Original Article

Frequency and Outcome of Cardiovascular Disease in Pregnant Women Presenting with Shortness of Breath in Low Resource Setup

Farah Deeba Nasrullah, Noor Soomro, Saima Shaikh, Hassan Ala and Riffat Jaleel

ABSTRACT

Objective: To determine the frequency and causes of cardiac disease in pregnant women presenting to obstetric unit and to assess the associated maternal and fetal outcome in cardiac patients.

Study Design: Descriptive Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Obetet and Gynae, Civil Hospital Karachi from June, 2020 to Dec, 2020 for a period of six months.

Materials and Methods: Pregnant women between 18-40 years of any gestational age and parity presenting to antenatal clinic or emergency with complain of shortness of breath and/or palpitation were included in the study. Patients with hyperthyroidism and asthma were excluded .History pertinent to cardiovascular disease was taken followed by examination. Selected patients were seen by a consultant cardiologist and an echocardiography was performed. Patients diagnosed with cardiac disease were identified, treated in collaboration with cardiologist. Maternal and fetal outcome was noted. All data was analyzed for descriptive statistics.

Results: A total of 252 pregnant women presenting with shortness of breath and/or palpitation were included in the study. Mean age of women was 31 years and mean gestational age was 35 years . Majority of patients were un booked(77.8% n=14) and multipara (50%n=9) A total of 18 (7%)women were diagnosed as cardiac disease in pregnancy. The most common cause was valvular heart disease observed in 61.1 %(n=11) followed by cardiomyopathy in 27.7% (n=5) Congenital heart disease and ischaemic heart disease were diagnosed in 5.6% each (n=1). Mitral stenosis and regurgitation were common valvular lesions. ICU admission and ventilator support was required in 77.8% (n=14) and 55.6% (n=10) women respectively. Mortality rate was 11.1%(n=2) .Adverse fetal outcome included IUD in 22.2%(n=4) ,low birth weight16.7%(n=3),preterm birth 44.4%(n=8) and NND 5.6%(n=1).

Conclusion: Cardiac disease in pregnancy is associated with significant maternal and perinatal morbidity and mortality

Key Words: Valvular Heart Disease (VHD)- Cardiomyopathy (CMP)–Congenital heart disease (CHD)-Iscaemic heart disease (IHD)

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INTRODUCTION

Cardiac disease is the most important cause of indirect maternal deaths during pregnancy and puerperium accounting for about 10% maternal mortality.

Cardiac disease complicates 1-4% of pregnancies and accounts for 10=15% mortality[1]. Congenital heart defects are observed as most frequent cause of cardiac disease in pregnancy in developed countries whereas rheumatic heart disease is more common world -wide. In general stenotic valvular lesions are tolerated less than regurgitant lesions due to limited cardiac output and peripheral vasodilation. Valvular heart disease (VHD) may first time be presented and diagnosed during pregnancy due to hemodynamic changes occurring in pregnancy. The number of women in childbearing age with cardiac disease is rising due to better diagnostic tools and care during childhood[2]. Cardiac disease in pregnancy poses a challenge to obstetricians and needs specific care by multidisciplinary team including obstetrician, cardiologist and anaesthetist. Studies have shown that cardiac disease in pregnancy is associated with chances of adverse maternal and fetal outcome[3,4]. Shortness of breath and palpitations are very common and are mostly due to physiological changes associated with pregnancy

Department of Obetet and Gynae, Civil Hospital, Karachi.

Correspondence: Dr. Farah Deeba Nasrullah, Associate Professor of Gynae, Civil Hospital Karachi.
Contact No: 0334-3277821
Email: drfarahnasrullah@gmail.com

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or anaemia but these symptoms could be due to underlying cardiac disease[5]. Therefore it is important to evaluate these patients carefully and seek advice from cardiac consultants when required. Maternal mortality can be reduced with early diagnosis and treatment of cardiac disease.

The aim of this study was to identify pregnant women with cardiac disease and to manage them in collaboration with cardiologist and observe the maternal and fetal outcome associated with cardiac disease in pregnancy. This will help to estimate the magnitude of this problem in our local population and we would be able to suggest some recommendations in our routine obstetrics for management of pregnant women with cardiac disease which will help to reduce maternal and fetal complications in future.

MATERIALS AND METHODS

This was a cross sectional study conducted from June to December 2020 at the department of obstetrics & gynaecology Civil Hospital Karachi which is a tertiary care centre. A total of 252 pregnant women between 18- 40 years of any parity and gestational age presenting to obstetric antenatal care clinic and emergency department with shortness of breath and / or palpitations were included in the study. Patients referred from primary and secondary care with suspicion of cardiac disease were also included in this study. Patients with history of hyperthyroidism and respiratory problems were excluded. Focused history pertinent to cardiovascular symptoms like severity of dysponea, orthopnea, cyanosis, chest pain and excessive weight gain was taken. This was followed by general physical examination to check blood pressure, pulse, respiratory rate, edema, chest auscultation for crepitation and cardio-vascular examination for presence of murmur. Obstetric examination included symphysio-fudal height, amount of liquor, fetal heart sound auscultation and expected fetal weight. All patients with provisional diagnosis of cardiac disease were seen by a consultant cardiologist and undergone ECG and transthoracic echocardiography at our cardiology department. Patients diagnosed with cardiac disease were mutually managed by consultant obstetrician, cardiologist and anesthetist. All observations were noted on a proforma. Maternal and fetal complications as well as mode of delivery were also recorded. Maternal outcome measures included New York Heart Association (NYHA) class, cardiac failure, atrial fibrillation, ICU admission, need of ventilatory support and mortality. Fetal outcome measures were prematurity, low birth weight, intrauterine fetal death and neonatal death. All data was entered on SPSS 20 and analyzed for descriptive statistics. Categorical data was described as frequency and percentages and continuous data as mean and standard deviation.

RESULTS

The study included 252 pregnant women between 18-40 years presenting with shortness of breath and /or palpitations. In these women 18 (7.14%) were diagnosed as cardiac disease in pregnancy. The mean age of patient was 31 years and mean gestational age was 35 years. Majority of patients n=14(77.8%) were un-booked including 5 referrals. Multiparty was observed in 9(50%) women while 6(33.7%) were grand multipara and 3 (16.8%) women were primigravida. The most common diagnosis was valvular heart disease 61.1% (n=11) followed by cardiomyopathy 27.7% (n=5) and both the congenital heart disease and ischaemic heart disease were diagnosed in 5.6% (n=1) women. In patients with VHD the mitral stenosis 27.7% (n=5) was most common including two patients with prosthetic heart valves followed by mitral regurgitation in 22.2% (n=4), aortic and tricuspid regurgitation in 5.6% (n=1) cases. In this study 33.3% (n=6) women were hypertensive and 11.2% (n=2) developed pulmonary oedema. Accordinng to NYHA Classification 38.9% (n=7) presented with symptoms of class III, 33.3% (n=6) class II and 27.7% (n=5) class IV. Echocardiography showed ejection fraction less than 30 in 22.2% (n=4) whereas ejection fraction between 30-40% and > 40% was observed in 38.9% (n=7) women. Demographic and clinical features are described in table 1.

Table No.1: Characteristics of pregnant women with cardiac disease

Demographics	
Age mean (SD)	31 years ± 4.12
Gestational age mean(SD)	35 weeks ± 3.13
Primi n(%)	3 (16.7%)
Multipara n(%)	9 (50%)
Grand multipara n(%)	6 (33.3%)
Diagnosis n(%)	
Valvular Heart Disease	11 (61.1%)
Cardiomyopathy	5 (27.7%)
Congenital Heart Disease	1(5.6%)
Ischaemic Heart Disease	1(5.6%)
NHY Classification n(%)	
Class II	6(33.3%)
Class III	7(38.9%
Class IV	5(27.7%
Ejection fraction n(%)	
< 30%	5(27.7%)
30- 40%	8 (44.4%)
>40%	5 (27.7%)

Cardiac failure, and atrial fibrillation were encountered in 16.8 (n=3) and 11.2% (n=2) women respectively. Pulmonary hypertension was diagnosed in 11.2% (n=2). ICU admission was required in 77.8% (n=14) women with cardiac disease and ventilator support was needed in 55.6% (n=10) women. Maternal mortality

encountered in 11.2% (n=2) which included cases of severe mitral stenosis and cardiomyopathy. Perinatal outcome was good in 55.6% (n=10) women. Adverse perinatal outcome included preterm birth 44.4% (n=8), low birth weight 50% (n=9) stillbirth in 22.2% (n=4) and neonatal death in 5.6%(n=1) women. Maternal and perinatal outcome is represented in table 2.

Table No.2: Adverse Maternal and fetal outcome

Complication	Frequency	Percentage
Cardiac failure	3	16.8%,
pulmonary artery hypertension	2	11.2%
Arrhythmia	2	11.2%
Caesarean delivery	9	50%
ICU admission	14	77.8%
ventilatory support	10	55.6%
Intrauterine death	4	22.2%
Neonatal death	1	5.6%
Preterm birth	8	44.4%
Low birth weight		

DISCUSSION

Cardiac disease in pregnancy is one of the most significant causes of maternal morbidity and mortality[6]. Cardiac disease may be a pre- existing condition already diagnosed prior to the pregnancy or may be first time diagnosed during pregnancy as a result of physiological changes of pregnancy which makes the disease symptomatic. Cardiac disease seen in pregnancy includes congenital heart disease, valvular heart disease, cardiomyopathy, pulmonary artery hypertension and ischaemic heart disease.

In a study by silverside CK the most cardiac complications were observed in antepartum period followed by postpartum period and less were observed in post-partum period co relating with our study[7]. Our 61% patients were antepartum, 33% intrapartum and 16% presented after delivery. Most of patients (80 %) were un-booked including 5 referrals from primary and secondary care services. Rheumatic heart disease is almost eradicated in developed countries, however it still exists in low resource countries like Pakistan. The highest prevalence of RHD is reported in India, Pakistan, Indonesia, China and Congo[7]. Studies have shown that RHD accounts for majority of cases of cardiac disease in developing countries[8,9,10]. In a systemic review conducted at south africa it was reported that valvular heart disease was most common in antenatal cardiac patients and they found 71-84% cases of mitral stenosis ,mitral regurgitation and prior mitral valve repair[11]. In this study we also found rheumatic heart disease as the most common cardiac disease identified in 61.1% women followed by cardiomyopathy in 27.7%, whereas congenital heart disease and ishaemic heart disease were less common as both were found in 5.6% cases. The most common valvular lesion in this study was mitral stenosis followed by mitral regurgitation comprising about 80% of VHD cases, while others included tricuspid and aortic regurgitation. Physiological changes in pregnancy like increase in stroke volume, cardiac output and heart rate are poorly tolerated by patient with severe valvular stenosis and thus women may first time present with symptoms of cardiac de-compensation in pregnancy which may result in adverse maternal and fetal outcome. In a local study CMP was found to be more common seen in 42.9% followed by VHD (22.1%).[12] Women with mechanical prosthesis are at high risk of complications during pregnancy and are advised for early referral a tertiary care Centre[13]. In this study two patients were referred due to mechanical heart valves both were symptomatic and treated in collaboration with cardiologist. Diao M in their study found significant association of severity of cardiac disease with New York Heart Association (NYHA) class[14]. In this study 28% (n=5) women presented with NYHA class IV whereas NYHA class III and II were observed in 39% (n=7) and 33% (n= 6) women respectively.

Women with VHD have a high rate of deterioration during pregnancy and increased morbidity due to cardiac failure and arrhythmias which results in hospitalization and need for treatment[15]. In a local study congestive cardiac failure was found in 20% cases whereas infective endocarditis and thromboembolism were seen in 2% cases[16]. In our study we found cardiac failure in 16.8%, pulmonary artery hypertension and arrhythmia in 11.2% women diagnosed with cardiac disease. Other morbidities included ICU admission and ventilator support required in 77.8% and 55.6% respectively. Cardiac disease in pregnancy is the most common indirect cause of maternal deaths world-wide. Specially, in developing countries it is associated with high rates of adverse maternal outcome[17]. Hameed et al in their study found maternal death rates of 2% in women presenting with valvular heart disease[18]. A local study also found high mortality in women with cardiac disease in pregnancy[19]. In this study two maternal deaths were encountered (11.2%). One patient presented with cardiomyopathy while the other was a case of severe mitral stenosis with severe pulmonary artery hypertension.

Assessment of neonatal risks in women with cardiac disease is not extensively studied specially in low resource countries like Pakistan but it is very important for assessment and decision making for further management. The most common complications are prematurity, fetal growth restriction and perinatal death[20]. A study conducted in Pakistan by Aamir also found association of cardiac disease with preterm birth, low birth weight, neonatal (.6%) and maternal mortality (12%). In this study perinatal outcome was good in 55.5% women with cardiac disease. Whereas adverse

perinatal outcome included intrauterine death (22.2%), low birth weight (16.6%) and neonatal death (5.6%) in these women. Timely diagnosis of cardiac disease before planning a pregnancy and prompt treatment prior to pregnancy is likely to reduce neaonatal and maternal complications.

CONCLUSION

Pregnancy with cardiac disease is associated with significant risk of maternal morbidity and mortality and adverse perinatal outcome. Though majority of patients tolerate pregnancy well , timely referral to a tertiary care is very important for management of these patients by a multidisciplinary team .Diagnosis and treatment of cardiac disease before pregnancy may reduce the risk of maternal and perinatal complications. The study concluded that NYHA CLASS> II ,pulmonary hypertension and ejection fraction < 30% is associated with poor maternal outcome.

Author's Contribution:

Concept & Design of Study:	Farah Deeba Nasrullah
Drafting:	Noor Soomro, Saima Shaikh
Data Analysis:	Hassan Ala, Riffat Jaleel
Revisiting Critically:	Farah Deeba Nasrullah, Noor Soomro
Final Approval of version:	Farah Deeba Nasrullah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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