

# Risk Factors of Myocardial Infarction in Pre and Postmenopausal Women

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## Abstract

**Introduction:** The leading cause of death of women, whatever their race or ethnicity, is cardiovascular disease, which accounts for one in three women. Myocardial infarction (MI) has multifactorial pathogenesis with variable inflammatory, atherosclerotic plaque eroded or ruptured, vasoconstriction, and thrombosis.

**Aim:** The aim of the study was to studying the risk factors of acute MI between women before and after menopause.

**Materials and Methods:** This research was a prospective clinical study in which 21 premenopausal women and 35 postmenopausal women (PMW) were enrolled who had a MI. The profile of the risk factor and the angiographic results was compared for the two classes.

**Results:** A total of 56 female patients were included in this study in that 21 patients were premenopausal, and 35 were PMW. The most common symptom is typical chest pain. In the premenopausal group, 14 patients were in the age group between 35 and 44 years and the postmenopausal group, 16 patients were in the age group between 51 and 60 years, accounting to 45%. The most common infarction in postmenopausal patients is the anterior wall MI, also common in inferior wall MI patients. Left ventricular dysfunction in the premenopausal population is 14.29% and postmenopausal group 40%. In the postmenopausal community, mortality was 8.57 percent.

**Conclusion:** From this study, we concluded that the risk factor of acute MI is highly prevalent among the PMW compared to premenopausal women. Similarly, the mortality rate was also high among the PMW compared to premenopausal women.

**Key words:** Coronary artery disease, Menopause, Myocardial infarction

## INTRODUCTION

Unlike in the rest of the world, the incidence of coronary artery disease (CAD) is rising in India and is alarming because it becomes increasingly prevalent amongst younger age groups.<sup>[1]</sup> During this century, the primary cause of death and disability has been cardiovascular disease in women of every ethnic and racial group. Cardiovascular disease incidence in women rises sharply with age. Indian women are frequently affected by coronary heart disease. This could be due

to social influences, lack of exercise, diet, frequent birth, and anemia. This could be due to religious, social, environmental, and economic factors; they seek medical advice late. After acute myocardial infarction (MI), they undergo further complications and mortality.

The measurement of acute cardiovascular syndrome has not been carried out for premenopausal women, even though it was the most important killers of women within the age group and outpaced even breast cancer.<sup>[2]</sup> In the postmenopausal women (PMW) who are all significant predictors of cardiovascular occurrences are BMI, physical inactivity, metabolic syndrome, hypertension, and diabetes mellitus (DMs) increase. Women differ in many ways, from men in cardiovascular anatomy and physiology. The chests, heart, and various structures of the body and distribution of fat are relatively smaller. Your cardiovascular system is designed to meet great pregnancy and birth requirements.

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**Month of Submission :** 09-2020  
**Month of Peer Review :** 09-2020  
**Month of Acceptance :** 10-2020  
**Month of Publishing :** 11-2020

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CA mortality exceeds the death rate among women of all ages.<sup>[3]</sup> Still, in PMW, the key cause of death<sup>[4]</sup> is no doubt a multifactor cardiovascular risk and a variety of factors are involved. Still, the protective effects of female sex hormones, particularly estrogenic ones, are a factor that has been attributed to this discrepancy.<sup>[5]</sup> The increased rate of CAD in PMW seems partly linked to the loss of safety provided by endogenous estrogen. Type II DMs is a significant risk factor for MI and CAD.<sup>[6-8]</sup> This result is confirmed by a drastic rise in CAD among women in surgical menopause.<sup>[9]</sup> In comparison, hypertension and hyperlipidemia and a higher body mass index are found at higher levels after menopause.<sup>[10]</sup> Menopause is associated with a rise in blood pressure (BP) and a decrease in physiological night-time PB fall.<sup>[11]</sup> Furthermore, diabetic patients have increased vascular load and have abnormal of 24 h BP profiles.<sup>[12]</sup> These factors may be a factor in raising the risk of cardiovascular events in diabetic PMW.

The practice of coronary therapy is now better suited to reducing morbidity and mortality than other areas of cardiovascular medicine.<sup>[13]</sup> New treatments for acute MI are being tested, not just to prove their safety and efficacy but also to ensure their cost-effectiveness and quality of life.

### Aim

The aim of the study was to studying the risk factors of acute MI between women before and after menopause.

## MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Medicine at Ramanathapuram Headquarters hospital from 2019 August to 2019 December in 21 premenopausal women and 35 PMW who had a MI. The profile of the risk factor and the angiographic results was compared for the two classes. There have been registered clinical submissions, risk factors, vitalities, Killip functional classification, and ECG. Serial ECG, biochemistry routine, and other laboratory procedures needed have been performed. Results are analyzed and discussed in the following statistics.

## RESULTS

Fifty-six females, 21 premenopausal and 35 PMW were included in this analysis [Table 1]. Typical chest pain is a common symptom. The chest pain lasts from 3 to 48 h for hospitalization. The maximum occurrence of MI in the premenopausal population is between 35 and 44 years. The postmenopausal category comprises 16 cases out of 35 patients, with a maximum event of MI between 51 and 60 years, which represents 45%. The most common infarction in

postmenopausal patients is the anterior wall MI, also common in inferior wall MI patients [Table 2]. In postmenopausal cases, DM found 45.71% and premenopausal 38.10%. Among women premenopausal, 38.10% had high total cholesterol and 40.0% had high total postmenopausal cholesterol. Hypertension was observed in 33.33% of premenopausal women and 31.43% of PMW [Table 3]. About 23.81% and 22.86% of women in premenopausal and postmenopausal were found to be obese. Left ventricular dysfunction in the premenopausal population is 14.29% and postmenopausal group 40%. In the postmenopausal community, mortality was 8.57 percent [Table 4].

## DISCUSSION

The annual occurrence of cardiovascular disease varies according to menopausal age. More significant loss of physical functioning in PMW leads to greater weight gain, insulin resistance, and hypertension. Weight gain is primarily due to central obesity which is related to waning of estrogen development. Changes in the lipid profile

**Table 1: Distribution of the study group**

| Study group          | No. of patients |
|----------------------|-----------------|
| Premenopausal group  | 21              |
| Postmenopausal group | 35              |

**Table 2: Distribution of site of MI**

| Site                 | Anterior wall | Inferior wall | Anteroseptal | Lateral wall |
|----------------------|---------------|---------------|--------------|--------------|
| Premenopausal group  |               |               |              |              |
| Frequency            | 12            | 6             | 3            | 0            |
| Percentage           | 43.75%        | 40.62%        | 15.62%       | 0%           |
| Postmenopausal group |               |               |              |              |
| Frequency            | 18            | 8             | 8            | 1            |
| Percentage           | 52.94%        | 23.52%        | 22.05%       | 2.63%        |

**Table 3: Distribution of risk factors**

| Risk factors   | Premenopausal group |            | Postmenopausal group |            |
|----------------|---------------------|------------|----------------------|------------|
|                | Frequency           | Percentage | Frequency            | Percentage |
| DM             | 8                   | 38.10      | 16                   | 45.71      |
| HTN            | 7                   | 33.33      | 11                   | 31.43      |
| Hyperlipidemia | 8                   | 38.10      | 14                   | 40.00      |
| Obesity        | 5                   | 23.81      | 8                    | 22.86      |

**Table 4: Distribution of complication**

| Complication | Premenopausal group |            | Postmenopausal group |            |
|--------------|---------------------|------------|----------------------|------------|
|              | Frequency           | Percentage | Frequency            | Percentage |
| LV failure   | 3                   | 14.29      | 14                   | 40.00      |
| Death        | 0                   | 0.00       | 3                    | 8.57       |

during the menopausal process are contributory risk factors to CAD in perimenopausal women. There is an elevated incidence of other risk factors such as DMs, hypertension, and metabolic syndrome in the postmenopausal era and is well related to increased risk of CAD.

In the majority of our sample, symptoms of chest pain were common. The common MI symptoms of McCance and Huether (1998) are chest pain, seizure, chest pain, nausea pain, diaphoresis, shortness of breath, or radiation to the nose, jaw, back, and left-arm.<sup>[14]</sup>

In our study, both premenopausal women and PMW majority had diabetes. No differences were found in blood glucose, and insulin levels among premenopausal and PMW in a study done in the Netherlands by Peters *et al.* and Manson *et al.* in Nurses' Health Study found that diabetes was associated with a marked increase in MI.<sup>[15,16]</sup>

The critical, independent factor in connection with deteriorated risk factors for cardiovascular disease was central obesity following menopause. Ley and Lees found a marked increase in android fat and a decrease in android fat in PMW.<sup>[17]</sup> In a study by Gower *et al.*; it was found that PMW had greater total body fat, summed central skin folds, and estimated intra-abdominal fat than premenopausal women.<sup>[18]</sup> The highest-level cardiovascular disease risk factor among menopausal women was high BMI stated by Green *et al.*<sup>[19]</sup> in his study.

In a cross-sectional study by Peters *et al.*, no difference in systolic and diastolic BP was found between before and after menopause.<sup>[15]</sup>

Chang *et al.* found that PMW had total cholesterol and LDL-C than premenopausal women in their research in Chinese women.<sup>[19]</sup>

## CONCLUSION

From this study, we concluded that the risk factor of acute MI is highly prevalent among the PMW compared to premenopausal women. Similarly, the mortality rate was also high among the PMW compared to premenopausal women.

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**How to cite this article:** Pitchai M, Jawaharlal PK. Risk Factors of Myocardial Infarction in Pre and Postmenopausal Women. *Int J Sci Stud* 2020;8(8):146-148.

**Source of Support:** Nil, **Conflicts of Interest:** None declared.