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Maternal And Fetal Outcomes In Pregnant Women With Cardiac Disease At A Tertiary Care Centre: A Retrospective Study

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Abstract
Background: Cardiac disease during pregnancy remains a major concern for maternal and fetal health. It contributes significantly to morbidity and mortality, especially in developing regions where rheumatic heart disease (RHD) is prevalent. The physiological changes in pregnancy impose additional strain on the cardiovascular system, leading to potential complications. The aim of this study was to analyze the maternal and fetal outcomes in pregnant women with cardiac disease, identifying risk factors and potential management strategies to improve prognosis.
Methods: This study evaluates maternal and fetal outcomes in pregnant women with cardiac disease based on a retrospective analysis of 210 cases. Data were collected from hospital records of tertiary care centers. The study included demographic information, cardiac lesion types, maternal complications, mode of delivery, and fetal outcomes. The New York Heart Association (NYHA) classification was utilized for functional assessment.
Results: The majority of patients (58%) were classified under NYHA Class I & II, while 42% were in Class III & IV. RHD was the predominant cardiac condition (76.2%), with mitral stenosis and mitral regurgitation being the most common lesions. Maternal complications included anemia (45%, p=0.03), congestive cardiac failure (21%, p=0.02), and preeclampsia (18%, p=0.04). ICU admission was required in 12.3% of cases, and maternal mortality was 3.8% (p=0.01). Vaginal delivery was the most common mode (64.3%, p=0.05), followed by cesarean section (30.5%). Preterm birth occurred in 14.8% of cases (p=0.02), with 25.7% of neonates requiring NICU admission (p=0.03). Perinatal mortality was recorded at 6.2% (p=0.04).
Conclusion: Pregnancy in women with cardiac disease is a high-risk condition that demands a multidisciplinary approach for optimal outcomes. Early diagnosis, structured antenatal care, and timely interventions can significantly reduce maternal and fetal complications. Further research is needed to refine management strategies and improve prognoses in high-risk pregnancies.

Keywords: Cardiac disease in pregnancy, Rheumatic heart disease, NYHA classification, Maternal morbidity, Fetal outcomes, Socio-economic impact, Retrospective study.

Introduction: Cardiac disease is a significant contributor to maternal and fetal morbidity and mortality worldwide, particularly in low- and middle-income countries. The cardiovascular system undergoes profound changes during pregnancy, including a 30–50% increase in cardiac output, increased blood volume, and reduced systemic vascular resistance.[1] these physiological adaptations can exacerbate underlying cardiac conditions, leading to potentially life-threatening complications for

both mother and fetus. In developing countries, rheumatic heart disease (RHD) remains the most prevalent cardiac condition among pregnant women, largely due to inadequate healthcare access and late diagnosis[2]. Conversely, in high-income nations, congenital heart disease (CHD) is the leading cause of maternal cardiac morbidity due to improved survival rates following pediatric interventions.[3] Studies have demonstrated that pregnant women classified as NYHA Class III or IV have significantly increased risks of adverse outcomes, including preterm birth, neonatal intensive care unit (NICU) admissions, and maternal mortality[5].

Despite advances in cardiac care, the burden of heart disease in pregnancy remains high, emphasizing the need for a multidisciplinary management approach involving obstetricians, cardiologists, and neonatologists. The American College of Obstetricians and Gynecologists (ACOG) and the European Society of Cardiology (ESC) recommend comprehensive preconception counseling and risk stratification to improve outcomes[4]. Additionally, balloon mitral valvotomy (BMV) has been identified as a beneficial intervention in cases of severe mitral stenosis during pregnancy, reducing the risk of decompensation[6].The presence of cardiac disease in pregnancy presents a unique challenge, necessitating specialized care from a multidisciplinary team that includes obstetricians, cardiologists, and neonatologists.

In developing countries, RHD remains the leading cause of heart disease in pregnancy, whereas congenital heart disease (CHD) is more prevalent in developed nations[3]. Studies have shown that pregnant women with NYHA Class III and IV disease have significantly higher rates of adverse outcomes, including preterm birth, NICU admissions, and maternal mortality[7]. Despite advances in medical management, the burden of cardiac disease in pregnancy remains substantial, necessitating comprehensive antenatal surveillance and timely intervention.

The primary objective of this study is to evaluate maternal and fetal outcomes in pregnant women with cardiac disease at a tertiary care center. Specifically, we aim to determine the impact of different cardiac conditions on pregnancy, compare the effectiveness of various treatment strategies, and assess the influence of socio-economic factors on prognosis. By comparing our findings with existing literature, we hope to contribute to the growing body of knowledge on optimizing care for this high-risk patient population.

Materials and Methods: A retrospective study was conducted on 210 pregnant women diagnosed with cardiac disease at tertiary care hospital of more than one year. The data included patient demographics, type of cardiac lesion, maternal complications, mode of delivery, and fetal outcomes. The New York Heart Association (NYHA) classification was used to assess cardiac function. Data were extracted from hospital records and analyzed for trends in maternal and fetal outcomes. To evaluate the prevalence and impact of cardiac disease on maternal and fetal outcomes. Statistical analysis was performed using SPSS software. Descriptive statistics, including mean, standard deviation, and percentages, were used. Categorical variables were analyzed using the chi-square test, and continuous variables were compared using an independent t-test. A p-value of <0.05 was considered statistically significant.

Results

The results of this study highlight significant maternal and fetal outcomes in pregnant women with cardiac disease, particularly among those with severe forms of heart disease. Rheumatic Heart Disease (RHD) was found to be the most common cardiac condition, affecting 76.2% of cases (Table 1), with Mitral Stenosis with Mitral Regurgitation being the most prevalent lesion (Table 1). The majority of women were aged 23-29 years, though age did not appear to significantly influence outcomes (p-value = 0.06, Table 1).

Maternal outcomes were significantly affected by the severity of cardiac disease, as categorized by the NYHA classification (Table 2). Women in NYHA Class III and IV experienced significantly worse outcomes, including higher rates of ICU admission (12.3%, p-value = 0.01) and maternal mortality (3.8%, p-value = 0.01) compared to those in NYHA Class I and II (Table 2). Maternal

complications were common, with anemia (45%, p-value = 0.03), congestive cardiac failure (21%, p-value = 0.02), and preeclampsia (18%, p-value = 0.04) being observed in a significant proportion of cases (Table 2). These findings suggest that the severity of cardiac disease is strongly associated with adverse maternal health outcomes.

The mode of delivery was also influenced by the maternal cardiac condition, with the majority of women undergoing vaginal delivery (64.3%, p-value = 0.05), though a notable proportion required cesarean sections (30.5%, Table 3). This was largely due to obstetric indications rather than cardiac factors. There was no statistically significant association between delivery mode and cardiac disease severity (p-values > 0.05, Table 3).

Fetal outcomes were similarly affected by maternal cardiac disease. Preterm birth occurred in 14.8% of cases (p-value = 0.02, Table 4), and NICU admissions were required for 25.7% of newborns (p-value = 0.03, Table 4). Additionally, perinatal mortality was recorded at 6.2% (p-value = 0.04, Table 4). These results shows the increased risk for adverse fetal outcomes in pregnancies complicated by maternal cardiac disease.

Socio-economic factors (Table 5) also played a significant role in the outcomes. Women from lower socio-economic backgrounds experienced higher rates of maternal complications (p-value = 0.03) and preterm birth (p-value = 0.04). Additionally, the data revealed that access to timely medical care was significantly associated with improved outcomes, as women from higher socio-economic groups tended to receive more consistent prenatal care and early interventions (p-value = 0.02). These findings suggest that socio-economic status is an important factor influencing both maternal and fetal health in pregnancies complicated by cardiac disease.

Table1: The demographic distribution and types of cardiac conditions: the majority of cases involved women aged 23-29 years, with rhd being the most frequently diagnosed condition. mitral stenosis with mitral regurgitation was the most common lesion observed.

Parameter	**Finding**	**Cases**	**p-value**
Age Range	23-29 years (59.5%)	**125**	0.06
Most Common Cardiac Condition	Rheumatic Heart Disease (76.2%)	**160**	0.04
Most Common Cardiac Lesion	Mitral Stenosis with Mitral Regurgitation	**90**	0.03

Table2: Maternal health complications and severity based on NYHA classification. Women in NYHA Class III and IV had significantly worse outcomes, including higher ICU admission and maternal mortality rates.

Parameter	**Finding**	**Cases**	**p-value**
NYHA Class I & II	58%	122	0.05
NYHA Class III & IV	42%	88	0.02
Maternal Complications	Anemia (45%),	95	0.03
	Congestive Cardiac Failure (21%),	44	0.02
	Preeclampsia (18%)	38	0.04
ICU Admission	12.3%	26	0.01
Maternal Mortality	3.8%	8	0.01

Table3: Delivery modes and frequency of interventions, The majority of patients had vaginal deliveries, while cesarean sections were performed primarily for obstetric indications.

Parameter	**Finding**	**Cases**	**p-value**
Vaginal Delivery	64.3%	135	0.05
Cesarean Section	30.5%	64	0.06
Instrumental Delivery	5.2%	11	0.08

Table4: Neonatal health indicators and complications.

Parameter	Finding	Cases	p-value
Preterm Birth	14.8%	31	0.02
NICU Admission	25.7%	54	0.03
Perinatal Mortality	6.2%	13	0.04
Intrauterine Fetal Demise	2.9%	06	0.05
Small-for-Gestational-Age Infants	14.3%	30	0.06

Table5: Socio economic factors and prognosis.

Parameter	Finding	Cases
Access to Tertiary Care	70% had access	147
Income Level (Low-Middle)	68%	143
Education Level (Primary or Lower)	54%	113
Awareness of Cardiac Condition Before Pregnancy	46%	97

Discussion This study highlights that RHD remains a predominant cardiac condition affecting pregnancy, despite advances in medical management. The findings align with previous studies, reinforcing that maternal and fetal morbidity is significantly higher in unbooked cases and those with NYHA Class III/IV status. Early diagnosis, multidisciplinary management, and optimized antenatal care can improve pregnancy outcomes. The role of balloon mitral valvotomy (BMV) in severe MS cases is also emphasized as a beneficial intervention to mitigate complications.

Several studies corroborate our findings. Roos-Hesselink et al[4]. (2013) found that maternal morbidity is significantly increased in women with NYHA Class III/IV conditions. Pandey et al[5]. (2016) and Naik et al[6]. (2022) reported similar trends in maternal and fetal complications, emphasizing the need for specialized care. Bansode et al. (2010) highlighted the increased risks associated with cardiac failure and arrhythmia, findings that align with our study's data on ICU admissions and mortality rates. Additionally, socio-economic disparities in healthcare access were identified as a major contributing factor to worsened outcomes, as also discussed by Khanna et al[7]. (2021).

Conclusion Pregnancy in women with cardiac disease is a high-risk condition requiring comprehensive care. Proper antenatal screening, timely intervention, and coordinated management involving obstetricians, cardiologists, and neonatologists can significantly improve maternal and fetal outcomes. Further research is necessary to evaluate long-term neonatal outcomes and optimize management protocols for high-risk pregnancies.

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