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RESEARCH ARTICLE

Clinical Spectrum and Short-Term Cardiac Outcomes of Peripartum Cardiomyopathy among Bangladeshi Women

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Abstract: ***Background:*** Peripartum cardiomyopathy (PPCM) is a life-threatening cause of heart failure in previously healthy women during late pregnancy or the postpartum period; however, data from Bangladesh remain limited. This study aimed to evaluate the clinical spectrum and short-term cardiac outcomes of PPCM in Bangladeshi women. ***Methods:*** This cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Bangladesh Medical University, Dhaka, from June 2024 to July 2025, involving 40 women with PPCM diagnosed using echocardiography (LVEF ≤45%). Demographic, clinical, and echocardiographic data were collected at baseline and at the six-month follow-up. Descriptive statistics were analyzed using SPSS version 25.0. ***Results:*** The mean age was 28.4 ± 6.1 years, with 50% aged 26–35 years and 80% being multigravida. Most patients (70%) developed postpartum symptoms, and 65% presented with severe LV systolic dysfunction (LVEF <30%). Pulmonary hypertension and intracardiac thrombi were present in 65% and 7.5% of patients, respectively. At six months, 20% achieved full recovery (LVEF ≥50%), 35% achieved partial recovery, 37.5% had persistent dysfunction, and mortality was 7.5%. All the patients received standard heart failure therapy. ***Conclusion:*** Peripartum cardiomyopathy in Bangladeshi women predominantly affects multiparous postpartum women with severe LV dysfunction. Although recovery within six months was observed in over half of the patients, early diagnosis and comprehensive management remain essential to reduce morbidity and mortality.

Keywords: Peripartum cardiomyopathy, heart failure, postpartum left ventricular dysfunction

INTRODUCTION

Peripartum cardiomyopathy (PPCM) is a potentially life-threatening form of heart failure that occurs toward the end of pregnancy or in the months following delivery in previously healthy women [1]. It is characterized by left ventricular (LV) systolic dysfunction, typically defined as an ejection fraction (LVEF) ≤ 45%, in the absence of pre-existing structural heart disease [2]. Despite its rarity, PPCM represents a major cause of maternal morbidity and mortality worldwide, with substantial geographic variation in incidence, clinical characteristics, and outcomes [3,4]. While the disorder has been extensively studied in Western populations, evidence from South Asia, including Bangladesh, remains sparse, limiting the region-specific understanding of disease patterns and outcomes.

The etiology of PPCM is multifactorial, involving genetic, hormonal, inflammatory, and vascular mechanisms [5,6]. Proposed pathogenic contributors include oxidative stress, antiangiogenic signaling (e.g., excess prolactin fragments), and immune-mediated myocardial injury [7]. Recent genetic studies have identified an overlap between PPCM and dilated cardiomyopathy, suggesting a shared predisposition in some women [8]. Established risk factors encompass multiparity, advanced maternal age, pre-eclampsia, hypertension, and multiple pregnancies [9]. These factors are prevalent in low- and middle-income countries (LMICs), where antenatal cardiovascular screening is often limited, contributing to delayed diagnosis and poor outcomes [10].

Globally, the reported incidence of PPCM ranges from 1 in 1,000 to 1 in 10,000 live births, with markedly higher rates in regions of sub-Saharan Africa, Haiti, and South Asia [11]. Studies from Nigeria and South Africa have reported severe presentations and reduced recovery rates, often attributed to nutritional deficiencies, genetic predisposition, and healthcare inequities [12,13]. Similarly, limited regional data from South Asia suggest that PPCM disproportionately affects multiparous postpartum women and is often diagnosed late in the disease course [14]. In Bangladesh, systematic studies remain extremely limited, and the true burden of PPCM is likely underestimated due to under-recognition and diagnostic constraints.

Clinical manifestations typically include progressive dyspnea, orthopnea, and peripheral edema, which may

be misattributed to normal physiological changes of pregnancy [6]. Echocardiography remains the cornerstone of diagnosis, enabling assessment of LVEF, chamber dimensions, and associated findings such as pulmonary hypertension or LV thrombus [3]. Recent evidence indicates that right ventricular dysfunction and elevated biomarkers (NT-proBNP) are important prognostic markers [15,16]. Although contemporary heart failure therapy improves survival and LV recovery in high-income settings, outcomes in LMICs remain suboptimal due to late presentation and limited access to follow-up care [10].

Given these disparities, there is a pressing need for context-specific data from Bangladesh to inform early diagnosis, risk stratification, and management strategies tailored to local healthcare realities. The present study, therefore, aims to describe the clinical spectrum, echocardiographic features, and short-term cardiac outcomes of women with PPCM in Bangladesh, thereby addressing a critical knowledge gap in the South Asian context.

MATERIAL AND METHODS

This cross-sectional, observational study was conducted in the Department of Obstetrics and Gynaecology, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from June 2024 to July 2025. The study included 40 women diagnosed with peripartum cardiomyopathy (PPCM), either during the last month of pregnancy or within five months postpartum, who were admitted to the department during the study period.

Inclusion criteria:

- Women aged 18–45 years.
- Onset of heart failure symptoms during the last month of pregnancy or within five months postpartum.
- Left ventricular ejection fraction (LVEF) ≤45% confirmed by echocardiography.
- Absence of pre-existing cardiac disease before pregnancy.

Exclusion criteria:

- Known congenital or valvular heart disease.
- Ischemic or hypertensive cardiomyopathy is unrelated to pregnancy.
- Severe systemic infection or sepsis at presentation.
- Chronic renal or hepatic failure.
- Incomplete clinical or echocardiographic data.

Data Collection and Study Procedure

Eligible patients were identified through clinical screening and echocardiographic evaluation. Demographic data, obstetric history, and clinical findings were recorded using a structured case record form. Clinical parameters included age, parity, gravidity, residence, and timing of symptom onset. Vital signs, NYHA class, and presence of symptoms such as dyspnea, orthopnea, or pedal edema were documented at admission. Baseline laboratory investigations, chest radiography, ECG, and transthoracic echocardiography were performed for all participants. Echocardiographic assessment included measurement of LVEF (Simpson's biplane method), left ventricular end-diastolic diameter (LVEDD), left atrial size, and presence of intracardiac thrombus or pulmonary hypertension.

All patients received standard heart failure therapy as per guideline-based recommendations, including diuretics, beta-blockers, ACE inhibitors (or ARB), and digoxin when indicated. Anticoagulation was prescribed for patients with LVEF <30% or evidence of LV thrombus. A follow-up evaluation was performed at six months to assess symptomatic status and echocardiographic improvement. Informed consent was obtained from each participant before enrollment. Confidentiality and anonymity were strictly maintained throughout the study.

Statistical Analysis

Data were analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Descriptive statistics were used to summarize demographic, clinical, and echocardiographic characteristics.

RESULTS AND OBSERVATIONS:

Table 1 presents baseline demographics and obstetrics of study participants. Mean age was 28.4 ± 6.1 years, with half (50%) aged between 26-35 years. Most patients (65%) were urban residents, while 35% came from rural areas. Multigravida women predominated (80%), and 70% developed symptoms during the postpartum period. Pregnancy-induced hypertension (PIH) was present in 25% and diabetes mellitus in 15%, whereas 10% reported a family history of cardiac disease.

Table 1: Baseline characteristics of study participants (N = 40)

Variable	Categories	Frequency (n)	Percentage (%)
Age group (years)	18–25	14	35.0
	26–35	20	50.0
	>35	6	15.0
	Mean ± SD (years)	28.4 ± 6.1	
Residence	Urban	26	65.0
	Rural	14	35.0
Gravida status	Primigravida	8	20.0
	Multigravida	32	80.0
Timing of symptom onset	Last month of pregnancy	12	30.0
	Postpartum period	28	70.0
Pregnancy-induced hypertension (PIH)	Present	10	25.0
Diabetes mellitus	Present	6	15.0
Family history of cardiac disease	Present	4	10.0

Table 2: Clinical and echocardiographic findings (N = 40)

Variable	Groups/Categories	Frequency (n)	Percentage (%)
Presenting symptoms	Dyspnea (NYHA III–IV)	28	70.0
	Orthopnea/PND	24	60.0
	Pedal edema	22	55.0
LVEF categories	<30%	26	65.0
	30–39%	11	27.5
	≥40%	3	7.5
	Mean LVEF (%)	31.2 ± 7.8	
Left ventricular dilatation	Present	22	55.0
Pulmonary hypertension (moderate–severe)	Present	26	65.0
Intracardiac thrombus	Present	3	7.5

Table 2 shows clinical and echocardiographic features at presentation. Dyspnea was universal, with 70% of patients classified as NYHA class III–IV. Orthopnea and paroxysmal nocturnal dyspnea were present in 60%, and pedal edema in 55%. Mean left ventricular ejection fraction (LVEF) was 31.2 ± 7.8%. Severe LV systolic dysfunction (LVEF <30%) was found in 65%, moderate dysfunction in 27.5%, and mild dysfunction in 7.5%. LV dilatation was present in 55% and pulmonary hypertension in 65%, while intracardiac thrombus was observed in 7.5%.

Table 3: Treatment profile and short-term (6-month) cardiac outcomes (N = 40)

Variable	Groups/Categories	Frequency (n)	Percentage (%)
Medical therapy received	Loop diuretics	40	100.0
	ACE inhibitors / ARB	34	85.0
	Beta-blockers	29	72.5
	Digoxin	30	75.0
	Anticoagulant	6	15.0
6-month outcomes	LVEF recovery ≥50%	8	20.0
	Partial recovery (LVEF 40–49%)	14	35.0
	Persistent dysfunction (<40%)	15	37.5
	Mortality	3	7.5

Table 3 summarizes therapeutic management and outcomes. All patients received loop diuretics, 85% were treated with ACE inhibitors or ARBs, and 72.5% received beta-blockers. Digoxin was used in 75% of cases, and anticoagulants in 15%. At six-month follow-up, 20% achieved full recovery (LVEF ≥50%), and 35% showed partial recovery (LVEF 40–49%). Persistent LV dysfunction (<40%) was noted in 37.5%, and mortality at six months was 7.5%.

DISCUSSION

The findings of this study demonstrate that peripartum cardiomyopathy (PPCM) in Bangladeshi women primarily affects multiparous postpartum patients in their late twenties and early thirties, with severe LV systolic dysfunction and a relatively low short-term recovery rate. These observations align with regional patterns reported from other South Asian and African cohorts, underscoring the influence of socio-demographic and health system factors on disease presentation and outcomes [10,12]

The predominance of postpartum onset in 70% of participants is consistent with data from Karaye et al., and Al Riyami et al., suggesting a shared pathophysiologic mechanism associated with late gestational hemodynamic stress and postpartum vascular maladaptation [12,14]. Arany and Hoes et al. emphasized the role of oxidative and hormonal stressors—particularly the antiangiogenic prolactin fragment 16 kDa—in myocardial injury during this period [1,5]. The observed high prevalence of severe LV dysfunction (LVEF < 30% in 65%) mirrors reports from the study by Sliwa et al., and indicates delayed diagnosis, possibly due to the overlap of early cardiac symptoms with normal postpartum fatigue or volume overload [13].

The proportion of patients with pulmonary hypertension (65%) in the present study is notable and clinically relevant. Mild-to-moderate pulmonary hypertension has been linked to increased mortality in PPCM, reflecting elevated left atrial pressures and impaired LV compliance [17,18]. Similar findings were described in the BRO-HF Quebec cohort, where right ventricular dysfunction and elevated pulmonary pressures independently predicted adverse outcomes [19]. Such comorbidities likely compound the hemodynamic burden and may explain the persistence of LV dysfunction in a substantial subset of our cohort.

Although 55% of participants achieved partial or full recovery within six months, the 7.5% mortality rate remains concerning. These figures fall between outcomes reported in high-income nations and those from African registries where mortality exceeds 10–15% [3,13]. Differences in recovery and survival are likely multifactorial—reflecting disparities in access to care, baseline comorbidities, and nutritional factors such as selenium deficiency, which has been implicated in PPCM pathogenesis in West Africa [20]. In Bangladesh, limited access to specialized cardiac follow-up and echocardiography likely hinders optimal management and timely titration of heart failure therapy.

Multiparity was a striking characteristic in 80% of patients, consistent with earlier literature associating higher parity with increased PPCM risk [9]. The relationship between parity and disease severity may reflect cumulative vascular and hormonal stress, or socio-cultural factors such as limited birth spacing and restricted antenatal monitoring. Furthermore, hypertensive disorders were present in 25% of cases—slightly lower than in the ESC EORP registry but comparable to findings from other LMIC cohorts [14]. The coexistence of pre-eclampsia and PPCM has been shown to worsen LV recovery and increase adverse outcomes, reinforcing the need for early cardiovascular screening in high-risk pregnancies.

At the pathophysiologic level, PPCM in this cohort reflects the classic phenotype of severe LV dilatation and systolic dysfunction with variable reversibility. Studies have demonstrated that recovery often occurs within the first six months, driven by prompt initiation of heart failure therapy and favorable baseline myocardial strain [15]. The partial recovery observed in over one-third of our participants supports these data, suggesting that earlier detection could enhance the likelihood of normalization. However, the persistence of dysfunction in 37.5% highlights potential myocardial injury beyond reversible remodeling, possibly due to delayed presentation, recurrent pregnancies, or limited pharmacologic optimization.

The 7.5% incidence of LV thrombus in this cohort further underscores the thromboembolic risk in PPCM. Data from the ESC EORP registry identified thromboembolic events in 6%–7% of patients despite anticoagulation, consistent with our findings [21]. This emphasizes the need for individualized anticoagulation strategies, especially in women with LVEF < 30% or persistent LV dilatation.

In summary, this study contributes valuable insight into the clinical behavior of PPCM in Bangladesh, a setting where epidemiologic data are scarce. The demographic and echocardiographic profiles parallel those in other LMICs, reinforcing the global inequities in maternal cardiac health. Improving outcomes will require strengthening perinatal cardiac screening, raising awareness among obstetricians, and establishing multidisciplinary cardio-obstetric care pathways. Broader national surveillance and longer-term follow-up studies are warranted to clarify predictors of recovery and guide evidence-based management in South Asian populations.

Limitations of the study

This study was conducted in a single tertiary center with a relatively small sample size, which may limit generalizability. The follow-up period was restricted to six months, precluding long-term outcome assessment. Additionally, advanced imaging modalities such as cardiac MRI were not utilized due to limited

availability, potentially underestimating subclinical myocardial abnormalities.

CONCLUSION

Peripartum cardiomyopathy among Bangladeshi women commonly affects multiparous individuals in their late twenties and early thirties, presenting predominantly in the postpartum period with severe LV systolic dysfunction. Despite delayed presentation, over half of the patients demonstrated partial or full recovery within six months, while mortality remained modest. These findings underscore the need for early echocardiographic screening, timely initiation of heart failure therapy, and structured postpartum follow-up to improve maternal cardiac outcomes in Bangladesh.

Conflicts of interest

There are no conflicts of interest.

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