International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Mandal B. Int J Reprod Contracept Obstet Gynecol. 2023 Mar;12(3):603-608
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20230522

Original Research Article

Study of fetomaternal outcome in congenital heart disease in pregnancy in IPGME and R and SSKM Hospital, Kolkata

Baishakhi Mandal*

Department of Obstetrics and Gynaecology, IPGME and R and SSKM Hospital, Kolkata, West Bengal, India

Received: 05 February 2023
Accepted: 20 February 2023

***Correspondence:**
Dr. Baishakhi Mandal,
E-mail: baishakhimandal18@gmail.com

ABSTRACT

Background: Because of improving medical and surgical management, most infants born with congenital heart disease (CHD) will reach reproductive age, and women are now presenting for obstetric and congenital cardiac care, many following reparative cardiac surgery or intervention. The maternal and fetal risk of a pregnancy for this population will depend on the anatomic and physiologic classification of the type of CHD. Aim of the study was to determine any complications during pregnancy and after birth in pregnant mother with CHD and to find out any complications of newborn baby, born to a mother with CHD.
Methods: The present study was descriptive observational study. This study was conducted for 1 year in department of obstetrics and gynaecology, IPGME and R and SSKMH, Kolkata, sample size 71.
Results: In our study there is no maternal death. Most of patients had vaginal delivery under local anesthesia. Thus, concluding early intervention and proper follow up can reduce the morbidity and mortality in CHD mother, vaginal delivery should be preferred in case of CHD in pregnancy. Also, baby born to CHD mother do not suffer from the same disease.
Conclusions: We concluded that early intervention and proper antenatal check-up can improve the outcome of the pregnant women with CHD as well as the baby, combined obstetrics and cardiac follow-up can reduced maternal mortality rate. There is no correlation between mother heart diseases with baby.

Keyword: CHD in pregnancy, Assisted vaginal delivery, Normal vaginal delivery, CHD and fetus, Complication in heart disease

INTRODUCTION

Because of improving medical and surgical management, most infants born with CHD will reach reproductive age, and women are now presenting for obstetric and congenital cardiac care, many following reparative cardiac surgery or intervention. The maternal and fetal risk of a pregnancy for this population will depend on the anatomic and physiologic classification of the type of CHD as defined by the 2018 AHA/ACC guidelines for the management of adults with CHD.

Primigravida with CHD may be at higher risk during an individual pregnancy, but if they survive, and the risk of pregnancy is generally not cumulative. Thus, successive pregnancies generally entail the same but not greater risk, assuming the cardiovascular status remains stable.

Maternal arrhythmias increase during labour and delivery, possibly owing to volume shifts and hypertension. In women with arrhythmias before pregnancy, recurrence during pregnancy is common and is associated with an increased risk for fetal complications.[1] Labour, delivery, and the postpartum period are a time of increased arrhythmia and heart failure incidences, even in patients without cardiovascular disease. Possible explanations include altered hemodynamic with myocardial irritability. As patients with CHD live longer, arrhythmias are an increasing cause of morbidity and mortality. In addition, more women with CHD are becoming pregnant, and these

patients are at increased risk for arrhythmias and congestive heart failure. Valvular rheumatic heart disease is often only diagnosed during pregnancy because hemodynamic changes occurring as a result of the pregnancy uncover its symptoms. And since a vast majority of these females are not aware of any preexisting heart conditions, many obstetrical complications occur, even resulting in death in 10% of cases.[2] Another factor contributing to their lack of early detection is the deceptiveness of symptoms and cardiac signs during pregnancy. And since a vast majority of these females are not aware of any preexisting heart conditions, many obstetrical complications occur, even resulting in death in 10% of cases. According to a recent study, 15% of maternal deaths were caused by maternal heart disease. Fortunately, life expectancy is excellent for most patients with CHD, depending on their type of defect, previous interventions, and current hemodynamic status.[3]

CHD are the most common birth defects in humans, affecting approximately 0.8% of all live births. The spectrum of defects is broad, ranging from complex defects that result in profound disability and death in infancy to minor defects that are discovered later in life in asymptomatic adults. Improved imaging and diagnostic methods in recent years have led to an increase in the detection and characterization of some of the more minor defects, and advances in medical and surgical care have resulted in a vast improvement in the survival and quality of life of those patients with the more severe defects. Specifically, many women with CHD are now reaching reproductive age and maternal cardiac disease remains the largest contributor to maternal morbidity and mortality worldwide. A critical component of the care of women of reproductive age involves knowledgeable preconception counseling and skillful management throughout pregnancy and delivery. Such care requires both familiarity with the congenital lesions and close collaboration with high-risk obstetrical services.

Spontaneous labour is usually quicker and carries a higher chance of a successful delivery than induced labour. The threshold for assisted delivery either by vacuum extraction or forceps should be low in order to avoid a prolonged second stage of labour.[4]

METHODS

Study design

The study was cross sectional type.

Study settings

Study conducted at department of obstetrics and gynaecology, IPGME and R and SSKMH,

Study type

Study type was of descriptive observational study

Study duration

Study conducted from 1st January, 2021 to 30th June, 2022

Study population

All pregnant women who are diagnosed with CHD.

Inclusion criteria

All pregnant women diagnosed with CHD, VSD, ASD, TOF, Transposition of great artery, TAVPC, Coarctation of aorta, PDA, Ebstein anomaly, patent foramen ovale, any other form of CHD attending the OPD or indoor were included.

Exclusion criteria

Patient who could not be contacted even after 3 attempts, patient with rheumatic heart disease, heart disease with diabetes, chronic hypertension and chronic nephritis were excluded.

Sample size

Total 71 patients were included in the study.

Sampling design

Consecutive sampling included patients record, bed head tickets, pre designed pretested semi-structured proforma, ECG and Doppler machine echocardiography.

Study technique

Study techniques variables included-interview, physical examination, imaging, laboratory investigations, record review as well as age, cyanotic verses acyanotic, education, rural/urban, occupation, corrected/uncorrected, preterm premature rupture of membrane, low birth weight (LBW) baby, congenital anomaly, neonatal jaundice and NICU admission.

Diagnostic criteria

Echocardiography, fetal echo, LBW baby <2.5 kg birth weight, USG colour doppler were consider as diagnostic criteria.

Statistical analysis

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0, SPSS Inc., Chicago, IL, USA) and Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples.

Z test (Standard normal deviate) was used to test the significant difference of proportions.

P≤0.05 was considered for statistically significant.

RESULTS

In our study, 20 (28.2%) patients were ≤20 years of age, 35 (49.3%) patients were 21-30 years of age and 16 (22.5%) patient were ≥31 years of age.

The value of z=2.584. The value of p=0.00988. The result is significant at p<0.05.

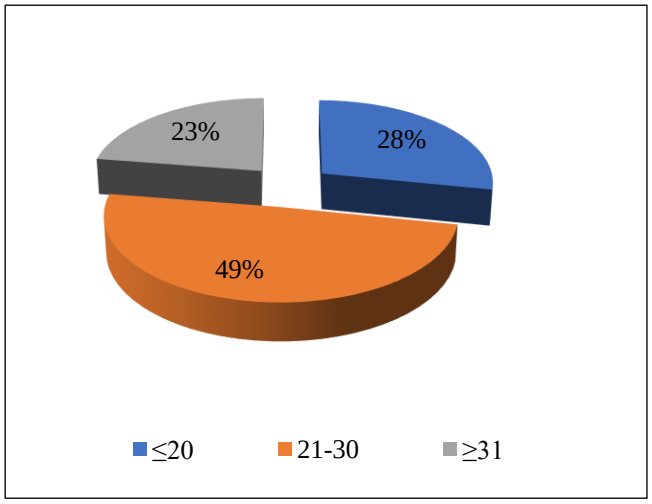

Figure 1: Distribution of age in group.

In our study, 18 (25.4%) patients were in class 12, 12 (16.9%) patients were college students and 1 (1.4%) patient was master's student.

The value of z=1.2335. The value of p=0.2187. The result is not significant at p<0.05.

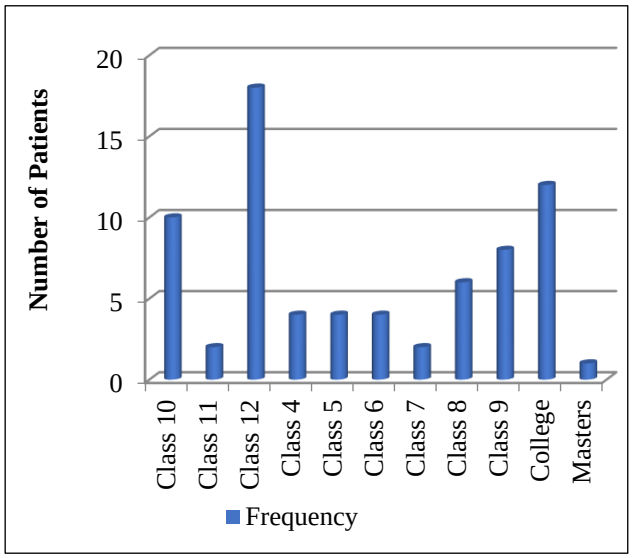

Figure 2: Distribution as per education.

In our study, 29 (40.8%) patients had ASD, 1 (1.4%) patient had ASD with atrial fibrillation, 2 (2.8%) patients had ASD with mitral valve prolapse.

The value of z=2.5406. The p=0.01108. The result is significant at p<0.05.

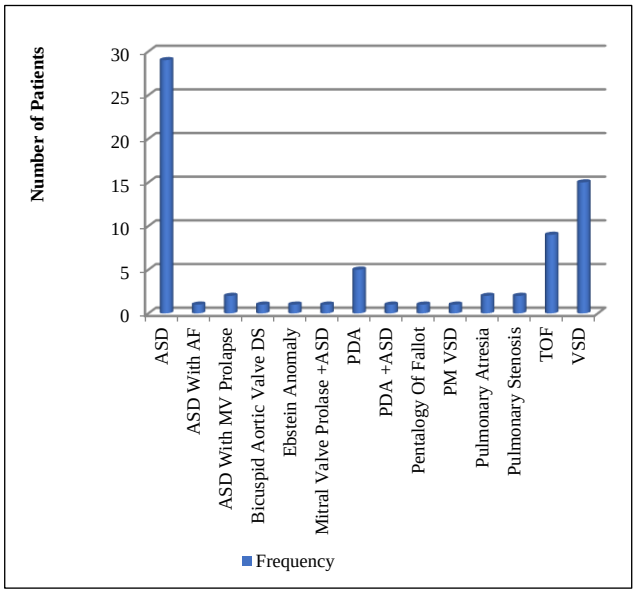

Figure 3: Distribution of type of cardiac disease.

Table 1: Distribution of mode of delivery.

Mode of delivery	N	Percent (%)
Assisted vaginal delivery	19	26.8
LSCS	33	46.5
Normal vaginal delivery	19	26.8
Total	71	100

In our study, 19 (26.8%) patients had assisted vaginal delivery, 33 (46.5%) patients had LSCS and 19 (26.8%) patients had normal vaginal delivery in mode of delivery.

The value of z=2.4386. The value of p=0.01468. The result is significant at p<0.05.

Table 2: Distribution of ITU/CCU admission rate.

ITU/CCU	N	Percent (%)
ICCU	2	2.8
ITU	8	11.3
No ITU	60	84.5
CCU	1	1.4
Total	71	100

In our study, 2 (2.8%) patients had ICCU (Intensive cardiac care unit), 8 (11.3%) patients had ITU and 1 (1.4%) patient had ITU/CCU in ITU/CCU.

The value of z=8.7353. The value of p<0.00001. The result is significant at p<0.05.

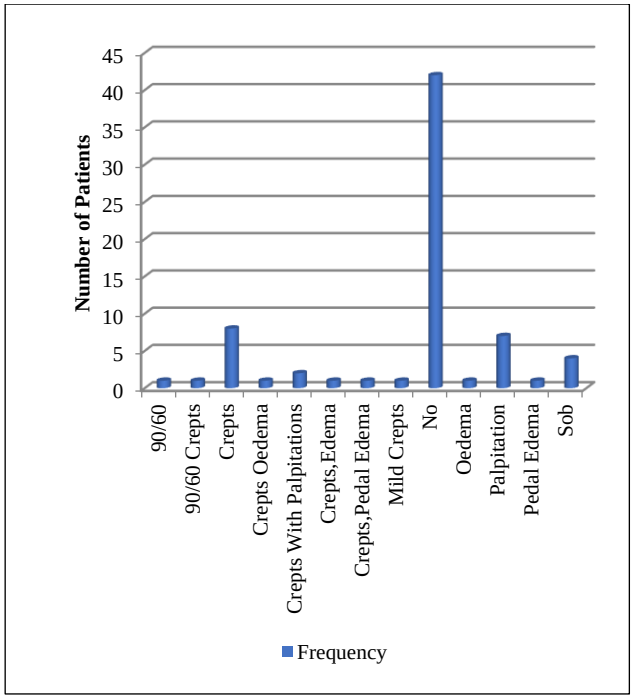

Figure 4: Distribution of day 2 and 5 vitals (Post confinement).

In our study, most of the patient showed no complications.

The value of z=5.9737. The value of p<0.00001. The result is significant at p<0.05.

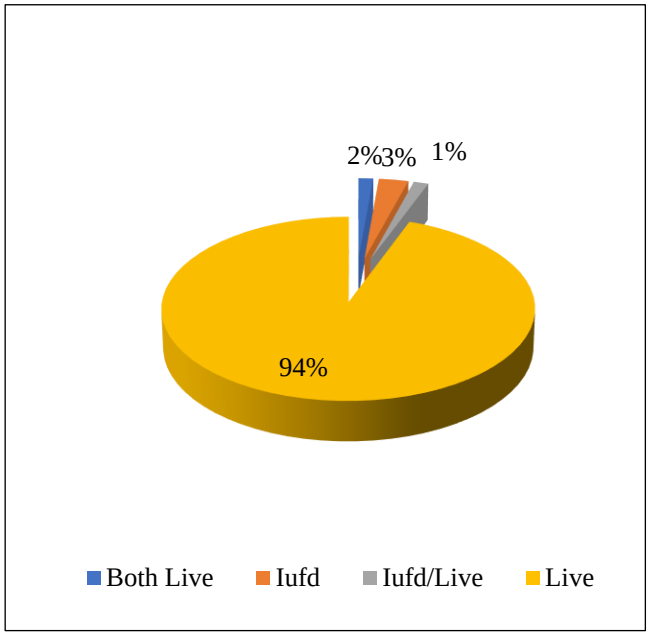

Figure 5: Distribution of baby outcome.

In our study, 94% babies are born alive.

The value of z=10.9137. The value of p<0.00001. The result is significant at p<0.05.

Table 3: Distribution of baby heart disease.

Baby heart disease	N	Percent (%)
No	71	100
Yes	0	0
Total	71	100

All the babies did not suffer any heart disease like mother.

Table 4: Distribution of NICU/SNCU admission.

NICU/SNCU	N	Percent (%)
NICU	7	9.9
SNCU	14	19.7
NO	50	70.4
Total	71	100

In our study, 7 (9.9%) patients had NICU admission, and 14 (19.7%) patients had SNCU admission.

The value of z=6.0717. The value of p<0.00001. The result is significant at p<0.05.

Table 5: Distribution of mean birth weight.

N	Mean	SD	Min	Max	Median
71	2.5697	0.4701	1.4000	3.80	2.600

Above table showed that the mean birth weight (Mean ± SD) of patient's baby is 2.5697±0.4701 kg.

DISCUSSION

The present study was a descriptive observational study. This study was conducted from 1st January, 2021 to 30th June, 2022 at department of obstetrics and gynaecology, IPGME and R and SSKMH, Kolkata. The 71 patients were included in this study.

Roos-Hesselink et al observed that reducing maternal mortality is a WHO global health goal. The mean age was 29.5 years.[5] Prevalent diagnoses were congenital (57%) and valvular heart disease (29%).

We found that, out of 71 patients, most of the patients were in 21-30 years of age [35 (49.3%)]. Rest of 20 (28.2%) patients were ≤20 years of age and 16 (22.5%) patient were ≥31 years of age. This was statistically significant (p=0.00988), (z=2.584). The mean Age of patients was [248.5800±5.5971].

Our study showed that, most of the patients were primigravida [33 (46.5%)]. This was statistically significant (p<0.00001), (z=4.413). It states with development more number of patients with CHD visit hospital early for ANC checkup. Most of the patients did not have higher education which somehow obscure there visit to tertiary care unit.

Manh et al found that caring for children and mothers suffering from cardiac disease is highly challenging, with issues including late diagnosis as well as inadequate infrastructure and supply of drugs.[6] Hypertension (odds ratio (OR): 59.75, 95% confidence interval (CI): 9.1-392.17), the heart disease types [ASD (OR: 4.27, 95% CI: 1.19-15.29) and tetralogy of Fallot (OR: 6.82, 95% CI: 1.21-38.55)], and the complications [heart failure (OR:10.34, 95% CI: 2.75-38.87) and pulmonary edema (OR:107.16, 95% CI: 4.96-2313.93)] were observed as risk factors for intrauterine growth restriction.

We showed that, most of the patients had ASD [29 (40.8%)] which was statistically significant (p=0.01108), (z=2.5406). Maximum heart diseases are uncorrected ASD, which have a good prognosis in pregnancy.

Nanda et al observed that cardiac disease is leading cause of maternal mortality among UK women with uncorrected CHD and those who have undergone corrective/palliative surgery may have complicated pregnancies.[7]

We found that, most of the patients had no complication [42 (59.2%)], with zero mortality.

Avila et al showed that the improvement in surgical techniques has contributed to an increasing number of childbearing women with complex CHD.[8] To evaluate fetal and maternal outcomes in pregnant women with CCC and to analyze the predictive variables of prognosis. Maternal and fetal complications were higher (p<0.05) in women with hypoxemia. Pregnancy in women with CCC was associated to high maternal and offspring risks.

In our study, most number of patients had vaginal delivery [38 (53.6%)] and it was statistically significant (p=0.01468), (z=2.4386).

We showed that, maximum patients had no ITU/CCU admission or PPH [60 (84.5%)] which was statistically significant (p<0.00001), (z=8.7353) and we also found that most of the patients had no post-delivery complications [42 (59.2%)] which was statistically significant (p<0.00001), (z=5.9737).

Cauldwell et al exclaimed that cardiac disease in pregnancy is a challenging clinical problem.[9] Women with CHD make up the majority of these cases and although maternal mortality is infrequent, a good outcome is only achieved though meticulous multidisciplinary care, beginning with pre-pregnancy counseling.

We found that, most of the patients had live baby outcome [67 (94.4%)] which was statistically significant (p<0.00001), (z=10.9137) and we also found that all patients had no baby heart disease.

Our study showed that, lower number of babies had NICU admission [7 (9.9%)] and it was statistically significant (p<0.00001), (z=6.0717).

In our study, most of the patients had LBW as an indication for NICU admission [9 (42.9%)].

We showed that, the mean number of ANC of patients was [5.2535±37.7970.], mean ejection fraction of patients was [63.1972±6.0205]. Weeks of termination of patients was [36.9296±1.8231.] week.

We found that, out of 71 patients, most of the patients were 21-30 years of age. The mean age of patients was [24.85800±5.5971].

Our study showed that, most of the patients were primigravida with heart disease. Hence more people with heart disease are turning to hospital for better management.

Though most of the patients received basic education, thus it was easier for them to communicate better. Education also improves their compliance with further antenatal check up and treatment.

We found that, most of the patients had no PAH, stating most of heart disease if detected earlier complications can be avoided.

Vaginal delivery is better in heart disease with pregnancy, it is clearly shown in our study that most of the patient had undergone vaginal delivery, their post-delivery complications were less when compared to LSCS.

Maximum patients did not need ITU/CCU interventions. As early antenatal check up monitoring was done and patient was timely admitted hence ITU admission was prevented.

Post-delivery complication like PPH, cardiac overload causing crepitations, palpitation were very less due to proper post-delivery management in hospitals.

We found that, most of the patients had live baby outcome and also all patients had no baby heart disease.

Our study showed that, lower number of babies had NICU admission, as intrapartum monitoring was done. Most frequent indication for babies in NICU was found to be LBW.

We showed that, the mean number of ANC of patients was [5.2535±37.7970.]. Hence all the patients were regularly attending ANC clinic as well as cardiology outdoor which had better outcome.

Ejection fraction (EF) of most of patients was [63.1972±6.0205]. Hence EF is not affected in most of CHD.

Weeks of termination of patients was [36.9296±1.8231.], as we all knew cardiac load increases during delivery, most

of the patient were timely admitted to prevent complications during delivery.

Mean birth weight of babies were [2.5697±0.4701] kgs. Hence most of the babies born healthy.

Limitations

In spite of every sincere effort my study has lacunae.

The notable short comings of this study are the sample size was small only 71 cases are not sufficient for this kind of study. The study has been done in a single centre. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out.

CONCLUSION

Our study is conducted on pregnant women with CHD and their effect on neonatal baby. As shown in our study most of the patients turn to hospital at an early age, average age being 21 years, which reduces the complications of heart disease in those patients. As shown in our study most of the patients turn to hospital at early age for early intervention in pregnancy. Most of the patients with CHD with or without correction if managed early complication like, palpitation, arrythmias, cardiac overload, PAH, cardiac failure, PPH and death can be avoided as seen in our study. With proper ANC, timed decision and monthly cardiac follow up, ITU, CCU intervention and critical conditions can be avoided in pregnancy, during delivery and postpartum period. As shown in our study babies born to those mothers, showed no effect of heart disease on them, born with 2.5 kgs birth weight as average and undergone less NICU admissions. Education improves compliance of patients to antenatal visits and medications. Tertiary care unit played a major role in management of heart disease in pregnancy, both cardiac and obstetrics departments worked together to improve the general health conditions of this patients during pregnancy and to reduce the morbidity and mortality among the baby and the mother.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Silversides CK, Harris L, Haberer K, Sermer M, Colman JM, Siu SC. Recurrence rates of arrhythmias during pregnancy in women with previous tachyarrhythmia and impact on fetal and neonatal outcomes. Am J Cardiol. 2006;97(8):1206-12.
2. Lim ST. Rheumatic heart diseases in pregnancy. Ann Acad Med Singap. 2002;31(3):340-8.
3. Nieminen HP, Jokinen EV, Sairanen HI. Late results of pediatric cardiac surgery in Finland: a population-based study with 96% follow-up. Circulation. 2001;104:570-5.
4. Steer PJ. Pregnancy and contraception. In: Gatzoulis MA, Swan L, Therrien J, Pantely GA, eds. Adult congenital heart disease: A practical guide. Oxford: BMJ Publishing, Blackwell Publishing. 2005;16-35.
5. Roos-Hesselink J, Baris L, Johnson M, De Backer J, Otto C, Marelli A et al. Pregnancy outcomes in women with cardiovascular disease: evolving trends over 10 years in the ESC Registry of Pregnancy And Cardiac disease (ROPAC). Eur Heart J. 2019;40(47):3848-55.
6. Manh NT, Bui Van N, Le Thi H, Vo Hoang L, Nguyen Si Anh H, Trinh Thi Thu H et al. Pregnancy with heart disease: maternal outcomes and risk factors for fetal growth restriction. Int J Environ Res Publ Heal. 2019;16(12):2075.
7. Nanda S, Nelson-Piercy C, Mackillop L. Cardiac disease in pregnancy. Clinical Medicine. 2012;12(6):553.
8. Avila WS, Ribeiro VM, Rossi EG, Binotto MA, Bortolotto MR, Testa C et al. Pregnancy in women with complex congenital heart disease. A constant challenge. ArquivosBrasileiros de Cardiologia. 2019;113:1062-9.

Cite this article as: Mandal B. Study of fetomaternal outcome in congenital heart disease in pregnancy in IPGME and R and SSKM Hospital, Kolkata. Int J Reprod Contracept Obstet Gynecol 2023;12:603-8.