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Maternal And Fetal Outcomes In Pregnancies Complicated By Cardiac Disease At A Tertiary Care Center"

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Abstract:
Background: Pregnancies complicated by cardiac disease present a significant challenge, demanding meticulous management and multidisciplinary care. This study evaluates maternal and fetal outcomes in pregnancies affected by cardiac conditions at a tertiary care hospital.
Methods: A prospective, observational study was conducted on 85 pregnant women diagnosed with cardiac disease. Participants were followed throughout the antenatal period, delivery, and postpartum. Maternal outcomes, including cardiac complications, NYHA classification, ICU admissions, and mortality, were analyzed alongside fetal outcomes, such as birth weight, preterm delivery, and NICU admissions.
Results: Rheumatic heart disease (40%) was the most common condition, followed by congenital heart disease (30%), mitral valve prolapse (8%), peripartum cardiomyopathy (6%), arrhythmias (5%), and ischemic heart disease (4%). Cardiac complications were observed in 10% of cases, including congestive heart failure, pulmonary edema, arrhythmias, and thromboembolism. Cesarean delivery was the predominant mode of delivery (55%). All pregnancies resulted in live births, with a mean birth weight of 2.8 kg, and NICU admissions were required in 10% of cases.
Conclusions: Rheumatic heart disease remains the leading cardiac condition complicating pregnancies. Early diagnosis and a multidisciplinary approach are crucial to minimizing maternal and fetal complications and ensuring favorable outcomes.

Keywords: Cardiac Disease in Pregnancy, Maternal Outcomes, Fetal Outcomes, Cardiac Complications

Introduction:

Cardiac disease is a significant medical condition that complicates approximately 1-3% of pregnancies globally. Advances in cardiology and obstetrics have enabled women with pre-existing heart conditions to conceive and carry pregnancies to term; however, the challenges associated with these pregnancies remain formidable. The hemodynamic changes during pregnancy, such as increased blood volume, cardiac output, and heart rate, can exacerbate underlying cardiac conditions, posing risks to both the mother and fetus.[1]

Pregnancy in women with cardiac disease is associated with increased maternal and fetal morbidity and mortality. Maternal complications can include congestive heart failure (CHF), arrhythmias, pulmonary edema, and thromboembolism, while fetal risks include prematurity, intrauterine growth

restriction (IUGR), and low birth weight. The type and severity of cardiac disease, along with the functional status of the mother (as assessed by the New York Heart Association [NYHA] classification), are critical determinants of pregnancy outcomes.[2]

Rheumatic heart disease (RHD) continues to be the leading cause of cardiac disease in pregnancy in developing countries, whereas congenital heart disease (CHD) is increasingly prevalent due to improved survival rates following corrective surgeries in childhood. Other less common conditions such as peripartum cardiomyopathy, mitral valve prolapse, arrhythmias, and ischemic heart disease also pose significant risks.[3]

Managing pregnancies complicated by cardiac disease requires a multidisciplinary approach involving obstetricians, cardiologists, anesthesiologists, and neonatologists. Early risk assessment, preconception counseling, and meticulous antenatal care are critical to optimizing outcomes. Women with severe cardiac conditions (NYHA Class III or IV) or specific lesions like severe pulmonary hypertension or cyanotic heart disease are at particularly high risk of adverse outcomes, including maternal death. Therefore, timely diagnosis and appropriate interventions are essential to minimize these risks[4].

Several studies have highlighted the importance of tailored management strategies. For instance, Siu et al[1]. demonstrated that pregnancy outcomes in women with cardiac disease largely depend on the type and severity of the underlying condition. Similarly, McFaul et al[2]. emphasized that the use of standardized protocols for cardiac monitoring and delivery planning significantly reduces complications. However, there remains a lack of data from developing regions where resource constraints often limit comprehensive care.

The present study with aim to evaluate the maternal and fetal outcomes in pregnancies complicated by cardiac disease at a tertiary care hospital. This study with objectives of identifying the most common cardiac conditions, their associated complications, and their impact on obstetric outcomes.

Methodology:

This study was an observational study conducted at a tertiary care teaching hospital, between October 2022- october2023 at the Department of Obstetrics and Gynecology. Ethical approval was obtained from the institutional review board before the commencement of the study. The study included 85 pregnant women diagnosed with various cardiac conditions attending OPD with confirmed cardiac diagnosis (either pre-existing or developed during pregnancy), and consented to participate in the study. Exclusion criteria non-consenting participants and those with severe comorbidities.

All participants underwent detailed interviews and clinical assessments to confirm the presence of cardiac disease, including a review of medical history, physical examination, and diagnostic tests such as echocardiograms and classification of heart conditions (e.g., rheumatic heart disease, congenital heart disease, mitral valve prolapse) and determination of functional status using the NYHA classification system. Participants were followed throughout their pregnancy, attending regular antenatal visits at intervals based on clinical guidelines.

Post-delivery, participants were followed one week after delivery to evaluate recovery and identify any early complications, particularly related to cardiac function. This included a physical examination, assessment of cardiac symptoms, and another echocardiogram to detect any changes from the antenatal period. The final follow-up occurred six weeks postpartum, focusing on long-term maternal health, recovery from childbirth, and the normalization of cardiac function.

Results:

Table 1: Demographics and NYHA Classification

Characteristic	**Count (%)**
Age Group	
<20 years	10 (11.8%)
21-25 years	42 (49.4%)

26-30 years	21 (24.7%)
>31 years	14 (16.5%)
Parity	
Primi	47 (55.3%)
Multi	38 (44.7%)
NYHA Classification	
NYHA Class I	60 (70.6%)
NYHA Class II	18 (21.2%)
NYHA Class III	5 (5.9%)
NYHA Class IV	2 (2.4%)

The majority of participants were aged between 21 and 30 years (74%). Most women were primigravida (55%), indicating that many were pregnant for the first time. The NYHA classification revealed that 70% of women were in Class I, with minimal symptoms, while 5.9% were in more severe classes (III and IV), indicating a higher risk for complications. (Table 1).

Table 2: Distribution of Cardiac Conditions

Cardiac Condition	Count (%)
Rheumatic Heart Disease (RHD)	34 (40%)
Congenital Heart Disease (CHD)	26 (30%)
Mitral Valve Prolapse (MVP)	7 (8%)
Peripartum Cardiomyopathy	5 (6%)
Arrhythmias	4 (5%)
Ischemic Heart Disease (IHD)	3 (4%)
Other	6 (7%)

The most common cardiac condition among participants was RHD, accounting for 40% of cases. CHD was the second most prevalent, found in 30% of cases. Other conditions included mitral valve prolapse, peripartum cardiomyopathy, and various arrhythmias. This distribution highlights the complexity of heart disease affecting pregnant women, with a significant proportion of participants having multiple or severe cardiac conditions. (Table2)

Table 3: Cardiac Complications and Outcomes

Complication	Count (%)
Congestive Heart Failure (CHF)	6 (7.1%)
Pulmonary Edema	4 (4.7%)
Arrhythmias	2 (2.4%)
Thromboembolism	1 (1.2%)
ICU Admissions	9 (10.6%)

Cardiac complications were relatively common in this study, with 10% experiencing one or more complications. The most frequent complications were CHF (7.1%) and pulmonary edema (4.7%). Arrhythmias occurred in 2.4% of cases, and thromboembolism was observed in 1.2%. The need for ICU admission was required in 10.6% of cases, with most admissions occurring postpartum (67%).(Table 3)

Table 4: Fetal Outcomes.

Outcome	Count (%)
Live births	85 (100%)

Preterm deliveries	7 (8.2%)
Low Birth Weight (<2.5 kg)	10 (11.8%)
NICU Admissions	9 (10.6%)
Mean Birth Weight	2.8 ± 0.5 kg
Apgar Score at 1 minute	7.8 ± 0.7

All 85 pregnancies resulted in live births. Preterm deliveries were seen in 8.2% of cases, while low birth weight (<2.5 kg) was found in 11.8% of neonates. The mean birth weight was 2.8 kg. Apgar scores at 1 minute averaged 7.8, indicating good immediate neonatal health. NICU admissions were required for 10.6% of neonates, mainly due to respiratory distress or congenital anomalies.(Table 4)

Table 5: Mode of Delivery

Mode	**Count (%)**
Cesarean section	47 (55.3%)
Vaginal delivery	38 (44.7%)
Instrumental delivery	0

The predominant mode of delivery was cesarean section (55.3%), followed by vaginal delivery (44.7%). Instrumental deliveries were not recorded in this study, reflecting the preference for planned surgical interventions in high-risk pregnancies due to maternal cardiac disease. (Table 5)

Table 6: Postpartum Complications

Complication	**Count (%)**
Postpartum hemorrhage	1 (1.2%)
Gestational Diabetes Mellitus (GDM)	1 (1.2%)
Preeclampsia	1 (1.2%)
Anemia	1 (1.2%)
Bronchial Asthma	1 (1.2%)

Postpartum complications were relatively uncommon but included minor issues such as postpartum hemorrhage (1.2%), GDM (1.2%), and anemia (1.2%). The presence of these complications highlights the need for continuous monitoring and management in the postpartum period to ensure recovery and prevent further complications.(Table 6)

Discussion:

This study provides a evaluation of maternal and fetal outcomes in pregnancies complicated by cardiac disease. Most participants were young, typically between 21 and 30 years old, reflecting the common age range for pregnancy. This is consistent with other studies, where younger women are often diagnosed with cardiac disease and seek care during pregnancy.[6] Primigravida (first-time mothers) made up 55% of our cohort, which aligns with previous research showing that these women may have less experience in managing pregnancy complications, particularly those involving heart disease.[7]

The prevalence of cardiac conditions in this study aligns with findings from similar research. Rheumatic heart disease was the most common condition, affecting 40% of participants, similar to reports from other developing regions where RHD is prevalent due to high incidences of rheumatic fever.[8] This is comparable to findings from a study in Bangladesh where RHD accounted for 35% of cardiac cases in pregnancy.[9] Congenital heart disease was the second most common (30%), also consistent with international data, reflecting improved surgical outcomes and survival into reproductive age for women with congenital heart defects.[10]

The incidence of cardiac complications such as congestive heart failure (6.6%) and pulmonary edema (4%) in this study is within the range reported in other studies, where similar conditions were found in 5-8% of pregnancies complicated by cardiac disease a study by Siu et al. found that 8% of women with heart disease experienced severe cardiac events during pregnancy, including CHF and arrhythmias.[11]

The fetal outcomes observed in this study 100% live births, 8.2% preterm deliveries, 11.8% low birth weight, and 10.6% NICU admissions were broadly comparable to findings in other research. Studies in developed countries report similar rates of preterm birth (7-10%) and low birth weight (10-15%) in pregnancies with cardiac disease, suggesting that while outcomes are improving with better care, the risks remain significant. The mean birth weight of 2.8 kg and Apgar scores at 1 minute (7.8 ± 0.7) are also consistent with other studies, indicating generally good immediate neonatal health despite the challenges of maternal cardiac disease.

The mode of delivery was primarily cesarean section (55.3%), which is consistent with other high-risk studies, where surgical delivery is preferred to minimize risks associated with labor and delivery complications in women with heart disease. Postpartum complications were minor in this study, but they included postpartum hemorrhage, GDM, anemia, and bronchial asthma conditions that require careful management to prevent exacerbating the maternal cardiac condition.

Conclusion:

The findings emphasize the critical role of a multidisciplinary approach, integrating expertise from cardiology, obstetrics, and maternal-fetal medicine to effectively manage these high-risk pregnancies. While maternal and fetal outcomes have improved with advances in cardiac care and pregnancy management, significant risks remain, particularly for women with severe cardiac conditions.

Continued collaboration among healthcare providers, ongoing research, and access to specialized care are crucial to further refine management strategies for pregnant women with heart disease. This will help ensure safer pregnancies, better maternal health, and improved neonatal outcomes for this vulnerable population. The findings of this study contribute to a growing body of evidence supporting targeted interventions that can make a significant difference in the lives of women and their babies affected by cardiac disease during pregnancy.

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