	0	2	2	0.289
PAH	1	4	5	0.438
Pulmonary edema	1	7	8	0.871
arrhythmia	2	2	4	0.525
CHF	0	4	4	0.396
Death	0	3	3	0.467
Neonatal				
IUGR	0	5	5	0.215
Prematurity	2	9	11	0.781
Birth asphyxia	1	2	3	0.586
NICU admission	5	13	18	0.334
Still birth	0	1	1	0.600

In the present study, out of 65 pregnant women with heart disease, 63.07% patients were already on cardiac medication and 36.92% patients were not on any cardiac medications. Most of fetal and neonatal complication (8 neonates, 12.31%) were in group of patients who were taking cardiac medication (Table 7).

Table 7: Comparison of fetomaternal complications with or without cardiac medications (n=49).

Complications	Medication		Total	P value
	Yes	No		
Fetal	6	2	8	0.805
Neonatal	9	6	15	0.848
Maternal	6	20	26	0.785
Total	14	35	49	-

DISCUSSION

Our study was conducted from January 2018 to December 2019 in PDRMC RNT Medical College. In this study total of 65 pregnant women with heart disease admitted and studied and the outcome was analyzed. Total number of pregnant patients with heart diseases delivered during the study period at our institute was 65 out of 30,000 deliveries. Incidence of heart disease in the study was 0.22%. Reason may be underreporting of the deliveries at periphery by Dais or other health personnel's and they remain undiagnosed. Similar findings were seen in the study conducted by Prasanna et al where the incidence of heart disease was 0.5%. Incidence of heart disease in pregnancy varies from 0.5-3%.⁵

In our study, the mean age of the patients was 24.33 years (ranging from 19-36 years). The age group 21-25 year is most commonly affected 64.62% (42 cases) followed by age group 26-30 years 23.08% (15 cases). In a study

conducted by Sayeeda et al it was reported that the mean age of the patients was 27.00 years (ranging from 18-35 years) and most (82%) belonged to age group 21-30 years.⁶

Out of 65 cases enrolled for the study, 52.30% patients (34 cases) were primigravida while the 24.62% patients (16) were gravida 2, remaining 23.07% cases (15) were gravida 3 and more. Trevino et al reported in their study that 62.5% patients were nulliparous.⁷ Sayeeda et al also showed in their study that most of the patients (46%) were primigravida.⁷

In our study population of 65 patients, mean gestational age at delivery was 37.46±2.14 weeks. In a study conducted by Aisha et al, it was reported that mean gestational age at delivery was 36.8±5.64 weeks. Maximum number of patients had term delivery i.e., 65.45%.⁸

In our study out of 65 cases, majority (38 cases, 58.46%) cases from rural area and 41.53% (27 cases) from urban area. Similar findings were seen in the study conducted by Pandey et al where out of 117 patients, 41.02% (48) from urban and 58.9% (69) from rural area.⁹

In our study, majority patients 58.46% (38 patients) were unbooked while 41.54% (27 patients) were booked. Similar findings were seen in the study conducted by Prasanna et al where 64% patients were unbooked and 36% patients were booked. Most of unbooked patients are from rural areas.⁵

In our study, majority of patients, 66.15% (43) diagnosed after pregnancy while 33.85% patients (22) are diagnosed before pregnancy for heart disease. Agrawal et al in their study cases of heart disease diagnosed before pregnancy were 27 (25%), and cases diagnosed during current pregnancy were 77 (71.2%) while 4 (3.7%) cases were diagnosed postpartum.¹⁰

In our study population, the most common congenital heart disease was ASD (7 cases, 50%) followed by VSD (5 cases, 35.71%), TOF (1 case, 7.14%) and Eisenmenger syndrome (1 case, 7.14%). Similar findings were seen in the study conducted by Joshi et al where in congenital lesions, atrial septal defect was present in 50% cases (3 cases).¹¹

In our study, mitral stenosis is the predominant lesion 13 cases (30.23%). Multiple valve involvement was seen in 21 patients (48.83%). In a study conducted by Konar et al it was reported that multiple cardiac lesions were present in 35.58% (100/281) pregnancies.¹² Agrawal et al reported that isolated mitral stenosis was seen in 27.7% patients (30 cases). Mixed valve involvement was seen in 12.9% patients (14 cases).¹⁰

In our study, majority patients were in NYHA class I and II (50 cases, 76.92%), 15 cases (23.07%) in NYHA class

III and IV. In our study NYHA grade III and IV most of patients were from rural (15.38%). Similar findings were seen in the study conducted by Sawhney et al where 77.4% patients were identified as NYHA class I & II and 22.6% were identified as NYHA class III-IV.¹³

In our study, most of patients had vaginal delivery (42 patients) 64.62% and caesarean section was done in (23 patients) 35.38%. These results were comparable to previous similar study by Konar et al where majority of the women 67% delivered vaginally and 33.0% women delivered by cesarean section because of obstetric reasons.¹²

In our study, out of 65 pregnant females the labour was of spontaneous in onset in (35 patients) 53.85% and induced in (07 cases) 10.78% because of obstetric reasons. In our study, caesarean section was done in 23 patients (35.38%) of which, 9 patients (13.84%) had elective caesarean and 14 patients (21.54%) had emergency caesarean section. Most common indication for c section was scar tenderness in 4 cases. This is consistent with Agarwal et al¹⁰

In our study of 65 pregnant cases of heart disease, live birth rate was 98%, abnormal neonatal events were reported in 35.38% (23) pregnancies. A total of 27.69% babies required NICU care, 10.76% babies were IUGR, 18.46% babies are premature, 4.62% babies under went birth asphyxia and 1.53% still born. Low birth weight noted in 29.23% babies. Prasanna et al showed in their study that 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.⁵

Out of 65 cases, 40 patients (61.53%) underwent maternal complications and in 25 cases (38.46%) no evidence of maternal complication. This was consistent with Joshi et al study.¹¹ In our study, majority of cases (32.30%) were anemic, 5 patients (7.69%) had PIH, 2 patients (3.07%) had abruptio placentae, 2 cases (3.07%) of preeclampsia, 2 (3.07%) case of PROM, 3 (4.62%) patients had fever, 1 case (1.53%) of PPH and 2 cases (3.07%) of wound dehiscence reported. This is consistent with Pandey et al.⁹

Out of 65 pregnancies, cardiac complications were present in 40% of patients. Out of which 15 required ICU care. Maternal cardiac complications include 7.69% cases of PAH, 6.15% cases of CHF, 12.30% cases of pulmonary edema, 2 cases of peripartum cardiomyopathy (3.07%), arrhythmia in 7.69% (5 cases), 4.62% cases of maternal mortality also noted. 4 cases of CHF had anemia and pulmonary edema also. All maternal mortalities are due to CHF. This is consistent with Pandey et al.⁹

Out of 65 cases of heart disease pregnancy, 24.62% (16) patients under went cardiac surgery prior to pregnancy. 15.38% (10) went for MVR, 1.54% (1) went for ASD

closure, 1.54% (1) went for VSD closure, and 6.15% (4) had BMV. Out of 16 cases of previous history of cardiac surgery, 14 cases due to RHD and 2 cases due to CHD. This is consistent with Sayeeda et al.⁵

In our study majority of fetomaternal complications are in nonoperated patients (fetal 46.15%, maternal 33.84%) as compared to operated patients (fetal 12.30%, maternal 6.15%). This is consistent with Bhatla et al.¹⁴

Most of fetal and neonatal complication (8 neonates, 12.31%) were in group of patients who were taking cardiac medication. Postulated reasons for the increased incidence of fetal and neonatal complication include hemodynamic compromise secondary to valvular stenosis, maternal arrhythmias and cardio active drugs including diuretics, digitalis and beta blockers, which have been associated with impairment of uterine blood flow. Most of maternal complication (20 patients, 30.77%) were in group of patients who were not taking any cardiac medication. These findings are consistent with Bhatla et al.¹⁴

CONCLUSION

In conclusion, the results of the present study suggest that management of the pregnant women with cardiac abnormalities should be multidisciplinary to enhance care for these patients. There is need for pre-pregnancy counseling, early diagnosis, correction of cardiac lesions where indicated, close surveillance during pregnancy and a team approach comprising of obstetricians, cardio logists, neonatologists and nursing personnel for a successful pregnancy outcome. It is mandatory to provide better health care facilities to rural and periphery areas for diagnosis and management and early referral in such pregnant to prevent morbidity and mortality.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. N.K.A.W, Mook V, Peters L. Severe cardiac disease in pregnancy, part 2: impact of congenital and acquired disease during pregnancy. Lippincott Williams and Wilkins. 2005;11:435-48.
2. Salam S, Mushtaq S, Mohi-udDin, Gul I, Ali A. Maternal and fetal outcome in pregnancy with heart disease in tertiary care hospital in India. *Int J Reprod Contracept Obstet Gynecol.* 2017;6:3947-51.
3. Pujitha KS, Sheela SR, Jyothi NS. A study of maternal and fetal outcome in cardiac disease in pregnancy at tertiary care center. *Int J Reprod Contracept Obstet Gynecol.* 2017;6:5095-8.
4. Ahmed N, Kausar H, Ali L, Rakhshinda. Fetomaternal outcome of pregnancy with Mitral stenosis. *Pak J Med Sci.* 2015;31(3):643-7.
5. Prasanna Kosuru ML, Aruna Kumari K. Clinical study of maternal and perinatal outcome in heart disease complicating pregnancy at tertiary referral center of Telangana State. *Int J Gynaecol.* 2018;8(2):46-54.
6. Sayeeda S, Fatima Wahid S, Begum F, Zaman MM. A Two Years Study on Pregnant Women with Cardiac Disease in a Tertiary Care Centre. *Bangladesh J Obstet Gynaecol.* 2008;23(1):8-14.
7. Treviño ER, Delgado GT, Navarro A. Perinatal outcomes in pregnant women with heart disease: Hospital General León experience. *Int J Reprod Contracept Obstet Gynecol.* 2019;8(1):54-8.
8. Khan DA, Sharma N, Kapoor M, Duwarah SG, Ahanthem SS. The Spectrum of Heart Disease in Pregnancy and its Outcome in Patients Visiting a Tertiary Care Centre of Northeastern: A Prospective Study. *J Clinical Diagnostic Res.* 2018;12(7):16-20.
9. Pandey K, Verma K, Gupta S, Jahan U, Kirti, Gupta P. study of pregnancy outcome in women with cardiac disease: a retrospective analysis. *Int J Reprod Contracept Obstet Gynecol.* 2016;5(10):3537-41.
10. Agrawal S, Agrawal A, Bhandari M, Siddiqui SS, Koonwar S. Critical analysis of all pregnancies with heart disease, misses and near misses over 1-year period along with expert group so as to optimize outcome and improve patient care – Need-based analysis. *Heart India.* 2019;7(2):55-62.
11. Joshi G, Joshi SC, Jha SK, Singh Y, Joshi A. Maternal heart disease and pregnancy outcome: Findings from a retrospective cohort in a tertiary care government hospital in Haldwani, Nainital. *Nig J Cardiol.* 2015;12(2):120-3.
12. Konar H, Chaudhuri S. Pregnancy Complicated by Maternal Heart Disease: A Review of 281 Women. *J Obstet Gynaecol India.* 2012;62(3):301-6.
13. Sawhney H, Aggarwal N, Suri V, Vasishta K, Sharma Y, Grover A. Maternal and perinatal outcome in rheumatic heart disease. *Int J Gynaecol Obstet.* 2003;9-14.
14. Bhatla N, Lal S, Behera G, Kriplani A, Mittal S, Agarwal N, Talwar KK. Cardiac disease in pregnancy. *Int J Gynaecol Obstet.* 2003;82(2):153-9.

Cite this article as: Chaudhary K, Sen S. Fetomaternal outcomes in pregnancy with different cardiac disease at a tertiary care center in Udaipur. *Int J Reprod Contracept Obstet Gynecol.* 2020;9:3983-8.