Fetomaternal Outcome of Pregnancy with Heart Disease

[1]Rahul Prusty, [2]Anuradha Mishra, [3]Jyoti Ranjan Behera, [4]Sobhan Kumar Padhi and [5]Sanghamitra Mahapatra

[1,2,4]*Department of Obstetrics and Gynecology, Mkcg Medical College Berhampur, India*

[3]*Department of Pediatrics Mkcg Medical College, Berhampur, India*

[5]*Department of Obstetrics and Gynecology, MKCG Medical College and Hospital , Berhampur, India*

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ABSTRACT
The purpose of this study is to identify risk variables that predict complications, identify early detection of pregnancy-related diseases and provide appropriate care of complications. Along with careful fetomaternal surveillance in the prepartum, intrapartum, and postpartum phases, it also entails prompt intervention when necessary to allow women with heart disease to experience a normal pregnancy and labour result. During the research period, which ran from August 2022 to June 2024, this study provided information on the overall frequency of cardiac illness in pregnancy, maternal and newborn mortality, the mode of delivery and its impact on the patients' outcomes and the length of hospital stay overall. Due to the fact that M.K.C.G. Medical College and Hospital is a premier referral facility with a specialised and well-organised Cardiology Department, the result for pregnant patients with heart disease at this facility is superior to any nearby hospital. This investigation looked at 64 women with various heart conditions who were admitted to MKCG MCH, BERHAMPUR either emergency room visits or out-of-hours admissions between August 2022 and June 2024 (2024). Also not included in the research were any women who were surviving other illnesses including molar pregnancy and ectopic pregnancy. Assessing the patients' age, parity and socioeconomic position required the researcher to do appropriate clinical tests, such as cardiovascular evaluations. Every patient's medical history is examined by the researcher to see whether any of them have a family history of heart disease, a history of menstruation, or a history of prior heart illness. The research primarily focusses on individuals with pregnancy-related cardiac disease who are in the puerperium or have the ailment at a gestational age of more than 28 weeks. Additionally, individuals with peripartum cardiomyopathy-generally defined as those who experience heart failure in the last month of their pregnancy or within five months after giving birth-are also included in the research. Analysing the different traits, treatments and results of these pregnant heart disease patients is the primary goal of the current study. In order to provide the ladies with care during their pregnancies, the researcher collaborated with the cardiologists. Cardiologists provide routine checks on women's hearts and, if necessary, admit them to the hospital. Additionally, they provided them with medication and other therapy that was necessary for them to regain their health. We may infer that a multidisciplinary strategy is required to minimise maternal morbidity, mortality and perinatal morbidity throughout pregnancy and labour. Professionals such as obstetricians, cardiologists, anaesthesiologists, and paediatricians are part of these multidisciplinary teams. Patients should be urged to have surgery at this time if they require it for heart-related conditions. MTP, however, needs to be limited for the first several months only and its usage should be determined by the complexity. Additionally, it can be concluded that vaginal delivery is a perfectly safe delivery method for women with heart disorders., thus, caesarean sections should only be suggested in cases of obstetric reasons. Patients with NYHA class I or II have a better prognosis, but those with more functional difficulties because indicates a higher risk of cardiovascular problems as complications in classes III and IV.

INTRODUCTION

Heart disease is a leading cause of maternal mortality that do not result from obstetrics, complicating between 1% and 3% of births. Heart disorders also have a significant impact on postpartum and antepartum mortality and morbidity. Heart conditions place a pregnant woman at extremely high risk, which can have a significant impact on both the mother and the foetus. Foetal and maternal morbidity and death can be reduced with the help of a multidisciplinary team providing adequate intrapartum, prenatal and postnatal care. Heart disease symptoms during pregnancy might resemble those of a typical pregnancy, including dyspnoea, murmurs and pedal oedema. As a result, diagnosing the condition can be difficult for medical experts[1,2].

These cardiac-related anomalies may be congenital or the result of acquisition. Cardiomyopathies, ischaemic or rheumatic heart disorders are examples of acquired illnesses. Heart illness in mothers can have a negative effect on the developing foetus, as evidenced by low APGAR scores, spontaneous miscarriages, an increase in newborn mortality and ICU hospitalisations. In certain instances, the necessity for therapeutic abortion is increased because to concerns about maternal safety. One of the main disorders that affect pregnancy is heart disease. Congenital and rheumatic heart disorders are the most often seen cardiovascular lesions. Pregnancy-related circulatory fluctuations in heart health can frequently result in maternal or foetal fatalities[3]. Among expectant mothers with cardiac conditions There is a significant six-fold increase in the thrombosis risk factor and a 50% increase in plasma volume, which exacerbates pregnancy-related problems. In the majority of these situations, an early diagnosis is necessary for the mother's and the child's favourable results.

These clinical scenarios necessitate not only a diagnosis but also the efficient supervision of a multidisciplinary team that includes a paediatrician, a qualified obstetrician, a cardiologist, nurses and an anaesthesiologist. Additionally, there has been a notable rise in the detection of cardiac conditions in expectant mothers, which is increasingly implicated in maternal fatalities. For many years, rheumatic heart disorders (RHD) have been highly prevalent due to undernourishment and limited access to healthcare services[4,5]. This is especially common in developing countries where access to quality healthcare services is limited and facilities themselves are subpar. One of the contributing factors in these situations is also poor hygiene or inadequate sanitation. On the other hand, when streptococcal disease is treated with antibiotic prophylaxis in order to improve quality of life, Higher prevalence of better CHD [congenital heart disease] is the direct outcome of enhanced diagnostic capabilities and health care facilities and improved or corrected RHD follows. Significant advancements in a variety of surgical techniques have also made it possible for women with congestive heart failure (CHD) to attain a better reproductive age and safely become pregnant[6]. Echocardiography is routinely conducted on pregnant or susceptible women in order to correctly and early identify cardiac problems. Acquired cardiac abnormalities are also a common lesion among these people. Sufficient follow-up during all phases of pregnancy and a good appraisal of the mother's prognosis before to conception are necessary for optimal results. Heart failure is a leading cause of maternal fatalities, hence it is crucial that cardiac patients be well watched throughout pregnancy in order to identify heart failure conditions early. Obstetricians still face difficulties in treating pregnant women with cardiac problems, despite significant progress in their prognosis. Of the females suffering from severe cardiac pre-conception counselling may also be advantageous in some circumstances. RHD, CHD and CMP [cardiomyopathies] are the most common or commonly occurring cardiac abnormalities that complicate pregnancy. Pregnant women most frequently have numerous valvular lesions and mitral valve abnormalities[7,8]. Pregnancy has a negative impact on cardiac illnesses and the physiological changes that occur during pregnancy might exacerbate the condition. Therefore, it becomes crucial for medical professionals to comprehend the fundamentals of obstetric management and how pregnancy affects cardiac conditions. Cardiac patients can now become pregnant and stay pregnant thanks to recent improvements in medical care and treatment options. Before becoming pregnant, women must, however, receive information about both maternal and foetal risk factors through prenatal counselling[9-13].

MATERIALS AND METHODS

This investigation looked at 64 women with various heart conditions who were admitted to MKCG MCH, BERHAMPUR either emergency room visits or out-of-hours admissions between August 2022 and June 2024 (2024). Also not included in the research were any women who were surviving other illnesses including molar pregnancy and ectopic pregnancy. Assessing the patients' age, parity and socioeconomic position required the researcher to do appropriate clinical tests, such as cardiovascular evaluations. Every patient's medical history is examined by the researcher to see whether any of them have a family history of heart disease, a history of menstruation, or a history of prior heart illness.

The research primarily focusses on individuals with pregnancy-related cardiac disease who are in the puerperium or have the ailment at a gestational age of >28 weeks. Additionally, individuals with peripartum cardiomyopathy-generally defined as those who

experience heart failure in the last month of their pregnancy or within five months after giving birth-are also included in the research. Analysing the different traits, treatments and results of these pregnant heart disease patients is the primary goal of the current study. In order to provide the ladies with care during their pregnancies, the researcher collaborated with the cardiologists. Cardiologists provide routine checks on women's hearts and, if necessary, admit them to the hospital. Additionally, they provided them with medication and other therapy that was necessary for them to regain their health[14-16].

According to the study, some women have cardiac issues that are more serious than others. Additionally, the researchers classified the way in which women's hearts functioned using a unique approach. This approach assists in selecting the best course of action for each lady based on her individual medical circumstances. That being said, some ladies required a longer hospital stay than others. The study also examined the women's social and economic backgrounds. The researcher also examined the women's medical histories, determining if any of them had ever experienced rheumatic fever as children or had taken any antibiotics to avoid cardiac issues. Women's menstrual cycles were examined in relation to their marital lives, including how long they had been married, the number of pregnancies they had previously experienced, any difficulties they had and the weight and well-being of their prior children. Some ladies even underwent cardiac surgery before to becoming pregnant. At each stage of pregnancy, a grade was assigned to the patients based on their individual conditions. Women with lesser grades (1 or 2) fared better than those with higher grades (3 or 4), whereas the latter group experienced more difficulties. In order to assess the women's health, the researcher also performed standard procedures including blood tests and ultrasounds. Additionally, some specialised tests, such echocardiograms, were carried out. Women with higher grades, however, (3 or 4) were taken to the hospital right away. due to the discovery of a cardiac condition, they remain in the hospital for an extended period. Just two weeks before to their due date, the ladies who had lower grades (1 or 2) were hospitalised[17-19].

Inclusion Criteria: Every patient with cardiac disease who is pregnant and has reached puberty or is older than 28 weeks gestation. Patients with peripartum cardiomyopathy experiencing heart failure in the last month of their pregnancy or within five months after giving birth.

Exclusion Criteria: Heart disease with ectopic pregnancy, molar pregnancy were excluded in this study.

RESULTS AND DISCUSSIONS

Table 1: Age Distribution (Years)

		Frequency	Percent
Valid	18-20	5	7.8
	21-25	20	31.3
	26-30	27	42.2
	31-35	6	9.4
	>35	6	9.4
	Total	64	100.0

The participants chosen for this study were of age group 18 years and above. On analysing their age classification it was found that majority of participants were of age group 21-30. 42.2% research participants were of age group 26-30 while 31.3% candidates were having age range 21-25 years. 9.4% participants were having age >35 years. Equal number of participants also falls in age group 31-35. Remaining 7.8% participants had age <20 years.
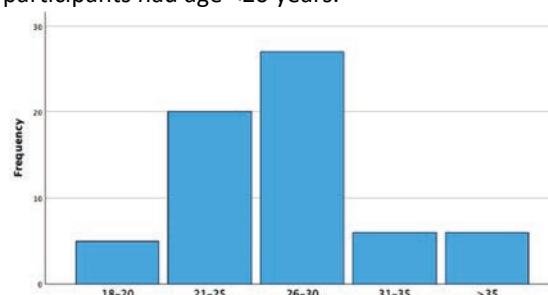

Fig. 1: Age (Years)

Table 2: Mean Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age in Yrs	64	18	37	27.08	4.745

According to the analysis of above table, the mean value of AGE in years was 27.08 (SD= 4.75).

Table 3: Religion

		Frequency	Percent
Valid	Christian	3	4.7
	Hindu	57	89.1
	Muslim	2	3.1
	total	62	96.9
Missing	.	2	3.1
Total		64	100.0

Among total 64 participants, most of the participants used to follow Hindu religion which accounts for 89.1% of chosen research population. After Hindu majority Christianity and Muslim religion contributes to 4.6 and 3.1%. There were 3.1% participants whose religion details are missing.
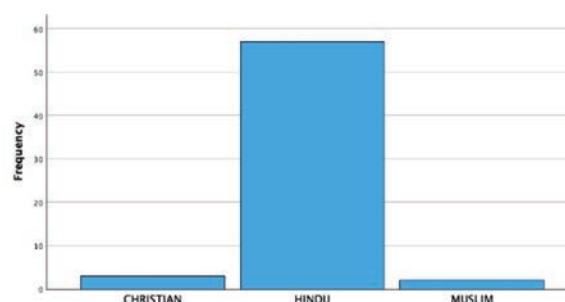

Fig. 2: Religion

Table 4: Booked/Unbooked

		Frequency	Percent
Valid	Booked	45	70.31
	Unbooked	19	29.6
	total	64	100

It has been carried out from the above results 70.31% were booked while remaining 29.6% were unbooked.

Table 5: Socio-Economic Status

		Frequency	Percent
Valid	High	6	9.4
	low	51	79.7
	Middle	6	9.4
	total	63	98.4
Missing		1	1.6
Total		64	100.0

In the total research population there was only one participant whose socio economic information was not available while for the rest of the participants their social and economic background information was available. From the available data of 63 participants, it was found that most of the participants chosen for the study belong to low level groups which constitute 79.7% of participants whose data was available. For high and middle level groups equal number of participants were there, formulating to 9.4% in each group.
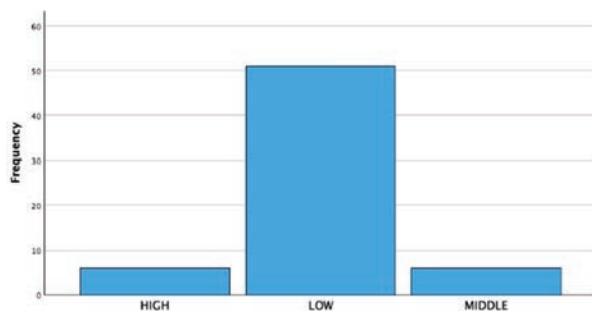

Fig. 3: Socio-economic Status

Table 6: Mean ga at

	n	Minimum	Maximum	Mean	Std. Deviation
Ga at admission in wks	64	6	41	31.50	11.199

Form the above findings it has been analysed that mean value of GA AT admissions were 31.50 (SD=11.19).

Table 7: Ga At Admission (Weeks)

		Frequency	Percent
Valid	1-10	6	9.4
	11-20	8	12.5
	21-30	2	3.1
	31-40	44	68.8
	41-50	4	6.3
	Total	64	100.0

It has been carried out that 68.8% chosen research candidates had GA at admission in week 31-40 while 12.5% admissions were in between weeks 11-20. The minimum GA at admission was observed in week 21-30 which forms only 3.1% of total population.
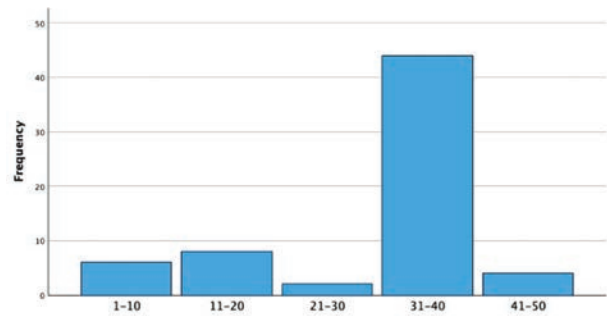
Fig. 4: GA AT Admission (Weeks)

Table 8: Obstetric Status

		Frequency	Percent
Valid	G1	29	45.3
	G2A1	7	10.9
	G2P1L0	1	1.6
	G2P1L1	18	28.1
	G3P2L2	4	6.3
	G5P1L1A3	1	1.6
	G6P4L4A1	2	3.2
	G6P5L4	1	1.6
	G6P5L5	1	1.6
	Total	64	100

Out of 64 participants most of the participants had G1 obstetric status which account for total 45.3%. The second most dominating obstetric status group was found to be G2P1L1 accounting for 28.1%. The third most prevalent status was G2A1 which was found in 10.9% participants. Obstetric status of type G5P1L1A3, G6P5L5, G6P4L4A1 and G6P5L4 were found to be equally present, contributing 1.6% in each category.
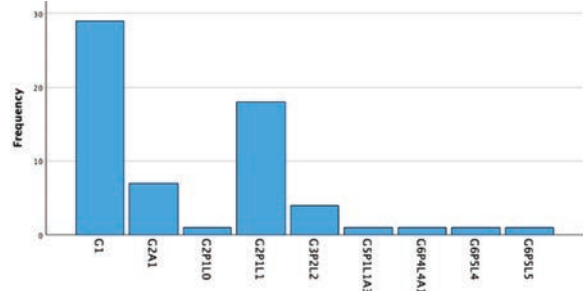
Fig. 5: Obstetric Status

Out of 16342 prenatal cases throughout the current research period (August 2022-June 2024), 64 instances of heart disease were confirmed, yielding a 0.39% incidence. Maternal cardiac disease accounts for 2-3% of pregnancies and 4-10% of maternal deaths globally[20]. The incidence was changing over time and in different regions. The occurrence in this case series was in line with research by Etheridge (1977), Lahiri *et al.* (2002), Rochet *et al.* (2002) and Tayyiba Wet *al.* (2008) (0.5%).

Table 1 shows that 50 patients, or 78.12%, were in the 20-35 year old age range. within this age bracket[21,22]. Six patients belonged to the over-35 age group. Within the study group, 78.12% of the patients were in the

active reproductive age range (20-35 years old).This number matched Indian research like S Kumari *et al.* (2003) and Chadha P *et al.* (2002), which found 80% and 83% of the value, respectively. In this case series, the percentage of patients over 35 years old was 9.4%. However, because of the late marriage age, 22% of elderly patients were found in western research such as Galia *et al.* (2004).Rheumatic heart disease accounted for 75% of all heart diseases in my study (Table 4). Mitral valve prolapse (1.56%), cardiomyopathy (6.25%) and congenital cardiac disease (14.06%) Rheumatic heart disease accounted for 75% of all heart diseases in my study. Arrhythmia (3.12%), mitral valve prolapse (1.56%), cardiomyopathy (6.25%), and congenital heart disease (14.06%). 75% of the patients in this case series were instances of rheumatic heart disease, which was comparable to research by Mohan et al. (2020) (72.7%) and Rita G *et al.* (73.34%) Lower than research by Jones (1951) (90%), Mendelson (1960) (91.4%) and Mainak *et al.* (2014) (70%)[23,24].

In this research group, there were 2 cases of arrhythmia (3.12%), which was <in investigations by Baren *et al.* (1974) (5.3%) and Rita G *et al.* (2014) (3.33%). This could be because there were 64 instances reported in this study as opposed to Rita Get al.'s 30 cases.This study series included 6.25% instances of cardiomyopathy, which differed from studies by James LB, 1998 (.2%) and Farhana A *et al.* (2005) (4%). The observed elevated occurrence of malnourishment in this research might be the cause of the disproportionately high frequency of cardiomyopathy[25].

Next common valvular lesion was MS combined with MR (25.49 %)which was lower than the studies of Jones 1955(35%.I have got only 5.88% cases of multi valvular heart disease which was lower than study of Thomas *et al,* 2002 (18%).we have got only 1 case of each MR and AS (1.96%) ,which is much lower than study of Ismail *et al* (12% MR,6%AS). It so also involves longer stays in hospitals and intensive care units for mothers and newborns[26,27]. In a similar vein, cyanotic heart patients are more likely than the acyanotic group to experience unfavourable cardiac and foetal maternal outcomes. Heart failure, arrhythmias and decline in NYHA class functions are associated with a high risk. Since NYHA class II patients have a higher chance of experiencing adverse events while seeming safe and stable, there is a greater need to modify precautions for managing these patients among CHD patients[28]. Congenital cardiac disorders are also thought of as a spectrum of lesions, each of which has a unique course of therapy and implications. The result is also dependent on a number of variables, including the kind of lesion, its condition, the accessibility and effectiveness of multidisciplinary treatment and infrastructure, the timing of the presentation and center-specific care such as well as patients' adherence to prenatal treatment. In addition to preconception therapies, appropriate prenatal care, the treatment of heart lesions before to pregnancy, prompt referrals to care facilities and multidisciplinary teams must be prioritised in order to improve patient and foetus outcomes in such individuals[27,28].

CONCLUSION

It can be concluded that to reduce the maternal morbidity, mortality as well as perinatal morbidity during pregnancy and labour a multi-disciplinary approach must be used. Such multidisciplinary teams include professionals like obstetrician, cardiologists, anaesthesiologist and paediatrician. During interval period if cardiac issues need surgery then it must be advised to patients during interval period. However MTP must be restricted for initial months only and its place should be measured as per complication. It can also be concluded that even with cardiac diseases women can deliver through vaginal mode which is completely safe and thus caesarean section must be recommended in case of obstetrics indications only. Patients who have NYHA class I or II demonstrates favourable prognosis while patients who have more functional challenges due to class III and IV shows greater complication risk of cardiovascular issues. Thus they should be advised against pregnancy. It is crucial that among pregnant women underlying cardiovascular issues must be regularly monitored so that their identification can be made easy. It is also suggested that throughout pregnancy proper counselling must be given to pregnant women so that with multidisciplinary efforts fetal and maternal complication risks can be reduced. Also RHD, CHD and CMP are prevalent cardiac lesions which complicate the pregnancy.

To achieve accurate, safe and timely diagnosis of pregnant cardiac patients, cardio maternal tertiary care is required in which various multidisciplinary professionals are available. Pregnancy with heart issues has strong relation with perinatal and maternal morbidity. Thus it is suggested that regular cardiac auscultation and obstetric evaluation must be performed in antenatal women. It will help cardiologists to confirm any suspected heart complications. It has been also suggested that throughout pregnancy, puerperium and labor process, counselling, diagnosis, frequent antenatal monitoring, early detection, cardiac failure management and delivery at equipped centre must be performed. It will lead to favourable fetal and maternal results among cardiac women patients. Another crucial conclusive remark which is identified from the above study is that due to heart diseases, pregnant women have high maternal mortality rates.

Women who have NYHA class more than II, LVSD, prosthetic valve, mitral stenosis suffers from high risks. However most of the patients can successfully tolerate pregnancy and through successful management, can easily undergo safe and successfully delivery. Pregnancy is also characterised with prolong state of both physical and physiological stress. Existence of heart disease can further elevate the risk factor for both mother and fetus. Such greater prevalence of risk factors demands for more dedicated and close monitoring and diagnosis so that accurate and timely care decisions can be taken for ensuring patient and fetus safety.

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