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MATERNAL AND FETAL OUTCOME IN PREGNANCIES WITH CARDIAC DISEASES IN TERITIARY CARE CENTRE

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ABSTRACT:

Background: About 1% to 3% of pregnancies are complicated by heart disease. Heart disease is the main non-obstetric factor in maternal deaths. Congenital and acquired heart problems can be roughly categorized as affecting pregnant women.

Material and Methods: From July 2021 to July 2022, the study was carried out at the Government General Hospital at Guntur, Department of Obstetrics and Gynecology. The study looked at 100 cases of cardiac disease complicating pregnancy. 1.29 percent of the women who gave birth here had cardiac disease. Out of 100 women, 94 were admitted for safe confinement, 4 for a first trimester abortion, and 2 for an ectopic pregnancy that had ruptured. For the first time during pregnancy, cardiac disease was discovered in 33% of the women. RHD was observed in 19% of patients, MVP in 6%, and CHD in 7% of cases. In two cases, teenage pregnancies were associated with heart disease. In 53% of cases, rheumatic heart disease is present, while 44% of women had congenital heart disease.

Result: NYHA class I or II symptoms were present in 92 women . There were 25 cases of isolated MS. The most frequent congenital cardiac condition observed in 23 women was VSD. 18 cases involved ASD. In two cases, ASD with PHT is seen. 18 women had corrective cardiac surgery. Of these, 10 individuals had surgery for congenital heart disease; 8 of these patients had RHD surgery. 77 women delivered by vaginal route, 3 cases by assisted vaginal deliveries and 16 cases required a caesarian section. Three instances had intraoperative complications, while ten cases had postoperative complications. 11 infants were admitted to the NICU, and 19 of them were preterm. There were 3 Neonatal deaths, 9 received ventilatory support. There were 2 maternal deaths.

Conclusion: Favourable prognosis is noted in women with NIHA class I &II, Avoidance of factors precipitating heart failure like Anemia, Infections, Arrhythmias regular cardiac follow-up, strict adherence to cardiac medications, will improve the outcome

KEYWORDS: Maternal and fetal outcome, Pregnancy, cardiac diseases, tertiary care

INTRODUCTION Heart conditions that affect pregnant women can be broadly divided into congenital and acquired. Rheumatic heart disease, cardiomyopathies, and ischemic heart disease are among the acquired category. Rheumatic heart disease is most prevalent in acquired groups in developing nations, including India [1,2, 3]. Cardiomyopathies and ischemic heart disorders are widespread in affluent nations. Heart rate and stroke volume both increase during a typical pregnancy [4, 5]. Heart disease makes these changes even

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worse. Co-morbidities like pregnancy, anemia, and urinary tract infections add to the stress on the heart and exacerbate heart failure[6]. As a result, pregnant women with heart disease require thorough monitoring and follow-up. The complete cardiac and obstetric treatment has improved, allowing expectant mothers to give birth safely. Many of the earlier research were retrospective and limited series in nature. Women who were attending government hospital for safe confinement, pregnancy termination, and intensive care were the subjects of the study conducted over one year period.

MATERIALS AND METHODS

This prospective study on maternal and fetal out come in pregnancies with maternal cardiac diseases was done in the Department of Obstetrics and Gynecology, Govt. General Hospital, Guntur medical college, Guntur. This is a government referral centre for all the surrounding hospitals. The study was conducted over the period of one year from July 2021 to July 2022. All pregnant women diagnosed to have heart disease and admitted to the hospital for either safe confinement or termination of pregnancy, any cardiac complications were included in the study. Pregnant women with heart disease and labor pain admitted through casualty are also included.

INCLUSION CRITERIA

- All patients with heart disease complicating pregnancy irrespective of gestational age– without any other medical illness.
- Pregnant women diagnosed to have cardiac disease during hospital stay.

EXCLUSION CRITERIA

- Pregnant patients with associated medical illness like anemia, PIH, chronic kidney disease, GDM are excluded from the study.
- Those who did not give consent for the study.

Pregnant women with cardiac disease in NYHA class I and II are admitted at 36 weeks of gestation. NYHA class III and IV are admitted to hospital at once the diagnosis is made. Cardiac symptoms if arise at any period of gestation are admitted immediately and intensive care is given to such patients. Conditions precipitating heart failure like anemia, infections, preeclampsia should be treated promptly. Drugs taken by cardiac patients should be revised and cardiology opinion to be obtained. Penicillin prophylaxisis given in RHD. Inj. Ampicillin (50mg/kg) and Inj. Gentamycin (3mg/kg) are given for infective endocarditis prophylaxis

Caesarean delivery is done for obstetric indications. Few cardiac indications for LSCS are pulmonary hypertension, Eisenmenger syndrome, Coarctation of aorta. During labour, patient is kept in bed in propped up position, nasal oxygen administered. IE prophylaxis if needed is administered. Strict monitoring of vital signs, restriction of IV fluids, cardiac drugs to be continued in intrapartum period when needed. Second stage of labour is curtailed by applying outlet forceps with liberal episiotomy. Episiotomy wound is sutured in layers. In the postpartum period patient is monitored for PPH, pulmonary edema, LRI and special precautions are taken to prevent these complications. Cardiologist review should also be obtained in postpartum period. Breast feeding should be started as early as

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possible. Babies are examined by pediatrician. All new born babies are immunized as per national schedule.

OBSTETRIC OUTCOME

Obstetric complications observed in mother are missed abortion, incomplete abortion, preterm labour, one maternal death due to atrial fibrillation with embolic manifestation. Otherwise, women are delivered by normal labour, Lscs or by assisted vaginal delivery .

CARDIAC OUTCOME

Cardiac complications observed are pulmonary edema, intra of fall in saturation, sudden worsening of NYHA grade or sudden cardiac arrest and cardiac death .

NEONATAL OUTCOME

Neonatal outcomes observed are low birth weight, preterm birth, small for gestating, IUGR, large for gestation, baby with single umbilical artery, respiratory distress syndrome. These babies require admission to NICU. Postnatal women who delivered are counseled for adapting any of the available forms of contraception and also the risks involved in future pregnancies should be explained to the patient and her partner, which is most important. Birth spacing for a minimum of three years should be advised for primigravida mothers. Puerperal sterilization is advised for the women who have completed their families. In women in whom PS could not be done, vasectomy is advised to their spouse. In the women who have not completed their family or in whom sterilization procedures could not be carried out IUCDs are inserted under strict aseptic precautions with infective endocarditis prophylaxis .

RESULTS

This study was conducted in the Department of Obstetrics and Gynaecology, Government general hospital, Guntur for a period of one year from July 2021 to July 2022. A total number of 100 pregnant women with heart disease were included in the study.

TABLE 1: OBSTETRIC CODE

	Frequency	**Percentage**
Primi	51	51.0%
Multi	49	49.0%
Total	100	100

Among the 100 pregnant women with heart disease admitted to the hospital 51 were Primi gravida and multigravida were 49 in numbers. Prevalence of heart disease in our hospitalis 1.29%.

T**ABLE2:SOCIO-ECONOMIC STATUS**

	Frequency	**Percentage**
III	48	48.0%
IV	52	52.0%
Total	100	100

In our study 48 pregnant women belongs to socioeconomic class III and 52 pregnant

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women comes under socioeconomic class IV. Distribution of women as per socioeconomic status 52% in class III and 48% in classIV.

TABLE 3: PREVIOUS MODE OF DELIVERY

	Frequency	Percentage
Abortion	6	12.24%
FTND	36	73.4%
LSCS	7	14.28%
Total	49	100

In this study, 36 pregnant women had previous full term vaginall delivery and caesarian section was performed in 7 cases. 6 pregnant women admitted to the hospital with cardiac disease underwent D&C for abortion. Remaining 51 cases are Primi gravida

TABLE 4: GESTATIONAL AGE

	Frequency	Percentage
First Trimester	6	6.0%
Preterm	19	19.0%
Term	74	74.0%
Postdated	1	1.0%
Total	100	100

Gestational age in the pregnant women at the time of admission to the hospital was studied: 74% of the patients belong to term gestation. Preterm labour 19% of the cases and first trimester abortion occurred in 6%.1 women with heart disease was referred to our hospital as postdated.

TABLE 5: NYHA GRADING

	Frequency	Percentage
I	56	56.0%
II	36	36.0%
III	8	8.0%
Total	100	100

The cardiac functional status of the pregnant women with heart disease at the time of admission to the hospital was studied: Most of the patients have stable cardiac status and they fall under class I-56%. 36% of the pregnant women belong to NYHA class II and 8% of the cases belong to NYHA class III at the time of admission.

TABLE 6: TYPE OF HEART DISEASE

	Frequency	Percentage
CHD	44	44.0%
MVP	03	3.0%

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RHD	53	53.0%
Total	100	100

Echocardiography helps in diagnosing heart disease in pregnant women. About 53% of the women had rheumatic heart disease and 44%had congenital heart disease. Mitral valve prolapse is seen in 3% of the cases and is mostly an incidental finding during ECHO study.

About 27 pregnant women were found to have heart disease during the antenatal period, 3 cases diagnosed during the postnatal period. Among this postnatal cases1 women found to have VSD with eisenmenger syndrome and she was started on T. digoxin, T. bosentan.1 women was diagnosed as having heart disease during intraoperative period and ECHO confirmed diagnosis in the postoperative period as RHD-MS.

TABLE 7: SURGERIES

In 100 cases about 18 pregnant women underwent cardiac surgery and 1 woman diagnosed as a case of ASD is planned for ASD closure after delivery. Various types of surgical corrections underwent are as follows:

Corrective Procedure	**No. of women**	**Percentage**
Mitral valve replacement	1	5.55%
ASD Closure	8	44.44%
VSD Closure	9	50.0%
PDA ligation	1	5.55%
Total	18	100

TABLE 8: MODE OF DELIVERY

Among 100 pregnant women 6 cases were admitted during their first trimester with complaints such as bleeding per vaginum, ultrasound finding of missed abortion and manual vacuum aspiration with check curettage is done for such cases. Among the remaining 96 cases, caesarian section was performed in 16 women including both elective and emergency procedures. Pregnant women admitted to the labour ward with adequate cervical dilatation and satisfactory progress of labour with stable cardiac status isa llowed a natural course of labour. 2 Cases underwent laprotomy for ruptured ectopic and 1 case underwent hysterotomy for failed medical termination of pregnancy

	Frequency	**Percentage**
Assisted vaginal delivery	3	3.125%
Elective	9	9.375%
Emergency	7	7.29%
Labour normal	74	77.08%
Hysterotomy	1	1.04%
Laprotomy	2	2.08%
Total	96	100

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CAESARIAN SECTION

Caesarian section in pregnant women with cardiac disease was performed mainly due to obstetric indications. Of the 94 deliveries 16 cases underwent caesarian section, 9 cases underwent elective LSCS and emergency LSCS was done in 7 cases.

TABLE 9: LSCS

Type	Number	Percentage
Elective	9	56.25%
Emergency	7	43.75%
Total	16	100

Indications for LSCS

In emergency caesarian section performed the most common indication is failed induction followed by CPD. Twins and breech with long period of secondary infertility and fetal distress in 1casefor which LSCS was done.

TABLE 10: TYPE OF ANESTHESIA

Spinal anesthesia was administered to 62.5% of the cases and general anesthesia was given to 12.5% of cases. About 6 cases were admitted in the first trimester with missed abortion, in complete abortion and IV sedation was administered to them

	Frequency	Percentage
GA	3	12.5%
IV sedation	6	25.0%
Spinal	15	62.5%
Total	24	100

TABLE 11: ANESTHESIA COMPLICATIONS

Various types of anesthesia were administered to 2 4 cases and anesthesia complications occurred in 3 cases.

Type of Complication	Number of Cases
Fall in SPO2	1
Pulmonary edema	2
Total	3

TABLE 12: POSTOPERATIVE COMPLICATIONS

Pregnant women with heart disease delivered should be monitored vigorously in the immediate postnatal period. Strict vitals monitoring, maintaining intake output chart, administering antibiotics, nasal oxygen were given. Cardiologist review should be obtained postnatally and if the patient was on cardiac drugs, it should be continued.

Complications	Number of Patients
LRI	3
Pulmonary edema	3

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Dyspnea	2
Pulmonary embolism	2
Total	10

In the immediate postop period, 2 women having MS with atrial fibrillation developed pulmonary embolism and expired of sudden cardio respiratory arrest and pulmonary edema developed in 3 cases.

TABLE 13: DURATION OF STAY IN ICU

Cardiac patients with NYHA grade 3 or 4, Severe MS with atrial fibrillation, AS, uncorrected cyanotic heart disease requires intensive care. Women in the postnatal period also require intensive care since they can develop cardiac failure. About 78% of the cases were observed for 24 to 48hours.

	Frequency	**Percentage**
<24hrs	7	7.0%
24 -48hrs	78	78.0%
48 -72hrs	6	6.0%
>72hrs	9	9.0%
Total	100	100

Patients diagnosed to have MS with pulmonary hypertension; MS with atrial fibrillation requires a longer period of ICU stay.

TABLE 14: NEED FOR VENTILLATORY SUPPORT

Out of 100 pregnant women studied, 9 cases required ventilator care. Most of the cardiac patients were connected to elective ventilator support. 5 cases of MS with PHT were put on ventilation. 2 cases diagnosed to have mitral stenosis with atrial fibrillation were connected to ventilator. Cases that were put on elective mechanical ventilation are mostly weaned in 24 hours.

	Frequency	**Percentage**
No	91	91.0%
Yes	9	9.0%
Total	100	100

TABLE 15: NEONATAL OUTCOME

The Pregnancy outcome in 100 patients was studied. 6 patients were admitted for first trimester miscarriage. Of the remaining 94 cases preterm birth occurred in20.21%, Term delivery in 78.72% of the cases, 1.06 % of the baby was delivered after completion of 40 weeks of gestation.

	Frequency	**Percentage**
Post term	1	1.06%

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Preterm	19	20.21%
Term	74	78.72%
Total	94	100.0

TABLE 16: NICU ADMISSION

Neonate born to pregnant mothers complicated by heart disease requiring NICU care was studied in detail. Out of the 94 babies born 11 required admissions to the NICU. These babies were screened for heart disease by performing ECHO. In our study, the screening for the heart disease is negative for these babies.

	Frequency	**Percentage**
No	83	88.29%
Yes	11	11.70%
Total	94	100.0

DISCUSSION

The most frequent non-obstetric cause of maternal morbidity and mortality is heart disease. It significantly affects neonatal outcomes as well. This study reflects thematernal and fetal outcomes in women with heart disease treated in our hospital.

The rate of heart disease that was found to be prevalent among the pregnant women who attended this facility was 1.29% [8,9,10]. Sahni G, et al, studied have found a frequency anywhere from 0.3 to 3.5% [11,12,13,14]. The prevalence rate may not accurately reflect that of the overall community due to the fact that this is a referral centre.

The prevalence of heart disease among pregnant women was as follows in various studies:

Name of the study	**Year**	**Prevalence (%)**
Mahesh K[15]	1995-2006	1.52
Suman P[16]	2012	4.3
Nagamani G[17]	2013-14	1.2
Ashwini M[18]	2004-13	0.4
Indira I[19]	2006-07	0.43
Our study	2021-22	1.29

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According to Drenthen, W, this study similar to several other Indian studies. In western studies, congenital heart disease was the commonest type [20]. About 8 women with RHD had underwent surgical treatment, valve replacement was done in 1 case, combined valve replacement performed in 1 case. Severity of the stenosis was correlated with higher NYHA functional class [21].

ANTENATAL CARE

All pregnant women with heart disease were booked case. w33% (n=33) of the women were diagnosed to have heart disease for first time during the current pregnancy. The commonest age group distribution was 26– 30 (n=69 69%).

HEART DISEASE

The commonest type of heart disease is RHD (n=53 ,53%) which is similar to other Indian studies [22]. Among these, mitral stenosis was the most common type. Isolated MS was noted in 47.16% of the cases (n=19). This study similar to several other Indian studies [23,24]. In western studies, congenital heart disease was the commonest type. About 8 women with RHD had underwent surgical treatment, valve replacement was done in 1 case, combined valve replacement performed in one case.

Congenital heart disease was seen in 44 cases (44%), commonest type being ventricular septal defect, which includes 23 cases. Atrial septal defect was identified in18 cases, 2 cases of ASD with pulmonary hypertension, were also included in our study. Ashwini M & Gayatridevi J conducted a study and found that 40% had undergone surgical correction of which one fourth were done during pregnancy[25]. In our study one women diagnosed to have ASD was planned for surgical closure after delivery. VSD withEisenmenger's syndrome was seen in one case which was diagnosed in the immediate postnatal period [26].

Maternal death was seen in 2 cases – one case with severe MS with eisenmengers syndrome

In the immediate postop period, Another patient developed pulmonary embolism and died of sudden cardio respiratory arrest.

NYHA CLASS

Majority of the women included in our study were admitted with NYHA Class I (n=56, 56%) and Class II (n=36, 36%). About 8% of the women belong to NYHA class III[26]. Cardiac status based on NYHA functional classification was an independent predictor of cardiac event ina Canadian multicenter study by Sameul C, Siu etal[27].

CARDIAC COMPLICATIONS

Three women developed intraoperative cardiac complication. 2 women developed intraoperative pulmonary edema and 1 case had intraoperative fall in spo2. Postop complications were noted in 10 cases. Pulmonary edema seen in 3 cases, LRI developed in 3 cases, dyspnea in 2 cases and pulmonary embolism in 2 cases. Pulmonary edema was the common complication in many studies [27].

NEONATAL COMPLICATIONS

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Maternal cardiac disease was associated with an increased risk of neonatal complications . In cardiac mothers, there is increased incidence of Low birth weight babies [28]. Placental insufficiency usage of drugs like beta blockers are associated with increased incidence of IUGR/Low birth weight babies.

Mahesh Koregol et al conducted a study and found that the rate of NICU admission was 30.1%[29].

3 babies delivered by forceps were observed in NICU. 3 babies were admitted for getting IV antibiotics.

COMPARISION WITH OTHER STUDIES

The various important results calculated from this study are compared with that of other studies in the following table:

Parameter	Our study	Mahesh	Suman P	Nagamani	Ashwini	Indira
Reference		(15)	(16)	(17)	(18)	(22)
Prevalence	1.08	1.52	4.3	1.2	0.4	0.43
% Gravida	I, 52.0	I, 52.72	I, 57	II, 45	I, 56.7	I, 42
% RHD	56.0	86.44	70.10	60	66.7	80
% MS	61.40	62.75	60.30	54	89.74	91.67
% CHD	29.0	13.56	9.28	40	33.3	18.33
% Neonatal deaths	0	2.9	0	5.0	1.67	0
% Maternal deaths	1.0	3.6	3.09	5.0	3.3	6.6

CONCLUSION

It is recommended that pregnant women with heart problems schedule frequent prenatal appointments. Corrective surgeries during pregnancy should be carried out in the second trimester if necessary, but there is a high risk to the foetus. The cardiologist should check any cardiac medications given before becoming pregnant. Preferably, delivery should take place in a tertiary care facility with a multidisciplinary approach. To detect hereditary cardiac conditions in newborns, foetal ECHO is conducted about 20 weeks of gestation. There is no doubt that using a consistent treatment strategy and providing universal access to obstetric and cardiac care will enhance the outcomes for women with heart disease.

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DECLARATIONS:

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Taken.

Consent for publication:

All the authors approved the manuscript for publication.

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All required data is available.

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