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Research Article

STUDY ON CLINICAL PROFILE AND OUTCOME IN PATIENTS WITH PERIPARTUM CARDIOMYOPATHY IN A TERTIARY CARE HOSPITAL

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Abstract

Introduction: Peripartum cardiomyopathy is a potentially fatal disease of heart failure with reduced left ventricular ejection fraction (LVEF <45%) in a previously healthy women Despite its morbidity and mortality, the etiology remains unknown and subject to much speculation. PPCM resembles dilated cardiomyopathy but is considered a distinct entity. The Working Group on PPCM of the Heart Failure Association of the European Society of Cardiology defines it as a non-familial form of peripartum heart failure characterized by left ventricular systolic dysfunction presenting towards the end of pregnancy or in the 5 months post delivery, where no other cause of heart failure is found.

Objectives: To study the clinical profile, prognosis and outcome in Patients with PPCM.

Materials and methods: A Prospective study was conducted on 40 diagnosed cases Peripartum cardiomyopathy admitted in the department of Obstetrics and gynecology, Department of General Medicine and Cardiology in Mc Gann teaching hospital in Shivamogga. Patients initially presented with complaints of Dyspnea, PND, Orthopnea, pedal edema, palpitations, fatigue were evaluated with routine investigations, ECG and 2D Echocardiography to assess LVEF and assessed for associated risk factors for PPCM, followed up for 6months for prognosis by doing clinical assessment, routine investigations and 2D echocardiography to look for LV systolic function status. The risk factors contributing to PPCM and prognosis markers and outcomes are assessed statistically for significance.

Results: The study population had a mean age of 28.8+/- 7.13years, with Dyspnea (32.5%) and Orthopnea (22.5%) are the most common presenting complaints and belong to NYHA class 3(42.5%) and class 4(32.5%). Most of the patients are presented in postnatal period (57.5%), primigravida (65%) are most affected group Sinus tachycardia (52.5%) is the most common ECG finding, Preeclampsia (45%) is the most common risk factor followed by anemia (37.5%), multiparity (7.5%), chronic hypertension (5%), Diabetes and hypothyroidism contributing 2.5% each. 40% of the patients

LVEF is between 36-40%. Acute pulmonary edema is the most common complication (27.5%) , 15% are in cardiogenic shock with severe LV dysfunction, thromboembolic complications including pulmonary thromboembolism, CVT, DVT, TIA contributing for (30%) of the complications. Recovery is seen in (62.5%) of participants, death in (5%) of participants.

Conclusion: This study showed that early detection and intervention with standard heart failure drugs leads to better recovery rates in participants in terms of improvement in LV systolic function (LVEF), complications and deaths are common in severly affected LV function patients.

Key Words: Echocardiography; Reduced Left ventricular ejection fraction <45%; Peripartum cardiomyopathy; Pregnancy and postpartum; Anemia; Preeclampsia.

INTRODUCTION

Peripartum cardiomyopathy (PPCM) was recently redefined by the European Society of Cardiology (ESC) as an idiopathic cardiomyopathy presenting with heart failure (HF) due to systolic dysfunction of the left ventricle (left ventricular ejection fraction [LVEF] <45%) towards the end of pregnancy or in five months following delivery, where no other cause of heart failure is found.[1]

Until specific etiologies are identified, PPCM remains a diagnosis of exclusion. The incidence is reported to be 1 in 3000 to 1 in400 live births. During pregnancy blood volume and cardiac output increases, whereas after load decreases. These changes causes a transient, reversible hypertrophy of the left ventricle. The transient diastolic dysfunction during the third trimester and early postpartum period resolves shortly after birth.

Nutritional disorders such as deficiencies in selenium and other micronutrients also might play a role in the pathogenesis of PPCM. Familial predisposition to PPCM has been reported.

The onset of PPCM can easily be masked because the manifestations can mimic those of mild heart failure. Women with PPCM commonly show dyspnea, dizziness, chest pain, cough, neck vein distension, fatigue and peripheral edema.[1]

Arrhythmias, embolic events from thrombosis of the dilated dysfunctional left ventricle and acute myocardial infarction due to decreased perfusion to coronary arteries are other less common clinical features. Blood pressure is often normal or decreased, and tachycardia is common.[5]

An ECG should be performed in all patients with suspected PPCM as it has a high negative predictive value. There may be an absence of a specific ECG pattern for PPCM initially but the ECG is rarely normal: repolarization abnormalities, LV hypertrophy, dysrhythmias, Q-waves in the anteroseptal precordial leads, and prolonged PR and QRS intervals are common.[5]

Several other tests should be performed: complete blood cell count and serum levels of troponin, urea, creatinine, and electrolytes, liver and thyroid function tests. The definitive diagnosis of PPCM depends on echocardiographic identification of new-onset heart failure during a limited period around parturition.

Management of PPCM in the absence of evidence- based data is like standard treatment for other forms of heart failure. Timely diagnosis and delivery are crucial.

The goals of heart failure treatment are to improve hemodynamic status, minimize signs and symptoms and optimize long-term outcomes. Treatment focuses on reducing preload and after load and increasing cardiac inotropy.

ACE inhibitors, beta-blockers and MRAs should be initiated and continued at least till complete recovery of LV size and systolic function. Discontinuation of heart failure medications can be considered only in the case of complete recovery of ventricular function and exercise response.

AIM

This study is aimed to assess clinical profile and outcome of peripartum cardiomyopathy in a tertiary care centre.

OBJECTIVES

a) To study the clinical presentation of peripartum cardiomyopathy patients.

b) To study the Prognosis of peripartum cardiomyopathy patients.

c) To study the Outcome of Peripartum cardiomyopathy.

MATERIALS AND METHODS

Source of Data: This study will be carried out in the term antenatal and postnatal patients admitted in the department of obstetrics and gynecology, department of cardiology and in department of general medicine in Mc Gann teaching hospital with cardiac symptoms.

Method of collection of Data

The present study is conducted in the department of Medicine, Cardiology and Obstetrics and Gynecology in Mc Gann teaching hospital after obtaining permission from institutional ethical committee on all the antepartum and postpartum patients presented with fatigue, palpitations, increased night time urination, shortness of breath with activity and in supine position, swelling of ankles are included after obtaining informed written consent. Demographic profile and clinical profile of all the patients are collected by standard questionnaire and evaluated with clinical and routine hematological and biochemical investigations, ECG 2D echocardiography, managed conservatively with the evidence-based heart failure drugs appropriate for antepartum and postpartum patients. Once stabilized, patients are discharged and followed up for a period of 6 months with monthly visits. In each visits NYHA class, vital signs, adverse events are recorded, physical examination and compliance to drug is assessed if needed ECG and 2D echocardiography are advised and standard heart failure drugs are adjusted as per the need of the patient condition. At the end of 3rd and 6th month one 2D echocardiography to reassess the Left ventricular ejection fraction. Based on the LVEF outcome is assessed.

Place of Study: Department of Obstetrics and Gynecology, General medicine and Cardiology, in Mc Gann teaching hospital, Shivamogga.

Study period: The total duration of study was 18 months (May 2023 to December 2024).

Study design: prospective study

Ethical consideration in the study: Ethical clearance was taken from the institutional ethical committee

Ethical clearance letter is annexed

DATA analysis: Data is analysed using SPSS software. Analysis of data was done using Chi square test.

Sample size estimation: 40

Sample size calculation formula: n= z2 .p.(1-p) /d2

Based on previous studies

Z: 1.96(for 95% confidence interval)

P: 0.45% (prevalence)

d: 0.155(absolute precision)

With above calculations the minimum estimated sample size is 39.63 rounded up to 40.

(Whichever the cases come in study period are included in the study)

INCLUSION CRITERIA:

1) Heart failure secondary to left ventricular dysfunction with a LVEF <45% with its onset between the last month of pregnancy and five months following delivery.

2) Age more than 18year

EXCLUSION CRITERIA:

1) Pre-existing known cardiac or thyroid disorder or any drug abuse.

2) Concomitant therapies for other systemic illness other than heart failure

3) Associated with any congenital heart defects

RESULTS

Table 1: Distribution of participant's according to age in years

Age in years	No. of participants	Percentage
18-23	11	27.50
24-29	12	30.00
30-35	9	22.50
36-42	8	20.00
Mean ± Standard deviation (SD)	28.8 ± 7.13	
Median	29	
Range	23	
Minimum	18	
Maximum	41	
Total	**40**	**100.00**

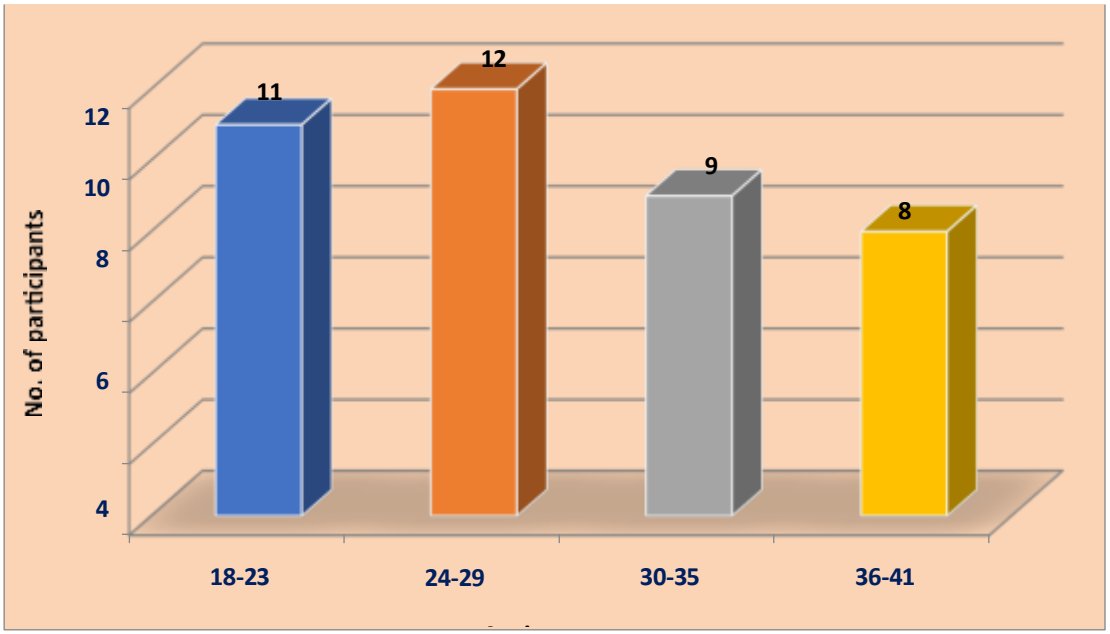

Figure 1: Distribution of participant's according to age in years

The above table and figure shows that age distribution of the 40 patients diagnosed with peripartum cardiomyopathy (PPCM) reveals a varied spread across different age groups. The largest group, comprising 30% (12 participants), falls within the 24–29 years age range, indicating that this is the most common age bracket affected. Following closely, the 18–23 years age group accounts for 27.5% (11 participants), suggesting a significant occurrence among younger women. Patients aged 30-35 years make up 22.5% (9 participants), while the oldest group, aged more than 36 years, constitutes 20% (8 participants). Collectively, these

findings highlight that PPCM predominantly affects women in their 20s and early 30s, with a notable presence across all age groups from 18 to 41 years, totally 100% of the study population.

Table 2: Distribution of participants according to educational qualification

Education	No. of participants	Percentage
Primary School	15	37.50
High School	12	30.00
PUC/12th	8	20.00
UG Degree	4	10.00
Master degree	1	2.50
Total	**40**	**100.00**

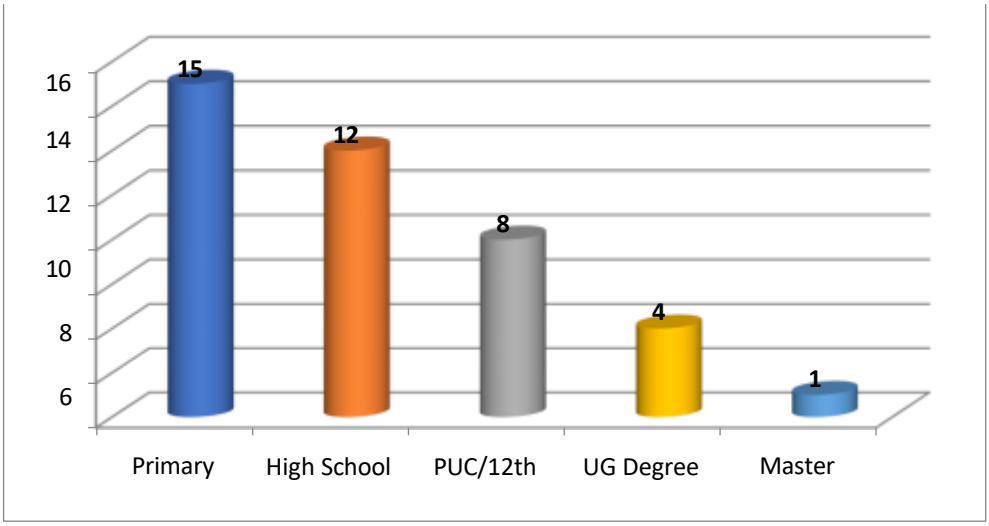

Figure 2: Distribution of participants according to educational qualification[27]

The above table and figure showing the educational background of 40 participants, revealing range of educational levels. The majority of participants (37.50%) had a primary school education, followed by high school (30.00%), and PUC/12th (20.00%). A smaller proportion of participants held an under graduate degree (10.00%) or a master's degree (2.50%). Overall, the table suggests that the participants come from a variety of educational backgrounds, with a slightly higher representation of those with primary and high school education.

Table 3: Distribution of participants according to Parity

Parity	NO. of participants	Percentage
Primigravida	26	65%
Multigravida	14	35%
Total	40	100

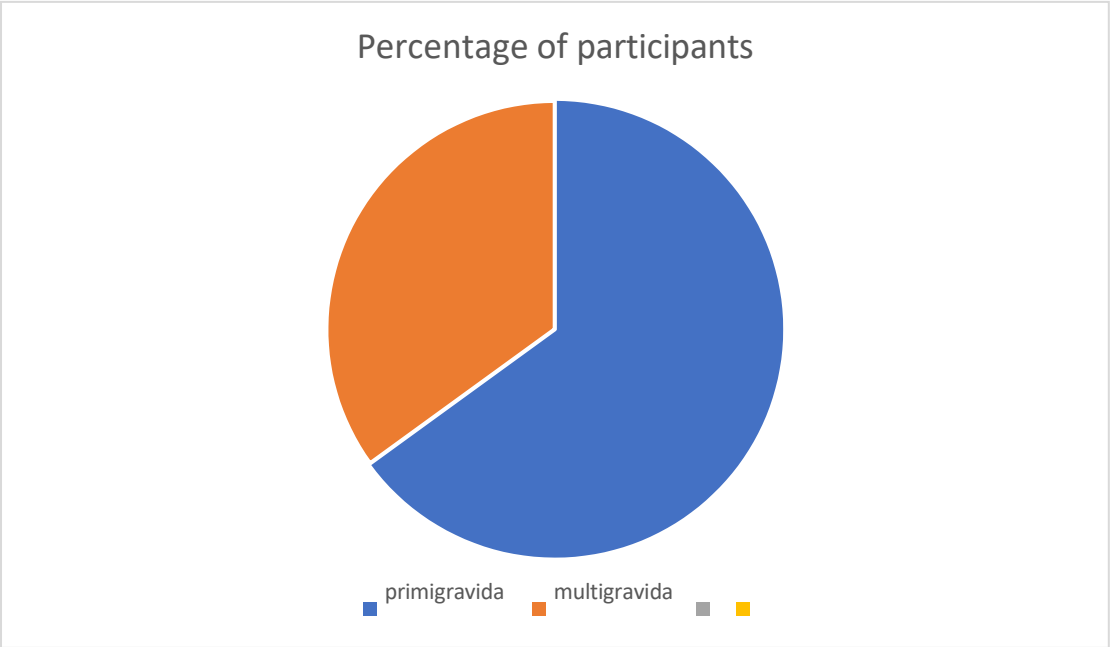

Table 4: Distribution of participants according to gestation

Figure 3: Distribution of participants according to parity

The above table and figure depicts that among40 participants majority are primi-gravida (65%) and multigravida (35%) are diagnosed with PPCM. This implicates that PPCM is more commonly affecting primigravida than multigravida.

NO. Gestations	NO. Participants	Percentage
Singleton pregnancy	37	92.5%
Twin pregnancy	3	7.5%
Total	40	100%

Figure 4: Distribution of participants according to gestation

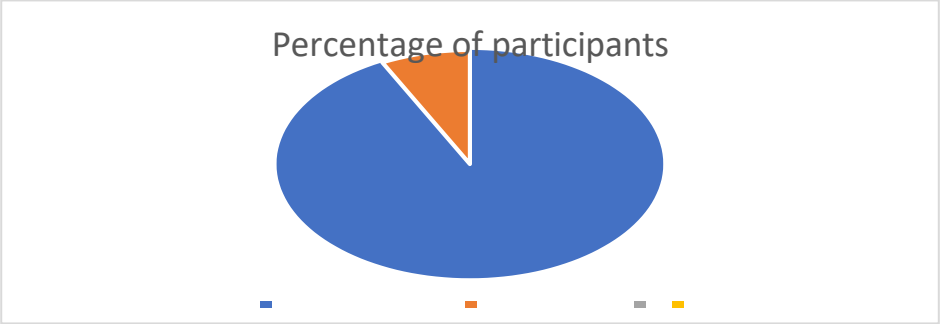

Table 5: Distribution of participants by socioeconomic status

In our study multifetal gestation (twin pregnancy) is 3(7.5%) remaining 37(92.5%) are singleton pregnancy, all 3 developed PPCM. So multifetal gestation is also one of the risk factor for developing PPCM.

Socioeconomic status	No. of participants	Percentage
Low	20	50%
Middle	15	37.50%
High	5	12.50%
Total	40	100%

Table 6: Distribution of symptoms among participants

The table and figure shows that the distribution of patients based on their socioeconomic status. Out of 40 participants, half (50%) belong to the low socioeconomic group, while 37.50% fall in to the middle category. Only 12.50% of the patients are from a higher socioeconomic background. This data indicates that the majority of patients come from lower and middle-income groups, high-lighting the need for accessible healthcare support for economically disadvantaged populations.

SL NO.	Symptoms	No. of participants	Percentage
1	Chest pain	1	2.5%
2	PND	5	12.5%
3	Palpitations	6	15%

4	Bilateral lower limb swelling	6	15%
5	Orthopnea	9	22.5%
6	Dyspnea	13	32.5%
Total		40	100%

The above table and figure shows that the symptoms experienced by 40 participants. Dyspnea is the most common symptom, affecting 32.5% of participants, followed by orthopnea at 22.5%. Bilateral lower limb swelling and palpitations were reported by 15% of individuals each. Paroxysmal nocturnal dyspnea (PND) was observed in 12.5% of participants, while chest pain was the least reported symptom at 2.5%.Thesefindings highlight dyspnea and orthopnea are the predominant symptoms in the study population, indicating a potential link to cardiopulmonary conditions.

Table 8: Predominant signs of heart failure among participants

Table 7: Distribution of participants according to time of onset of symptoms

Time of onset of symptoms	NO. of participants	Percentage
ANC 36-40 weeks of gestation	17	42.50%
PNC within first 10 days	17	42.50%
PNC11th dayto5thmonth	6	15%
Total	40	100%

The above table and figure showed out of 40 participants 42.5% are presented in ANC 36-40 weeks of gestation and 57.5% are presented in postnatal period among PNC 42.5% are within 10 days of post delivery and 15% are from 11th day to 5th month of delivery. These indicating PPCM is more commonly manifested in PNC period than ANC period the reason may be pregnancy overlapping symptoms masking the symptoms of PPCM. Hence close monitoring is needed here to suspect and make a diagnosis of PPCM in both ANC and PNC period.

Signs	NO. of participants	Percentage
Elevated JVP	38	95%
Edema	32	80%
S3 gallop	20	50%
Systolic murmur	18	45%

The above table and figure depicts among 40 participants of PPCM 95% are presented with elevated JVP, 80% with edema, and 45% each with S3 gallop and systolic murmur. This indicating that elevated JVP is the most common sign seen in PPCM, edema second common sign, and S3 gallop in 50%, systolic murmurs in 45% can also heard in cases of PPCM.

Table 9: Distribution of Participants by NYHA Functional Classification

NYHA Class	No. of participants	Percentage
II	10	25.00
III	17	42.50
IV	13	32.50
Total	40	100.00

The above table and figure shows that the distribution of 40 participants according to their New York Heart Association (NYHA) functional classification, which assesses the severity of heart failure symptoms. The majority of participants (42.50%) were classified as NYHA Class 3, indicating marked limitation of physical activity due to symptoms. NYHA Class 4, representing severe limitations with symptoms even at rest, accounted for 32.50% of the participants. Meanwhile, NYHA Class 2, characterized by slight limitations during physical activity, comprised25.00% of the group. The overall study shows that a significant proportion of the participants (75.00%) were in advanced stages of heart failure (Classes 3 and 4), highlighting the prevalence of moderate to severe symptoms in this population.

Table 10: NYHA Classification at 3rd and 6th month of follow ups

NYHA CLASS	At diagnosis	At 3rd month	At 6th month
I	**0**	**3(7.8%)**	**25(65.7%)**
II	10(25%)	**18(47.3%)**	**8(21.07%)**
III	17(42.5%)	**11(28.9%)**	**5(13.15%)**
IV	13(32.5%)	**6(15.7%)**	**0**
TOTAL	40(2DIED)	**38**	**38**

The above table compares nyha classes at diagnosis and at 3rd and 6th month of followup showing 7.8% of patients reached nyha class i in 3 months and 65% of patients at 6th month suggesting that regular medications and followup helps in better recovery of ppcm patients.

Table 11: Distribution of Participants by Blood Pressure (BP) Categories

Blood pressure in mmHg	No. of participants	Percentage
Normal	16	40.00
Hypotension	4	10.00
Hypertension stage-1	5	12.50
Hypertension stage-2	15	37.50
Total	**40**	100.00

The table provides the blood pressure (BP) levels among the participants. Out of 40 participants, 40% had normal BP, while 10% experienced hypotension. Hypertension was observed in a significant proportion of participants, with 12.5% classified under stage-1 hypertension and 37.5% under stage-2 hypertension. This indicates that nearly half (50%) of the participants had elevated BP levels, highlighting the prevalence of hypertension among the group. Given the high occurrence of hypertension, particularly in the more severe stage-2 category, regular monitoring and early interventions are essential to prevent potential complications related to cardiovascular health.

Table 12: ECG changes among participants

ECG changes	No. of participants	Percentage
Sinus rhythm	7	17.5
Sinus tachycardia	21	52.5
Inverted T wave	6	15
Prolonged QT interval	2	5
Atrial fibrillations	4	10
Total	**40**	**100**

The table 12 shows that sinus tachycardia was the most common ECG finding, observed in 52.5% of participants. Sinus rhythm was present in 17.5%, while 15% had an inverted wave. Atrial fibrillation (AF) was noted in 10% of cases, and a prolonged QT interval was the least common finding at 5%. These results indicate a high prevalence of abnormal ECG findings, with sinus tachycardia being the most frequent, suggesting possible under-lying cardiovascular stress or dysfunction in the study population.

Table 13: Distribution of participants according to hemoglobin level.

Hemoglobin range in gm/dl	No. of participants	Percentage
Normal(11-14)	25	62.5%
Mild anemia(9-10.9)	9	22.5%
Moderate anemia(7-8.9)	6	15%
Severe anemia(<7)	0	0
Total	40	100%

In our study there are 15 (37.5%) participants are anemic among them 9(22.5%) are mild anemic and remaining 6(15%) are moderate anemic and 26(62.5%) are in normal range of hemoglobin these suggestive of anemia is one of the major risk factor for PPCM in this study.

Tablet 14: Distribution of participants based on mode of delivery

Mode of delivery	NO. of participants	Percentage
Forceps delivery	1	2.5%
Vaccum	6	15%
LSCS	15	37.5%
Vaginal delivery	18	45%
Total	40	100%

The above table and figure presents the vaginal delivery was the most common mode of delivery, accounting for 45% of cases, followed by lower-segment cesarean section (LSCS) at 37.5%. Vacuum-assisted delivery was observed in 15% of participants, while forceps delivery was the least common at 2.5%. This indicates that while vaginal delivery remains the predominant mode, a significant proportion required surgical or assisted intervention.

Table 15: Complications associated with PPCM in study participants

Complications	No. of participants	Percentage
Acute pulmonary edema	11	27.5
Thromboembolism	5	12.5
Cardiogenic shock	6	15
CVT	4	10
DVT	3	7.5
TIA	2	5
Pericardial effusion	4	10
Pleural effusion	5	12.5
Total	**40**	**100.00**

The above table and figure shows that 27.50% of participants experienced acute pulmonary edema, followed by cardiogenic shock and acute pulmonary embolism. Other complications were less frequent, with rare ones like cerebrovascular accident and pulmonary thromboembolism. The data underscores the significant burden of cardiovascular and thromboembolic complications in this population.

Table 16: Distribution of Participants by Outcome

Out come	No. of participants	Percentage
Death	2	5.00
Partially Recovered	13	32.50
Recovered	25	62.50
Total	**40**	**100.00**

The table and figure shows that the majority of participants (62.5%) fully recovered, while 32.5% experienced partial recovery. Unfortunately, 5% of cases resulted in death. This indicates a generally positive outcome for most patients, though a notable proportion faced incomplete recovery, highlighting the need for continued medical care and follow-up.

Table 17: Distribution of Participants by LVEF at Diagnosis

LVEF Range (%)	No. of Participants	Percentage
<30	3	7.5
30-35	12	30
36-40	16	40
40-45	9	22.5
Total	**40**	**100.00%**

The above table shows that the majority of participants (70%) had a left ventricular ejection fraction (LVEF) of 40% or below, with 40% falling within the 36-40% range and 30% in the 30-35% range. A smaller proportion (7.5%) had severely reduced LVEF (<30%), while 22.5% had an LVEF greater than 40%. These findings suggest a high prevalence of reduced cardiac function among the study population, emphasizing the need for close monitoring and management of heart function.

Table 18: Showing LVEF at diagnosis and follow ups at 3rdand 6thmonth

LVEF range in percentage	At diagnosis	At 3rdmonth of follow up	At 6th month of follow up
<30	3 (7.5%)	1(2 Died)	0
30-35	12 (30%)	5(13.1%)	0
36-40	16 (40%)	14(36.8%)	4(10.5%)
40-45	9 (22.5%)	12(31.5%)	9(23.6%)
45-60	-	6(15.7%)	25(65.7%)
TOTAL	40	38	38

The above table showing that only6(15.7%) of patients are reached their LVEF more than 45% in 3 months follow up but at 6th month of follow up 25(65.7%) of patients are reached their LVEF more than 45% suggesting that regular long term follow up with proper heart failure medications contributes in better recovery from PPCM.

Table 19: Risk factors associated with PPCM

Risk Factor	No. of Participants	Percentage
Preeclampsia	18	45
Anemia	15	37.5
Multi fetal gestation	3	7.5
Chronic hypertension	2	5
Type-2 Diabetes mellitus	1	2.5
Hypothyroidism	1	2.5
Total	**40**	**100.0**

The table shows that anemia (45%) and preeclampsia (37.5%) were the most common risk factors among participants. Other contributing factors included multiparity (7.5%), chronic hypertension (5%), type 2 diabetes (2.5%), and hypothyroidism (2.5%). These findings suggest that hypertensive disorders and nutritional deficiencies play a significant role in the health risks faced by the study population, under-scoring the importance of early detection and management of these conditions.

Table 20: Risk factors and their association with Outcome

Risk Factor	Recovered	Partially Recovered	Death	Total
Preeclampsia	8	9	1	18
Anemia	10	3	1	15
Multiparity	3	0	0	3
Chronic hypertension	2	0	0	2
Type-2 diabetic mellitus	1	0	0	1
Hypothyroidism	1	0	0	1
Total	25	13	2	40

The above table shows that the outcomes of participants based on different risk factors. Among the 40 cases, preeclampsia was the most common risk factor, affecting 18 participants, with 8 recovering fully, 9 partially recovering, and resulting in death. Anemia was another significant risk factor, affecting 15 participants, with 10 recovering, 3 partially recovering, and 1 death reported. Other conditions such as multiparity, chronic hypertension, type-2 diabetes mellitus, and hypothyroidism were present in fewer cases, with all affected participants recovering fully. The data highlights that preeclampsia and anemia posed the highest risks, contributing to the majority of partial recoveries and both recorded deaths. This underscores the importance of early diagnosis and management of these conditions to improve maternal health outcomes.

Table 21: Comparison of mean echocardiography parameters with baseline after 3rd month and after 6th month

Parameters	Baseline		At 3rd months		At 6th month		Statistical analysis	
	Mean	SD	Mean	SD	Mean	SD	t−test	P-value
IVSED(mm)	7.47	1.22	7.99	0.79	7.23	0.84	1.989	0.064
LVED(mm)	56.72	5.01	51.98	8.97	53.56	7.87	1.382	0.026*
LVPWED (mm)	7.51	1.45	7.92	0.76	7	0.98	1.118	0.083
LVEDV(mL)	132.01	15.45	132.55	16.02	45	14.65	2.192	0.001*
IVSES(mm)	8.62	1.47	8.41	1.11	8.53	1.09	0.901	1.251
LVES(mm)	54.07	6.89	47.13	7.97	51.54	7.99	1.433	0.032*
LVPWES (mm)	8.96	2.11	9.03	2.19	9.01	2.21	0.891	0.086
LVESV(mL)	50.02	8.97	42.66	9.38	48.51	9.49	1.217	0.001*
LV strain (%)	−12.17	3.01	−14.94	2.48	-13.56	2.05	2.321	0.045*
EF (%)	33.05	9.36	39.07	9.43	40.12	9.45	1.012	0.017*
TAPSE (cm/s)	1.63	0.39	1.89	0.23	1.91	0.21	1.011	0.084
RVS' velocity(m/s)	8.89	0.84	9.34	0.57	9.35	0.55	1.891	0.038*
LA diameter (mm)	41.65	4.36	40.5	2.95	40.02	2.14	2.217	0.014*

*P<0.05 is significant. SD: Standard deviation, LV: Left ventricular, LVESV: LV end systolic volume, LVEDV: LV end diastolic volume, EF: Ejection fraction, RVS: Right ventricular systolic excursion, SD: Standard deviation, LA: Left atrial, IVSED: Interventricular septal thickness in end‑diastole, LVED: LV end‑diastolic, LVES: LV end ‑ systolic, LVPWED:LV posterior wall thickness in end-diastole, IVSES: Interventricular septal thickness in end of systole, LVPWES:LV posterior wall thickness in end- systole, TAPSE: Tricuspid annular plane systolic excursion

The above table presents the baseline, 3-month, and 6-month measurements of various

cardiac parameters, along with their statistical analyses. Notably, left ventricular end-diastolic diameter (LVED), left ventricular end-systolic diameter (LVES), left ventricular end-diastolic volume (LVEDV), left ventricular end-systolic volume (LVESV), left ventricular strain, ejection fraction (EF), right ventricular systolic velocity (RVS' velocity), and left atrial (LA) diameter showed statistically significant changes over time($p<0.05$). LVED, LVES, LVEDV, and LVESV showed reductions, indicating potential improvements in cardiac function. EF and LV strain improved, suggesting enhanced myocardial performance. Additionally, RVS' velocity and LA diameter demonstrated significant variations, reflecting possible functional adaptations. Other parameters, such as interventricular septal end-diastolic thickness (IVSED), left ventricular posterior wall end-diastolic thickness (LVPWED), and tricuspid annular plane systolic excursion (TAPSE), did not show significant changes. These findings suggest that cardiac function, particularly left ventricular performance, improved over the 6-month period, with significant enhancements in EF and strain parameters.

DISCUSSION

The results of this study provide a comprehensive overview of the demographic, clinical, and echocardiographic characteristics of 40 patients diagnosed with peripartum cardiomyopathy (PPCM). The majority of participants were young women, with the highest proportion (30%) falling within the 24–29 age group, followed closely by the 18–23 age group (27.5%). Educational and socioeconomic data revealed that most participants had primary or high school education (67.5%) and belonged to low or middle-income groups (87.5%).[6]

Clinically, Dyspnea (32.5%) and Orthopnea (22.5%) were the most common symptoms, and (42.5%) are in NYHA class III (32.5%) are in class IV. The majority of cases (95%) presented with pedal edema, elevated JVP (80%). (37.5%) are undergone LSCS, 45% are vaginally delivered & 2.5% are instrumental delivery. Sinus tachycardia (52.5%) being the most frequent ECG abnormality and Atrial fibrillation least common ECG abnormality. Longitudinal echocardiographic data showed significant improvements in cardiac parameters such as LVED, LVES, LVEDV, LVESV, EF, and LV strain over six months ($p < 0.05$), suggesting functional recovery in many patients. However, the persistence of severe symptoms (NYHA Class 3–4 in 75%) and complications like acute pulmonary edema (27.5%) under-score the need for vigilant monitoring and tailored management.[7]

The age distribution of participants in the present study with findings from Smrithi Shakya et al, Mumtaz A et al and Karaye KM et al. The mean age in the present study was 28.8 ± 7.13 years, which closely aligns with the reported mean age of in other reference studies. The similarity in age distribution suggests a comparable demographic profile among the studies, indicating consistency in the age group most affected or studied in similar research contexts. It helps in ease of identification of age group at risk of developing PPCM during pregnancy or in postpartum period.[8]

In our study common group affected is primigravida compared to multigravida this is similar to other studies which are mentioned above. Hence Primigravida are at high risk of developing PPCM, with this we can plan to do a cardiac evaluation (2D echocardiography) at last month of pregnancy which helps in early diagnosis and treatment of PPCM and also in preventing perinatal and postnatal potential complications related to PPCM and also in deciding place of delivery.[9]

In the present study, 42.5% participants experienced symptoms during the late antenatal period (36–40 weeks of gestation). Remaining 57.5% of participants in the present study reported symptom in postpartum period (42.5% are within 10days of postpartum remaining 15% are 1month after the delivery. These results are similar to the other studies mentioned above in the table. These study suggestive of PPCM is more commonly identified in postnatal period than antenatal period because of overlapping of pregnancy symptoms with heart failure symptoms and also precipitation of symptoms following delivery in immediate postpartum period due to increase in preload.

In the present study preeclampsia is the most common risk factor, contributing (45%) of participants this is similar to other 3 studies as mentioned above. Anemia is the second common risk factor found in our study this is comparable with the studies mentioned above this is because lower and middle class participants are more in our study compared to higher class and in this group of population nutritional deficiency anemia is the most common anemia. Hence anemia should be worked up and found the cause for anemia and corrected in priority in adolescent and reproductive age group and also educate them about nutrition and hygiene all this matters in decreasing risk of PPCM in Indian women's. Multifetal gestation accounts for 7.5%, chronic hypertension 5%, Diabetes 2.5%, and hypothyroidism 2.5% in our study which is comparable to other study groups.

In the present study, acute pulmonary edema was the most common complication, affecting 27.5% of participants similar to K P Mohan Sundari et al study, second most common complication is cardiogenic shock, which is comparable with Mumtaz et al & Smruthi Shakya et al studies, pulmonary embolism, pleural effusion are contributing (12.5%) and pericardial effusion (10%) of complications associated with PPCM this contributes minimal as compare to other studies which are mentioned in the above table. TIA (5%) which is more in our study compare to Smruthi Shakya et al study (2.9%). Cardiogenic shock , pulmonary edema & pleural effusion are due to moderate to severe LV dysfunction this is due to delay in diagnosing and treating PPCM as the symptoms overlap with pregnancy associated symptoms, where as thromboembolism, DVT, TIA are related to hypercoagulable state of pregnancy , prolonged immobilization, venus stasis, endothelial damage and also LV thrombus formation.[10]

Risk factor analysis highlighted anemia (45%) and preeclampsia (37.5%) as the most common contributors to PPCM. Outcomes were generally positive, with 62.5% of participants fully recovering, though 32.5% experienced partial recovery, and 5% succumbed.

CONCLUSION

This study emphasizes the vulnerability of young, economically disadvantaged women to PPCM, preeclampsia and anemia playing pivotal roles. While many patients achieved recovery, PPCM with poor LV function and shock are associated with adverse maternal outcome the high prevalence of residual symptoms and complications calls for targeted interventions, early diagnosis, treatment with effective heart failure drugs and long-term follow-up to optimize outcomes in this population. Counseling for further avoidance of pregnancy by effective implementation of family planning services prevents further recurrence. Further research with larger cohorts is warranted to validate these findings and refine prognostic strategies.

LIMITATIONS

There are a few limitations to this study. It was a single center study with a small sample size and a short term follow-up, which may affect its generalizability and validity. Long-term follow-up is essential to gain a better understanding of the natural history of treated PPCM patients. Genetic cause for PPCM is not evaluated in this study. Fetal outcome is not considered in this study.

REFERENCES

1. Bauersachs J, Arrigo M, Hilfiker-Kleiner D, et al. Current management of patients with severe a cute peripartum cardiomyopathy: practical guidance from the Heart Failure Association of the European Society Of Cardiology Study Group on peripartum cardiomyopathy. Eur J Heart Fail. 2016;18(9):1096–1105.
2. Sliwa K, Mebazaa A, Hilfiker-Kleiner D, et al. Clinical characteristics of patients from the world wide registry on peripartum cardiomyopathy (PPCM): EURO bservational Research Programme inconjunction with the Heart Failure Association of the European Society of Cardiology Study Group on PPCM. EurJ HeartFail.Epub2017 Mar8.
3. Hilfiker-Kleiner D, Haghikia A, Nonhoff J, Bauersachs J. Peripartum cardiomyopathy: current management and future perspectives. Eur Heart J.2015;36 (18):1090–1097.
4. Abboud J, Murad Y, Chen-Scarabelli C, Saravolatz L,ScarabelliTM .Peripartum cardiomyopathy :a comprehensive review. Int JCardiol. 2007;118(3):295–303.
5. Johnson-CoyleL,JensenL,SobeyA; American College of Cardiology Foundation; American Heart Association. Peripartum cardiomyopathy: review and practice guidelines. Am J Crit Care.2012;21(2):89–98.
6. Maron BJ, Towbin JA, Thiene G, Antzelevitch C, Corrado D, Arnett D, et al. Contemporary definitions and classification of the cardiomyopathies: an American Heart Association Scientific Statement from the Council on Clinical Cardiology, Heart Failure and Transplantation Committee; Quality of Care and Outcomes Research and Functional

Genomics and Translational Biology Interdisciplinary Working Groups; and Council on Epidemiology and Prevention. Circulation. 2006;113(14):1807-16.

7. Pregnancy Mortality Surveillance System [cited 2018 October 19th].

8. Gouley BA MT, Bellet S. Idiopathic myocardial degeneration associated with pregnancy and especially the puerperium. American Journal of Medical Science. 1937;19:185-99.

9. Demakis JG, Rahimtoola SH. Peripartum cardiomyopathy. Circulation. 1971;44(5):964-8.

10. Veille JC. Peripartum cardiomyopathies: a review. American journal of obstetricsand gynecology. 1984;148(6):805-18.