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ORIGINAL ARTICLE

An investigation of cardiac evaluation in asymptomatic pregnant women: A retrospective study in western India

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ABSTRACT:

Background: Significant alterations in the cardiovascular system take place during pregnancy.These modifications might impact a restricted heart capacity. Our goal was to evaluate the use of screening echocardiography in pregnant women who do not have any symptoms. **Materials and methods:**The majority of the participants in our study were in the initial stage of pregnancy. A comprehensive medical history and physical examination were conducted on all patients prior to the echocardiographic assessment. An electrocardiogram was performed on all the patients. An echocardiogram was performed on all patients using the Phillips Echo equipment. Standard methods were used to perform M mode, 2D, Doppler, and colour flow mapping. **Results:** 56.9% (n-188) of the patients were experiencing their first pregnancy, 26.9% (n-89) were in their second pregnancy, 8.4% (n-28) were in their third pregnancy, and 7.5% (n-25) of the patients were in their fourth pregnancy or beyond. Among the congenital cardiac diseases, Mitral valve prolapse is the most frequent, accounting for 44.9% (n=5), followed by atrial septal defect at 30.6%. **Conclusion:** We want to stress the importance of including foetal echocardiography in routine antenatal screening, regardless of any risk factors for CHDs.

Keywords: echocardiography, pregnancy, antenatal screening

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INTRODUCTION

Cardiac alterations take place between the sixth and eighth week of pregnancy.[1] Cardiovascular disease impacts around 0.2% to 4% of expectant mothers.[2]Significant alterations in the cardiovascular system take place during pregnancy.[3]These alterations could potentially impact a restricted heart capacity. Therefore, cardiac disease may become apparent for the first time during the prenatal period.[4]On the other hand, symptoms of pregnancy can resemble those of cardiac illness. The rate of maternal mortality among pregnant women with heart disease is approximately 1%, which is 100 times greater than that of women without heart disease.[5]The majority of pregnant women with heart conditions have a positive prognosis for both the mother and the baby, save for those with Eisenmenger syndrome, obstructive pulmonary vascular disease, and Marfan syndrome with aortopathy.

CHDs account for around 40% of perinatal fatalities,[6]where almost 20% of deaths happen within the initial month of life.[7]CHDs thus play a substantial role in the economic costs incurred by healthcare systems. Prenatal foetal echocardiography is the exclusive method of identifying such abnormalities. This foetal echocardiogram is typically performed in high-risk pregnancies where the incidence of congenital heart defects (CHDs) is historically greater. The current study aims to determine the occurrence of CHDs in a randomly selected group of pregnant women compared to those at high risk, and to assess the effectiveness of routine prenatal foetal echocardiography as a screening method for detecting CHD. However, they still face the possibility of experiencing other issues such as heart failure, arrhythmia, and stroke. Most cases of heart illness in western countries are congenital, followed by rheumatic heart disease.[8] In nations such as India, there are more cases of rheumatic heart disease compared to congenital heart disease. Therefore, it is important to identify cardiac problems in pregnant women who do not show any symptoms. Echocardiography is used to identify both congenital and acquired cardiac disease in this investigation. Echocardiography is beneficial for assessing pregnant women without posing any hazards to the foetus or the mother, as it is noninvasive and does not have any teratogenic effects.[9] Understanding the fundamental haemodynamic changes that happen during pregnancy and childbirth is crucial. The rise in blood volume can reach up to 70% compared to the blood volume before pregnancy. The decrease in peripheral resistance during pregnancy offsets the rise in cardiac output on the volume-loaded left ventricle in ventricular septal defect and patent ductus arteriosus, or the volume-loaded right ventricle in atrial septal defect.[10]

MATERIALS AND METHODS

This is a study that is planned to last for a period of 4 months. A total of 330 pregnant individuals who were

referred for cardiac examination to the cardiology and gynaecology departments at Icare Institute of Medical Sciences and Research and Dr. Bidhan Chandra Roy Hospital, Haldia, West Bengal, were included in this study. The patients were categorised based on the stage of pregnancy. The majority of the participants in our research were in the initial stage of pregnancy. A comprehensive history and physical examination were conducted on all patients prior to echocardiographic assessment. An electrocardiogram was performed on all the patients. An echocardiogram was performed on all patients using the Phillips Echo equipment. Standard methods were used to perform M mode, 2D, Doppler, and colour flow mapping. An extensive evaluation was conducted to exclude the presence of any heart illness that may have been present from birth or developed later in life.

RESULTS

Within the group being studied, 56.9% (n-188) of the patients were experiencing their first pregnancy, 26.9% (n-89) were in their second pregnancy, 8.4% (n-28) were in their third pregnancy, and 7.5% (n-25) were in their fourth or subsequent pregnancies (Figure 1).

Figure .1 Distribution of study population in various gestations

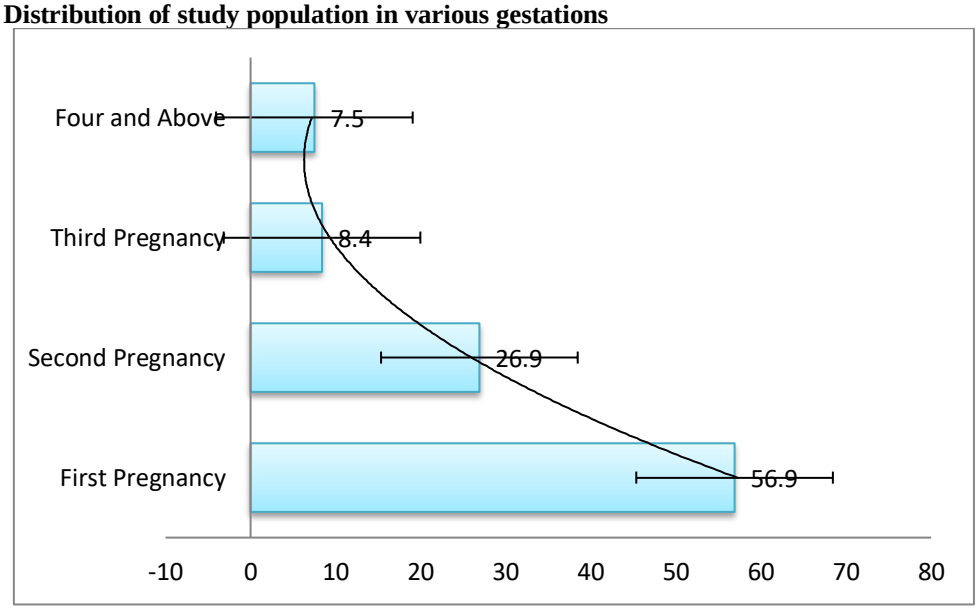

Table No. 1 Distribution of individual cases in the two groups

Sl. No.	List of congenital heartdiseasesdetected	No. of cases detected	No. of cases in high risk group	No. of cases in low risk group
1	Double outlet rightventricle	8	0	6
2	Congenital corrected transposition of greatvessels	4	0	4
3	Tricuspidatresia	2	0	2
4	Endocardial cushiondefect	10	4	6
5	Hypoplastic left heartsyndrome	4	0	4
6	Transposition of greatartery	8	0	8
7	Univentricular heart	6	0	6
8	Heterotaxy syndrome	2	0	2
9	Tetralogy of fallot with absent pulmonaryvalve	2	0	2
10	Ventricular septal defect	4	0	4
11	Ebstein'sanomaly	2	0	2

The distribution of individual cases in the two groups was displayed in table 1. Among the types of cardiac illness present at birth, Mitral valve prolapse is the most prevalent, accounting for 44.9% (n-5), followed by Atrial septal defect at 30.6% (n-4). Rheumatic heart disease is the most prevalent acquired heart disease in our study. Rheumatic heart disease is the primary cause of heart disease in our study, accounting for around 44%. This is followed by atrial septal defect and mitral valve prolapse, which contribute 22% each.

DISCUSSION

Heart disease is a significant factor in maternal mortality.[11]The heart Disease in Pregnancy (CARPREG) Risk Score can be computed to assess a woman's heart risk during pregnancy. Marfansyndrome with an enlarged aortic root (more than 4 cm), significant pulmonary hypertension (pulmonary vascular resistance more than 6 Wood

units), moderate to severe obstruction of blood flow from the left ventricle (30 mmHg), and a reduced ability of the left ventricle to pump blood (ejection fraction less than 30%) are conditions that make pregnancy inadvisable.[12]

It will also help parents avoid emotional distress by giving them enough time to comprehend the biological processes of the disease and make an informed decision about the pregnancy's outcome. The timing of the foetal echo is typically between 18-20 weeks, which allows us to make decisions about the pregnancy's prognosis during this stage. Regular prenatal ultrasound scanning may not be the best method for screening for CHD.[13]Many cases of CHD are not discovered during normal abdominal ultrasound screening scans. Foetal echocardiography, being highly accurate, can detect the majority of cases of congenital heart disease (CHD). Previous research has shown the significance of regular screening for congenital heart defects in unborn babies.[14-16]

Identifying CHD in the early stages of pregnancy allows the doctor enough time to discuss the seriousness and outlook of the disease with the family. This gives them the opportunity to make decisions about the pregnancy. These are the situations that would have been overlooked during antenatal screening or would have been detected later in pregnancy when making decisions would have been more challenging.

Although there are theoretical concerns about the potential detrimental effects of ultrasound energy on the developing baby, no proven consequences have been observed thus far.[17]However, individuals conducting foetal echocardiography should be mindful of these impacts, and it is important to minimise the power output and duration of exposure to prevent any potential negative consequences.

CONCLUSION

Ideally, conducting a basic assessment of cardiac function and heart illness before getting pregnant will allow for appropriate counselling. Physical changes that happen during pregnancy can lead to worsening in individuals with previously well managed conditions. The management of pregnant individuals with cardiac disease necessitates particular focus on diagnosis, therapy, and ongoing monitoring. Performing a methodical, precise, and practical evaluation of the risks associated with potential difficulties for both the mother and the foetus, both during pregnancy and after giving birth, is crucial for ensuring the success and safety of the pregnancy. We want to stress the importance of including foetal echocardiography as a part of regular antenatal screening, regardless of any risk factors for CHDs.

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