



Outcomes of Newly Diagnosed Patients of Peripartum Cardiomyopathy at Liaquat University Hospital, Hyderabad, Sindh, Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To determine the outcomes of newly diagnosed patients of peripartum cardiomyopathy at Liaquat University Hospital, Hyderabad.

Methodology: Total 91 patients of peripartum cardiomyopathy were included. A detailed medical history and base line equitable investigations were done. Patients were kept under observation for 7 days during their hospital stay and study outcomes were recorded. Descriptive statistics were calculated. Stratification was done and post stratification chi square test or fisher exact test was applied. Two sided P-value ≤ 0.05 was considered as significant.

Results: The overall mean age was 29.06 ± 4.71 years. Total 73.6% patients were belonged to urban and 26.4% belonged to rural areas. 52.7% patients had normal delivery while 40% had C-section and 6.6% had instrumental assisted deliveries. As far as outcomes are concerned, 65.9%

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patients had congestive heart failure, 12.1% patients had arrhythmias, 35.2% patients admitted in ICU, 64.8% patients admitted in recovery and 7.7% patients were died.

Conclusion: In a prospective cohort with PPCM, most women recovered; however, rates of CHF were observed significantly in patients with diabetes mellitus and hypertension. In-hospital mortality was comparatively less frequent but it was significantly associated in women having age less than 30 years.

Keywords: Outcomes; newly diagnosed patient; peripartum cardiomyopathy.

1. INTRODUCTION

Cardiovascular diseases including peripartum cardiomyopathy (PPCM) is now the leading cause of hospitalization, related complications, and deaths. Peripartum cardiomyopathy is defined as the development of acute onset of left ventricular dysfunction without known cause during one month prior to delivery and 5 months after the delivery. The diagnosis is purely based on exclusion in previously healthy heart. The burden of PPCM is greatly increased and the annual incidence of PPCM varies globally from 1:15,000 to 1:100 deliveries and the prevalence of PPCM in Pakistan having age more than 30 years is 28.8% and it increased to 44.4% in women with multigravida [1]. Mortality associated with PPCM varies widely based on the country and risk factors leading to PPCM. In an international multicenter study the mortality rate observed from 18% to 56% while another study conducted in Pakistan and evaluated patients of PPCM for more than 10 years has shown comparatively lower rates of mortality from 4% and 10% [2].

Risk factors associated with PPCM are increasing age, multiparity, smoking, alcoholism, preeclampsia, eclampsia, genetic predisposition, and poor socioeconomic background [3-6]. Surprisingly, most of them are present in our population [6]. Overall outcome of patients with PPCM greatly depends upon the underlying risk factors and available facilities in a region. That is why this study aims to determine the outcome associated with PPCM so by determining the actual burden in our area management strategies can be planned.

2. METHODOLOGY

A Non-probability consecutive sampling cross-sectional study was conducted in a tertiary care hospital in the Departments of Cardiology and Gynaecology & Obstetrics, Liaquat University Hospital, Hyderabad from 11th August 2018 to 10th January 2019 after taking the ethical

approval from the hospital ethical committee. The sample calculation was done using the raosoft software for "Sample size calculation" by using the proportion (Congestive heart failure 62.5%, Arrhythmias 12.5%, ICU admissions 43.75%, Recovery 62.5%, and Death 9.37%). By taking least proportion 9.37% with level of significance 95% and 6% margin of error, the sample size of this study finalized was 91 for final analysis. Due to low prevalence of disease and to complete the study in due time margin of error during the sample size calculation was kept on a higher side.

All the women from one month before the delivery to 5 months after the delivery having age between 20 to 40 years and echocardiogram proven diagnosis of peripartum cardiomyopathy were included in this study. Exclusion criteria for this study was; those women who did not consent to participate, women with left ventricular dysfunction due to other cause than peripartum cardiomyopathy, and women with valvular heart disease.

A written consent was taken from all the patients or their attendants after explaining them all the risks regarding disease. A detailed medical history and baseline equitable investigations in all patients were done and demographic characteristics and medical history were obtained such as age (years), residence, household monthly income, mode of delivery, smoking, diabetes mellitus, and hypertension. All the enrolled patients were managed as per the guidelines. And patients were kept under observation for acute management during their hospital stay and study outcomes (such as Congestive heart failure, Arrhythmias, ICU admissions, Recovery, and Death) were recorded. All the collected data were recorded on predesigned proforma.

Data were entered and analysed using SPSS version-21 Shapiro-Wilk test was applied to check the hypothesis of normality for age (years) and were expressed using appropriate

descriptive statistics such as mean \pm SD, median (IQR), maximum and minimum. Frequency and percentages were calculated for categorical variables such as age group, residence, household monthly income, mode of delivery, smoking status, diabetes mellitus, hypertension, and outcomes (such as Congestive heart failure, Arrhythmias, ICU admissions, Recovery, and Death). Effect modifiers like age group, residence, household monthly income, mode of delivery, smoking status, diabetes mellitus, and hypertension were controlled through stratification. Post stratification appropriate chi-square test or fisher exact test was applied. Two sided p-value of ≤ 0.05 was taken as criteria of statistical significance.

3. RESULTS

A total of 91 female patients were finally analyzed and their mean age and SD was 29.06 ± 4.71 years, majority of the women belongs to age less than 30 years (60.43%, N = 55) and resident of urban area (73.6%, N = 64). It was observed that 52.7% patients had normal delivery while 40% had c-section and 6.6% had instrumental assisted delivery. The most common mode of delivery was normal vaginal delivery (52.74%, N = 48) and the most common risk factor of PPCM in our study was presence of hypertension (47.3%, N = 43). Congestive heart failure (CHF) was the most commonly

encountered complication (65.93%, N = 60). The overall in-hospital mortality rate was 7.69% (N = 7). Rest of the description shown in Table 1.

Association of complications and in-hospital mortality was observed in Tables 2 to 5. Congestive heart failure was significantly observed in patients with hypertension and diabetes mellitus ($p < 0.05$). While, there is an insignificant association observed in relation to occurrence of arrhythmias and ICU admissions when compared with baseline and clinical characteristics ($p > 0.05$). Younger age (< 30 years) were significantly associated with higher in-hospital mortality ($p < 0.05$).

4. DISCUSSION

Peripartum cardiomyopathy is now being filed of interest by the cardiologists and gynecologists due to its increasing burden at early age and associated complications. Patients with this disease may present with confusing symptoms which may be associated with pregnancy and due to this patient may present and diagnose after sometimes and is the most common reason of developing associated complications. In this study, more than 65% of the women who diagnose with PPCM developed congestive heart failure and more than 12% developed arrhythmias, and greater proportion of women (35.2%) got admitted into intensive care unit (ICU) because of worsening condition. Among

Table 1. Baseline variables of women with postpartum cardiomyopathy (N = 91)

Variables		
Age (Mean \pm SD) – years	29.06 \pm 4.71	
Area of Residence	N	%
Urban	67	73.62
Rural	24	26.37
Mode of Delivery		
Normal	48	52.74
C-section	37	40.65
Assisted/Instrumental	6	5.59
Risk factors of PPCM		
Hypertension	43	47.25
Diabetes Mellitus	40	43.95
Smoking	8	8.79
Complications		
Congestive Heart Failure	60	65.93
ICU Admission	32	35.16
Arrhythmias	11	12.08
In-Hospital Mortality		
Yes	7	7.69
No	84	92.3

Table 2. Association of congestive heart failure with baseline and clinical characteristics (N=91)

		CONGESTIVE HEART FAILURE		TOTAL	P-Value
		Yes	No		
Age Group	≤30 years	37(67.3)	18(32.7)	55	0.739**
	>30 years	23(63.9)	13(36.1)	36	
Residence	Urban	46(68.7)	21(31.3)	67	0.360**
	Rural	14(58.3)	10(41.7)	24	
Household Monthly Income°	Up to 15,000	13(76.5)	4(23.5)	17	0.455**
	15,001-30,000	22(68.8)	10(31.3)	32	
	30,001-45,000	23(62.2)	14(37.8)	37	
Mode of Delivery°	45,001-60,000	2(40)	3(60)	5	1.000*
	Normal	32(66.7)	16(33.3)	48	
	C-Section	24(64.9)	13(35.1)	37	
Hypertension	Instrumental assisted	4(66.7)	2(33.3)	6	0.000*
	Yes	38(88.4)	5(11.6)	43	
Diabetes Mellitus	No	22(45.8)	26(54.2)	48	0.012*
	Yes	32(80)	8(20)	40	
Smoking°	No	28(54.9)	23(45.1)	51	0.711**
	Yes	6(75)	2(25)	8	
	No	54(65.1)	29(34.9)	83	

*Chi Square Test was applied; °Fisher Exact Test was applied
P-value ≤0.05 considered as Significant; * Significant at 0.05 levels; **Not Significant at 0.05 levels*

Table 3. Association of arrhythmias with baseline and clinical characteristics (N=91)

		ARRHYTHMIAS		TOTAL	P-Value
		Yes	No		
Age Group°	≤30 years	6(10.9)	49(89.1)	55	0.747**
	>30 years	5(13.9)	31(86.1)	36	
Residence°	Urban	9(13.4)	58(86.6)	67	0.721**
	Rural	2(8.3)	22(91.7)	24	
Household Monthly Income°	Up to 15,000	2(11.8)	15(88.2)	17	0.616**
	15,001-30,000	5(15.6)	27(84.4)	32	
	30,001-45,000	3(8.1)	34(91.9)	37	
Mode of Delivery°	45,001-60,000	1(20)	4(80)	5	0.144**
	Normal	9(18.8)	39(81.3)	48	
	C-Section	2(5.4)	35(94.6)	37	
Hypertension	Instrumental Assisted	0(0)	6(100)	6	0.071**
	Yes	8(18.6)	35(81.4)	43	
Diabetes Mellitus°	No	3(6.3)	45(93.8)	48	0.054**
	Yes	8(20)	32(80)	40	
Smoking°	No	3(5.9)	48(94.1)	51	1.000**
	Yes	1(12.5)	7(87.5)	8	
	No	10(12)	73(88)	83	

*Chi Square Test was applied; °Fisher Exact Test was applied
P-value ≤0.05 considered as Significant; * Significant at 0.05 levels; **Not Significant at 0.05 levels.*

them 7.7% of the women died during their hospital stay. Multiple studies can confirm the associated complications as observed in our study but these complications vary widely

depending upon the multiple factors such as in developed countries venous thrombo-embolic events, arterial embolizations, and cerebrovascular accidents (CVA) are more

common than in developing countries where the in-hospital mortality is more commonly observed [7,8]. Higher mortality rates in our region is most probably due to lack of awareness regarding the

disease by the general population leading to less or no antenatal checkups, poor hygiene, and lack of advance medical facilities.

Table 4. Association of icu admission with baseline and clinical characteristics (N=91)

		ICU ADMISSION		TOTAL	P-Value
		Yes	No		
Age Group	≤30 years	21(38.2)	34(61.8)	55	0.456**
	>30 years	11(30.6)	25(69.4)	36	
Residence	Urban	24(35.8)	43(64.2)	67	0.827**
	Rural	8(33.3)	16(66.7)	24	
Household Monthly Income[°]	Up to 15,000	5(29.4)	12(70.6)	17	0.375**
	15,001-30,000	13(40.6)	19(59.4)	32	
	30,001-45,000	14(37.8)	23(62.2)	37	
	45,001-60,000	0(0)	5(100)	5	
Mode of Delivery[°]	Normal	20(41.7)	28(58.3)	48	0.389**
	C-Section	10(27)	27(73)	37	
	Instrumental	2(33.3)	4(66.7)	6	
	Assisted				
Hypertension	Yes	17(39.5)	26(60.5)	43	0.409**
	No	15(31.3)	33(68.8)	48	
Diabetes Mellitus[°]	Yes	11(27.5)	29(72.5)	40	0.175**
Smoking[°]	No	21(41.2)	30(58.8)	51	1.000**
	Yes	3(37.5)	5(62.5)	8	
	No	29(34.9)	54(65.1)	83	

*Chi Square Test was applied; [°]Fisher Exact Test was applied
P-value ≤0.05 considered as Significant; * Significant at 0.05 levels; **Not Significant at 0.05 levels.*

Table 5. Association of in-hospital mortality with baseline and clinical characteristics (N=91)

		IN-HOSPITAL MORTALITY		TOTAL	P-Value
		Yes	No		
Age Group[°]	≤30 years	7(12.7)	48(87.3)	55	0.039*
	>30 years	0(0)	36(100)	36	
Residence[°]	Urban	5(7.5)	62(92.5)	67	1.000*
	Rural	2(8.3)	22(91.7)	24	
Household Monthly Income[°]	Up to 15,000	0(0)	17(100)	17	0.680**
	15,001-30,000	3(9.4)	29(90.6)	32	
	30,001-45,000	4(10.8)	33(89.2)	37	
	45,001-60,000	0(0)	5(100)	5	
Mode of Delivery[°]	Normal	2(4.2)	46(95.8)	48	0.219**
	C-Section	4(10.8)	33(89.2)	37	
	Instrumental	1(16.7)	5(83.3)	6	
	Assisted				
Hypertension[°]	Yes	3(7)	40(93)	43	1.000**
	No	4(8.3)	44(91.7)	48	
Diabetes Mellitus[°]	Yes	1(2.5)	39(97.5)	40	0.130**
	No	6(11.8)	45(88.2)	51	
Smoking[°]	Yes	0(0)	8(100)	8	1.000**
	No	7(8.4)	76(91.6)	83	

*Chi Square Test was applied; [°]Fisher Exact Test was applied
P-value ≤0.05 considered as Significant; * Significant at 0.05 levels; **Not Significant at 0.05 levels*

Presence of comorbidities like hypertension (88.4%) and diabetes mellitus (54.9%) were significantly associated with increased incidence of congestive heart failure in our study. The underlying mechanism behind this phenomenon is widely acceptable and this even gets worse when diabetes mellitus and hypertension are not well controlled. In a study conducted by Dhesi S [9] & Lindley KJ [10] and their colleagues confirms underlying mechanism and the findings of our study. While some of the international studies had also observed non-traditional risk factors of CHF in patients with PPCM like increased levels of uric acid, mother of male infant, and higher levels of prolactin [11,12].

The overall outcome of PPCM women who were admitted in ICU was surprisingly better than the studies conducted in developed countries in which PPCM associated mortality ranges from 18% to 56% [13] but this data is quite old and in recent times mortality in developed countries with proper antenatal care is less than 2% and in countries where health care facilities are less advanced and women of PPCM having multiples risk factors can range up to 50% [14]. That is why, focusing on patient's awareness regarding antenatal care, control of risk factors, and in-time proper management is crucial for the better quality of life and decrease in mortality rate.

5. CONCLUSION

In a prospective cohort with PPCM, most women recovered; however, rates of CHF were observed significantly in patients with diabetes mellitus and hypertension. In-hospital mortality was comparatively less frequent but it was significantly associated in women having age less than 30 years.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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