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ORIGINAL ARTICLE

Maternal and Fetal Outcomes in Pregnant Women with Cardiac Disease

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ABSTRACT

Objective: To determine the adverse maternal and fetal outcomes in pregnant women presented with cardiac disease.
Study Design: Cross-sectional study
Place and Duration: Department of Gyne & Obs Khalifa Gulnawaz Teaching Hospital Bannu and Gyne Department Mardan Medical Complex MTI, Mardan during from the period Jan 2023 to June 2023.
Material and methods: Total 120 pregnant women were enrolled in this study. Patients were aged between 20- 45 years. Patients detailed demographics were recorded after taking written consent. Among all the patients, 60 patients had cardiac disease and 60 had no cardiac disease. Two groups were maintained. Baseline characteristics such as age, parity, nature of cardiac lesions, New York Heart Association (NYHA) classification, and associated comorbidities were documented. Investigations included echocardiography, electrocardiography, and blood tests. Frequency of pre-eclampsia, gestational diabetes mellitus and post-partum haemorrhage were calculated. Adverse outcomes among (cesarean section, instrumental delivery,induction of labor and prolong labor, hypertensive disorder) were calculated among both groups. Fetal outcomes Perinatal mortality, Low birth weight, Low Apgar score and NICU admission were observed. Complete data was analyzed by SPSS 22.0 version.
Results: Mean age of the patients in cardiac disease group was 30.45±4.58 years with mean BMI 23.46±4.74 Kg/m^2 and in patients with no cardiac disease mean age was 28.86±6.48 years with mean BMI 22.85±5.78 Kg/m^2. RHD was the most frequent type of heart disease found in 40 (66.67%). Maternal complications such as pre-eclampsia, gestational diabetes mellitus, postpartum hemmorhagen C-section were more in cardiac patients as compared to patients with no cardiac disease. Fetal outcomes such as perinatal mortality in cardiac group was found in 8 (13.33%) and in other group it was found in 1 (1.67%), low birth weight in cardiac group was found in 20 (33.33%) and in other group it was found in 8 (13.33%), low apgar score in cardiac group was found in 12 (16.67%) and in no other group it was found in 3 (5%), 14 (23.33%) in cardiac patients had NICU admission and 4 (6.67%) patient in healthy group admitted to NICU.
Conclusion: We concluded in this study that the pregnant women with cardiac disease had high risk of adverse maternal and fetal complications.
Keywords: Cardic Disease, Pre-eclampsia, Post-partum haemorrhage, C-section, Maternal Mortality, Perinatal Mortality, NICU Admission, Low Apgar Score

INTRODUCTION

Heart disease complicates approximately 1% to 3% of pregnancies[1]. Heart disease is the primary non-obstetric contributor to maternal mortality. Heart problems related to pregnancy can be classified into two primary categories: congenital and acquired.

The category includes rheumatic heart disease, cardiomyopathies, and ischemic heart disease. Rheumatic heart disease demonstrates a greater incidence among acquired populations in developing countries, including India[2,3]. Cardiomyopathies and ischemic heart diseases demonstrate a significant prevalence in economically developed nations. In a typical pregnancy, there is an increase in heart rate and stroke volume[4,5]. Heart disease intensifies these changes. Co-morbidities, including pregnancy, anemia, and urinary tract infections, exacerbate the cardiac burden and increase the severity of heart failure. Pre-existing conditions such as congenital and rheumatic heart lesions, as well as hypertensive diseases, can exacerbate complications during pregnancy. Eighty percent of mitral stenosis cases represent the most prevalent rheumatic lesion, with aortic stenosis at 10%, mitral regurgitation at 6.6%, and aortic regurgitation at 2.5%[6]. Uebing and colleagues observed that approximately 15-50% of cardiac abnormalities are initially detected during routine antenatal examinations or due to symptoms and signs resulting from physiological changes associated with pregnancy[7].

Pregnant women with valvular heart disease exhibited a markedly elevated incidence of adverse outcomes, including arrhythmia, congestive heart failure, increased demand for cardiac medications, and hospitalization[8]. A retrospective study involving 90 pregnancies affected by cardiac heart disease (CHD) identified pulmonary edema in 17% of cases and other cardiac events in 12% of women, with no recorded maternal fatalities[9].

The management of pregnancy in women with cardiac disease requires collaboration between obstetricians and cardiologists. The enhancement of infertility treatments and maternal medical care has led to a higher proportion of women with congenital or acquired cardiac diseases successfully conceiving and delivering[10]. Conversely, the common clinical manifestations of cardiac disorders, including breathlessness, murmurs, and pedal edema, resemble typical physiological alterations observed during pregnancy. They present a diagnostic challenge for obstetricians. Delayed diagnosis may result in significant maternal and fetal complications and complicate pregnancy management. Risk stratification is essential for optimizing the management of pregnant women with cardiac disease. This study aimed to assess the maternal and perinatal outcomes linked to cardiac diseases in pregnant women delivering at a tertiary care hospital.

MATERIAL AND METHODS

This randomized control trial was conducted at Department of Gyne & Obs Khalifa Gulnawaz Teaching Hospital Bannu and Gyne Department Mardan Medical Complex MTI, Mardan during from the period Jan 2023 to June 2023.

The total number of pregnant women who participated in this study was 120. Patients whose gestational age was less than 26 weeks excluded from the study. Most of the patients were between the ages of 20 and 45. Following the receipt of written

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consent, records of patients' comprehensive demographic information were made. There were a total of sixty individuals, sixty of whom had cardiac disease and sixty of whom did not have cardiac illness. There were two groups that were kept. Documentation was done on baseline variables such as age, parity, the type of heart abnormalities, the categorization of the New York Heart Association (NYHA), and related comorbidities. It was determined through investigations that blood tests, electrocardiograms, and echocardiograms were performed. Pre-eclampsia, gestational diabetes mellitus, and postpartum haemorrhage were all evaluated and their respective frequencies were determined. Comparative analysis was performed on both groups to determine the prevalence of adverse outcomes such as cesarean section, instrumental delivery, induction of labor and prolong labor, and hypertensive problem. Results of the fetus We observed perinatal death, low birth weight, low Apgar score, and admission to the neonatal intensive care unit (NICU). SPSS 22.0 was used to do an analysis on all of the records.

RESULTS

Mean age of the patients in cardiac disease group was 30.45±4.58 years with mean BMI 23.46±4.74 Kg/m^2 and in patients with no cardiac disease mean age was 28.86±6.48 years with mean BMI 22.85±5.78 Kg/m^2. Mean gestational age among cardiac disease patients was 36.48±4.26 weeks while in healthy women mean gestational age was 36.52±3.28 weeks. Among cardiac disease patients RHD was the most frequent type of heart disease found in 40 (66.67%) followed by congenital heart disease in 16 (26.67%) and 4 (6.67%) had others. In cardiac patients 38 (63.33%) patients had NYHA class I and II while 22 (36.67%) patients had class III and IV. Table 1

Table 1: Baseline characteristics of all the included patients (n=120)

Variables	Cardiac Disease	No Cardiac Disease
Mean age (years)	30.45±4.58	28.86±6.48
Mean BMI	23.46±4.74	22.85±5.78
Gestational age (weeks)	36.48±4.26	36.52±3.28
Types of Cardiac Disease		
RHD	40 (66.67%)	-
CHD	16 (26.67%)	-
others	4 (6.67%)	-
NYHA Classification		
I/II	38 (63.33%)	-
III/IV	22 (36.67%)	-

Frequency of pre-eclampsia in cardiac patients was high 20 (33.33%) as compared to healthy women 8 (13.33%) patients. Gestational diabetes mellitus in cardiac patients was found in 36 (60%) patients while in patients with no cardiac disease it was found in 10 (16.67%) patients, post partum haemorrhage was seen in 38 (63.33%) patients in cardiac group while in non-cardiac disease patients it was found in 18 (30%) patients. The difference between both groups was statistically significant with p-value <0.05. Table 2

Table 2: Comparison of Maternal Complications Between Both Groups

Complications	Cardiac Disease n/%	No Cardiac Disease n/%	P-Value
Pre-eclampsis	20 (33.33%)	8 (13.33%)	0.031
Gestational Diabetes	36 (60%)	10 (16.67%)	0.026
Postpartum Hemorrhage	38 (63.33%)	18 (30%)	0.018

Frequency of maternal outcomes (cesarean section, instrumental delivery,induction of labor and prolong labor,) in group I were significantly higher in cardiac disease patients as compared to women with no cardiac disease. Fetal outcomes such as perinatal mortality in cardiac group was found in 8 (13.33%) and in other group it was found in 1 (1.67%), low birth weight in cardiac group was found in 20 (33.33%) and in other group it was found in 8 (13.33%), low apgar score in cardiac group was found in 12 (16.67%) and in no other group it was found in 3 (5%), 14 (23.33%) in cardiac patients had NICU admission and 4 (6.67%) patient in healthy group admitted to NICU. Table 3

Table 3: Comparison of maternal and fetal outcomes among both groups

Outcomes	Cardiac Disease n/%	No Cardiac Disease n/%	P-Value
Maternal			<0.05
Cesarean section	18 (30%)	8 (13.33%)	
Instrumental delivery	10 (16.67%)	3 (5%)	
Induction of labor	22 (36.67%)	10 (16.67%)	
Prolong labor	10 (16.67%)	3 (5%)	
Fetal			<0.05
Perinatal Mortality	8 (13.33%)	1 (1.67%)	
Low birth weight	20 (33.33%)	8 (13.33%)	
Low Apgar score	12 (16.67%)	3 (5%),	
NICU Admission	14 (23.33%)	4 (6.67%)	

DISCUSSION

Cardiovascular illness is the primary non-obstetric contributor to maternal morbidity and death. The effect on neonatal outcomes is significant. Positive results are noted in women categorized as NYHA class I and II who proactively address risk factors linked to heart failure, such as anemia, infections, and arrhythmias. Furthermore, patients receive regular cardiac monitoring and adhere strictly to cardiac medication protocols. Women with serious heart illness should avoid pregnancy, and surgical surgery should occur before conception. Hink and Bolte (year) observed that heart illness adversely affects around three percent of pregnancies. The outcome has a substantial impact on both the maternal figure and the offspring[11]. We conducted present study aimed to examine the maternal and fetal complications in pregnant women presented with cardiac disease. In this regard we included 60 patients with cardiac disease and 60 pregnant women with no cardiac illness. In our study the mean age of the patients in cardiac disease group was 30.45±4.58 years with mean BMI 23.46±4.74 Kg/m^2 and in patients with no cardiac disease mean age was 28.86±6.48 years with mean BMI 22.85±5.78 Kg/m^2. Mean gestational age among cardiac disease patients was 36.48±4.26 weeks while in healthy women mean gestational age was 36.52±3.28 weeks. Among cardiac disease patients RHD was the most frequent type of heart disease found in 40 (66.67%) followed by congenital heart disease in 16 (26.67%) and 4 (6.67%) had others. In cardiac patients 38 (63.33%) patients had NYHA class I and II while 22 (36.67%) patients had class III and IV. These results were comparable to many of previous studies in which pregnant women with cardiac disease had average age of 30 to 40 years[12,13].

Persistent hypertension, anemia, seizures, arthritis, primigravida status, and NYHA classification were not different among pregnant women with rheumatic heart disease, according to a study. However, pregnancy-related cardiac problems including arrhythmias, restenosis, and congestive heart failure were significantly different between the two groups[14]. Another study found that 43% of pregnant women had valvular heart disease, with symptoms categorized as NYHA class III or IV. The main factor impacting negative feto-maternal outcomes was the insufficient functional class[15]. We observed similar findings with NYHA class III and IV being a substantial risk factor for the woman and her baby. In contrast, women in NYHA class I and II experienced an uncomplicated pregnancy.

In our study, frequency of pre-eclampsia in cardiac patients was high 20 (33.33%) as compared to healthy women 8 (13.33%) patients. Gestational diabetes mellitus in cardiac patients was found in 36 (60%) patients while in patients with no cardiac disease it was found in 10 (16.67%) patients, post partum haemorrhage was seen in 38 (63.33%) patients in cardiac group while in non-cardiac disease patients it was found in 18 (30%) patients. The difference between both groups was statistically significant with p-value <0.05. Previous studies demonstrated that pregnant women with cardiac disease had significantly more

maternal complications as compared to non cardiac disease patients[16].

In present study we found that frequency of maternal outcomes (cesarean section, instrumental delivery,induction of labor and prolong labor,) in group I were significantly higher in cardiac disease patients as compared to women with no cardiac disease. Fetal outcomes such as perinatal mortality in cardiac group was found in 8 (13.33%) and in other group it was found in 1 (1.67%), low birth weight in cardiac group was found in 20 (33.33%) and in other group it was found in 8 (13.33%), low apgar score in cardiac group was found in 12 (16.67%) and in no other group it was found in 3 (5%), 14 (23.33%) in cardiac patients had NICU admission and 4 (6.67%) patient in healthy group admitted to NICU. In terms of the obstetric outcomes of cardiac patients, a research found that the majority of them had delivered their babies vaginally, 29% had undergone a cesarean section, and 9% had undergone therapeutic termination of pregnancy[17]. The prevalence of low birth weight was 45% (2.4 ± 601.8 grams), which was even lower than our study. Ten babies passed away, and the prevalence of low birth weight was 45%. Another research found that infants born to mothers in NYHA classes III and IV had lower birth weights than children born to women in NYHA classes I and II. The percentage of neonates who had low birth weights was 45 percent. Certain maternal factors, such as poor oxygen saturation, cardiac medications, and early inducement of delivery owing to fetal or maternal discomfort, can be related to this low birth weight. Other possible causes include this low birth weight. Other perinatal outcomes included preterm (14%), fetal mortality, fetal growth restriction, and fetal distress (7%), and 3.5% of fetal cardiac lesions, which are also acquired from the current study. Some of these outcomes were also obtained from the studies that were conducted before. a dozen A total of five (22.7%) cases of preterm, twelve (54.2%) cases of small for gestational age, six (27.2%) cases of birth asphyxia, and fourteen (63.6%) cases of admission to the neonatal intensive care unit (NICU) were included in the list of perinatal morbidities[18].

Our findings indicate that achieving favorable pregnancy outcomes in women with heart conditions might be difficult. Consequently, all endeavors must be directed at stabilizing the heart condition prior to pregnancy. Preconception counseling is essential for the management of heart illness throughout pregnancy. Women with heart illness intending to conceive must comprehend the serious ramifications of pregnancy with unmanaged conditions and be informed about the warning signs linked to neonatal and maternal morbidity and death. The significance of maternal medicine consultants is paramount, necessitating a multi-disciplinary strategy involving a cardiologist, obstetrician, neonatologist, and anesthetist to handle these patients. Consistent prenatal examinations with comprehensive obstetric and cardiac evaluations at every appointment are crucial during pregnancy. Prompt detection of problems, quick intervention, and referral can enhance pregnancy outcomes.

CONCLUSION

As a result of this investigation, we came to the conclusion that pregnant women who had heart illness were at a significantly increased risk of experiencing unfavorable maternal and fetal issues.

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