To Study the Profile of Metabolic Syndrome in Young Patients of Acute Coronary Syndrome

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Abstract: *Introduction: Metabolic syndrome (MS) is a clinical and biological entity of lipid and nonlipid factors of metabolic origin, which places subjects at risk for cardiovascular and cerebrovascular diseases. Aims and Objectives: To study profile of Metabolic Syndrome in Young Patients of Acute coronary Syndrome. Methods: The study type is cross sectional study. The work was conducted in DEPARMENT OF MEDICINE, L. L. R. M MEDICAL COLLEGE, MEERUT. A sample size of 120 patients attending medicine OPD/IPD and Cardiology OPD were selected as per criteria. Results: Among the study population 58 participants had Metabolic Syndrome and 62 participants did not have Metabolic Syndrome. Conclusion: The prevalence of metabolic syndrome in young patients presented with acute coronary syndrome was found to be around 48.3%. Among all the components of metabolic syndrome, triglyceride levels was the commonest component elevated (83%). The prevalence of other components were low HDL cholesterol levels (39%), increased waist hip ratio (48%) and elevated blood pressure (29%).*

Keywords: Metabolic syndrome, Acute coronary syndrome, Coronary Artery Disease

1. Introduction

ACS leads to significant effects on patient's psychology, morbidity, and increased financial burden when it occurs at this young age (1, 2). Young patients with ACS on coronary angiography (CAG) show a relatively increased incidence of single - vessel disease and nonobstructive stenosis. The risk as well as the clinical factor profile and the arterial involvement pattern differ between young and elderly CAD patients (3, 4). Metabolic, genetic, and conventional causes may result in CAD occurring at a younger age in India. ACS in very young adults with age ≤30 years is rare (5). In India, the prevalence of acute myocardial infarction (AMI) in this population is between 2 - 10%. (6)

Coronary artery disease (CAD) is the single most frequent cause of death. The atherosclerotic cardiovascular disease is a chronic disorder developing insidiously, and it remains as the major cause of premature death. Importantly, evidence revealing that increased cardiovascular risk starts to develop at a very young age has accumulated over the past decades.

Metabolic syndrome (MS) is a clinical and biological entity of lipid and nonlipid factors of metabolic origin, which places subjects at risk for cardiovascular and cerebrovascular diseases.

2. Material and Methods

The study type is cross sectional study. The work was conducted in Department of Medicine, L. L. R. M Medical College, Meerut. A sample size of 120 patients attending medicine OPD/IPD and Cardiology OPD were selected as per criteria.

A pre - structured Proforma was filled up for the study. Each subject was given a thorough work up for history and physical examination to fulfill the inclusion and exclusion criteria. Routine hematological and biochemical investigations were carried out. The following parameters were measured at the time of enrollment into the study:

Inclusion Criteria:
- Patients who will give consent
- Age between 18 to 45 years
- Patients having Acute Coronary Syndrome

Exclusion Criteria:
- Patients on Anti - lipidemic Drugs
- Patients with impaired renal function.
- Cardiomyopathies,
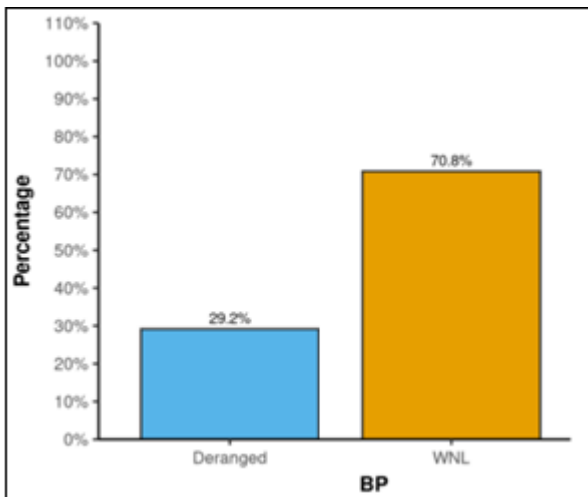- Patients having thyroid dysfunction.
- Pregnancy

3. Results

Distribution of the Participants in Terms of 'BP (mmHg)'

Table 1: Distribution of BP

BP	Frequency	Percentage	95% CI
Deranged	35	29.2%	21.4% - 38.3%
WNL	85	70.8%	61.7% - 78.6%

- 29.2% of the participants had BP: Deranged.
- 70.8% of the participants had BP: WNL.

Out of 35 patients having deranged BP, 8 has only raised systolic BP and 27 had raised both SBP and DBP. None of them had isolated raised diastolic BP.

Association of BP in Pt. with and without 'Metabolic Syndrome'

Table 2: Association of BP and Metabolic Syndrome

| BP	Metabolic Syndrome			Chi - Squared Test	
	Present	Absent	Total	χ2	P Value
Deranged	30 (51.7%)	5 (8.1%)	35 (29.2%)	27.649	<0.001
WNL	28 (48.3%)	57 (91.9%)	85 (70.8%)		
Total	58 (100.0%)	62 (100.0%)	120 (100.0%)		

Chi - squared test was used to explore the association between 'Metabolic Syndrome' and 'BP'.

There was a significant difference between the various groups in terms of distribution of BP ($\chi2 = 27.649$, p = <0.001).

Strength of association between the two variables (Cramer's V) = 0.48 (Moderate Association)

Strength of association between the two variables (Bias Corrected Cramer's V) = 0.47 (Moderate Association) 51.7% of the participants in the group [Metabolic Syndrome: Present] had [BP: Deranged].48.3% of the participants in the group [Metabolic Syndrome: Present] had [BP: WNL].8.1% of the participants in the group [Metabolic Syndrome: Absent] had [BP: Deranged].91.9% of the participants in the group [Metabolic Syndrome: Absent] had [BP: WNL].

Participants in the group Metabolic Syndrome: Present had the larger proportion of BP: Deranged. Participants in the group Metabolic Syndrome: Absent had the larger proportion of BP: WNL.
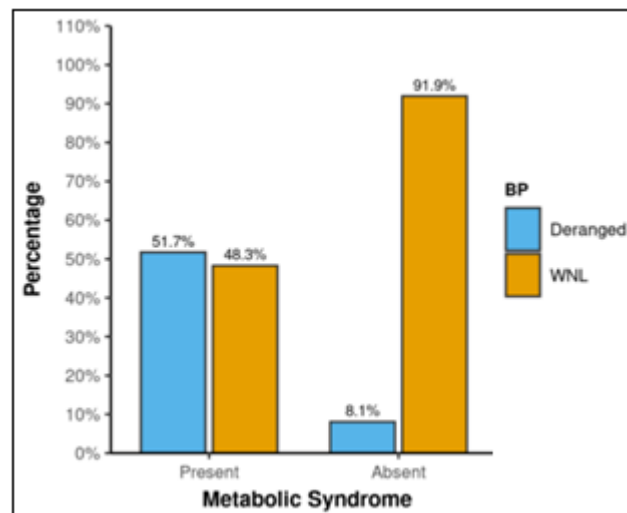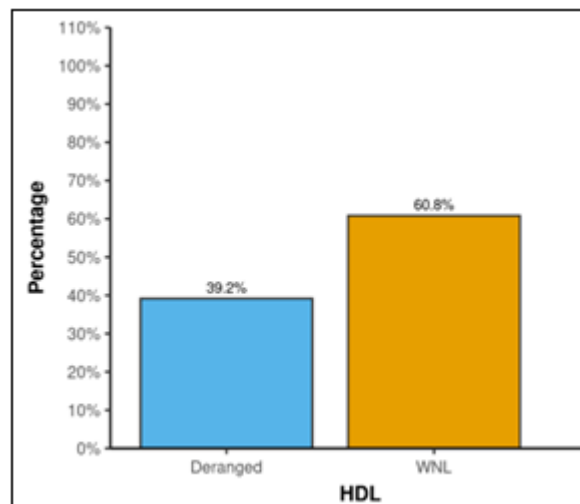

Distribution of the Participants in Terms of 'HDL (mg/dL) '

Table 3: Distribution of HDL

HDL	Frequency	Percentage	95% CI
Deranged	47	39.2%	30.5% - 48.5%
WNL	73	60.8%	51.5% - 69.5%

39.2% of the participants had HDL: Deranged.60.8% of the participants had HDL: WNL.

Association of HDL and Patients with and without 'Metabolic Syndrome'

Table 4: Association between Metabolic Syndrome and HDL

| HDL	Metabolic Syndrome			Chi - Squared Test	
	Present	Absent	Total	χ2	P Value
Deranged	42 (72.4%)	5 (8.1%)	47 (39.2%)	52.080	<0.001
WNL	16 (27.6%)	57 (91.9%)	73 (60.8%)		
Total	58 (100.0%)	62 (100.0%)	120 (100.0%)		

Chi - squared test was used to explore the association between 'Metabolic Syndrome' and 'HDL'.

There was a significant difference between the various groups in terms of distribution of HDL ($\chi2 = 52.080$, p = <0.001).

Strength of association between the two variables (Cramer's V) = 0.66 (High Association)

Strength of association between the two variables (Bias Corrected Cramer's V) = 0.66 (High Association)

72.4% of the participants in the group [Metabolic Syndrome: Present] had [HDL: Deranged].27.6% of the participants in the group [Metabolic Syndrome: Present] had [HDL: WNL].8.1% of the participants in the group [Metabolic Syndrome: Absent] had [HDL: Deranged].91.9% of the participants in the group [Metabolic Syndrome: Absent] had [HDL: WNL]. Participants in the group Metabolic Syndrome: Present had the larger proportion of HDL: Deranged. Participants in the group Metabolic Syndrome: Absent had the larger proportion of HDL: WNL.
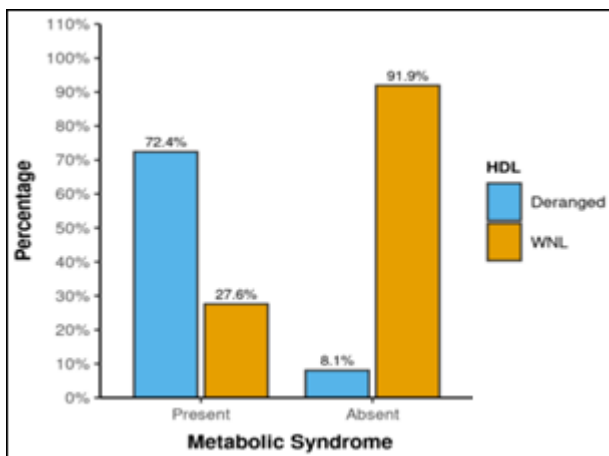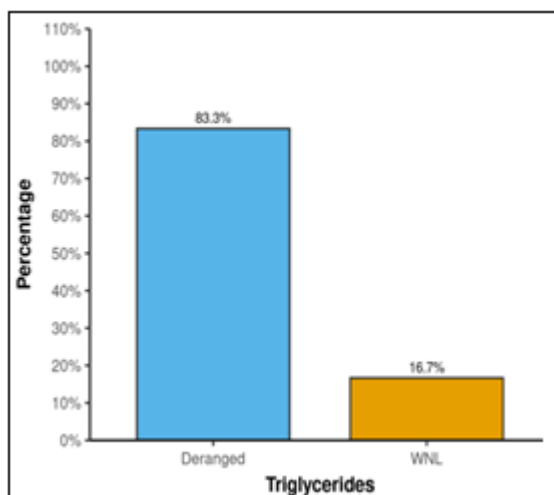

Distribution of the Participants in Terms of 'Triglycerides (mg/dL) '

Table 5: Distribution of Triglycerides

Triglycerides	Frequency	Percentage	95% CI
Deranged	100	83.3%	75.2% - 89.3%
WNL	20	16.7%	10.7% - 24.8%

83.3% of the participants had Triglycerides: Deranged.16.7% of the participants had Triglycerides: WNL.

Association of 'Triglycerides' in patients with and without Metabolic Syndrome'

Table 6: Association between Metabolic Syndrome and Triglycerides

Triglycerides	Metabolic Syndrome			Chi - Squared Test	
	Present	Absent	Total	χ2	P Value
Deranged	54 (93.1%)	46 (74.2%)	100 (83.3%)	7.715	0.005
WNL	4 (6.9%)	16 (25.8%)	20 (16.7%)		
Total	58 (100.0%)	62 (100.0%)	120 (100.0%)		

Chi - squared test was used to explore the association between 'Metabolic Syndrome' and 'Triglycerides'.

There was a significant difference between the various groups in terms of distribution of Triglycerides (χ2 = 7.715, p = 0.005).

Strength of association between the two variables (Cramer's V) = 0.25 (Low Association)

Strength of association between the two variables (Bias Corrected Cramer's V) = 0.24 (Low Association)

93.1% of the participants in the group [Metabolic Syndrome: Present] had [Triglycerides: Deranged].6.9% of the participants in the group [Metabolic Syndrome: Present] had [Triglycerides: WNL].74.2% of the participants in the group [Metabolic Syndrome: Absent] had [Triglycerides: Deranged].25.8% of the participants in the group [Metabolic Syndrome: Absent] had [Triglycerides: WNL].

Participants in the group Metabolic Syndrome: Present had the larger proportion of Triglycerides: Deranged. Participants in the group Metabolic Syndrome: Absent had the larger proportion of Triglycerides: WNL.
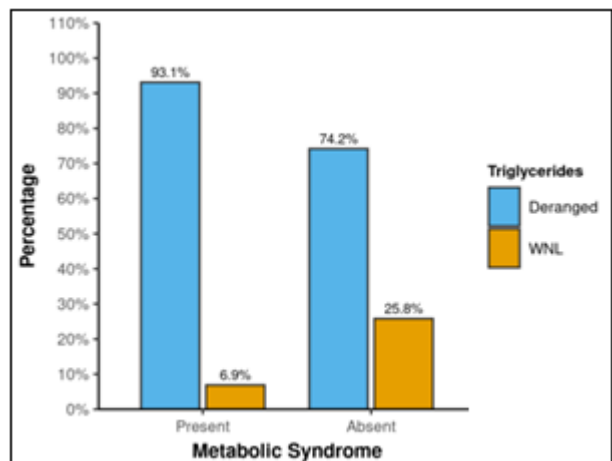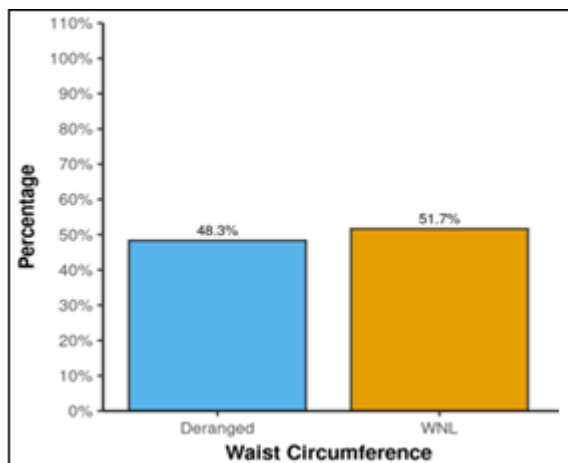

Distribution of the Participants in Terms of 'Waist Circumference (cm)

Table 7: Distribution of Waist Circumference

Waist Circumference	Frequency	Percentage	95% CI
Deranged	58	48.3%	39.2% - 57.6%
WNL	62	51.7%	42.4% - 60.8%

48.3% of the participants had Waist Circumference: Deranged. 51.7% of the participants had Waist Circumference: WNL.

Association between 'Waist Circumference' and 'Gender'

Table 8: Association between Waist Circumference and Gender

| Gender	Waist Circumference			Chi - Squared Test	
	Deranged	WNL	Total	χ2	P Value
Male	36 (62.1%)	55 (88.7%)	91 (75.8%)	11.605	<0.001
Female	22 (37.9%)	7 (11.3%)	29 (24.2%)		
Total	58 (100.0%)	62 (100.0%)	120 (100.0%)		

Chi - squared test was used to explore the association between 'Waist Circumference' and 'Gender'.

There was a significant difference between the various groups in terms of distribution of Gender (χ2 = 11.605, p = <0.001).
Strength of association between the two variables (Cramer's V) = 0.31 (Moderate Association)

Strength of association between the two variables (Bias Corrected Cramer's V) = 0.3 (Low Association) 62.1% of the participants in the group [Waist Circumference: Deranged] had [Gender: Male].37.9% of the participants in the group [Waist Circumference: Deranged] had [Gender: Female].88.7% of the participants in the group [Waist Circumference: WNL] had [Gender: Male].11.3% of the participants in the group [Waist Circumference: WNL] had [Gender: Female].

Participants in the group Waist Circumference: WNL had the larger proportion of Gender: Male. Participants in the group Waist Circumference: Deranged had the larger proportion of Gender: Female.
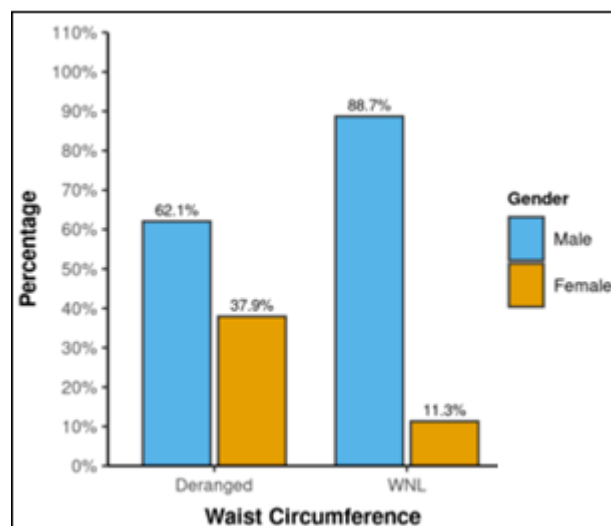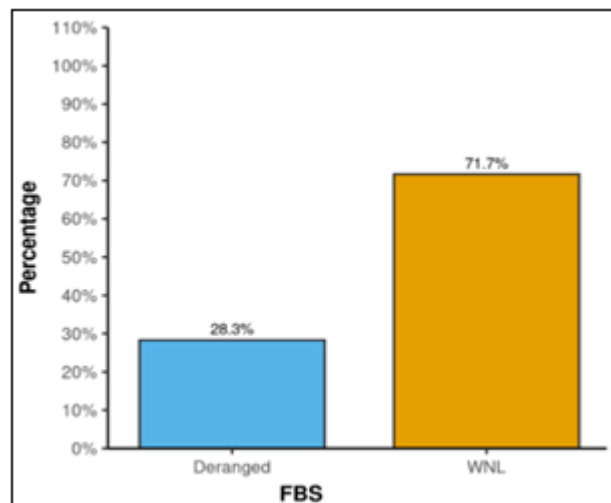

Distribution of the Participants in Terms of 'FBS'

Table 9: Distribution of FBS

FBS	Frequency	Percentage	95% CI
Deranged	34	28.3%	20.7% - 37.4%
WNL	86	71.7%	62.6% - 79.3%

28.3% of the participants had FBS: Deranged.71.7% of the participants had FBS: WNL.

Association of 'FBS' in patients with and without Metabolic Syndrome

Table 10: Association between Metabolic Syndrome and FBS

FBS	Metabolic Syndrome			Chi - Squared Test	
	Present	Absent	Total	χ2	P Value
Deranged	19 (32.8%)	15 (24.2%)	34 (28.3%)	1.083	0.298
WNL	39 (67.2%)	47 (75.8%)	86 (71.7%)		
Total	58 (100.0%)	62 (100.0%)	120 (100.0%)		

Chi - squared test was used to explore the association between 'Metabolic Syndrome' and 'FBS'.

There was no significant difference between the various groups in terms of distribution of FBS (χ2 = 1.083, p = 0.298).

Strength of association between the two variables (Cramer's V) = 0.09 (Little/No Association)

Strength of association between the two variables (Bias Corrected Cramer's V) = 0.02 (Little/No Association) 32.8% of the participants in the group [Metabolic Syndrome: Present] had [FBS: Deranged].67.2% of the participants in the group [Metabolic Syndrome: Present] had [FBS: WNL].24.2% of the participants in the group [Metabolic Syndrome: Absent] had [FBS: Deranged].75.8% of the participants in the group [Metabolic Syndrome: Absent] had [FBS: WNL].
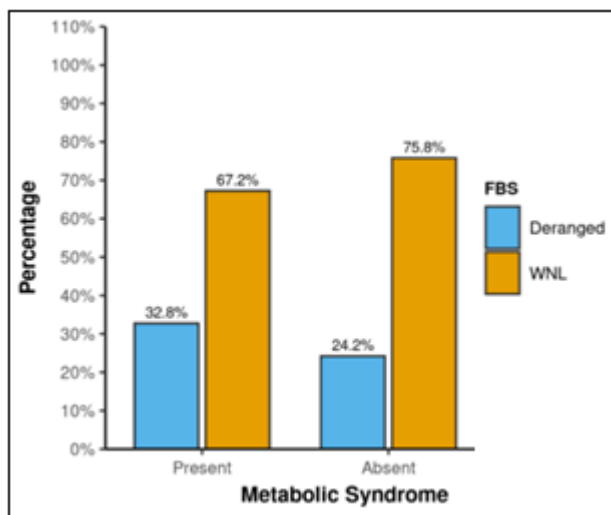
4. Discussion

This study, "**To Study the Profile of Metabolic Syndrome in Young patients of Acute Coronary Syndrome**" is an observational study done on 120 patients of age < 45 years admitted with acute coronary syndrome in LLRM medical college and SVBP hospital. The study population included 120 patients presented with acute coronary syndrome out of which 91 patients were male and 29 patients were female. Among the 120 patients 58 were diagnosed for metabolic syndrome according to the NCEP ATP III guidelines. Several previous studies have shown that the overall prevalence of metabolic syndrome in Indian population is 31.4%. It was observed that females (48.2%) are more affected from metabolic syndrome than male (16.3%). While evaluating on the basis of age prevalence was found to be 2.9% in aged 18–30years and it was increased to 31.0% in aged 60–69 years in Asians.

In this study, the metabolic syndrome, defined according to NCEP ATP III criteria, was found in 58 patients (48.3%) of the study population. The Triglyceride was the most common determinant elevated in patients with or without the metabolic syndrome and it was about 83%.

The prevalence of other components were found to be raised i. e. Fasting blood sugar (28%), low HDL cholesterol levels (39%), increased waist hip ratio (58%) and elevated blood pressure (29%).

Among the 120 patients, range of age was 50 patients were between the age of 31 - 40 years and 70 patients were between 41 to 45 years.

The risk factors associated with ACS were also assessed. History of Smoking was present in 75 patients (62.5%) in the study population and History of Alcohol intake was found in 66 patients (55%). Among the 58 patients with metabolic syndrome, 54 patients had elevated Triglyceride level and 4 had normal level. The correlation found between elevated Triglyceride level levels and metabolic syndrome was statistically significant. The mean Triglyceride level levels was found to be 173.02mg/dl in patients with metabolic syndrome and 163.79 mg/dl in patients without metabolic syndrome. This difference was statistically significant.

5. Conclusion

The prevalence of metabolic syndrome in young patients with acute coronary syndrome was around 48.3%. Among all the components of metabolic syndrome, triglyceride levels was the commonest component elevated (83%). The prevalence of other components were low HDL cholesterol levels (39%), increased waist hip ratio (48%) and elevated blood pressure (29%). This high prevalence of metabolic syndrome in young indicates the need for a comprehensive non communicable disease prevention and control program. Increasing awareness and early identification of these clusters of risk factors should be emphasized in designing population wide prevention strategies. The major aim is to emphasise on underlying cause of the syndrome, and also on other cardiovascular risk factors. Most of people with metabolic syndrome are obese and lead a physically inactive lifestyle. Therefore, lifestyle modification to be done in these patients. Weight loss usually requires a multifaceted program that includes diet modification and physical exercise. Other factors of CVD should be considered, which are supposed to play an important role includes High Sensitivity C - reactive Protein (hsCRP), increased intima - media thickness of carotid arteries, and increased pulse wave velocity. When the whole spectrum of various causative and risk factors of cardio vascular disease risk in metabolic syndrome is uncovered, we can more effectively execute the preventive strategies in population on a wide range.

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