

Original Research Article


Spectrum of Cardiac Disorders Complicating Pregnancy in Patients Visiting a Tertiary Care Centre of Hyderabad: A Prospective Study

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Abstract

Background: An increased prevalence of cardiovascular disease (CVD) has been found in pregnant women, posing a difficult clinical scenario in which the responsibility of the treating gynecologist extends to the unborn fetus.

Aim and Objectives: To analyze the case records of women with cardiac disorders during pregnancy, labor and postpartum to know the trends and fetomaternal outcome of such women.

Materials and methods: A study was carried out on pregnant women with heart disease who delivered during that study period. The patients were followed up throughout pregnancy and their fetomaternal outcomes were compared with equal number of women without heart disease. Patients were evaluated for development of any cardiac complications, obstetric complications, and perinatal outcomes.

Results: The present study compared 50 pregnant women or puerperia having heart disease and pregnancy outcome with 50 pregnant women without heart disease admitted during the same period as control group. The prevalence of heart disease in pregnancy was 50 cases (3.22%). Rheumatic heart disease was the most common encountered type 80% followed by congenital heart disease 14%. A total of 5 (10%) patients had undergone corrective cardiac surgery. Out of 50 cases, 10 (20%) had cardiac complications. Most common cardiac complication was congestive cardiac failure 8 (80%). The percentage of maternal mortalities was 4% among those having heart disease.

Conclusion: Pregnancy in women with heart disease is associated with significant cardiac and neonatal morbidity. Over the years, it has been found that pregnancy complicated by heart disease can

result in a favorable outcome for both mother and fetus, provided meticulous care is taken before and during pregnancy, labor and postpartum period with appropriate therapy.

Key words

Congenital heart disease, Maternal mortality, Perinatal outcome, Rheumatic heart disease.

Introduction

Cardiac disease in the pregnant patient can present challenges in cardiovascular and maternal-fetal management. It is important to understand that even in normal patients, pregnancy imposes some dramatic physiologic changes on the cardiovascular system. These include an increase in plasma volume by 50%, an increase in resting pulse by 17%, and an increase in cardiac output by 50% [1-3].

WHO reported that cardiac disorders used to be leading causes of maternal mortality globally, but the situation has changed because of reduction in the occurrence of the disorders, early diagnosis, and better management strategies. However, in low-income countries, Rheumatic Heart Disease (RHD) continues to be one of the most serious disorders during pregnancy, with the risk of the unfavorable maternal-fetal/ neonatal outcome, a challenge to the woman, obstetrician, pediatrician and physician [4, 5].

There has been very little attention paid to obtaining a history of pregnancy complications such as hypertension or preeclampsia. This is a missed opportunity that could allow us to develop testing and prevention strategies targeted towards women at highest risk for CVD. Because of symptoms such as, breathlessness or signs such as, an ejection systolic murmur which suggests heart disease, may be present in up to 90% of the pregnant women as a consequence of the physiological changes induced by pregnancy itself, there are problems in diagnosis as well as management of cardiac disorders [4-6].

There are no studies done in the Southern part of India, especially in Hyderabad region of India, on pregnancy associated with cardiac disease, in spite of the increasing number of the same.

Hence the current study is designed to provide an insight into the changing patterns and outcome of this ever increasing and life threatening condition at a tertiary care centre of Hyderabad, India with an aim to find out prevalence, spectrum of disorder and outcome in pregnancy with heart disease.

Materials and methods

We carried a study in the Department of Obstetrics and Gynecology, Mallareddy Narayana Hospital, Suraram, Hyderabad from April 2016 to March 2020. We included all the pregnant women with heart disease who delivered during that time period. Institutional Ethics Committee approval was taken for the study. A written consent was obtained from all participants and they were fully informed about the study.

Inclusion criteria

- Pregnant patient or puerperia presenting with signs and symptoms of heart disease and further confirmed by diagnostic tests,
- Pregnant women who were known case of heart disease during routine antenatal checkup,
- Pregnant women previously diagnosed with heart disease who were treated either medically or surgically, and chronic hypertension with structural heart changes.

Exclusion criteria

- Patients with cardiac failure due to non-cardiac cause.
- Patients who were lost to follow-up.

A detailed antenatal workup was done on pregnant women and equal number of patients

without CVD as controls, including detailed obstetric and cardiac history, thorough clinical examination. All women were subjected to routine antenatal tests and Echocardiogram (ECG) and Electrocardiography (ECHO). Patients were advised to have regular antenatal check-up and compulsory institutional delivery. Patients were evaluated for development of any cardiac complication like arrhythmia, congestive cardiac failure and atrial fibrillation. Any obstetric complications like preterm labour, fetal growth restriction, oligohydramnios and perinatal outcomes like intrauterine death, low birth weight, prematurity and respiratory distress syndrome etc.

Statistical analysis

For demographic and obstetric variables descriptive statistics was used to calculate the Mean \pm SD. To compare the means of parameters of both the groups' independent student test was performed and 95% limit and 5% level of significance were adopted. A p-value < 0.05 was considered significant. Analyses were done using SPSS Version 20 (IBM Corp. Released 2011.

IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: USA, IBM Corp).

Results

The present study included 50 pregnant women or puerperia having heart disease who delivered during study period and pregnancy outcome was compared with 50 pregnant women without heart disease admitted during the same period as control group.

The total number of deliveries during the study period was 1550 and the prevalence of heart disease in pregnancy was 50 cases (3.22%). The mean age of women with heart disease was 28.75 \pm 5.1 years and the mean age of controls were 26.51 \pm 4.62 years (p-value >0.05). The maximum number of cases were multigravida 64% and 58%, followed by primigravida 36% and 42% both in the cases and the control group respectively (p-value>0.05).

Rheumatic heart disease was the most common encountered type 80% followed by Congenital Heart Disease (CHD) 14% (**Table - 1** and **Graph - 1**).

Table - 1: Spectrum of heart disease.

Type of heart disease	Number (%)
RHD	40 (80%)
CHD	7 (14%)
Cardiomyopathy	2 (4%)
Arrhythmia	1 (2%)
Total	50 (100%)

Graph - 1: Spectrum of heart disease.

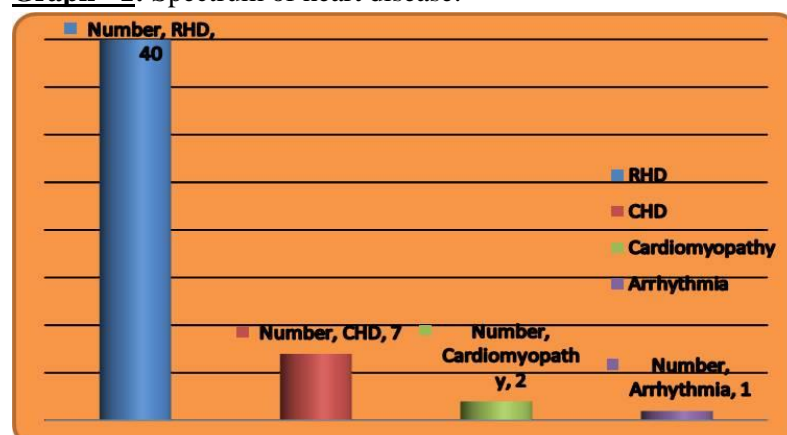


Table - 2: Distribution of different heart lesions among cases.

Types of heart disease		Number (%)
Valvular lesion (RHD) 40 (80%)	Mitral	20 (40%)
	Aortic	15 (30%)
	Tricuspid	5 (10%)
	Pulmonary	0 (0)
Congenital lesions 7 (14%)	VSD	4 (8%)
	ASD	2 (4%)
	PDA	1 (2%)
Corrected cardiac lesion 5 (10%)	Post ASD closure	2 (4%)
	Post Mitral Valve replacement	1 (2%)
	Post PDA closure	1 (2%)
	Post VSD closure	1 (2%)
Peripartum cardiomyopathy		2 (4%)

Graph - 2: Distribution of different heart lesions among cases.

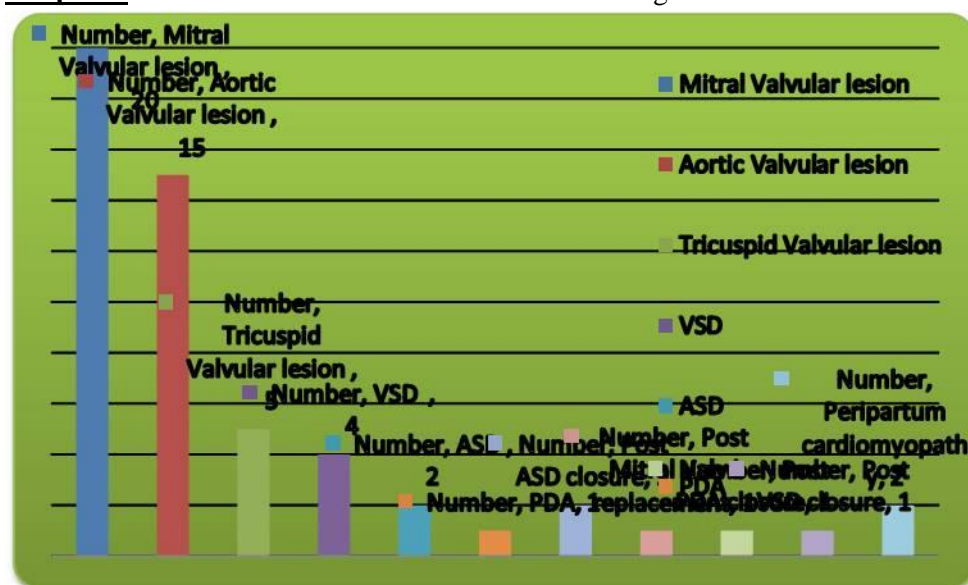


Table - 3: Cardiac complications among the cases.

Cardiac complications	Number (%)
Congestive Cardiac Failure (CCF)	8 (80%)
Atrial Fibrillation (AF)	1 (10%)
CCF+AF	1 (10%)

The most frequently involved valve in RHD was mitral valve (50% of all cases) followed by aortic 30%. The most widespread congenital lesion was Ventricular Septal Defect (VSD) (6%). A total of 5 (10%) patients had undergone corrective cardiac surgery. The most common valvular lesion was found to be mitral regurgitation (34%), followed by mitral stenosis (12%) (Table - 2 and Graph - 2).

In the present study, out of 50 cases, 10 (20%) had cardiac complications. Most common cardiac complication was congestive cardiac failure 8 (80%) (Table - 3 and Graph - 3).

In present study, most common antenatal complication among cases was preterm labour (24%) followed by hypertensive disorder of pregnancy (18%) (Table - 4 and Graph - 4).

Although rate of hypertension, Intrauterine Growth Restriction (IUGR) and abortion were high among cases than control but it was not statistically significant. There were 6 (12%) intrauterine foetal death cases among cases and none in control group (**Table - 4** and **Graph - 4**).

Graph - 3: Cardiac complications among the cases.

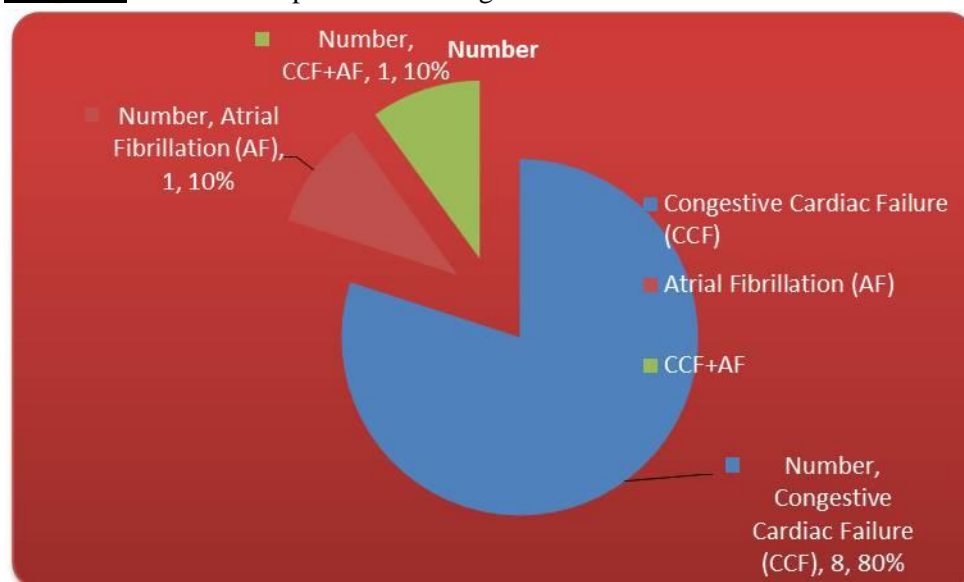
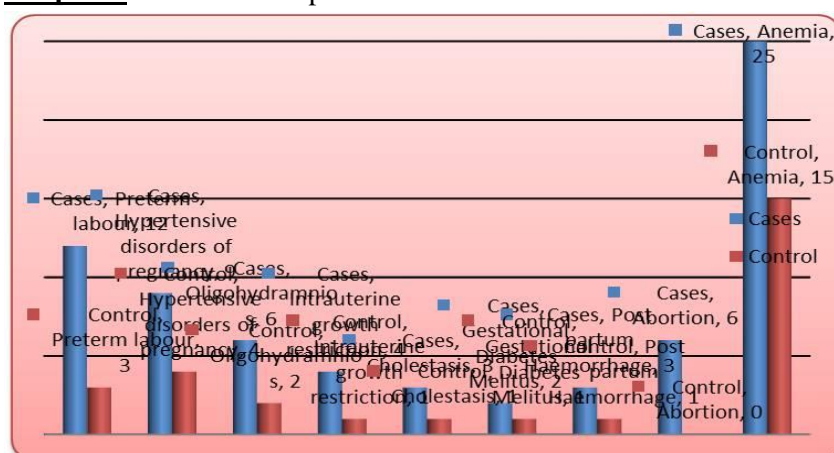


Table - 4: Obstetric complications in Cases and Controls.

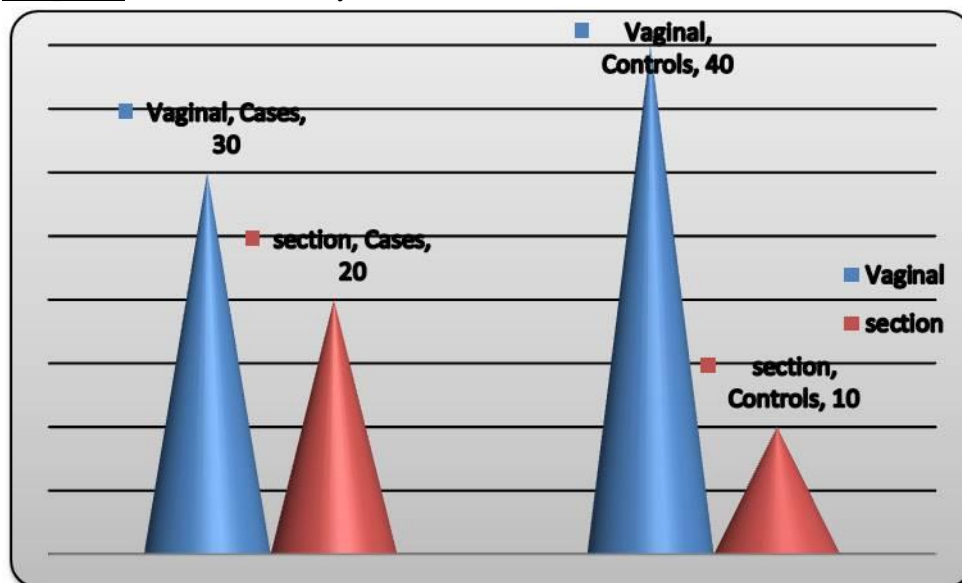
Obstetrical complication	Cases: Number (%)	Control: Number (%)	P value
Preterm labour	12 (24%)	3 (6%)	0.0121*
Hypertensive disorders of pregnancy	9 (18%)	4 (8%)	0.1391
Oligohydramnios	6 (12%)	2 (4%)	0.1424
Intrauterine growth restriction	4 (8%)	1 (2%)	0.1708
Cholestasis	3 (6%)	1 (2%)	0.3099
Gestational Diabetes Melitus	2 (4%)	1 (2%)	0.5597
Post partum Haemorrhage	3 (6%)	1 (2%)	0.3099
Abortion	6 (12%)	0	0.0119
Anemia	25 (50%)	15 (30%)	0.0423*

*=significant

Graph - 4: Obstetric complications in Cases and Controls.



Graph - 5: Mode of Delivery in Cases and Controls.



Five patients (10%) developed cardiac failure during intrapartum period, while two (4%) during postpartum period and one (2%) in antenatal period. There was no significant association found between the two groups in term of mode of delivery (p-value=0.4415) (Graph - 5).

There was more Neonatal Intensive Care Unit (NICU) admission among the cases (18%) when compared with controls (8%), (p-value 0.1391). The most common indication for NICU admission was prematurity (24%) among the case and Neonatal jaundice (18%) in the controls (p=0.4636%). There was no neonatal mortality. The percentage of maternal mortalities was 4% among those having heart disease. There was no maternal mortality among the controls (p-value-0.0423*).

Discussion

Profound changes occur in the maternal circulation that have the potential to adversely affect maternal and fetal health, especially in the presence of underlying heart conditions. Up to 4% of pregnancies may have cardiovascular complications despite no known prior disease. Contraindications to pregnancy generally consist of 4 states: Marfan syndrome with dilated aortic root (>4 cm), pulmonary hypertension

(pulmonary vascular resistance, >6 Wood units), moderate-to-severe left ventricular outflow tract obstruction (≥ 30 mmHg), and LVEF < 0.30. If a woman with one of these conditions becomes pregnant, early consultation with a maternal-fetal medicine specialist and a cardiologist should be done in order to evaluate the patient's risk and prepare the plan of care. Pregnancy with pulmonary hypertension confers a prohibitively high cardiac risk and carries a combined maternal and fetal mortality rate that approaches 50%. Termination of pregnancy should be considered in this condition [5-7].

The prevalence of heart disease in pregnancy in present study was 3.22%. Dina Aisha Khan, et al. found 2.32% prevalence in their study [8]. Prevalence among various studies done in India and abroad was from 1.3 to 4.3% [9, 10].

The mean age of women with heart disease of 28.75 ± 5.1 years which was comparable to other studies [8, 9]. Similar to other studies; maximum number of women were multigravida, (60%) followed by primigravida 40% [8, 11]. We found most of the cardiac cases to have RHD followed by CHD, whereas Dina Aisha Khan, et al. found that congenital heart disease as the most commonly encountered lesion (49.09%) followed by RHD (41.83%). In developing countries, the

incidence of RHD for years has continued to be higher, as most of the patients belonged to low socioeconomic class where poverty, poor nutrition, low level of sanitation and hygiene and inaccessibility to health services are common. The most common valvular lesion was found to be mitral regurgitation (34.5%). Other studies also mentioned mitral valve was the commonest valve involved and mitral stenosis in RHD was the most common lesion [10, 11].

In the present study, 10 (20%) had cardiac complications. The most common complication was congestive cardiac failure (80%), which was similar to earlier studies [8-10]. In present study, 60% of cases delivered vaginally and 40% by LSCS. The percentage of instrumental vaginal deliveries (24%) was higher among cases which are fairly justified in an attempt to cut short second stage of labour. Though some studies showed a lower rate of vaginal delivery in 45.2% cases and caesarean delivery in 54.8% [12]; two other studies mentioned a higher rate of vaginal delivery (53% and 46.6%) [11, 13].

There were no neonatal mortalities in present study population. Similar results were concluded by Puri S, et al., where 86% had live birth and 14% had stillbirth [14]. Moutquin JM, et al., reported that foetal/neonatal mortality rate (2%) was higher than that reported in general obstetric population (0.3%) [15].

With the increase in prevalence of heart diseases in pregnant women, it has emerged as an important cause of maternal mortality especially so in the developing countries. In present study heart disease was attributed in 4%, whereas Dina Aisha Khan et al. found it to be 10.34% [8]. Konar H, et al., stated that heart diseases associated with pregnancy accounted for 15% of pregnancy related mortality [11]. Like in present study, Sawhney H, et al., concluded that pregnant women with severe symptoms have a mortality risk up to 5-15% [16]. In contrast to this study, a lower maternal mortality of 1.1%, 3.09% and 4% was recorded in a study by three other authors [9, 10, 13].

Currently a large proportion of those suffering rheumatic heart disease are not diagnosed, or are diagnosed at a late stage when damage to the heart is very severe. Rheumatic heart disease remains the leading cause of maternal cardiac complications in pregnancy. In many rheumatic heart disease-endemic countries there is little or no access to life-saving heart valve surgery. Measures to halt the progression to severe rheumatic heart disease require long-term treatments and a well-functioning health system to deliver this service. Additionally, because treatment is long-term, it can be costly and challenging for patients to regularly visit a healthcare facility, and some patients may avoid the injections due to discomfort or fear of adverse events [13-15].

Ensuring a steady, quality supply of benzathine penicillin is also a key priority in the 13th WHO General Programme of Work, specifically the strategic priority on universal health coverage; access to medicines, vaccines and health products. Additionally, the WHO Road map for access to medicines, vaccines and other health products 2019-2023 and the WHO Benzathine Penicillin Technical Working Group are working to address global supply and demand issues for benzathine penicillin and ensure a quality-assured, safe and effective product is available on the shelves when needed [14-1].

With better health facilities, pregnant women with congenital heart disease will continue to rise and hence expertise in management of such conditions is imperative in times to come.

Conclusion

Successful pregnancies can be achieved when cardiac complications are managed during pregnancy. In order to optimize maternal and neonatal outcomes, close collaboration between the maternal-fetal medicine specialist and the cardiologist is important.

References

1. Warnes CA, Williams RG, Bashore TM, Child JS, Connolly HM, Dearani JA, et al. ACC/AHA 2008 Guidelines for the Management of Adults with Congenital Heart Disease: Executive Summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to develop guidelines for the management of adults with congenital heart disease). *Circulation*, 2008; 118(23): 2395–451.
2. Franklin WJ, Benton MK, Parekh DR. Cardiac disease in pregnancy. *Tex Heart Inst J.*, 2011; 38(2): 151-153.
3. S Chhabra, P Choudhary, S Gore, G Arora, S Mittal. Cardiac Disorders Complicating Pregnancy. *Crit Care Obst Gyne.*, 2018; 5(1): 2.
4. de Swiet M. Maternal mortality: confidential enquiries into maternal deaths in the United Kingdom. *Am J Obstet Gynecol.*, 2000; 182: 760-766.
5. Bowater SE, Thorne SA. Management of pregnancy in women with acquired and congenital heart disease. *Postgrad Med J.*, 2010; 86(1012): 100–5.
6. Regitz-Zagrosek V, Gohlke-Ba C, Iung B, Pieper PG. Management of cardiovascular diseases during pregnancy. *Current Problems in Cardiology*, 2014; 39(4): 85-151.
7. Boston ML. The criteria committee of the New York Heart Association. In *Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels*. 1994; pp. 253-256.
8. Dina Aisha Khan, et al. The Spectrum of Heart Disease in Pregnancy and its Outcome in Patients Visiting a Tertiary Care Centre of Northeastern: A Prospective Study. *Journal of Clinical and Diagnostic Research*, 2018 Jul; 12(7): QC16-QC20.
9. Bangal VB, Singh RK, Shinde KK. Clinical study of heart disease complicating pregnancy. *IOSR*, 2012; 2(4): 25-28.
10. Puri S, Bharti A, Puri S, Mohan B, Bindal V, Verma S. Maternal heart disease and pregnancy outcomes. *JK Science*, 2013; 15: 07-10.
11. Konar H, Chaudhuri S. Pregnancy complicated by maternal heart disease: a review of 281 women. *The Journal of Obstetrics and Gynecology of India*, 2012; 62(3): 301-06.
12. Stangl V, Schad J, Gossing G, Borges A, Baumann G, Stangl K. Maternal heart disease and pregnancy outcome: A single centre experience. *European Journal of Heart Failure*, 2008; 10(9): 855-60.
13. Chhetri S, Shrestha NR, Pilgrim T. Pregnancy complicated by heart disease in Nepal. *Heart Asia.*, 2014; 6(1): 26-29.
14. Puri S, Bharti A, Puri S, Mohan B, Bindal V, Verma S. Maternal heart disease and pregnancy outcomes. *JK Science*, 2013; 15: 07-10.
15. Moutquin JM, Gagnon R, Rainville C, Giroux L, Amyot G, Bilodeau R, et al. Maternal and neonatal outcome in pregnancies with no risk factors. *CMAJ*, 1987; 137(8): 728-32.
16. Sawhney H, Aggarwal N, Suri V, Vasishta K, Sharma Y, Grover A. Maternal and perinatal outcome in rheumatic heart disease. *Int J Gynaecol Obstet.*, 2003; 80(1): 09-14.