

Research Article

Pregnancy Outcomes and Fetometrnl Complications in Mild to Moderate Mitral Stenosis Patients Presenting to DHQ's Teaching Hospital Timergara

Sumera Begum¹, Sajjad Khan², Munazza Ayub³, Humaira Bibi⁴, Saiqa Noor⁵, Rehana Yasmin⁶

¹MBBS, FCPS Gyne and Obs, Senior Registrar Gynae and Obs Unit, Timergara Teaching Hospital, Timergara, Pakistan

²MBBS, FCPS Cardiology, Assistant Professor, Timergara Teaching Hospital, Timergara, Pakistan

³MBBS, FCPS Gyne and Obs, Registrar Gynae and Obs Unit, Timergara Teaching Hospital, Timergara, Pakistan

⁴MBBS, MRCOG FCPS Gyne and Obs, Associate Professor, Timergara Teaching Hospital, Timergara, Pakistan

⁵MBBS, FCPS Gyne and Obs, Senior District Gynecologist, Timergara Teaching Hospital, Timergara, Pakistan

⁶MBBS, House Officer Gynae and Obs Unit, Timergara Teaching Hospital, Timergara, Pakistan

Corresponding Author: Dr. Munazza Ayub, MBBS, FCPS Gyne and OBS, Registrar Gynae and Obs Unit, Timergara Teaching Hospital, Timergara, Pakistan

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ABSTRACT

Background: In areas where rheumatic heart disease is common, mitral stenosis continues to be a significant cardiac issue that complicates pregnancy. Because of the hemodynamic demands of pregnancy, even mild to severe illness can become clinically serious. The aim The purpose of this study was to assess the fetal and maternal outcomes of pregnant patients with mild to moderate mitral stenosis in a tertiary care environment.

Methods: From November 2024 to November 2025, 105 pregnant women with mild to moderate mitral stenosis were involved in this descriptive observational study at DHQ Timergara Teaching Hospital lower division. The diagnosis was verified by echocardiography. In order to get data, consecutive sampling was used. Obstetric events, fetal outcomes, complications, echocardiographic data, maternal demographics, and New York Heart Association functional class were all documented.

Results: Of the 105 women who were part of the study, 59 had significant mitral stenosis and 46 had mild mitral stenosis. Compared to women with mild mitral stenosis, those with moderate stenosis had worse functional status and more severe symptoms. 29.5% of patients experienced maternal problems; the moderate group was more likely to experience pulmonary edema (10.5%), arrhythmias (12.4%), and heart failure (8.6%). Preterm birth (26.7%), cesarean section (43.8%), and hypertensive disorders (13.3%) were common obstetric outcomes. Women with moderate mitral stenosis were more likely to experience fetal problems such low birth weight (21%), intrauterine growth restriction (16.2%), and admission to the neonatal intensive care unit (17.1%).

Conclusion: It was concluded that there are significant hazards associated with mild to moderate mitral stenosis during pregnancy for both the mother and the fetus, and the possibility of problems increases as the disease severity increases. To improve maternal and fetal outcomes in this high-risk group, early cardiac assessment, routine prenatal monitoring, and coordinated multidisciplinary care are essential.

Keywords: Pregnancy Outcomes, Fetometrnl Complications, Mitral Stenosis Patients, Timergara

INTRODUCTION

In obstetric cardiology, mitral stenosis is still a major problem, especially in low- and middle-income areas where rheumatic fever is still a major public health concern [1]. There is still a group of women of reproductive age with untreated or insufficiently managed valvular disease, despite advances in preventative care. During pregnancy, a woman's mitral valve stenosis may become symptomatic while routine activities of daily living do not unmask

the dysfunction; that is, the disease remains compensated or stable [2]. Mitral stenosis, particularly in the presence of a positive volume overload, increased heart rate, and elevated metabolic demands, may become symptomatic in the presence of previously compensated mitral stenosis and may shift the balance toward more symptomatic disease [3]. This is particularly concerning with mild and moderate mitral stenosis, a condition that may appear clinically insignificant, as pregnancy

alters both the volume and the dynamics of the circulation in a clinically significant manner. Mitral valve stenosis causes increased left atrial pressure and may increase the risk of pulmonary congestion and, consequently, pulmonary oedema [4]. Importantly, this left ventricular outflow obstruction and the subsequent pulmonary oedema risk increase with the later stages of pregnancy. Most practitioners accept that severe mitral stenosis is a high risk, but there has come to be a greater understanding that mild and moderate mitral stenosis is also high risk, and the disease is timely, symptomatic, and progressive [5]. A woman may appear stable with both mild and moderate mitral stenosis, but the later stages of pregnancy may precipitate a volume overload, anaemia, or increased heart rate, potentially resulting in increased risk of heart failure [6]. As a result, in a specific therapeutic context, terminology like "mild," "moderate," and "severe" become more dependent on the unique physiology and diastolic filling status of each pregnancy [7]. Both members of the dyad must be assessed simultaneously because the fetus is primarily impacted by the mother's cardiovascular deficiencies [8]. While many pregnant women with moderate mitral stenosis (MMS) experience no serious difficulties, some experience unfavorable outcomes that seem out of proportion to the disease's echocardiographic severity [9]. This implies that variables other than physical severity, like functional status, symptom burden, and the existence of comorbid diseases, may be crucial in predicting outcomes for both mothers and fetuses [10]. Because of this, managing pregnancy in women with mitral stenosis is difficult and calls for a multidisciplinary team that includes obstetricians, cardiologists, anesthesiologists, and neonatal specialists. Safer results for both the mother and the fetus depend on careful heart rate control, prevention of atrial fibrillation and other rhythm abnormalities, and proper hydration management. [11]. The mainstay of treatment usually involves beta-blockers, diuretics, and management of activities. In some cases, despite medical therapy, women may require a percutaneous balloon mitral valvotomy even when pregnant. The decision, however, is not an easy one. The benefits that may be gained by the mother must be weighed against the risks the procedure may pose to the fetus [12]. The rate of cardiac disease in pregnancy has not changed over the years. More recent studies report an incidence of 0.1 to 4% [13]. In Pakistan and other developing countries,

rheumatic heart disease is still a predominant factor, with mitral stenosis the most common valvular disease [14]. Pregnancy is associated with significant changes in the cardiovascular and haemodynamic profile. While most women adjust well to these changes, women with heart disease tend to decompensate and are at a higher risk of morbidity and even mortality [15]. The cardiovascular changes that occur in pregnancy from 7 weeks of gestation and for 2 weeks postpartum are characterised by a low resistance state with high blood flow [16].

Objective

This study aimed to evaluate maternal and fetal outcomes in pregnant women with mild to moderate mitral stenosis in a tertiary care setting.

METHODOLOGY

This study was a descriptive observational study conducted at DHQ Timergara Teaching Hospital lower dir from Nov 2024 to Nov 2025. A total of 105 pregnant women diagnosed with mild to moderate mitral stenosis were included. Non-probability consecutive sampling was used to recruit participants who met the inclusion criteria.

Inclusion Criteria

- Pregnant women diagnosed with rheumatic mitral stenosis classified as mild or moderate
- Singleton pregnancy
- Gestational age beyond the first trimester

Exclusion Criteria

- Severe mitral stenosis
- Significant associated valvular disease such as severe mitral regurgitation or aortic valve pathology
- Known congenital heart disease or cardiomyopathy
- Multiple pregnancy
- Coexisting uncontrolled chronic illnesses such as hypertension, diabetes, or renal disease
- Incomplete clinical records or loss to follow-up

Data collection

Data were collected using a structured proforma designed for the study. Maternal demographic characteristics, obstetric history, and cardiovascular symptoms were documented at baseline. To calculate the severity of mitral stenosis, the following were achieved by echocardiographic mitral valve area, mean diastolic pressure gradient, pulmonary artery systolic pressure and other standard clinical measures: mitral valve area of

> 1.5 cm² and mean gradient < 5 mmHg was classified as mild mitral stenosis and mitral valve area of 1.0 cm² to 1.5 cm² and mean gradient of 5 and 10 mmHg was classified as moderate mitral stenosis. Every echocardiographic assessment was performed by Certified Cardiologists. Clinical parameters such as New York Heart Association functional class and echocardiographic findings were recorded. During pregnancy, maternal pulmonary oedema, arrhythmias, and heart failure, hospitalisation, and other complications were monitored. Maternal morbidity, induced labour, and other obstetric complications such as mode of delivery and postpartum haemorrhage were recorded. From the fetal and neonatal side, the parameters recorded were: Apgar scores, low/very low birth weight, intrauterine growth restriction, and admission to the neonatal intensive care unit. Gestational age, preterm birth, and other relevant outcomes were also registered.

Statistical Analysis

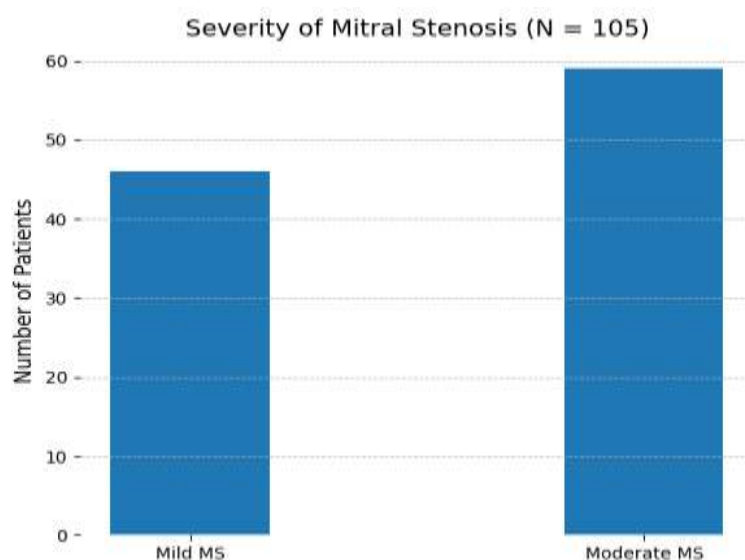
Data were entered and analyzed using the statistical software package SPSS v26.0. Continuous variables were summarized as mean and standard deviation, whereas categorical variables were expressed as frequencies and %ages. Associations between the severity of mitral stenosis and maternal or fetal outcomes were analyzed using chi-square tests for categorical variables and independent sample t-tests for continuous variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The mean maternal age of totally 105 patients was 27.8±4.6 years. 37.1% of women were primigravida, whereas 62.9% of women were multigravida. First trimester (17.1%), third trimester (28.6%), and second trimester (54.3%) were the most common times for patients to present. 43.8% of cases had mild mitral stenosis, whereas 56.2% of women had significant mitral stenosis.

Table 1. Baseline Maternal Characteristics (N = 105)

Variable	Category	n	%
Age (years)	Mean ± SD	27.8 ± 4.6	—
Parity	Primigravida	39	37.1
	Multigravida	66	62.9
Gestational age at presentation	First trimester	18	17.1
	Second trimester	57	54.3
	Third trimester	30	28.6
Severity of mitral stenosis	Mild	46	43.8
	Moderate	59	56.2



Women with intermediate mitral stenosis experienced more symptoms upon presentation (71.2%) than those with mild mitral stenosis (45.7%). The majority of patients with mild stenosis were in NYHA Class I (63.0%),

whereas women with moderate stenosis were mostly identified in NYHA Class II (42.4%) and Class III (28.8%). Echocardiographic findings revealed that the moderate group had a smaller mean mitral valve area (1.18 ± 0.11 cm²) than

the mild group ($1.42 \pm 0.18 \text{ cm}^2$) and a bigger mean diastolic gradient ($7.3 \pm 1.2 \text{ mmHg}$ vs. $4.1 \pm 0.8 \text{ mmHg}$). Furthermore, pulmonary artery systolic pressure exceeding 40 mmHg was more common in intermediate cases (37.3%) compared to mild patients (13.0%).

Table 2. Maternal Clinical and Echocardiographic Findings

Variable	Mild MS (n = 46)	Moderate MS (n = 59)
Symptomatic at presentation, n (%)	21 (45.7)	42 (71.2)
NYHA Class I	29 (63.0)	18 (30.5)
NYHA Class II	13 (28.3)	25 (42.4)
NYHA Class III	4 (8.7)	17 (28.8)
Mitral valve area (cm^2), Mean $\pm$ SD	1.42 ± 0.18	1.18 ± 0.11
Mean diastolic gradient (mmHg), Mean $\pm$ SD	4.1 ± 0.8	7.3 ± 1.2
Pulmonary artery systolic pressure >40 mmHg, n (%)	6 (13.0)	22 (37.3)

10.5% of all patients had pulmonary edema, with the majority of instances occurring in the moderate group (15.3%). 12.4% of women had arrhythmias, with 5.7% having supraventricular tachycardia and 6.7% having atrial fibrillation.

Just 2.2% of the mild group experienced heart failure episodes, compared to 8.6% of the cohort. 2.9% of patients, all from the moderate group—had to be admitted to the intensive care unit. There were no maternal fatalities.

Table 3. Maternal Complications

Complication	Total n (%)	Mild MS n (%)	Moderate MS n (%)
Pulmonary edema	11 (10.5)	2 (4.3)	9 (15.3)
Arrhythmias	13 (12.4)	4 (8.7)	9 (15.3)
Atrial fibrillation	7 (6.7)	2 (4.3)	5 (8.5)
Supraventricular tachycardia	6 (5.7)	2 (4.3)	4 (6.8)
Heart failure episodes	9 (8.6)	1 (2.2)	8 (13.6)
ICU admission	3 (2.9)	0 (0.0)	3 (5.1)
Maternal mortality	0 (0.0)	0 (0.0)	0 (0.0)

In women with intermediate stenosis (33.9%) compared to those with mild stenosis (17.4%), preterm birth occurred in 26.7% of cases. 43.8% of patients underwent cesarean delivery, which was once more common in the moderate category (52.5%). Postpartum hemorrhage happened in 7.6% of patients, while induction of labor was necessary in 18.1% of cases. Of the entire group, 13.3% had hypertensive

problems. 21.0% of newborns had low birth weight, with 27.1% of women with moderate stenosis and 13.0% of moms with mild stenosis. 16.2% of patients had intrauterine growth restriction, and 17.1% of newborns—mostly in the moderate category (22.0%)—needed to be admitted to the NICU. 4.8% of babies had low Apgar scores at one minute. In both groups, the newborn survival rate was 100%.

Table 4. Obstetric Outcomes

Obstetric Outcome	Total n (%)	Mild MS n (%)	Moderate MS n (%)
Preterm delivery	28 (26.7)	8 (17.4)	20 (33.9)
Cesarean delivery	46 (43.8)	15 (32.6)	31 (52.5)
Induction of labor	19 (18.1)	6 (13.0)	13 (22.0)
Postpartum hemorrhage	8 (7.6)	3 (6.5)	5 (8.5)
Hypertensive disorders	14 (13.3)	5 (10.9)	9 (15.3)
Fetal Outcomes			
Low birth weight (<2.5 kg)	22 (21.0)	6 (13.0)	16 (27.1)
Intrauterine growth restriction	17 (16.2)	4 (8.7)	13 (22.0)
Preterm birth	28 (26.7)	8 (17.4)	20 (33.9)
NICU admission	18 (17.1)	5 (10.9)	13 (22.0)
Low Apgar score at 1 minute	5 (4.8)	1 (2.2)	4 (6.8)
Neonatal survival	105 (100%)	46 (100%)	59 (100%)

DISCUSSION

The present study stated that both maternal and neonatal risks remain clinically significant,

even when the disease is classified as non-severe. Moderate mitral stenosis was linked to increased maternal symptoms, greater fetal

complications, and higher cardiovascular morbidity, while even mild cases demonstrated meaningful risks, emphasizing the importance of vigilant monitoring and proper management during pregnancy. This is consistent with the literature that the increased total blood volume, elevated heart rate, and increased cardiac output during pregnancy present an additional burden on a stenotic mitral valve [17]. These findings are consistent with findings of other studies in this region, where rheumatic heart disease is prevalent and valvular stenosis is common, particularly in young women of reproductive age. The symptom profile in the moderate mitral stenosis group, particularly the progression to higher NYHA classes, is a powerful indicator of the need for prompt cardiovascular and functional assessment in the early stages of pregnancy. Other notable findings in this group include moderate mitral stenosis and the most maternal complications, including pulmonary oedema, arrhythmias, and heart failure [18]. Complications usually develop in the third trimester, which is when blood flow is most required, and the mother is most tachycardic. The presence of pulmonary artery pressure in the more serious cases of stenosis further justifies the link between the severity of the disease and negative events in the mother. The suggestion of continuous care in the emergency room, in some cases, is a reminder that, in cases of moderate stenosis, we can expect rapid progression to decompensation without careful planning of early interventions and constant monitoring [19]. Differences in obstetric outcomes in this study by severity groups are also clear. More frequent outcomes were seen in preterm delivery, caesarean section, and labour induction among women with moderate mitral stenosis [20]. Maternal cardiac decompensation and its complications are recognised in the literature as a reason for early delivery as a means of damage control for the mother and fetus. Also, the high caesarean delivery rate in the moderate group illustrates a clinical practice pattern of allowing women with a higher risk of haemodynamic instability to avoid prolonged labour. The relatively low rate of postpartum haemorrhage indicates that mitral stenosis mainly influences antepartum and intrapartum physiology rather than uterine functionality postpartum. Neonatal and fetal outcomes also exhibited the same pattern, with restricted growth, low birth weight, and admission to neonatal intensive care being more prevalent in moderate mitral stenosis [21]. Maternal cardiac output and uteroplacental insufficiency are factors in its disproportionate prevalence. Reduced perfusion

of the placenta may be the explanation for the elevated morbidity in neonates concerning the complex of higher pulmonary pressures and poor functional status of the mother in this study [22]. The control of perinatal mortality stands as a positive outcome in light of the more complex care now available obstetrically and neonatally as part of a tertiary institution. The study confirms that the severity of illness predicts maternal and fetal outcomes [23]. However, the presence of complications in patients with mild mitral stenosis suggests that illness severity alone should not be used for risk stratification. Mitchell and Barlow's functional capacity, the progression of symptoms, accompanying diseases, and echocardiogram details should be included in decision-making. Structured surveillance and monitoring among the obstetrician, cardiologist, anaesthetist, and neonatologist should be encouraged based on outcomes from the study. This study also has multiple limitations that are important to highlight. Most importantly, the study was performed at only one tertiary care centre, which will be the least comparable for the transferability of results to rural and underserved areas that have no access to specialised cardiac care. Second, the sample size does not provide a statistically significant sample size to determine the absence of differences in the study's subgroups. Factors that can be used to establish differences include the socioeconomic levels of the respondents, the medical treatments that are available, and/or other comorbid medical diseases that are present. Third, and to complete the assessment, the study used a cross-sectional design, which limits assessing long-term maternal and neonatal outcomes and outcomes other than the peripartum period. Finally, certain clinical data that have been recorded were based on patients' medical history and symptoms, and this could have introduced a recall bias or documentation bias. Lastly, rheocardiographic evaluations were carried out during gestation, with possible impact of dynamic haemodynamic alterations on measurement, and therefore on determining the degree of severity of the disease.

CONCLUSION

It is concluded that pregnancy in women with mild to moderate mitral stenosis is associated with meaningful maternal and fetal risks, and the likelihood of complications increases with the severity of the disease. Women with moderate mitral stenosis demonstrated higher rates of pulmonary edema, arrhythmias, heart failure, preterm delivery, and fetal growth

restriction, but complications were also observed in those with mild stenosis, indicating that even non-severe disease requires careful monitoring. These findings reinforce the need for early diagnosis, timely cardiology assessment, and close antenatal surveillance to prevent decompensation during pregnancy.

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