Research Article

Sociodemographic, Clinical and angiographic Overview of Women with Acute Coronary Syndrome: A Current Prospective Hospital Based Study in Bangladesh

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Abstract

Background: *Women's life cycles are more complex than men's, and because female sex hormone shields premenopausal women from overt atherosclerosis, their risk of coronary events is lower. Postmenopausal women experience various comorbidities and more severe cases of coronary artery disease (CAD). Nevertheless, there is a paucity of information comparing pre- and postmenopausal women with acute coronary syndrome (ACS) in terms of their sociodemographic profiles, risk factors, clinical features, and angiographic severity of coronary artery disease. The purpose of this study was to evaluate the sociodemographic, clinical and angiographic aspects of premenopausal and postmenopausal women with ACS.*

Methods: *In this cross sectional observational study a total of 140 female patients with acute coronary syndrome were enrolled. They were divided in group-I (premenopausal) and group-II (postmenopausal) on the basis of the state of menopause. The sociodemographic profile, clinical data and coronary angiographic characteristics severity were compared between the premenopausal and postmenopausal ACS groups.*

Results: *The mean age of ACS patients who were premenopausal was 41.53 ± 5.45 years, while that of postmenopausal patients was 57.23 ± 7.45 years. These differences were statistically significant (p= 0.001). Most of the patient among both the groups didn't complete their secondary school certificate (42.9% vs 65.7%). Premenopausal individuals had a considerably higher family history of early CAD (50% vs. 32.9%; p=0.017) than postmenopausal individuals. In the postmenopausal group, DM and smokeless tobacco were more common (68.6% vs. 40%; p=0.001 and 20% vs. 2.9%; p=0.002). In the premenopausal group, atypical presentations were more common (30% vs. 12.9%; p=0.013). The majority of patients in both groups initially had unstable angina, then STEMI and NSTEMI. The postmenopausal group had a lower mean left ventricular ejection fraction (50.71 ± 8.38% vs. 53.74 ± 7.46%; p=0.026) and RWMA (55.7% vs 62.9%; p=0.390) than the premenopausal group. In the premenopausal group, normal coronary angiography and single vessel disease were more common (31.4% vs 17.1%; p=0.04 and 31.4% vs 15.7%; p=0.002), while triple vessel disease was more common in the postmenopausal group (48.6% vs 20%; p=0.001). The postmenopausal group's most often affected vascular was the left anterior descending artery (95.7% vs. 85.7%; p=0.04). In the postmenopausal group, the mean Gensini score was greater than in the premenopausal group (56.1 ± 43.4 vs. 33.5 ± 36.9; p=0.001).*

Conclusion: *Premenopausal ACS patients were more likely to have a family history of early CAD and an unusual presentation, while postmenopausal patients were more likely to have diabetes and smokeless tobacco. Both the groups didn't complete their secondary school certificate. In the premenopausal group, normal coronary angiography and single vessel disease were more common, whereas in the postmenopausal group, triple vessel disease was more common. CAD in the postmenopausal group was more severe.*

Introduction

Coronary artery disease (CAD) is a significant problem for both public and medical health. It is a prevalent and primary cause of death worldwide. In Europe, CAD accounts for 20% of all deaths and causes 1.8 million deaths annually; in the United States, on the other hand, it accounts for 1 in 4.8 deaths and is the leading cause of mortality (Aboyans et al., 2018). It accounts for one-third of all deaths among women and is the leading cause of death in this category. (Mosca et al., 2011) It is the fourth common cause of death and accounts for 10.68% of total death, of which male 12.47% and female 8.19%. (Bangladesh Bureau of Statistics (BBS), 2006) In actuality, women over 65 have a similar or even higher incidence of coronary artery disease (CAD) as males do beyond 75 years of age. (Thom et al., 2006) Major noncommunicable diseases (NCDs) include diabetes, cancer, chronic lung disease, and cardiovascular disease, according to the World Health Organization's 2018 Noncommunicable Diseases Country Profile, 67% of that in Bangladesh is caused by NCD. (Bangladesh Bureau of Statistics (BBS), 2006).

A collection of clinical disorders known as ischemic heart disease (IHD) are defined by myocardial ischemia, which is an imbalance in the supply and demand of blood in the heart. Ischemia is linked to limited nutrition availability, poor elimination of metabolic end products, and insufficient oxygen delivery because the underlying pathophysiologic defect in the ischemic myocardium is inadequate perfusion. The repercussions of oxygen deprivation and poor metabolite washout are combined in myocardial ischemia. Myocardial ischemia in the majority of IHD patients is brought on by a decrease in coronary blood flow as a result of atherosclerotic coronary artery disease. Due to the major coronary arteries' enormous capacity and the slow progression of coronary atherosclerosis, there is typically a protracted period of silence. (Steenbergen & Frangogiannis, 2012).

In women, heart disease started much later than in males, and because estrogen has a vascular protective effect that helps prevent atherosclerosis, heart disease is less common in young women. Contrary to popular belief, coronary artery disease (CAD) attacks women at earlier ages and is a major cause of death for all women, regardless of race or ethnicity. Since the 1950s, women's incidence of CAD has increased while men's incidence has decreased. (Nambirajan et al., 2020)

Bangladesh has been experiencing epidemiological transition from communicable disease to non-communicable disease and death from coronary artery disease is increasing in an alarming rate. Uncertainty surrounds the precise prevalence of CAD in Bangladesh, however new evidence suggests that it ranges from 3.4% in rural areas to 19.6% in an urban sample of working professionals. (Sayeed et al., 2010; Ahsan et al., 2009) In addition to consuming excessive amounts of fat and carbohydrates, smoking, not exercising frequently, and not getting enough sleep, modern women also have professional and home responsibilities. Overweight, dyslipidemia, arterial hypertension, decreased glucose tolerance, and diabetes mellitus are the results of this condition. Because of this, a growing proportion of young women are experiencing coronary artery disease, not just in Western and industrialized nations but also in Asian nations. (Ahmed et al., 2021).

Effective diagnosis and treatment of coronary heart disease, as well as preventive screening, have been found to depend on the recognition of prodormal symptoms. It was critical to identify the symptoms linked to acute recurrent cardiac episodes. Nonetheless, individuals with silent myocardial ischemia typically had more advanced and severe illness, and symptoms among younger women were atypical. Additionally, a prior study found that young women without chest discomfort had a higher likelihood of having CAD. (Lichtman et al., 2015).

An increasing amount of research indicates that women with CAD have somewhat different and more severe vasculopathy than males do. Because plaque erosion rather than rupture is the more common cause of acute events in atherosclerosis, the disease is typically less severe. In terms of structural characteristics, women's coronary arteries are smaller than those of men. Nonetheless, the reference and lesion plaque burden, eccentricity, and calcium deposition in the atherosclerotic plaques of women are comparable to those of males. (Pravda et al., 2017) The majority of AMI cases in young women involve thrombus that develops with an intact fibrous cap. However, older women are more likely to get coronary thrombosis in the presence of a calcified nodule. Plaque erosion accounts for 25–30% of STEMI patients and is more common in younger smokers. It is linked to a thik-cap fibroatheroma, smooth muscle cells, increased proteoglycans, few macrophages, and inflammatory cells. (Chandrasekhar et al., 2018).

Angiographically normal epicardial coronaries were more common in premenopausal women, indicating nonatherosclerotic disease, according to the coronary angiographic profile, which showed a clear difference in the pattern of CAD between the two groups of women. Premenopausal women were more likely to have single vessel disease even in those with large coronary lesions, whereas multi-vessel disease was more common in postmenopausal women, with TVD accounting for the majority of cases. (Soman et al., 2026).

Evidence of microvascular dysfunction (CMD) can be seen in nearly two thirds of women with non-obstructive illnesses. This can include inflammation, atherosclerotic emboli, aberrant vasomotion in the epicardium, and endothelial microvascular dysfunction. Both the presence and lack of conventional cardiovascular risk factors have been linked to CMD. Cardiovascular MRI, positron emission tomography, echo Doppler, and invasive coronary flow reserve (CFR) assessment can all be used to objectively screen for microvascular ischemia Clinical trials testing for microvascular dysfunction in stable angina are summarized by Bairey Merz et al. (2017) in a recent white paper published in INOCA. (Chandrasekhar et al., 2018; Bairey Merz et al., 2017).

General Objective
To compare severity of coronary artery diseases among pre- and postmenopausal women with acute coronary syndrome. Specific objectives:
 In order to fulfil the above general objectives, the following specific objectives are:
- To assess the risk factors and coronary angiographic profile between pre- and post menopausal women with acute coronary syndrome.
- To assess the severity of coronary artery diseases between pre- and post menopausal women with acute coronary syndrome by Vessel score, Gensini score.
- To assess the complete sociodemographic characteristics among pre-and postmenopausal women with acute coronary syndrome.
- To assess the complete clinical characteristics among pre-and postmenopausal women with acute coronary syndrome.

Materials and Methods
In a medical teaching institution in central Bangladesh, this observational cross-sectional study was carried out. The National Heart Foundation Hospital and Research Institute's Post Graduate Research reference number is N.H.F.H. & R.I 4-14/7/Ad/04, dated December 28, 2021. Written informed consent from each study participant was obtained before the study subjects were enrolled. Included in this study were premenopausal and postmenopausal women with acute coronary syndrome who underwent coronary angiography and were admitted to the cardiology department of the National Heart Foundation Hospital and Research Institute in Dhaka, Bangladesh, between December 2021 and November 2022.

Postmenopause was defined as a lack of menstrual bleeding for 12 month or a history of hysterectomy. (Nelson, 2008) Pre menopause women had not experienced menopause and oophorectomy. (Tang et al., 2021)

Complete sociodemographic characteristics, Risk factors, clinical presentation, coronary angiographic profile, vessel score, Gensini score were recorded in this study.

Acute coronary syndrome was diagnosed in-patient consistent with compatible clinical presentation and further confirmation by ECG and cardiac biomarker was done to diagnose the subtype of ACS.

Statistical Analysis

Using the Gpower 3.1.9.4 version, the sample size was determined by applying the mean difference between two independent means (two groups), setting the location ratio to 1, effect size to 0.50, alpha error to 0.05, and power to 80%. The sample size was 140 in total. With the statistical software for social science (SPSS) 22 version, data entry was completed. The SPSS software, version 22, was used for all statistical analyses. Mean±SD was used to express continuous values, while frequency and % were used to express categorical variables. The Student's t-test was used to compare the means of continuous variables. The Chi-Square test was used to see whether categorical variables were associated. For continuous variables, Pearson Correlation Coefficient was used to do correlation analyses. The significance of the result as determined in 95% confidence interval and a p-value <0.05 was considered to be statistically significant.

Inclusion Criteria

1. Premenopausal women with acute coronary syndrome
2. Postmenopausal women with acute coronary syndrome.
3. Those underwent coronary angiogram.
4. Give informed written consent

Exclusion Criteria

1. Associated valvular heart diseases.
2. Associated with congenital heart diseases.
3. Associated cardiomyopathy.
4. Patients with extremely severe concomitant diseases (Severe deentia, advanced maignancy).
5. Unwilling to participate in the study.

Results

This study includes 140 diagnosed cases of ACS patients seen in the department of cardiology between December 2021 and November 2022. Patients were divided into two groups based on whether or not they were menopausal. Premenopausal women with ACS made up Group I, and postmenopausal women with ACS made up Group II. The mean age of the patients in group I was 41.53 ± 5.45 years, while the mean age of the patients in group II was 57.23 ± 7.45 years. Of the patients in group I, 45.7% (32) were between the ages of 41 and 45, while the patients in group II were between the ages of 56 and 60, as indicated in figure-1.
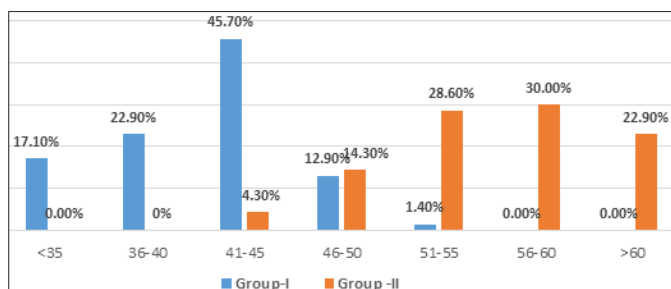
Rich people were more common in postmenopause then premenopause (58.6% vs 42.9%). A statistically significant difference (>0.05) between the two groups was not found, as indicated by the analysis in Table 1.

Table 1: Comparison of socioeconomic status between the groups (n=140)

Socio-economic status	Group I (n=70)	Group II (n=70)	p value*
Rich	30 (42.9)	41 (58.6)	
Middle class	39 (55.7)	28 (40.0)	0.201
Low class	1 (1.4)	1 (1.4)	
Total	**70 (100.0)**	**70 (100.0)**	

*Chi-square test was done to measure the level of significance.

Table 2 showed that most of the patient among both groups I and group II didn't complete their SSC (42.9% vs 65.7%). But there was statistically significant difference between two groups (p>0.05).

Table 2: Comparison of education level between the groups (n=140)

Education level	Group I (n=70)	Group II (n=70)	p value
Below SSC	30 (42.9)	46 (65.7)	
SSC	16 (22.9)	10 (14.3)	0.201
HSC	15 (21.4)	5 (7.1)	
Graduate & above	9 (12.9)	9 (12.9)	
Total	**70 (100.0)**	**70 (100.0)**	

Chi-square test was done to measure the level of significance.

Heart rate was slightly higher in group II patient (77.64 ± 10.96) compared to group I patient (76.64 ± 8.87). Diastolic blood pressure was slightly higher in group I then group II (75.71 ± 8.09 vs 74.86 ± 9.59) shown in table 3.

Table 3: Comparison of Clinical examination between the groups (n=140)

Clinical examination	Group I (n=70)	Group II (n=70)	p value
HR	76.64 ± 8.87	77.39 ± 10.96	0.660
SBP	119.57 ± 13.34	119.57 ± 15.36	0.999
DBP	75.71 ± 8.09	74.86 ± 9.59	0.569

*Unpaired t test was done to measure the level of significance

Within the research population, the majority of patients in group I (58.6% of 41) were obese, followed by normal patients (25.7%), overweight patients (15.7% of 11), and obese patients (50.0%) in group II (35), which was also obese (28.6% of 20), overweight patients (14) and underweight patients (1). A statistically significant difference (>0.05) between the two groups was not found, as indicated by the analysis in Table- 4.

Table 4: Comparison of anthropometry between the groups (n=140)

BMI (kg/m²)	Group I (n=70)	Group II (n=70)	p value
Under weight	0 (0.0)	1 (1.4)	0.316
Normal	18 (25.7)	14 (20)	0.421
Over weight	11 (15.7)	20 (28.6)	0.067
Obese	41 (58.6)	35 (50.0)	0.309
Total	**70 (100.0)**	**70 (100.0)**	
Mean ± SD	26.43 ± 4.28	25.70 ± 3.78	0.282

*. Chi-square test was done to measure the level of significance

Diabetes, dyslipidemia, family history of early CAD, and hypertension were the most prevalent risk variables among the responders in both groups. There was no statistically significant difference (p>0.05) found in the levels of dyslipidemia and hypertension between the two patient groups. However, group II had a higher prevalence of DM and smokeless tobacco (p<0.05). OCP intake and the significantly higher prevalence of family H/O premature CAD in group I are displayed in (figure 2).
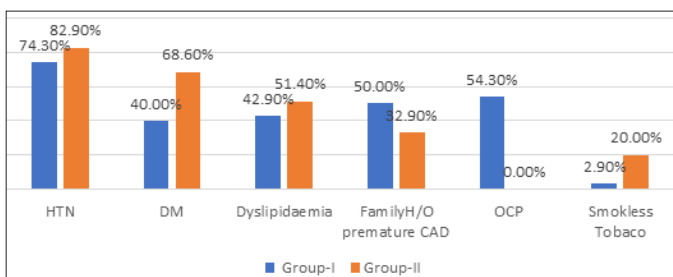
Figure 2: Risk factors distribution of the study populations (n=140)

Atypical presentations (such as palpitations, epigastric pain, tingling and numbness sensations in limbs, feelings of uneasiness, etc.) were more common in group I patients and shortness of breath was more common in group II patients among the study population, according to the clinical presentation of the study patients other than angina pain. However, as Table 5 illustrates, there was a statistically significant difference (p<0.05) in the unusual presentation between the two groups.

Table 5: Clinical presentation of the study patients other then anginal pain (n=140)

Clinical presentations	Group I (n=70)	Group II (n=70)	p value
Shortness of Breath	12 (17.1)	21 (30.0)	0.073
Atypical presentation	21 (30.0)	9 (12.9)	0.013

Chi-square test was done to measure the level of significance

From a clinical perspective, it was clear that in group I, the majority of patients (58.6%) had unstable angina, with NSTEMI (30%) and STEMI (11.4%) following suit. The majority of patients in group II also had unstable angina (42.9%), which was followed by STEMI (20.0%) and NSTEMI (37.1%).

According to analysis, there was no statistically significant difference (p>0.05) in the subsets of ACS between the groups as indicated in Table 6.

Table 6: Comparison of clinical diagnosis between the groups (n=140)

Clinical diagnosis	Group I (n=70)	Group II (n=70)	p value
STEMI	8 (11.4)	14 (20.0)	0.164
NSTEMI	21 (30.0)	26 (37.1)	0.371
UA	41 (58.6)	30 (42.9)	0.063
Total	**70 (100.0)**	**70 (100.0)**	

*. Chi-square test was done to measure the level of significance

The mean value of FBS , HbA1C and serum creatinine were higher in group-II respectively. There was satistically significant difference in mean value of HbA1c and serum creatinine between two groups (p<0.05) and there were no statistically significant difference in mean value of FBS between two groups (p>0.05).

The mean value of troponin-I and CK-MB was more in group-II respectively. But there was no statistically significant difference between two groups (p>0.05).

The mean value of HDL-C is low in group-II and there was statistically significant difference in mean value of HDL-C between two groups (p<0.05) shown in table 7.

Table 7: Comparison of biochemical variable between the groups (n=140)

Lab investigation	Group I (n=70)	Group II (n=70)	p value
FBS (mmol/l)	6.8 ± 2.4	7.3 ± 2.2	0.232
HbA1C (%)	6.8 ± 1.7	7.7 ± 2.0	0.008
S.Creatinine (mg/dl)	0.9 ± 0.1	1.1 ± 0.4	0.001
CKMB (U/L)	38.0 ± 39.6	42.3 ± 23.8	0.470
Troponin I (ng/ml)	7.7 ± 22.6	17.2 ± 59.7	0.225
TG (mg/dl)	127± 57.2	144.7± 68.9	0.118
HDL(mg/dl)	40.5± 10.2	35.3± 6.0	<0.001
LDL (mg/dl)	105.1± 26.8	115± 38.4	0.066
TC (mg/dl)	156.4± 44.1	166.2± 57.3	0.258

Unpaired t test was done to measure the level of significance.

Among the study population, the mean RWMA of group-I patients was 55.7% % and 62.9% for group-II patients. The mean RWMA difference was statistically not significant (p>0.05) shown in table 8.

Table 8: Comparison of RWMA between the groups (n=140)

RWMA	Group I (n=70)	Group II (n=70)	p value
Present	39 (55.7)	44 (62.9)	
Absent	31 (44.3)	26 (37.1)	0.390
Total	**70 (100.0)**	**70 (100.0)**	

Chi-square test was done to measure the level of significance.

Among the study population, the mean left ventricular ejection fraction of group-I patients was 53.74± 7.46 % and 50.71± 8.38 % for group-II patients. The mean ejection fraction difference was statistically significant (p<0.05) shown in table 9.

Table 9: Comparison of mean left ventricular ejection fraction between the groups (n=140)

LVEF (%)	Group I (n=70)	Group II (n=70)	p value
≤30	1 (1.4)	0 (0.0)	
31-44	7 (10.0)	16 (22.9)	
45-54	27 (38.6)	27 (38.6)	
>55	35 (50.0)	27 (38.6)	
Total	**70 (100.0)**	**70 (100.0)**	
Mean ± SD	53.74 ± 7.46 %	50.71 ± 8.38 %	0.026

*Unpaired t test was done to measure the level of significance

The number of coronary arteries involved in the study participants indicated the severity of their coronary artery disease. Single vessel disease accounted for 31.4% (22), double vessel disease for 17.1% (12), and triple vessel disease for 20% (14), in group I. Single vessel disease accounted for 15.7% (11), double vessel disease for 18.6% (13), and triple vessel disease for 48.6% (34), in group II. Premenopausal women were more likely to have single vessel disease (p<0.002), while postmenopausal women were more likely to have triple vessel disease (p<0.001). Table-10 indicates that normal vessels are more common and substantial in premenopausal women.

Table 10: Severity of coronary artery disease in the study populations by number of coronary artery involvement (n=140)

Number of involved vessels	Group I (n=70)	Group II (n=70)	p value
None	22 (31.4)	12 (17.1)	0.049
SVD	22 (31.4)	11 (15.7)	0.002
DVD	12 (17.1)	13 (18.6)	0.825
TVD	14 (20.0)	34 (48.6)	0.001
Total	**70 (100.0)**	**70 (100.0)**	

Chi-square test was done to measure the level of significance.

Coronary artery involvement in the study patients by number of coronary artery involvement. In group-I, RCA was 78.6% (55), LCX was 78.6% (55), LAD was 85.7% (60) and LMCA 18.6% (13). In group-II, RCA was 90.0% (63), LCX 78.6% (55), LAD 95.7% (67) and LMCA 15.7% (11). Statistically significant difference rely on involvement of LAD was in postmenopausal patients (group-II) (p<0.05) shown in table 11.

Table 11: Comparison of coronary artery involvement between the groups (n=140)

Number of coronary artery involvement	Group I (n=70)	Group II (n=70)	p value
RCA	55 (78.6)	63 (90.0)	0.063
LCX	55 (78.6)	55 (78.6)	1.00
LAD	60 (85.7)	67 (95.7)	0.042
LMCA	13 (18.6)	11 (15.7)	0.564
Total	**70 (100.0)**	**70 (100.0)**	

Chi-square test was done to measure the level of significance.

The average Gensini score for the participants was 33.5±36.9 for group I and 56.1±43.4 for group II. The differences between the groups were statistically significant (p<0.05), as indicated in table 12.

Table 12: Severity of coronary artery disease in the study patients by Gensini score (n=140)

Variables	Group I (n=70)	Group II (n=70)	p value
Gensini score			
Mean ± SD	33.5 ± 36.9	56.1 ± 43.4	
Median	21	56	
Mean Rank	58.6	82.4	0.001

Student t-test done to measure the level of significance

Regarding the site of coronary artery lesion of RCA, LCX and LAD vessel were normal more in group-I and proximal involvement were more common in group-II and this findings were statistically significant <0.05).

LMCA was involved in 18.6% (13) of patient in group-I and 15.7% (11) patient of group-II respectively but this finding was not statistically significant shown in table 13.

Table 13: Distribution of the study subjects by site of coronary artery lesion (n=140)

Site of coronary artery lesion	Group I (n=70)	Group II (n=70)	p value
RCA			
Normal	24 (43.7)	7 (11.0)	0.001
Proximal	19 (34.5)	43(68.3)	0.001
Mid	8 (14.5)	10 (15.9)	0.841
Distal	4 (7.3)	3 (4.8)	0.565
LCX			
Normal	25 (47.2)	11 (21.0)	0.006
Proximal	22 (41.5)	33 (64.7)	0.018
Mid	1 (1.9)	2 (3.9)	0.535
Distal	5 (9.4)	5 (9.8)	0.949
OM	2 (2.9)	4 (5.7)	0.404

LAD			
Normal	23 (39.7)	9 (15.5)	0.004
Proximal	35 (58.3)	49 (76.6)	0.003
Mid	1 (1.7)	6 (9.4)	0.063
Distal	1 (1.7)	0 (0.0)	0.300
Diagonal	0 (0.0)	3 (4.3)	0.800
LMCA			
Normal	57 (81.4)	59 (84.3)	0.654
disease	13 (18.6)	11 (15.7)	0.654

*Chi-square test was done to measure the level of significance.

In group I, normal findings were reported for the proportion of lesion in RCA, LCX, and LAD. Apart from RCA, group I also had more <70% lesions. Conversely, group II had a higher prevalence of lesions (70–99%).

Based on the proportion of lesions in LMCA, 81.4% (57) patients in group I and 84.3% (59) patients in group II were found to be normal, whereas 12.9% (9) patients in group I and 8.6% (6) patients in group II had ≥50% lesions, as indicated in table 14.

Table 14: Severity of coronary artery disease of the study patients by percentage of coronary artery lesion (n=140)

Site of coronary artery lesion	Group I (n=70)	Group II (n=70)	p value
RCA			
Normal	24 (43.6)	7 (11.1)	0.001
<70%	9 (29.0)	18 (32.1)	0.117
70-99%	20 (64.5)	30 (53.6)	0.217
100%	2 (6.5)	8 (14.3)	0.007
LCX			
Normal	25 (47.2)	11 (21.0)	0.006
<70%	11 (36.7)	6 (13.6)	0.187
70-99%	19 (63.3)	35 (79.5)	0.002
100%	0 (0.0)	3 (6.8)	0.790
LAD			
Normal	23 (39.7)	9 (15.5)	0.004
<70%	11 (29.7)	11 (19.0)	0.776
70-99%	24 (64.9)	45 (77.6)	0.002
100%	2 (5.4)	2 (3.4)	0.911
LMCA			
Normal	57 (81.4)	59 (84.3)	0.654
<50%	4 (5.7)	5 (7.1)	0.654
≥ 50%	9 (12.9)	6 (8.6)	0.730

Chi-square test was done to measure the level of significance.

Discussion

This one-year cross-sectional observational study was carried out in the Department of Cardiology at NHFH &RI, Dhaka, between December 2021 and November 2022.

This study took into account 140 female patients who had been admitted to the hospital with acute coronary syndrome (ACS) and had coronary angiography. Patients were divided into two groups based on whether or not they were menopausal. Premenopausal women with ACS made up Group I, and postmenopausal women with ACS made up Group II.

The mean age of patients in group I was 41.53 ± 5.45 years, while patients in group II had a mean age of 57.23 ± 7.45 years in this study. The majority of group I's patients were between the ages of 41 and 45. The majority of group II patients were between the ages of 56 and 60, which was consistent with Ahmed et al.'s study from 2021, which indicated that the mean age was 41.6± 3.8 vs. 56.0± 7.2. (Ahmed et al., 2021).

Regarding socioeconomic status of the patient revealed that ACS more common in post menopausal women those who were rich but ACS of premenopausal women were common in middle class society.

Most of the patient among both the groups didn't complete their secondary school certificate .

In terms of the risk factor analysis, the most prevalent risk variables in both groups were obesity, dyslipidemia, diabetes mellitus, family history of early CAD, and hypertension.

However, smoking was absent in patients in groups I and II, respectively. In our nation, female patients who smoke are extremely uncommon.

On the other hand, postmenopausal patients had considerably higher rates of DM and smokeless tobacco. The prevalence of diabetes mellitus rises with age, and chronic uncontrolled diabetes is a major risk factor for diffuse disease and multiple coronary artery involvement. In our nation, using smokeless tobacco is more prevalent, particularly in rural cultures. OCP consumption and a family history of early CAD were considerably more prevalent in premenopausal individuals In Bangladesh, Ahmed et al. (2021) conducted a study on acute coronary syndrome in premenopausal and postmenopausal women. Among the risk variables they identified in common were dyslipidemia, obesity, smoking, diabetes mellitus, hypertension, and a family history of early CAD. Seventy-six percent of risk factors included hypertension. The results of a study by Chowdhury et al. (2018) also linked the use of smokeless tobacco to CAD, which was consistent with our findings. Because diabetes counteracts the protective effects of estrogen and is linked to endothelial dysfunction and platelet abnormalities, it poses a larger danger to women. Additionally, a number of recent studies have demonstrated that the two main risk factors for CAD in women are diabetes mellitus and hypertension. (Soman et al., 2016), (Chowdhury et al., 2018;

Kandoria et al., 2017; Yihua et al., 2017). In the premenopausal group, the percentage of patients who had none of the above traditional risk factors but still had CAD was much greater, indicating that the young women's CAD is being caused by reasons other than the conventional risk factors. (Soman et al., 2016).

The study participants' symptoms included dyspnea and an atypical presentation (palpitations, epigastric discomfort, tingling and numbness in the limb, uneasiness, etc.), which was considerably more common in premenopausal women and consistent with a prior study by Yihu et al. (2017).

In both groups, unstable angina was the most common diagnosis, followed by NSTEMI and STEMI. This result could be explained by the fact that coronary vasospasm is widespread in premenopausal women and that homonal protection throughout reproductive age correlated with other earlier studies. (Soman et al., 2016).

The postmenopausal group's mean values of HbA1c and S. creatinine were much higher and their HDL-C was lower. This difference could be attributed to various comorbidities, advancing age, and a lack of hormonal protection. Women's lipid metabolism is significantly impacted by menopause, mostly resulting in an increase in LDL-C and a reduction in HDL-C. (Yihu et al., 2017) The mean left ventricular ejection fraction of group-II patients was low in compared to group-I patients. There was decrement in left ventricular ejection fraction with advancing age with ACS. As postmenopusal patients suffer more from STEMI and NSTEMI then premenopausal patients. This may effect the reduction of LVEF in postmenopausal patients.

SVD and coronary angiography are significantly more normal in premenopausal women. The premenopausal woman's increased frequency of microvascular dysfunction may be the cause of her normal coronary angiography. Because of DM, increasing age, and higher AMI, TVD was substantially more common in postmenopausal women; comparable results were also seen in other studies. (Nambirajan et al., 2020).

Ahmed et al.'s study showed that premenopausal women had more coronary artery involvement in single vessels (24% vs. 52%) and triple vessels (12% vs. 40%, $p<0.05$) in postmenopausal women. The results of this investigation were comparable to these. (Ahmed et al., 2021).

The left anterior descending artery, right coronary artery, and left circumflex artery were the most often involved coronary artery lesions in groups I and II, according to the distribution of lesions. Compared to group II, group I had a higher prevalence of left main coronary artery involvement.

The difference in the involvement of the left anterior descending artery and right coronary artery between the two groups is statistically significant ($p<0.001$).

Proximal LAD involvement was more prevalent in group I. In addition to proximal LAD, proximal LCX and proximal and mid RCA involvement were frequently observed in group II. There is currently no conclusive evidence regarding the reason why premenopausal women experienced a higher incidence of LAD illness. Considering the left anterior descending artery's physical configuration, it was more active and the left ventricle required more oxygen and nutrients to function. Since the anterior descending artery supplies the majority of blood to the left ventricle and supports a sizable portion of it, it is more likely to become implicated.

According to Ahmed et al.'s study from 2021, lesion distribution analysis revealed that 56% of the premenopausal group had more proximal left anterior descending artery (LAD) lesions. RCA (36%) and LCX (30%) were next. This finding is consistent with the study, which found that LAD was the most prevalent lesion in premenopausal women, followed by RCA and LCX, in that order. Similar results were also observed in the study by Dou et al. (2008) which showed that 50.4%, 39.1%, and 40.7% of LAD, LCX, and RCA were involved.

The vessel score of the study patients showed highest percentage of single vessel involvement in group-I and triple vessel involvement in group-II patients. Regarding both SVD and TVD difference were statistically significant ($p<0.05$).

Severity assessment by gensini score of the study patients revealed gensini score in group-I patients was 33.5± 36.9 and 56.1± 43.4 in group-II patient and this difference is highly statistically significant ($p<0.001$).

The Gensini score and vessel scores of patients were much lower, which meant the lesions were confined mostly to single or double blood vessels. This was probably because young women were more likely to have inflammation, coronary spasm, plaque erosion or rupture. On the other hand clinical manifestations postmenopausal patients were more complex and collateral circulation was easily formed as they had a longer disease duration and long term progress of the disease course.

Many studies also shown that postmenopausal women had more severe coronary artery diseases evidenced by more vessel score and gensini score in compared to premenopausal women. (Ahmed et al., 2021; Dou et al., 2008).

Limitations of the Study
- Since the research participants were purposefully chosen from a self-selected sample, it is not possible to infer that this sample is typical of Bangladesh's overall population. The study was carried out at a public hospital in the city of Dhaka. In certain sociodemographic or cultural contexts, it might be different.
- Women with ACS who underwent CAG were included in the study. This may inadequately reflect the angiographic profile of the women.

Conclusion

This study illustrates how the premenopausal era is a time when acute coronary syndrome is not as common but still carries a modest risk. Among both the groups of population didn't complete their secondary school certificate. The most prevalent risk factors in both groups were hypertension, diabetes mellitus, dyslipidemia, and a family history of early CAD. The premenopausal group also exhibited a high prevalence of OCP use. Smokeless tobacco use was widespread among postmenopausal individuals.

Compared to postmenopausal women, coronary angiographic findings in premenopausal women showed a single vessel, less severe lesion, and most frequently involved LAD. However, in the case of the high-risk group, LM involvement and multiple vessel involvement were discovered. In order to obtain more information, a large-scale community-based study should be conducted. Early diagnosis and treatment, along with social awareness of primary and secondary prevention, are crucial for lowering the burden, morbidity, and death rates associated with CAD.

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