Cardiovascular disease in pregnancy and its outcome: A prospective study

Dipali Prasad[1], Ravi Vishnu Prasad[2], Manoj Kumar Choudhary[3], Kanchan Kumari[1]

[1]Department of OBG, IGIMS, Patna, Bihar, India, [2]Department of Cardiology, IGIMS, Patna, Bihar, India, [3]Department of General Medicine, IGIMS, Patna, Bihar, India

ABSTRACT

Introduction: Prevalence estimates place maternal heart illness anywhere from 0.3 to 3.5 percent. Up to 20.5% of all maternal deaths of non-obstetrical cause are attributable to cardiovascular disease. **Aim:** The aim of the study was the management of patients with the multidisciplinary approach to maternal cardiovascular disease and its influence on maternal and fetal outcomes in a tertiary care centre. **Objectives:** 1. To find out the prevalence and spectrum of heart disease in Pregnancy. 2. To find out the outcome of pregnancy with heart disease in a tertiary care centre. **Materials and Methods:** This prospective study of one year was done on pregnant with heart disease coming to the Obstetrics and Gynaecology department in collaboration with the cardiology department of IGIMS, Patna. A study was done on 65 pregnant with heart disease between the age group 20 to 35 years were compared to a control group of 65 pregnant women who were hospitalised during the same time period but did not have heart disease. All the pregnant women with heart disease were included in this study. Patients with medical disorders like Kidney disease, Liver disease, Pulmonary Disease, Diabetes Mellitus were excluded from the study. We used IBM's SPSS v23 to analyse the collected data. **Result:** Prevalence of heart disease in pregnancy was 5.8% in present study and mostly of RHD (62.5%), followed by corrected CHD (12.5%) and CHD (10.9%). Patients of NYHA Class I and II (58.5%), Class III (26.2%), and Class IV (15.4%). The mitral valve was most often impacted by RHD (35.3% of all cases), followed by the tricuspid valve (15.0%). Eight (1.1%) people had cardiac surgery for therapeutic reasons. Six percent of all corrective surgeries included closing an atrial septal defect (ASD). The most common kind of congenital abnormality was a ventricular septal defect (VSD, 3%), followed by atrial septal defect (ASD, 1.5%) and pulmonary ductal atresia (PDA, 1.5%). Patients with heart disease had a higher rate of MTP, emergency LSCS and instrumental births than the controls. Deaths during pregnancy were 4 (6.2%) with cardiac disease and no maternal mortality in control group and all belonged to NYHA Class 4 were anaemic. In patients with a left ventricular ejection fraction of 45% or below, death was high. Two women died intrapartum from RHD, and two died postpartum from Peripartum cardiomyopathy. There were significantly more incidences of low-birth-weight infants (36.4%) compared to the control group (p = 0.001). Cases had a statistically significant greater frequency of obstetric problems, as well as an increased risk of developing anaemia, hypertension, hypothyroidism, cholestasis, FGR, and GDM (p-value 0.017). Multiparity, severe valvular lesion, NYHA function class III or IV, arrhythmia, and low ejection fraction were associated with poor maternal outcome in the current study. **Conclusion:** Maternal morbidity and mortality due to heart disease can be reduced appreciably by antenatal care, early diagnosis, and management with the help of cardiologists and surgery in selected cases.

Keywords: Fetal outcome, maternal outcome, pregnancy, rheumatic heart disease

Introduction

Cardiology, obstetrics, and other medical specialists face a formidable obstacle in the one to three percent of pregnancies that are complicated by heart disease.[1]

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Table 1: Table for association between age group and parameters

Parameters	Age group			P
	<25 years (*n*=29)	25-35 years (*n*=33)	>35 years (*n*=3)	
Age (Years)***	22.17±1.69	28.73 ±3.01	36.00±00	<0.001[1]
Socioeconomic status				0.915[2]
Upper	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Middle				
Lower				
Parity				0.840[2]
G1	12 (41.4%)	16 (48.5%)	1 (33.3%)	
G2	17 (58.6%)	17 (51.5%)	2 (66.6%)	
POG				0.973[2]
Abortion	4 (13.8%)	3 (9.1%)	0 (0.0%)	
Preterm	4 (13.8%)	6 (18.2%)	0 (0.0%)	
Term Pregnancy	20 (69.0%)	23 (69.7%)	3 (100.0%)	
Post-Term Pregnancy	1 (3.4%)	1 (3.0%)	0 (0.0%)	

Table 2: Type of Heart Disease and New York Heart Association Classification

Type of Heart Disease	Group		Chi-Squared Test	
	Case	Total	χ^2	P
RHD	40 (62.5%)	40 (62.5%)	-	-
CHD	7 (10.9%)	7 (10.9%)		
Corrected CHD	8 (12.5%)	8 (12.5%)		
Cardiomyopathy	5 (7.8%)	5 (7.8%)		
Eisenmenger Syn	2 (3.1%)	2 (3.1%)		
Peripartum Cardiomyopathy	2 (3.1%)	2 (3.1%)		
Total	64 (100%)	64 (100%)		

NYHA Grade	Group		Chi-Squared Test	
	Case	Total	χ^2	P
I	8 (12.3%)	8 (12.3%)	-	-
II	30 (46.2%)	30 (46.2%)		
III	17 (26.2%)	17 (26.2%)		
IV	10 (15.4%)	10 (15.4%)		
Total	65 (100%)	65 (100%)		

Although the prevalence of rheumatic heart disease (RHD) has decreased significantly in industrialized countries, it remains high in low-income regions and is a leading cause of maternal morbidity and mortality.[2]

Seventy-five to eighty-two percent of infants are born with some kind of cardiac defect, and in 20% to 65% of these instances, shunt lesions predominate in Western world. Despite a downward trend, RHDs continue to account for between 56 and 89 percent of cardiovascular disease in pregnancy in developing countries like India.

Increases in both the incidence and prevalence of cardiovascular disease (both acquired and congenital) in pregnant women may be attributed to better diagnosis and treatment options.

Due to factors such as increasing maternal age at first pregnancy, growing rates of diabetes, hypertension, and obesity, and significant advancements in the management of congenital heart disease,[3-5] the incidence of heart disease during pregnancy has increased.

Heart disease is now the leading indirect cause of maternal mortality, accounting for 20.5% of such deaths.[5,6]

Several studies have looked at the possibility of estimating mortality and morbidity in pregnant women who suffer from cardiac disease. Significant usage of the CARPREG scoring system, developed by Siu *et al.*, for assessing pregnancy risk. This score was adequate for diagnosing congenital heart disease, VHD, myocardial disease, and arrhythmias, but it was useless for prosthetic heart valves, aortopathy, and pulmonary artery hypertension (PAH).

As a result, Silversides *et al.* developed CARPREG II, an expanded risk score. According to the pathology and severity of cardiac disease, many predictors (previous cardiac episodes or arrhythmias, baseline ejection fraction, and so on) are given a maximum of 3 points and a minimum of 1 point in the CARPREG II score: NYHA Class III/IV, cyanosis, mechanical valve, ventricular dysfunction, high-risk left-sided valve diseases/left ventricular outflow tract blockage, pulmonary arterial hypertension, coronary artery disease, late-pregnancy evaluation, and no previous cardiac intervention.

There are other risk assessments outside the ZAHARA score and the WHO reclassification.[7]

Maternal mortality may rise to as high as 7% when patients in NYHA Class III and IV are pooled together. Classes I and II have a combined mortality rate of 0.5%, which is much lower. Similarly, classes I and II have a 2% maternal death rate, whereas classes III and IV have a 30% maternal mortality rate. Poor heart function and an inability to adapt to the physiological changes of pregnancy, the stress of giving birth, and the hemodynamic abnormalities of the puerperium are to blame for the increased maternal morbidity and death.

Pregnancy outcomes for women with valvular heart disease have been the subject of very few research.[8] This is especially true in countries with lower per capita incomes.

Pregnancies affected by cardiac issues have varying rates of maternal and neonatal mortality and morbidity, depending on the nature of the illness, the patient's functional level, and the associated complications.[9,10] Heart failure, pulmonary edema, cardiac shock, arrhythmias, thrombosis, and even maternal death are all possible causes of maternal morbidity. Birth defects, such as those of the heart or lungs, may also be present throughout pregnancy and delivery.

The present research aims to assess the frequency, severity, and outcome of maternal cardiac disease in pregnancy in a tertiary care center in Northern Bihar in India.

This study emphasis the need of Emergency physician, general cardiologist, obstetrician must be vigilant to identify these patients, diagnose, initiate appropriate treatment, handle complications, and transfer when needed.

Aims and objectives

The aim of this multidisciplinary research is to learn more about how cardiovascular disease in mothers affects pregnancy and childbirth.

Objectives

1. To find out the prevalence of cardiac disease among expecting mothers.
2. To identify the spectrum of maternal cardiac disease.
3. To assess the outcomes of women with heart disease throughout their pregnancies.

Method

Between January 2020 and December 2020, pregnant women presenting to the Obstetrics and Gynaecology department at IGIMS, Patna, with heart illness were included in prospective hospital-based research. Women with heart illness who gave birth during the research period were included whether they were pregnant or puerperal. After being thoroughly informed about the study's purpose and procedures, all participants gave their informed consent. Following text has to be edited:

The study was passed from Institutional Ethics Committee, letter no 1740/IEC/2020/IGIMS dated 29/09/2020.

Women who met the inclusion criteria had either presented with symptoms or been previously diagnosed with heart disease during pregnancy or the puerperium, or had been found to have heart disease at a regular antenatal exam or had been treatment for heart disease in the past. Individuals with other diseases were not included; this included kidney disease, liver disease, lung disease, and heart failure from causes other than cardiovascular disease. A total of 65 pregnant or puerperium women with heart disease who gave birth during the research period were compared to a control group of 65 pregnant women who were hospitalized during the same time period but did not have heart disease. As part of a thorough prenatal evaluation, the mother and fetus' medical histories were recorded in detail. This included information about any previous cardiac surgeries or interventions, the nature of the heart lesion, the results of a full physical exam, and the presence of any comorbid conditions like anemia or diabetes.

Prenatal testing was performed on all women and included echocardiogram (ECG) and electrocardiogram (ECHO). Based on their symptoms, all patients were assigned a functional category in the New York Heart Association's categorization system. Prenatal care including regular checkups and hospital births were urged. Patients were monitored for the occurrence of cardiac problems such arrhythmias, heart failure, and atrial fibrillation. Preterm birth, fetal growth restriction, oligohydramnios, and its perinatal consequences—including stillbirth, premature delivery, low birthweight, and respiratory distress syndrome—are all examples of obstetrical problems. Findings were compared to the feto-maternal outcomes of a similar sample size of pregnancies in which the mother did not have heart disease.

Statistical analysis

MS Excel was used to encrypt and store all of the data. For this study, we used IBM's SPSS v23 to analyze the collected data. The descriptive statistics were provided as means, standard deviations, medians, and interquartile ranges for continuous variables, and as frequencies and percentages for categorical variables. The "t" test for independent samples was used to compare two groups using continuously distributed data. The Wilcoxon test and other appropriate nonparametric tests were used if the data did not follow a normal distribution. For doing in-depth comparisons between sets of category data, the Chi-square test was created. For more than 25% of the cells in the contingency tables, Fisher's exact test was used since the expected frequency was less than five. In order to examine the linear relationship between two continuous variables, we used both Pearson's correlation (if the data were normally distributed) and Spearman's correlation (for non-normally distributed data). Significant results were considered to be at the P 0.05 level.

Result

There were a total of 1,120 live births and abortions throughout the study period. The prevalence rate of cardiovascular disease in pregnancy was 5.8%. There were a total of 65 cases, with 27 (41.50%) being booked, 21 (32.30%) not being booked, and 17 (26.10%) being referred.

An extensive correlation ($P < 0.05$) was found between POG and the categorical variable "Group":

Ages ranged from 18 to 36 years in both the case and control groups. A mean (standard deviation) age (in years) of 26.14 (4.58 years) was observed in the Case group, whereas the corresponding value for the Control group was 25.58. (4.26).

POG has a very high correlation with the category "Group" ($P < 0.05$). Preterm births and abortions are more common in the case group (10.8% and 15.4%, respectively), whereas full-term and post-term births are more common in the control group.

Chi-square analysis of the association is among case, type of heart disease, and NYHA functional class [Table 1].

There were no statistically significant variations in the prevalence of any particular heart disease type or NYHA Class across the study groups (χ^2 = -, P = -).

RHD was the most common heart abnormality, occurring in 40 patients (62.5%), followed by corrected CHD 8 (12.5%) and CHD 7 (10.9%).

NYHA status

Cases were divided into four categories depending on their NYHA status. Patients were primarily divided into four groups: Class I and II (58.5%), Class III (26.2%), and Class IV (15.4%) [Table 2].

The various cardiac lesion patterns are shown in Table 3. The mitral valve was most often impacted by RHD (35.3% of all cases), followed by the tricuspid valve (15.0%). Eight (1.1%) people had had cardiac surgery for therapeutic reasons. Six

percent of all corrective surgeries included closing an atrial septal defect (ASD). The most common kind of congenital abnormality was a ventricular septal defect (VSD, 3%), followed by atrial septal defect (ASD, 1.5%) and pulmonary ductal atresia (PDA, 1.5%).

Delivery method distribution did not differ substantially between case and control groups (X^2 = 7.508, P = 0.180) [Table 4].

The correlation between the two variables is (Cramer's V) = 0.24 (Low Association).

No statistically significant link was found (P = 0.180) between the two groups in terms of mode of delivery method. Nonetheless, the patients had a higher rate of MTP, emergency LSCS, and instrumental births in cases than the controls did.

The correlation between "Group" and "Maternal" was examined using Fisher's exact test. Distributionally, maternal outcomes were significantly different between case and control groups (X^2 = 26.238, P = 0.001) [Table 5].

Deaths during pregnancy were (6.2%) more common among women with cardiac disease. For the comparison group, maternal mortality was not present. The four decedent mothers all belonged to NYHA Class 4, were anemic. In patients with a left ventricular ejection fraction of 45% or below, death was high. Two women died intrapartum from RHD, and two more died postpartum from peripartum cardiomyopathy.

Since more than 20% of cells were expected to have a count of less than 5, Fisher's exact test was used to look at the correlation between "group" and "fetal weight" [Table 6].

In terms of fetal weight, there was a statistically significant difference between the groups (χ^2 = 13.280, P = 0.001).

There were significantly more incidences of low-birth-weight infants (36.4%) compared to the control group (P = 0.001).

Fisher's exact test was used to look at the connection between "Group" and "Obstetrical Complication," where more than 20% of the total number of cells had an expected count of less than 5 [Table 7].

Table 3: The Proportion of Patients with Various Heart Lesions

Different types of Heart disease	Number (%)
RHD valvular lesion	
Mitral	23 (35.3%)
Aortic	7 (10.8%)
Tricuspid	10 (15.3%)
Pulmonary	0 (0)
Congenital Lesion	
VSD	2 (3%)
ASD	1 (1.5%)
PDA	1 (1.5%)
Ebstein anomaly	1 (1.5%)
Coarctation of aorta	1 (1.5%)
Tetralogy of fallot	1 (1.5%)
Corrected Cardiac lesion	
Post-ASD Closure	4 (6.1%)
Postmitral valve replacement	1 (1.5%)
Postmitral valvotomy	1 (1.5%)
Post-PDA Closure	1 (1.5%)
Post-VSD Closure	1 (1.5%)
Cardiomyopathy	5 (7.8%)
Eisenmenger syndrome	2 (3.1%)
Peripartum cardiomyopathy	2 (3.1%)

Table 4: Association Between 'Group' and 'Mode of Delivery'

Mode of Delivery	Group			Fisher's Exact Test	
	Case	Control	Total	χ^2	P
MTP	5 (7.8%)	0 (0.0%)	5 (3.9%)	7.508	0.180
Vaginal Delivery	33 (51.6%)	43 (66.2%)	76 (58.9%)		
Vaginal Delivery with Forceps	3 (4.7%)	3 (4.6%)	6 (4.7%)		
Vaginal Delivery with ventouse	3 (4.7%)	2 (3.15)	5 (3.9%)		
Elective LSCS	14 (21.9%)	14 (21.5%)	28 (21.7%)		
Emergency LSCS	6 (9.4%)	3 (4.6%)	9 (7.0%)		
Total	64 (100.0%)	65 (100.0%)	129 (100.0%)		

Table 5: The association Between Group and Maternal Outcome

Maternal Outcome	Group			Fisher's Exact Test	
	Case	Control	Total	χ^2	P
Good	41 (63.1%)	64 (98.5%)	105 (80.8%)	26.238	<0.001
ICU	19 (29.2%)	1 (1.5%)	20 (15.4%)		
Expired	4 (6.2%)	0 (100.0%)	4 (3.1%)		
LAMA	1 (1.5%)	0 (100.0%)	1 (0.8%)		
Total	65 (100.0%)	65 (100.0%)	130 (100.0%)		

Table 6: Membership and Fetal Weight Relationship

Fetal Weight	Group			Fisher's Exact Test	
	Case	Control	Total	χ^2	P
<500g	6 (10.9%)	0 (0.0%)	6 (5.0%)	13.280	<0.001
<2.5Kg	14 (25.5%)	7 (10.8%)	21 (17.5%)		
>2.5Kg	35 (63.6%)	58 (89.2%)	93 (77.5%)		
Total	55 (100.0%)	65 (100.0%)	120 (100.0%)		

Table7: Association Between 'Group' and 'Obstetrical Complication"

Obstetrical complication	Group			Fisher's Exact Test	
	Case	Control	Total	χ^2	P
Anaemia	13 (20.3%)	17 (26.2%)	30 (23.3%)	20.876	0.017
HDP	8 (12.5%)	3 (4.6%)	11 (8.5%)		
Hypothyroid	5 (7.8%)	0 (0.0%)	5 (3.9%)		
Cholestasis	4 (6.2%)	1 (1.5%)	5 (3.9%)		
FGR	4 (6.2%)	2 (3.1%)	6 (4.7%)		
GDM	2 (3.1%)	0 (0.0%)	2 (1.6%)		
Rh Negative	2 (3.1%)	2 (3.1%)	4 (1.3%)		
Oligohydramnios	2 (3.1%)	2 (3.1%)	4 (1.3%)		
PPH	1 (1.6%)	1 (1.5%)	2 (1.6%)		
Breech	2 (3.1%)	3 (4.6%)	5 (3.9%)		
Previous caesarean	10 (15.6%)	6 (9.2%)	16 (12.4%)		
NR	11 (17.2%)	28 (43.1%)	39 (30.2%)		
Total	64 (100.0%)	65 (100.0%)	129 (100.0%)		

Pregnancy complication was distributed differently among the groups ($\chi^2 = 20.876$, $P = 0.017$).

With a value of 0.40 for the coefficient of determination (Cramer's V), the two factors are highly correlated with one another (Moderate association).

Cases had a statistically significant greater frequency of obstetric problems, as well as an increased risk of developing anemia, hypertension, hypothyroidism, cholestasis, FGR, and GDM (*P* value 0.017).

Analysis of the correlation between "case" and "cardiac complication" was performed using the Chi-squared test [Table 8].

Table 8: Association Between the "Case" and "Cardiovascular Complication"

Cardiac complication	Group		Chi-Squared Test	
	Case	Total	χ^2	P
AF	1 (1.6%)	1 (1.6%)	-	-
CCF	3 (4.7%)	3 (4.7%)		
Cardiac Death	4 (6.2%)	4 (6.2%)		
Arrythmia	7 (10.9%)	7 (10.9%)		
Any Cardiac event	10 (15.6%)	10 (15.6%)		
No Any Cardiac event	39 (60.9%)	39 (60.9%)		
Total	64 (100.0%)	64 (100.0%)		

Table 9: Study Cohort variable predicted to have adverse effects

Predictors	Number of patients
Age	>30 years (15)
Parity	Nulliparous (29)
Prior adverse cardiac event -Heart failure, stroke, arrhythmia, NYHA-2	Arrhythmia (7)
Prior valvular intervention	7
Mitral stenosis <2cm	8
Multivalvular involvement	28
Eisenmenger's syndrome	2
Aortic valve <1.5cm	1
NYHA3/4	27
Atrial fibrillation	1
Heart Failure	3
Ejection fraction <40% peck ventricular out flow tract gradient >30mmhg of ECHO	5

In terms of the prevalence of cardiac complications, there was no statistically significant difference between the groups (χ^2 = -, *P* value = -).

Fifteen (23.4%) of the 65 participants in the current research suffered serious heart issues. Even though there were 65 pregnant patients with heart problems, four mothers unfortunately lost their lives. There were four total fatalities during pregnancy, three occurring in the third trimester and one in the postpartum period.

Multiparity, severe valvular lesion, NYHA function class III or IV, arrhythmia, and low ejection fraction were associated with poor maternal outcome in the current study [Table 9].

Discussion

There is now a larger population of women with heart illness who, because to advances in diagnosis and treatment, are able to reach reproductive age while still in good functional health. So, for some of these young women, having a child is a realistic option.

The current analysis found a greater frequency of heart illness in pregnancy (5.8%) than the previous study (4.3%; Salam S. *et al.*[11]).

Various research types indicate that between 0.3 and 3.5 percent of pregnancies have complications due to cardiovascular disease.

Researchers found that the average age of women with cardiovascular illness was 26.14 ± 4.58.[12] From what we know about these women's reproductive histories, we may deduce that (55.4%) of them are multigravida and (44.5%) are primigravida.[13]

The incidence of abortion (10.8%) and premature delivery (15.4%) is higher in the case group compared to the control group. Term and post-term delivery were more in control as compare to case.

RHD (62.5%) will be the most common cardiac lesion, followed by corrected CHD (12.5%) and CHD (10.9%).

As the majority of patients in developing countries are malnourished, lack sanitation and hygiene, lack access to health care, etc., the incidence of RHD has remained high for years. Improved health services, better antibiotic prophylaxis for streptococcal illness, a higher level of life, and enhanced diagnostic facilities have all contributed to a rise in the prevalence of corrected CHD compared to CHD following RHD. Women born with congenital heart problems now have a better chance than ever of reaching reproductive age and having healthy pregnancies because of better surgeries to correct these conditions in recent years. As ours is the only tertiary care center in the area, we see patients at all stages, even those who have already had corrective treatments here (as follow-up).

The mitral valve was the most often impacted valve in RHD, accounting for (35.3%) of cases. The tricuspid valve came in second, accounting for (15.3%). The most common valvular condition is mitral stenosis. Mitral stenosis is the most frequent lesion in RHD,[14] and many studies have shown that the mitral valve is the most usually afflicted valve.

Eight people (12.5%), in the present study had undergone corrected cardiac operation. ASD closure was the most common cardiac lesion to be treated (9.09%), correlating with previous research by both Dina Aisha Khan *et al.* (2018)[10] and Agrawal *et al.* (2022).[9]

There were (61%) vaginal deliveries and (31.3%) LSCS in this study. Instrumental vaginal deliveries occurred at a higher incidence (9.4%) when there was a reasonable effort to speed up the third stage of labor. Nonetheless, some studies have observed decreased rates of vaginal delivery (45.2%) and caesarean section (54.8%)[15] births.

One indicator of the efficacy of a healthcare system is the incidence of maternal mortality. Increased rates of heart illness among pregnant women have made it one of the leading causes of maternal mortality, especially in low-income countries. This study found that heart illness contributed to the deaths of (6.4%) of all mothers. According to research by Gnanaraj Justin Paul *et al.* (1.6%),[16] all pregnancy-related deaths were caused by heart-related diseases. As a result of our center's interdisciplinary approach and close monitoring of high-risk patients, fewer women are reportedly passing away from cardiac causes.

We found that all four mothers who tragically passed away belonged to NYHA Class 4 and were anemic based on our investigation.

Babies of women with heart disease were more likely to be born with a low birthweight (36.4%) compared to the control (25.5%). According to research by Bangal VB *et al.*,[12] LBW occurs in as much as (60%) of women with cardiovascular disease and (42%) of women without cardiovascular illness.

Variables like anemia, hypertensive disorder in pregnancy, fetal growth rate, and previous cesarean delivery may account for statistically significant variations in obstetrical issues between cases and controls. Arrhythmias (10.9%), cardiac mortality (6.2%), CCF (4.7%), and atrial fibrillation (1.6%) were all serious issues for 15 (23.4% of 65) patients in this study. Congestive heart failure is the most common cardiac event in different studies in India, affecting 14.5 percent of the population.[10] Palpitations during pregnancy are common. Arrhythmias may develop de novo during pregnancy or pregnancy may exacerbate existing arrhythmias, likely related to hormonal effects.[17]

Conclusion

Prenatal care, early diagnosis, and treatment with the support of a cardiologist and surgery may greatly reduce maternal morbidity and mortality due to heart disease in specific conditions. Recent developments in cardiology have raised hopes for improved outcomes for pregnant individuals with heart conditions now undergoing treatment. An organized strategy for labor and postpartum care cannot be developed without open lines of communication between team members for the purpose of issue prevention, early diagnosis, and treatment. Assemble all involved physicians for an initial multidisciplinary planning meeting. Risk factors, responsible family planning, and the best possible care for a patient's heart should all be discussed at length during a comprehensive preconception assessment that involves experts from several fields.

The strength of the study

The results of this research emphasize the importance of early identification and therapy in enhancing fetomaternal prognosis.

Limitations of the study

Due to its single-center nature, small sample size, and short time frame, the research has limitations. So, further study is needed to provide a complete picture of obstetric care's development.

Summary

The importance of training physicians and obstetricians working in peripheral centers is emphasized in the current study. This training is necessary to enhance their skills in prepregnancy counseling, providing regular antenatal care, ensuring timely referrals, and developing personalized risk scores and guidelines. These measures aim to enhance the feto-maternal outcomes for pregnant patients with heart disease.

Key messages

Prepregnancy counselling, cardio-obstetrics team approach, regular antenatal care, timely referrals and developing personalized risk scores and guidelines are the key pillar of management.

Conflicts of interest

There are no conflicts of interest.

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