ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

ORIGINAL RESEARCH ARTICLE

Fetomaternal outcome in pregnancy with cardiac disease in a tertiary care hospital of Eastern India

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ABSTRACT

Background: Heart disease complicating pregnancy is an important indirect cause of maternal mortality and morbidity. Heart disease in pregnancy is still a major problem worldwide, particularly in low resource country like India. Its reported incidence varies between 0.1 to 4%. Heart disease complicates 1% to 3% of all pregnancies and is responsible for 10% to 15% of maternal mortality. Heart disease in pregnancy is associated with adverse fetomaternal outcome and has re-emerged as one of the leading causes of maternal mortality. The maternal mortality rate in women with cardiac disease is 7% and morbidity is 30% during pregnancy in India. **Methods:** This study was a prospective observational study conducted in the IPGMER & SSKM Hospital, Kolkata, West Bengal from December 2021 to February 2022. 72 Pregnant women with heart disease were taken as study group. Multiple pregnancy and any other medical disorder like GDM, PIH, were excluded from study. Fetomaternal outcome, mode of delivery, prematurity, LBW, NICU admission and maternal and neonatal mortality were compared. Template was generated in MS excel sheet and analysis was done on SPSS software. **Results:** Among 72 patients majority 28 (38.89%) patients belonged to age group 25-29 years. Majority

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

26 (36.11%) patients belonged to lower middle class Majority 38 (52.78%) patients were P0+0 and 18 (25%) were P1+0 parity group. Majority 20 (55.56%) belong to gravida G1. 20 (27.78%) patients had CHD and RHD. 40 (55.56%) were normal delivery. 26 (36.11%) of babies were underweight. Maternal death occurred in 4 (5.56%) cases and neonatal death was 2 (2.78%). **Conclusions:** Feto-maternal outcome can be improved appreciably by antenatal care, early diagnosis and management

Keywords: Feto-maternal outcome, heart disease, pregnancy, RHD

INTRODUCTION

Pregnancy makes a significant demand on the cardiovascular system. Cardiac disease in the pregnant woman can present a challenge to the obstetrician, cardiologist and neonatologist.[1] The spectrum of cardiovascular disease is changing and varies between countries.[2] At present 0.2 - 2% of all pregnancies are complicated by cardiovascular disease.[3] Cardiac disorders contribute to approximately 20.5% of maternal deaths.[4] The ratio of Rheumatic Heart Disease (RHD) and Congenital Heart Defects (CHD) is decreasing due to improved pediatric care and improved surgical interventions early in childhood.[5] Maternal functional status is a most important predictor of outcome and most often defined by New York Heart Association (NYHA) functional class.[6] Increasing number of women with cardiac disease is reaching the reproductive age due to modern therapeutic options and moreover these patients are now attempting pregnancy multiple times due to improved availability of life saving modern therapy.[7] Poor functional status and cyanosis are mostly associated with adverse maternal and neonatal outcome.[7] In developing countries, anemia is a major associated factor that precipitates heart failure. Pregnant women with cardiac disease fall into two categories. Those with diagnosed heart disease and under treatment even before becoming pregnant. Those with previously undiagnosed heart disease Cardiac lesions and pregnancy both may affect each other adversely. It is essential to thoroughly evaluate patients for underlying cardiovascular disease in order to promote optimal care during pregnancy that plays a major role in the outcome.[8]

The maternal mortality rate in women with cardiac disease is 7% and morbidity is 30% during pregnancy in India.[9,10] It is an important indirect cause of maternal mortality in India. There are very few studies available in India that is prospective, focused particularly on heart disease in pregnancy. Most studies were retrospective and used small sample size.

With this background, this study intends to study the Fetomaternal Outcome in Pregnancy with cardiac Disease in a Tertiary Care Hospital of Eastern India.

Method and Materials:

Type of study: prospective observational study

Study design : Observational study.

Study setting: Department of Obstetrics and Gynecology, IPGMER & SSKM Hospital, Kolkata, West Bengal, India

Period of study: December 2021 to February 2022, 3 months

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

Definition of problem : In the developing country like India along with hemodynamic changes, the presence of complicating factor like anemia, under reporting disease, inadequate antenatal care and poor socio-economic condition add to the high maternal death to the cardiac disease in pregnancy.

Inclusion Criteria: Women with diagnosed heart disease with pregnancy admitted through Out-Patient-Department (OPD) and Emergency of Department of Obstetrics and Gynecology, IPGMER & SSKM Hospital, Kolkata.

Exclusion criteria : Mothers with medical disorder other than cardiac disease.

Sample size : All reported diagnosed case of cardiac disease with pregnancy fulfilling inclusion and exclusion criteria admitted through OPD and Emergency of Obstetrics and Gynecology, IPGMER & SSKM Hospital, Kolkata. during the study period

Method of data collection: Data were collected from ward, labor room, OT record sheet, neonatal units. Predesigned record sheet was filled up.

Study tool :

A : Detailed History like Age, Parity, Gestational Age, Socio-economic Status, Obstetrics history, Past history of any cardiological event.

B : Clinical Examination like Obstetrics Examination and Cardiovascular & Respiratory System Examination.

Total 72 cases were studied in this observational study. Ethical permission was taken. The patients fulfilled the inclusion criteria were selected and recruited for the study. Written informed consent was taken for participation in the study. Previous medical history relevant to heart disease such as past history of rheumatic fever, consultation with cardiologist, taking of medicine or any previous history of heart failure were also evaluated. Past surgical history especially cardiac operation was taken with special reference to type of operation, type of lesion and clinical improvement. A careful supervision was made on each labor case & mode of delivery was evaluated. All the patients after discharge were advised to come OPD for follow up 6 week after delivery, and to consult cardiologist.

Statistical Analysis:

Data was entered into SPSS 26 (SPSS Inc Chicago IL USA). Analysis was based on intention to treat. Continuous variables have been assessed by Student's t test and Mann Whitney U test depending on the data normality. Categorical data has been assessed by chi square test. P value <0.05 has been considered to be statistically significant.

Ethical clearance: The study will be conducted only after obtaining written approval from the Institutional Ethics Committee. Written informed consent was taken from every study patient or their logical representative.

Results

This hospital based prospective study was conducted in IPGMER & SSKM Hospital, Kolkata from December 2021 to February 2022 in the department of obstetrics and gynaecology. Total 72 patients with cardiac disease were taken. During the course of study total 1400 deliveries

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

were conducted in present tertiary care institution. The incidence of heart disease was 2.57% during the study duration

Table 1: Socio-demographic distribution of the study participants (n=72).

Socio-demographic profile		Frequency	
		Number	**%**
Age	< 20 years	4	5.56
	20 – 24 years	22	30.56
	25 -29 years	28	38.89
	30 – 34 years	14	19.44
	≥35 years	4	5.56
	Total	**72**	**100**
Economic status	Upper Middle class	12	16.67
	Lower Middle class	26	36.11
	Lower class	34	47.22
Religion	Muslim	34	47.22
	Hindu	38	52.78

Present study showed that among 72 patients 28 (38.89%) patients belonged to age group 25-29 years and 4 (5.56) belonged to age group <20 years. 26 (36.11%) patients belonged to lower middle class and 34 (47.22%) belong to lower class. Majority of the patients 38 (52.78%) were Hindu followed by Muslim 34 (47.22%). (Table 1)

Table 2 : Distribution of study participants according to Parity, Gravidity, Functional Classification on admission (NYHA), and Gestational age (n=72)

Parameters	**Frequency**	
	No. of Patient	**Percentage (%)**
Parity		
P0+0	38	52.78
P1+0	18	25.00
P1+1	2	2.78
P0+1	4	5.56
P2+0	4	5.56
P2+1	4	5.56
P3+1	2	2.78

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Total	**72**	**100**
Gravida		
G1	40	55.56
G2	20	27.78
G3	8	11.11
G4 and Above	4	5.56
Total	**72**	**100**
Functional Classification on admission (NYHA)		
Class I	34	47.20
Class II	24	33.30
Class III	10	13.90
Class IV	4	5.60
Total	**72**	**100.0**
Gestational age		
< 37 weeks	22	30.56
37-40 weeks	46	63.89
> 40 weeks	4	5.56
Total	**72**	**100.00**

Table 2 showed that 38 (52.78%) patients were P0+0 and 18 (25%) were P1+0 parity group. Majority of them were primigravidae i.e. 40 (55.56%) followed by second gravidae 20 (27.78%). NYHA classification at the time of admission denotes that 34 (47.2%) of the women were NYHS class I, 24 (33.30%) were class II, 10(13.90) were class II and 4 (5.60%) were class IV. Gestational age of 46 (63.56%) patients have gestational period of 37.40 weeks followed by 22 (30.56%) have gestational age < 37 weeks.

Table 3 : Depicted types of Heart Disease (n=72)

Type of Heart disease	**No. of patient**	**Percentage (%)**
AR	2	2.8
CHD	4	5.6
CHD, ASD	10	13.9
CHD, CSD	2	2.8
CHD, VSD	4	5.6
Chronic HTN	2	2.8
Dilated Cardiopathy	4	5.6

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Heart Block	2	2.8
IHD, MI	2	2.8
MR	4	5.6
MS	2	2.8
PPCM, PIH with GDM	2	2.8
RHD	2	2.8
RHD, MR	6	8.3
RHD, MR, MS	4	5.6
RHD, MS	8	11.1
SVT	4	5.6
Tachycardia	2	2.8
TR	2	2.8
VSD	2	2.8
WPW syndrome, SVT	2	2.8
Total	**72**	**100.0**

Table 3 depict that 20 (27.78%) patients had CHD and 20 (27.78%) RHD which highlighted that the heart disease of rheumatic origin is still rampant in our country.

Table 4 : Distribution of according to Mode of delivery, Maternal Complications and Birth weight

Parameters	**Frequency**	
	No. of Patient	**Percentage (%)**
Mode of delivery		
Normal	40	55.56
Instrumental (Forceps)	4	5.56
LSCS	28	38.89
Total	**72**	100.00
Birth Weight		
< 2 kg	14	19.44
2 – 2.4 kg	12	16.67
2.5 – 3 kg	32	44.44
> 3 kg	14	19.44
Total	**72**	**100.00**
Maternal Complications		
Pulmonary Hypertension	4	5.56
Convulsion	2	2.78

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Maternal Death	4	5.56

Table 4 showed that 40 (55.56%) were normal delivery, 28 (38.89%) were LSCS and 4 (5.56%) were Instrumental (Forceps) delivery. Birth weight record shows a high incidence of low birth weight babies born to theme mothers below 2 kg 14 (19.44%) and 2-2.4 kg 12 (16.67%). 32 (44.44%) babies were between 2.5 and 3 kg range. 14 (19.44%) babies were above 3 kg. while in maternal complication 4 (5.56%) have pulmonary hypertension, 2 (2.78%) have convulsion and maternal death occurred in 4 (5.56%) cases.

Figure 1 : Distribution of according to Perinatal Outcome

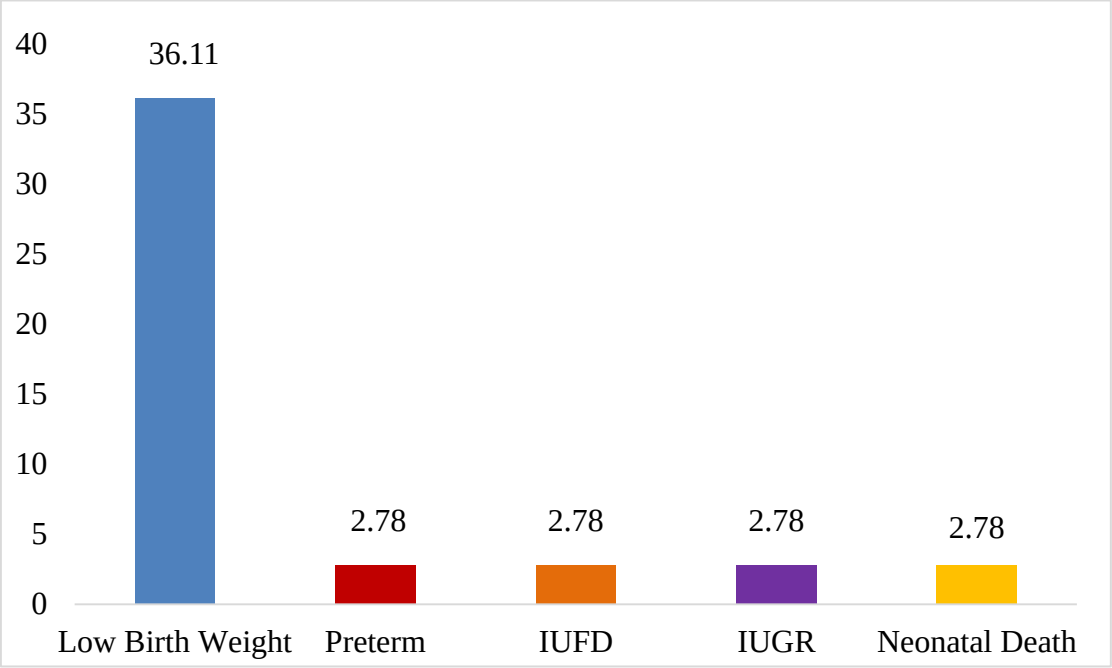

Figure 1showed that 26 (36.11%) of babies were underweight. Neonatal death was 2 (2.78%).

DISCUSSION

Majority of studies in pregnant women with cardiac disease were conducted by cardiologist and worsening of cardiac status was taken as adverse outcome. This prospective study was conducted in IPGMER & SSKM Hospital, Kolkata from December 2020 to February 2021. 72 cardiac patients were taken. The incidence of heart disease in pregnancy in present study was 2.57%, similar to the incidence seen in other earlier Indian studies.[8-11]

In present study among 72 patients 28 (38.89%) patients belonged to age group 25-29 years and 4 (5.56) belonged to age group <20 years. 26 (36.11%) patients belonged to lower middle class

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and 34 (47.22%) belong to lower class. Majority of the patients 38 (52.78%) were Hindu followed by Muslim 34 (47.22%).

In an Indian study done by Hiralal K et al found that increased maternal age was a risk factor for poor maternal and neonatal outcome which was not observed in the present study.[12]

In the present study 38 (52.78%) patients were P0+0 and 18 (25%) were P1+0 parity group. Majority of them were primigravidae i.e. 40 (55.56%) followed by second gravidae 20 (27.78%). NYHA classification at the time of admission denotes that 34 (47.2%) of the women were NYHS class I, 24 (33.30%) were class II, 10 (13.90) were class II and 4 (5.60%) were class IV. Gestational age of 46 (63.56%) patients have gestational period of 37.40 weeks followed by 22 (30.56%) have gestational age < 37 weeks.

Sheela CN et al in their study done in 2009 found that parity was not significantly associated with any adverse maternal outcome which was in corroboration with the present study.10 Martin LC et al in 2016 conducted a study in which he concluded that maternal age, parity and enrolment in third trimester were not associated with adverse fetomaternal outcome.[13] After reviewing the literature also authors found that preterm delivery is more common in heart disease than in normal pregnancy.[14,15]

Present study showed that 20 (27.78%) patients had CHD and 20 (27.78%) RHD which highlighted that the heart disease of rheumatic origin is still rampant in our country.

Most previous studies done in developing countries also showed the similar result.[12,15-17]

Our study revealed that 40 (55.56%) were normal delivery, 28 (38.89%) were LSCS and 4 (5.56%) were Instrumental (Forceps) delivery. Similar findings were observed in other Indian studies.[12,9-11]

Birth weight record shows a high incidence of low birth weight babies born to theme mothers below 2 kg 14 (19.44%) and 2-2.4 kg 12 (16.67%). 32 (44.44%) babies were between 2.5 and 3 kg range. 14 (19.44%) babies were above 3 kg. while in maternal complication 4 (5.56%) have pulmonary hypertension, 2 (2.78%) have convulsion and maternal death occurred in 4 (5.56%) cases. Whereas some studies also reported maternal mortality.[12,18]

As far as perinatal outcome is concerned 26 (36.11%) of babies were underweight. Neonatal death was 2 (2.78%).

CONCLUSIONS

Heart disease with pregnancy is one of the important causes of maternal death. Rheumatic heart disease is still the commonest cause of heart disease and mitral valve is the commonly affected area. Improvement of standard of living can reduce the incidence of rheumatic fever which in turn capable of lowering RHD. Maternal morbidity and mortality due to heart disease can be reduced appreciably by antenatal care, early diagnosis and management with the help of cardiologist & surgery in selected cases. Recent advancement in cardiology may result in more successful treatment of pregnant cardiac patients

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

ACKNOWLEDGEMENTS

Authors would like to acknowledge the patients who participated in this research study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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