

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20240800>

Original Research Article

Foeto-maternal outcome in pregnancy with and without heart disease: a comparative cross-sectional study in a tertiary care hospital

Miti Ratan, Ngashepam Shuradhaja Singh*, Chirom Pritamkumar Singh, Sonam Dolma, Nikita Gautam, Anmol A. Vaishnav, Saurabh Soni

Department of Obstetrics and Gynaecology, RIMS, Imphal, Manipur, India

Received: 03 February 2024

Accepted: 05 March 2024

*Correspondence:

Dr. Ngashepam Shuradhaja Singh,
E-mail: dhajasingh@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Pregnant women with underlying heart disease are at increased risk for adverse maternal, obstetric, and neonatal outcomes. One can successfully treat the majority of these incidents if detected early by accurate individual risk assessment and careful follow-up. The aim and objectives of this study were to compare the foeto-maternal outcome in pregnancy with and without heart diseases with period of gestation >32 weeks.

Methods: This study was carried out in a tertiary care teaching hospital of Imphal, the capital city of Manipur, using a standard-questionnaires among patients admitted. Data was analysed using SPSS 21.0 with statistical significance set at $p < 0.05$.

Results: Study was conducted on 112 pregnant women. The prevalence of heart disease was higher (71.4%) among the primiparous women. Highest occurrence of heart disease (66.1%) was seen in the housewife group. There was increased incidence of pre-term deliveries among pregnant women with heart disease (26.8%). Caesarean section (62.5%) and maternal complications (42.9%) were found to be higher among the pregnant women with heart disease. The incidence of NICU admission of babies was higher among mothers with heart disease (17.9%) compare to 5.4% in mothers without heart disease.

Conclusions: Early detection by accurate individual risk assessment and careful follow-up are key to improving outcomes.

Keywords: Foeto-maternal outcome, Heart disease, Period of gestation

INTRODUCTION

Pregnancy associated with any form of heart disease is a challenge for both obstetrician and cardiologist. Cardiac disease has significant impact on maternal health during pregnancy, labour and deliveries. Even though heart disease complicates only 0.1 to 4% pregnancies worldwide, it contributes to significant amount of maternal mortality and morbidity.¹⁻³ Improvements in health care services in recent decades have permitted more frequent identification of pregnant women with congenital and acquired heart diseases. The advancement in surgical

techniques and minimal invasive surgeries have improved the prognosis of congenital lesions and many women even with severe defects are now reaching child bearing age.⁴

Hemodynamic changes during normal pregnancy are well tolerated by women with normal cardiac reserve. Diseased heart shows signs of de-compensation with resultant increase in morbidity and mortality. It is natural to expect that foetus would also be compromised in these mothers. Foetal health depends upon an adequate and continuous supply of well-oxygenated maternal blood. In uncompensated heart disease, O₂ supply becomes limited

and that results in compromised foetal growth, leading to growth restriction, premature birth/even foetal death.⁵

Many women in developing countries are first diagnosed with heart disease during pregnancy. Echocardiography is the keystone of diagnosis and, along with an ECG, usually provides all that is needed for a clinical diagnosis and should be advised to all women having risk factor or suspected to have heart disease.⁶

Women with heart disease who desire or anticipate pregnancy should have pre-conceptional counselling. Most women with heart disease have successful pregnancies, but complacency in the diagnosis and management of pregnant patients can have dire consequences for both the mother and the fetus.⁷

Since heart disease has impact on foeto-maternal outcome related to maternal morbidity and mortality as well as foetal morbidity, new evidence is very much necessary at current practice. Hence, this study is to compare the foeto-maternal outcome in pregnancy with and without heart diseases and to increase the knowledge about severity of disease for proper management and timely intervention.

Objectives

The objectives of this study were to compare the foeto-maternal outcome in pregnancy with and without heart diseases with period of gestation >32 weeks.

METHODS

A cross-sectional study was conducted from Jan 2021 to Aug 2022. The study was conducted in Imphal, the capital city of Manipur, a state in North-Eastern region of India.

All Pregnant women were the population of the study with inclusion criteria were-pregnant women with diagnosed heart disease and without heart disease and >32 weeks gestational age 3,18 years and above and exclusion criteria were-uterine anomalies and multiple pregnancy. Sample size was calculated using the formula,

$$N = \frac{(u+v)^2 \{P_1(100-P_1) + P_2(100-P_2)\}}{(P_1-P_2)^2}$$

Where, $u=0.84$; (power=80), $v=1.96$; (Z value at 95% confidence interval)

According to Khan et al proportion of LBW in pregnancy with heart disease was 35% and in normal pregnancy, LBW was 13%.⁸

So, $P_1=35\%$ and $P_2=13\%$

$$N = \frac{(0.84+1.96)^2 \{35(100-35) + 13(100-13)\}}{(35-13)^2}$$

$$= \frac{26704}{484} = 55.1 = 56 \text{ (Each group)}$$

A total of 112 participants were recruited in the study.

Sampling

Sampling was random, pregnant women with known case of heart disease were recruited on the day of admission and participant of comparative group i.e., pregnant women without heart disease were recruited from the same setting on the day of case recruitment.

Data collection

Prior to the data collection ethical approval was sought from research ethics board, Imphal. Informed consent was taken from all participants. Using the predesigned proforma data was obtained from the pregnant women or from the records and by observing. The events of pregnancy without heart disease were recorded on the same day of recording the events of pregnancy with heart disease.

Statistical analysis

Collected data was checked for completeness. Data was entered and analysed using SPSS 21.0.

Ethical approval

Approval from Research Ethics Board, RIMS Imphal was taken and is Ref. no. A/206/REB-Comm (SP)/RIMS/2015/768/110/2020. Informed consent was taken from all the participants. The participation were completely voluntary and right to refuse to participate in the study was respected. Participants were assigned a code. Name, photo identity and address of the participants were taken. Information obtained for the study was used only for the purpose of the study and it was not disclosed to anybody outside the research team.

RESULTS

In our study maximum number of participants with heart disease (30.4%) belonged to the age group between 18-25 and 31-35 years of age. 57.1% of the pregnant women were multiparous and the remaining 42.8% pregnant women were primiparous women. The prevalence of heart disease was higher (71.4%) among the primiparous women. Pregnancy with booking status was found to be higher among the pregnant women with heart disease (85.7%). 66.1% of study participants were homemakers, 20.5% were employed in government service and 13.4% had a private job. Highest occurrence of heart disease (66.1%) was seen in the housewife group. There was increased incidence of pre-term deliveries among pregnant women with heart disease (26.8%). Caesarean section was found to be higher among the pregnant women with heart disease (62.5% vs 28.6%) with a $p<0.001$ according to Table 2. Maternal complications were found to be higher among the pregnant women with heart disease (42.9% vs 5.4%). More babies born to mothers with normal

pregnancy had APGAR score less than 9 (39.3%) when compared to mothers with heart disease (23.2%). Majority of mothers gave birth to normal birth weight babies, between 2.5 kg and 3.4 (62.5% v/s 58.9%). The incidence of NICU admission of babies was higher among mothers with heart disease (17.9%) compared to 5.4% in mothers without heart disease.

Table 1: Association showing heart disease with various variables.

Variables	Heart disease		P value
	Yes	No	
Age (in years)			
18-25	17	21	0.173
26-30	10	16	
31-35	17	14	
36-40	12	5	
Parity			
Primigravida	40	8	0.000
Multi	16	48	
ANC			
Booked	48	32	0.001
Un-booked	8	24	
Occupation			
Housewife	37	37	0.012
Govt. servant	7	16	
Private job	12	3	
Period of gestation			
Preterm	15	6	0.029
Term	41	50	

Table 2: Association showing heart disease with mode of delivery.

Heart disease	Mode of delivery		P value
	CS	Vaginal	
Yes	35	21	<0.001
No	16	40	

Table 3: Foeto-maternal outcomes associated with heart disease.

Variables	Heart disease		P value
	Yes	No	
Apgar score			
> 9	43	34	0.067
<9	13	22	
Birth weight (kg)			
<2.5	4	4	0.585
2.5-3.4	35	33	
3.5-4	15	13	
>4	2	6	
NICU admission			
Yes	10	3	0.039
No	46	53	
Maternal complications			
Yes	24	3	<0.001
No	32	53	

DISCUSSION

Pregnancy is a condition that stresses the cardiovascular system. Cardiac output shifts from 30% to 50%, peaking during mid pregnancy and immediate post-partum. Labour causes a further increase of 20% cardiac output with each uterine contraction and also is responsible for the increased venous return to the heart. These physiological conditions stress the heart and the cardiovascular system and pregnancy with pre-existing heart disease can pose a threat to the mother and may result in adverse outcome of pregnancy.

Our study was conducted on 112 pregnant women and assesses foeto-maternal outcomes in pregnancy with and without heart disease. Maximum number of participants with heart disease (30.4%) belonged to the age group between 18-25 and 31-35 years of age. The maximum number of normal subjects (37.5%) belonged to age group 18-25 years of age which is comparable to study conducted in Punjab medical college. Where 67.6% were in 20-25 years of age.⁹ 57.1% of the pregnant women were multiparous and the remaining 42.8% pregnant women were primiparous women. The prevalence of heart disease was higher (71.4%) among the primiparous women and it was found to be statistically significant ($p=0.000$) and comparable to study done in Bangladesh where 62.7% were primipara.¹³

Pregnancy with booking status was found to be higher among the pregnant women with heart disease (85.7%) and is comparable to study done in India and Pakistan in which booking status constitute 75 and 96.03% respectively.^{10,11} The 66.1% of study participants were homemakers, 20.5% were employed in government service and 13.4% had a private job. Highest occurrence of heart disease (66.1%) was seen in the housewife group and the least (12.5%) was seen among the government service group of participants which is in line with study done in Bangladesh of which 90.2% constitute by housewife.¹³

There was increased incidence of pre-term deliveries among pregnant women with heart disease (26.8%) compared to that of normal pregnancy (10.7%) but a similar study shows 18.9% and 15% only.^{9,10} According to our study delivery by caesarean section was found to be higher among the pregnant women with heart disease (62.5% vs 28.6%) but in similar study vaginal delivery are more in number 81.8% and 62.5%.^{9,10}

Maternal complications were found to be higher among the pregnant women with heart disease (42.9% vs 5.4%) which has comparable finding of 40% in other study.¹⁰ More babies born to mothers with normal pregnancy had APGAR score less than 9 (39.3%) when compared to mothers with heart disease (23.2%) and has similar finding of 5.9% with APGAR score <7.¹³ Majority of mothers gave birth to normal birth weight babies, between 2.5 kg and 3.4 (62.5% v/s 58.9%) and is comparable to study conducted in Punjab which constitute 66%.¹³ The

incidence of NICU admission of babies was higher among mothers with heart disease (17.9%) compared to 5.4% in mothers without heart disease and the results were found to be in line with study conducted in Bangladesh in which NICU admission constitute 25.5%.¹³

Limitations

One limitation of the study was its cross-sectional design, which restrict the establishment of causal relationship. Additionally, the study is the sample size of 112 pregnant women which may limit the generalizability of the findings to a broader population.

CONCLUSION

Pregnancy in women with heart disease still remains a challenging condition, one associated with elevated maternal and foetal morbidity and mortality. Our study has proven that pregnant women with underlying heart disease are at increased risk for adverse maternal, obstetric, and neonatal outcomes. Although there is a significant risk involved with such pregnancies, one can successfully treat the majority of these incidents if early detection by accurate individual risk assessment and careful follow-up, are a part of routine care. Expert joint cardiac and obstetric pre-pregnancy and antenatal care are key to improving outcomes.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Nqayana T, Moodley J, Naidoo D. Cardiac disease in pregnancy. Cardiovasc J Afr. 2008;19(3):145-51.
2. Chinchawade VB, Daver RG, Lewis P. Maternal outcome in heart disease in pregnancy. Res Rev J Med Health Sci. 2014;3(3):61-6.
3. Yasmeen N, Aleem M, Iqbal N. Feto-Maternal Outcome in Patients with Cardiac Disease in Pregnancy. Pak J Med Health Sci. 2011;5(4):748-51.

4. Thakkar JK, Yadav PA, Vyas RC. A Study of Pregnant Women with Cardiac Disease. J Dental Med Sci. 2016;15(3):27-9.
5. Indira I, Sunitha K and Jyothi. Study of Pregnancy Outcome in Maternal Heart Disease. J Dental Med Sci. 2015;14(7):06-10.
6. Nayak RG, Patil SK, Laddad MM. Pregnancy with heart disease-fetomaternal outcome. Int J Recent Trends Sci Techno. 2014;11(2):169-72.
7. Bangal VB, Singh RK, Shinde KK. Clinical study of heart disease complicating pregnancy. J Pharm Biol Sci. 2012;2(4):25-8.
8. Khan DA, Sharma N, Kapoor M, Duwarah SG, Ahanthem SS. The Spectrum of Heart Disease in Pregnancy and its Outcome in Patients Visiting a Tertiary Care Centre of Northeast: A Prospective Study. J Clin Diagnostic Res. 2018;12(7):16-20.
9. Tahira T, Tahir S. Pregnancy; outcome in cardiac disease. Professional Med J. 2012;19(2):145-9
10. Yasmeen NA, Aleem MA, Iqbal NA. Fetomaternal outcome in patients with cardiac disease in pregnancy. Pak J Med Health Sci. 2011;5(4):748-51.
11. Thamizhselvi N. Study of maternal and perinatal Outcome in heart disease complicating Pregnancy in a Tertiary Institution (Doctoral dissertation, Madras Medical College, Chennai), Dissertation. 2013.
12. Puri S, Bharti A, Puri S, Mohan B, Bindal V, Verma S. Maternal heart disease and pregnancy outcomes. JK Sci. 2013;15(1):7-10.
13. Abbasi S, Siddiqua SF, Rijvi S, Akhtar S, Haque B, Jesmin S. Study of maternal and fetal outcome in pregnancy with heart disease. Anwer Khan Modern Med Cllege J. 20173;8(2):112-6.

Cite this article as: Ratan M, Singh NS, Singh CP, Dolma S, Gautam N, Vaishnav AA, et al. Foeto-maternal outcome in pregnancy with and without heart disease: a comparative cross-sectional study in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol 2024;13:989-92.