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Heart Disease in Pregnancy and its Feto- Maternal outcome.

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Abstract
Results: *84% patients belonged to age group 20-29 years. 8% and 4% patients were teen aged and elderly respectively. 64% patients were either P_{0+0} or P_{0+1}. 8% patients were P_{0+3} and 2% patient were P_{3+0}. 74% patients had RHD. 26% had class I, 40% had class II, 20% patients had grade III and 14% had grade IV heart disease. The associated complications were anemia 46%, Respiratory tract infection 12%, pregnancy induced hypertension 2% and recurrent rheumatic fever 2%. 48% had vaginal, 20% had forceps and 32% had caesarean delivery. One mother died of heart failure. 100% of grade I, 95% of grade II, 50% of grade III disease had term delivery. 23.07% of grade I, 30% of grade II, 60% of grade III and 100% babies of grade IV mothers were of low birth weight (<2.5 kg). Babies weighing <1.5 kg were seen in 5% grade II, 10% grade III and 42.85% mothers with grade IV disease. 2 of grade IV and each of grade I II and III were died. CONCLUSION: Feto-maternal outcome can be improved appreciably by antenatal care, early diagnosis and management.*

Keywords: *feto-maternal outcome, heart disease, pregnancy*

I. Introduction

Cardiac disease during pregnancy is still a major problem worldwide. Heart disease in pregnancy is of great clinical significance both to the cardiologist & obstetrician. Cardiovascular disease complicates around 1-3% of all pregnancy and responsible for 10-15% of maternal death[1-3]. Although prevalence is low but now a days it is the leading cause of maternal death internationally[4]. Since more women with congenital or acquired heart disease are reaching child bearing age due to improved medical and surgical care, the incidence of cardiovascular disease in pregnancy is increasing. There is marked hemodynamic changes during pregnancy. The pregnant women is in a hyper-dynamic and volume-overloaded state as a result of physiological changes. These changes result in increased demand on the cardiovascular system. In normal women the cardiac reserve is sufficient to accommodate this increased work load. However women with underlying heart disease cannot tolerate these additional hemodynamic burden of pregnancy. So there may be significant risk to the mother, fetus or both. Therefore pregnancy may exaggerate underlying disease, resulting in increased morbidity and mortality. Despite advancement in medical care, heart disease in pregnancy is associated with high maternal and perinatal morbidity and mortality particularly in developing countries[5]. This study was done to enlighten the total incidence of pregnancy with heart disease and its effects on pregnancy outcomes in term of maternal and perinatal morbidity & mortality as there were few studies in India done regarding cardiac disease in pregnancy.

II. Materials & Method

Study setting:
Department of Obstetrics and Gynecology, R.G.KAR Medical College (RGKMC) & N.R.S Medical College Hospital (NRSMC) Kolkata.
Time line: July 2014 to June 2015
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.
Definition of population and inclusion criteria: Women with diagnosed heart disease with pregnancy admitted through Out-Patient-Department (OPD) and Emergency of Department of Obstetrics and Gynecology, RGKMC & H and NRSMC& H, Kolkata.

Exclusion criteria
1. Mother with coronary cardiac disease
2. 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, RGKMC and NRSMC& H, 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 design: Observational Study
Study tool

(A) Detailed History
1) Age
2) Parity
3) Gestational Age
4) Socio-economic Status
5) Domicile
6) Obstetrics history
7) Past history of any cardiological event

B) Clinical Examination
1) Obstetrics Examination
2) Cardiovascular & Respiratory System Examination

C) Investigations
1) Hb%, Blood grouping & RH typing, fasting blood sugar, FT_4, TSH, Thalessemia screening, HIV screening, $HBS_{Ag,}$ HCV
2) ECG
3) Echocardiography
4) Chest X Ray with abdominal shield (*where applicable)
5) USG for feto-placental profile & amniotic fluid index

50 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. The entire study population were evaluated by New York Heart Association functional grading. All cases were referred to the cardiologist after admission & managed by joint supervision of the obstetrician and cardiologist throughout the pregnancy and puerperium. A careful supervision was made on each labor case & mode of delivery was evaluated. The patients were kept 10 days after delivery for any complications including heart failure. Status of baby was evaluated at the time of delivery and during hospital stay. All the patients after discharge were advised to come OPD for follow up 6 week after delivery, and to consult cardiologist.

III. Results And Analysis

In this present series there were 50 confirmed cases of heart disease out of 20170 deliveries giving an incidence of 0.24%.

Table 1 showing Age distribution (N=50)

Age in year	No of patient	Percentage (%)
< 20 yrs	4	8
20 – 24 yrs	17	34
25 -29 yrs	25	50
30 – 34 yrs	2	4
≥35 yrs	2	4

Table 1 showed majority (84%) patients were within twenties. 8% patients were still in their teen age. 4% patients had pregnancy after 35. This reflected the Indian trend of early marriage and pregnancy.

Table 2 depicted Parity distribution (N=50)

Parity	No. of Patient	Percentage (%)
P_{0+0}	27	54
P_{1+0}	6	12
P_{0+1}	5	10

P_{2+0}	1	2
P_{0+2}	4	8
P_{2+1}	2	4
P_{3+0}	1	2
P_{0+3}	4	8

64% of patients in this study were either P_{0+0} or P_{0+1}. Most patients were not aware of their heart ailment till advanced pregnancy. As frequent pregnancy is discouraged, only one patient with P_{3+0} was pregnant once again. She had all three female children and was under stress from in-laws for male child. Among 4 patients with P_{0+3} one was known heart case and on treatment and the rest were not aware of their pathology till running pregnancy.

Table 3 showed Socioeconomic Status (N=50)

Economic status	No. of patient	Percentage (%)
Upper Middle class	2	4
Lower Middle class	10	20
Lower class	18	36
Below Poverty Line	20	40

Table 3 described socioeconomic status. 76% of the patients belonged to either lower income group (LIG) and Below Poverty line (BPL). Majority had rheumatic heart disease which was following rheumatic fever whose incidence is more common among overcrowding LIG. Only 4% were from upper middle class family. Inspite of having money they were refused by the well-equipped corporate hospital due to severity and associated risk. None of the patient attended Govt. Hospital was wealthy.

Table 4 Gave the picture of Rural / Urban distribution (N=50)

Area	No of Patient	Percentage (%)
Rural	43	86
Urban	7	14

86% came from rural area and the remaining 14% were from urban slum area.

Table 5 shown distribution of Religion

Religion	No. of Patient	Percentage (%)
Muslim	35	70
Hindu	15	30

Table 5 had shown distribution of religion. 70% of them were Muslim. This is because 55% of the population of the draining area are muslim and they belong to lower socio-economic family. The remaining patients were hindu. Total number of booked patient were 69% and 31% were unbooked cases.

Table 6 depicted types of Heart Disease

Type of Heart disease	No. of patient	Percentage (%)
Rheumatic heart disease(RHD)	37	74
1. MS	10	20
2. MR	3	6
3. MS + MR	7	14
4. AS	1	2
5 AR	1	2
6. TR	1	2
7. MS+ PAH	5	10
8. MS + MR + PAH	6	12
9.MR +AR +PAH	2	4
10.MS +MR +AS +PAH	1	2
Congenital Heart disease(CHD)	13	26
ASD with PAH	2	4
ASD without PAH	7	14
VSD with PAH	1	2
VSD without PAH	1	2
PDA	1	2
Fallot's tetralogy (corrected)	1	2

From table 6 we came to know 74% patients had rheumatic heart disease which highlighted that the heart disease of rheumatic origin is still rampant in our country. Some had single lesion, some had mixed

lesions. 34% patients (28% with RHD and 6% with CHD) had pulmonary hypertension. 4% of them had moderate PAH and rest of them had mild PAH.

According to New York Heart Association grading system 26% had class I heart disease while 40% suffered from class II heart disease. 20% patients presented with grade III and 14% of them had grade IV disease at the time of admission. The unbooked cases had come late with either grade III or grade IV disease. 8% patients were admitted with heart failure. Other complications were atrial fibrillation (AF) (4%), pulmonary edema (8%) and supraventricular tachycardia (2%). Most of them had mixed symptoms like dyspnea, palpitation, cough etc. though some of them presented with only dyspea. One patient was admitted after syncopal attack. The common presenting signs were pallor (46%), tachycardia (30%) and edema (22%). Other signs were raised JVP (10%), pulmonary basal crepitation (12%), hypertension (4%). All unbooked patients had moderate to severe anemia on admission. 60% patients had any of the following complications at any point of time. One mother died due to congestive heart failure. The associated complications were 46% moderate to severe anemia, 12% Respiratory tract infection, 2% pregnancy induced hypertension (PIH) and 2% recurrence of rheumatic fever.

Table *7* described Mode of Delivery

Mode of delivery	No. of patients	Percent (%)
Spontaneous vaginal delivery	24	48
Forceps	10	20
LSCS	16	32
Emergency	11	22
Elective	05	10

Table 7 described that the commonest mode of delivery was spontaneous vaginal delivery (48%), forceps were applied to cut short second stage of delivery in 10 (20%) patients. Lower uterine Segment Caesarean Section (LSCS) was done in 16 (32%) mothers, of which 11 were emergency and 5 cases were elective. Emergency LSCS were done for fetal indications but elective LSCS were mainly done for maternal indication. Indications of emergency LSCS were induction failure, post-cesarean pregnancy, fetal distress and maternal distress 2 (12.5%) in each cases and non-progress of labor in 3 (18.75%) cases. Elective LSCS done for the patients who had moderate PAH, AF and PIH for better peripartum management. All case of LSCS were done under epidural anesthesia. One mother was died due to uncompensated heart failure. The patient had 3 antenatal check-up and one cardiological check-up. She had grade IV disease with MS +MR +AS +PAH. She was offered MTP which she refused as she became pregnant 6 yrs after marriage. She had troubled marital life at in-laws house because of infertility. She was advised to be kept admitted throughout pregnancy which too was refused by patient party.

Table 8 showed Maturity Of Baby at birth

Functional class ((N.Y.H.A)	<34 weeks	34–37 weeks	≥38 weeks
Class I (n=13)	-	-	13 (100%)
Class II (n=20)	-	1 (5%)	19 (95%)
Class III (n=10)	2 (20%)	3 (30%)	5 (50%)
Class IV (n=7)	3 (42.85%)	3 (42.85%)	-

Table 8 showed that all patients (13) with grade I disease had delivery at term whereas patient with grade II had 95% term and 5% preterm delivery. Mothers with grade III disease had 50% term delivery and 50% preterm delivery of which one had delivery at 28 weeks, another at delivery 32week. For none of the patients with grade IV heart pregnancy continued till term. 2 patients went into labor at <28 wks. Premature termination was done for 4 patients, one at 29 wks and for 3 between 34-35 wks. The baby of dead mother was delivered by post-mortem cesarean section.

Table 9 described Neonatal Outcome

N.Y.H.A Grading	Birth weight (Kg)				Apgar Score at 1 minute	Apgar Score at 5 minutes	Admission at neonatal intensive care unit	Perinatal mortality
	<1.5	1.5-2	>2-<2.5	≥2.5				
I (13cases)	-	-	3(23.07 %)	10(76.92%)	7-10 for 10, 3-4 for 3	7-10 for 11, <3 for 2	2 (15.38%)	1 (7.6%)
II (20cases)	1(5%)	3(15 %)	2(10%)	14(70%)	7-10 for 19, <3 for 1	7-10 for 19, <3 for 1	1 (5%)	1 (5%)

III (10cases)	1(10%)	2(20 %)	3(30%)	4(40%)	7-10 for 6, 3-5 for 4	7-10 for 5, 0-3 for 5	5 (50%)	1(10%)
IV (7 cases)	3(42.85%)	1(14.28%)	2(28.57 %)	-	7-10 for 4, <3 for 2	7-10 for 4, <3 for 2	6 (85.71%)	2 (28.57%)

Table 9 described neonatal outcome. 23.07% babies of grade I, 30% babies of grade II, 60% babies of grade III and 100% babies of grade IV mothers were of low birth weight (LBW) weighing <2.5 kg. Extreme LBW weighing <1.5 kg were seen in 5% patients of grade II, 10% of mothers of grade III and 42.85% of mothers with grade IV heart disease. 15.38% babies of grade I, 5% babies of grade II, 50% of grade III and 85.71% of grade IV heart disease mothers had to be admitted at SNCU (Sick Neonatal Care Unit) due extreme prematurity and LBW and poor Apgar score. 2 of grade IV and one each of grade III, II and I. were died. Baby of mother with grade I heart disease died due to neonatal septicemia. Two babies of grade IV mother died of multiorgan failure in extremely premature and LBW baby. One baby of mother with grade III disease died of gross birth asphyxia (apgar score at 5min was 2). The baby of mother grade II heart disease died due to extreme prematurity and LBW.

There was 50 cases out of 20170 deliveries during the study period, giving an incidence of 0.24 percent which corroborate the result of study by Akinwusi P.O., Adeniji A.O et al[6]. Incidence is bit higher at our neighbouring country Pakistan[7]. In South Africa 0.65% of all pregnant women have heart disease[8]. In UK the incidence of heart disease during pregnancy has remained constant at 0.9% over several decades[9]. In this research low incidence of heart diaease in pregnancy was probably due to escape of diagnosis because of trivial or asymptomatic nature of the disease. RHD was most common etiology of heart disease in this study which is supported by other studies[10,11]. In this study LBW babies and fetal mortality were more among patients with heart disease was also reflected in other studies[12,13,.14].

IV. Conclusion

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.

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