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RISK FACTORS AND ANGIOGRAPHIC PROFILE OF YOUNG ADULT LESS THAN 40 YEARS OF AGE IN BANGLADESHI POPULATION

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ABSTRACT

Background: Coronary artery disease (CAD) in young adults under the age of 40 is an increasing medical, social, psychological, and economic concern, owing to the rise of civilization-related diseases and an unhealthy lifestyle. The problem of CAD in young people has not been studied as thoroughly as it has in older people, as current data consists primarily of case reports and small series, which are frequently tied to genetic features and family occurrence of the illness.

Aim: To evaluate the risk factors for ischemic heart disease and the angiographic pattern of young adults with CAD who presented with chest pain in the ER.

Methods: We conducted this observational study at Ibrahim Cardiac Hospital & Research Institute in Dhaka, Bangladesh, from February 1 to June 30, 2024. Patients with chest discomfort aged 21-40 years who underwent coronary angiography were included in the study.

Results: This retrospective analytical investigation was carried out from February 1st to June 30th, 2024, with 110 patients enrolled in the department of cardiology at Ibrahim Cardiac Hospital & Research Institute. Patients aged 21 to <40 years were separated into two groups: 21-30 years and more than 30 to <40 years, with a mean age of 34.28±4.25 years. All patients underwent a coronary angiogram, which revealed that 30% had non-flow limiting coronary arteries, 29.1% had single vessel disease, 22.7% had double vessel disease, 17.3% had triple vessel disease, and 0.9% had left main with or without coronary involvement. Patients aged 30 to under 40 had more coronary artery disease than those aged 21 to 30.

Conclusion: Young patients have distinct coronary artery disease patterns; hence the therapeutic plan must be tailored to their demographic. In this vulnerable age group, there should be a stronger emphasis on risk factor identification and management.

KEYWORDS: coronary artery disease, young adult, coronary angiography, risk factors.

INTRODUCTION

With rapid societal changes and an increase in the prevalence of classic risk factors for CAD, early atherosclerosis is becoming a growing concern, affecting persons as young as their third and fourth decades of life. South Asian cultures are seeing a significant increase in the incidence of CAD among younger age groups.

Premature coronary artery disease is more common among Indians (5-10%) than other ethnicities (~1-2%)1. Obesity, physical inactivity, hypertension, and other conventional risk factors have increased dramatically in younger adults during the previous 20 years2. Premature CAD (PCAD) is defined as the onset of coronary artery disease (CAD) before the age of 40 [3-4].

Young Indians have a greater incidence of CAD than any other ethnic group, with rates ranging from 12% to 16%. In addition to hypertension, diabetes, dyslipidemia, a family history of CAD, and obesity, inhaled tobacco products are a significant risk factor for coronary artery disease, myocardial infarction (MI), and mortality in young adults[5-7].

According to the research, young patients with ACS are often male smokers with a unique lipid profile, concomitant obesity, and a significant family history of early CAD. Coronary angiography (CAG) usually shows normal coronary arteries, leading a look for non-atherosclerotic reasons including coronary spasm, vasculitis, embolism, or hypercoagulability. Exaggerated goals, competition, workaholism, bad nutrition, use of psychoactive substances like cocaine, marijuana, and anabolic steroids, and disregard for early disease indicators have all been highlighted as negative lifestyle variables in young and very young people [8-10].

This study aimed to look into demographics, angiography, and risk factors of critical CAD in patients aged ≤40 years with chest pain.

MATERIALS AND METHODS

Design and Population:

This was a single-center, observational study conducted at a tertiary care hospital in Dhaka, Bangladesh. Participants presenting with chest pain (aged 21–less than40 years of age) who underwent coronary angioplasty for CAD were included in the study. Informed consent was obtained from all the participants before enrollment. Any participant with chest pain. The study was approved by the ethical review committee (ERC/ICHRI/ Research-2024-06) and was conducted with applicable principles of good clinical practice and local regulatory principles.

METHODS

Participants who fulfilled the recruitment criteria were eligible for enrollment into the study. Participants presenting with signs and symptoms of ischemic heart disease (IHD) underwent an initial electrocardiographic (ECG) assessment. Presenting features of chest pain. All the features observed on ECG were recorded. Patients demographic details such as age and gender were captured. After confirming the initial diagnosis of participants, patients were subjected to clinical assessments and a catheterization lab.

Risk Factors Assessment

Hypertension as documented by:[11]

1. History of hypertension diagnosed and treated with medication, diet, and/or exercise.
2. Blood pressure greater than 140 mmHg systolic or 90 mmHg diastolic on at least 2 occasions.
3. Current use of antihypertensive pharmacological therapy.

Diabetes can be characterized as persistent or chronic hyperglycemia brought on by a lack of insulin secretion, action, or both. HbAIC>6.5%, fasting plasma glucose of 7.0 mmol/L or higher, random or postprandial glucose of 11.1 mmol/L or higher, or abnormal oral glucose tolerance test are all indicators of diabetes[12].

Smoker was defined as a person who is either smoking any form of tobacco at least once a day or having any level of tobacco smoking within one month of the index event[11].

[13]Body mass index (weight (kg) / height (metre)2

- Normal weight =18.5-24.9 kg/m^2
- Overweight = 25-29.9 kg.m^2
- Obesity level-I =30-34.9 kg/m^2
- Obesity level-II=25-29.9 kg/m^2
- Obesity level-III=>40kg/m^2

Coronary Angiography: Under all aseptic precaution radial approach,17 a 2 mm catheter was inserted and a soft J-shaped guidewire was progressed through the catheter retrogradely under the fluoroscopy guidance. With proper manipulations of the catheter, the guidewire was advanced to the base of the aorta immediately above the aortic valve to engage the tip of the catheter in the coronary ostium. A radiocontrast dye (5–15 mL) was passed through the catheter to visualize the coronaries using fluoroscopy. Cine images of both the right and left coronary arteries with their branches were obtained. The lesions were assessed for significant or non-significant stenosis, in addition to other characteristics such as length, position of side branches, etc.

Statistical Analysis: Compiled data were analyzed using the statistical program SPSS 23 (SPSS IBM, Chicago, Illinois). Continuous data were presented as mean and standard deviation (SD) and analyzed using an independent student t-test. For categorical data, percentages were compared using the Chi-square test. P value < 0.05 was considered significant for all comparisons.

RESULTS

Among the 110 participants, patients age ranged from 21-40 years who admitted in the department of cardiology, Ibrahim Cardiac Hospital & Research Institute through emergency with the complaints of chest pain from 1st February,2024 to 30th June,2024.79% of patients were in the age group of more than 30 years to 40 years. The proportion of males (83.6%) were higher than female (16.4%) (Fig.-1).

Fig: 1 *(Male and Female ratio.)*

Most of the patients diagnosed as STEMI and Chronic stable angina (35.45%), within that 82% and 76% patients were in mora than 30 years to 40 years age group.

Table-1 showed hypertension and dyslipidemia was significant in age more than 30 to less than 40 years group.

Table 1 *(Distribution for Risk factors in different age groups. (n=110))*

RISK FACTORS	21-30 years age group	>30-40 years age group	P-value
HTN	6 (11.76%)	45 (88.24%)	0.024^{S}
DM	10 (21.28%)	37 (78.72%)	0.559^{NS}
Dyslipidaemia	11 (15.49%)	60 (84,51%)	0.052^{S}
H/O Smoking	11 (28.21%)	28 (71.79%)	0.126^{NS}
Family of IHD	2 (18.18%)	9 (81.81%)	0.127^{NS}

S= Significant; NS=Non-significant, Data were analyzed using Chi-square (χ2) Test.

p value reach from Chi-square (χ2) Test, p value significant ≤0.05

Within 110 patients 54.54% were obese and 16.36% were overweight participants. Within 110 participants 35.45% ECG showed STEMI in both group of patients.

Coronary angiogram was done all patients, which revealed 30% had non-flow limiting coronary artery, 29.1% had Single vessel disease, 22.7% had double vessel disease, 17.3% had triple vessel disease and 0.9% had left main with or without coronary involvement (Fig.-2).

Fig 2 *(Distribution of Coronary angiogram findings(n=110))*

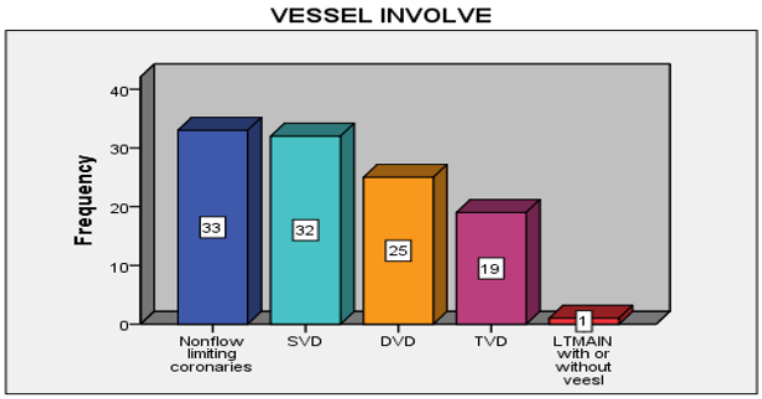


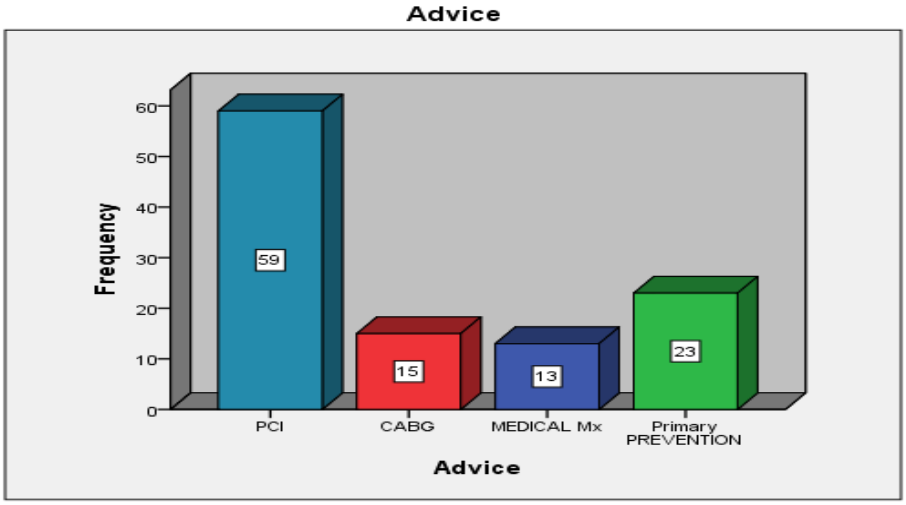
Table -2 showed 71.88% had SVD present, more than 30 to less than 40 years age group, TVD DVD and Lt main was more prominent in age group more than 30 to less than 40 years age group.

Table:2 *(Age group distribution in coronary artery involvement (n=110))*

Age Group	SVD	DVD	TVD	Lt. main with or without	Non-flow limiting Coronaries	P-value
21-30 years	9 (28.12%)	2 (8%)	3 (15.79%)	0	8 (24.24%)	0.298
>30-40 years	23 (71.88)	23(92%)	1684.21%)	1(100%)	25 (75.76%)	

After coronary angiogram 53.64% advised for PCI, 13.64% recommended for CABG, 11.82% were medical management and 20.91% advised primary prevention (Fig.-3).

Fig: 3 *(Recommendation after CAG(n=110))*



DISCUSSION

In study more than one third population were male and age group more than30-40 years. Pawansuri et al. 202314 and Faisal AWK et al.2022[15] showed similar result. Prakash B et al 2020[16] showed 1/3rd had hypertensive,1/5th (21.36%) had diabetic 9.4% had family history of ischemic heart disease,7.69% had

dyslipidaemic. Ewa M Maroszynska. Dmoch et al. 2016[17] showed half of participants (49.4%) had hypertensive, three quarter patients were smoker. In our study risk factors for ischemic heart disease in >30-40 years age groups were more hypertensive and dyslipidemia than 21-30 years age group.

Prakash B et al. 2020[16]. Showed 55.58% had SVD, 11.96% had DVD,3.4% had TVD and 21.36% had normal or mild or moderate coronary artery disease. Raunlyar et al. 202018 showed 30.27% had SVD ,13.76% had DVD, 11.92% had TVD, 32.11% had normal coronary artery disease. In our study we found 29.1% had SVD, 22.7% had DVD, 17.3% had TVD, 0.9% had left main and 30% had non-flow limiting coronary arteries, and more than 30-40 years age groups patients were higher incidence of coronary artery disease.

Young patient suffers. MI is on the rise in Bangladesh, and it not only affects health but also the country's economic progress. Heart disease occurs 5-10 years earlier in South Asian countries, particularly Bangladesh, then in Western Europe and South East Asian countries, with South Asians developing MI at the age of 53 compared to Western Europe and South East Asians at the age of 63.

Many medical conditions contribute to the early onset of coronary artery disease, and the more risk factors there are, the higher the incidence and earlier onset. Younger individuals have a completely different illness pattern; thus, treatment should be tailored accordingly. Only 110 patients had severe disease within the >30-40-year age group, therefore one should be certain about the severity of the disease before pursuing an intrusive method; otherwise, medical therapy may be a reasonable option. The acute appearance could be caused by a clot, spasm, spontaneous coronary artery dissection, myocardial bridging, or Takotsubo syndrome[19]. Myocardial infarction in the absence of obstructive CAD (MINOCA) has been widely reported in the literature, and it is prevalent in young adults[20].

So, when we take the patient to the catheterization lab without knowing the severity of the underlying coronary artery disease, stenting is performed, resulting in an unnecessary permanent impairment of the coronary artery. A clot or spasm might give the impression of serious disease, therefore PCI or even CABG is performed on a non-severe underlying atherosclerotic CAD.

Limitations of the study: It is a single-center study; data from other centers are required to portray the actual picture of disease patterns among young Bangladeshis.

REFERENCES

1. Aggarwal A, Srivastava S, Velmurugan M. Newer perspectives of coronary artery disease in young. World J Cardiol. 2016;8(12):728–734.
2. Andersson C., Vasan R. Epidemiology of cardiovascular disease in young individuals. Nat Rev Cardiol. 2018; 15:230–240.
3. Prajapati J, Jain S, Virpariya K, Rawal J, Joshi H, Sharma K, et al. Novel atherosclerotic risk factors and angiographic profile of young Gujarati patients with acute coronary syndrome. J Assoc Physicians India 2014; 62:584-8.

4. Siddique MA, Shrestha MP, Salman M, Haque K, Ahmed M, Sultan M, et al. Age related differences of risk profile and angiographic findings in patients with coronary heart disease. BSMMU J 2010;3:13-17.

5. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. Lancet 2004; 364:937-52.

6. Mammi MV, Pavithran K, Abdu Rahiman P, Pisharody R, Sugathan K. Acute myocardial infarction in north Kerala – A 20-year hospital-based study. Indian Heart J 1991; 43:93-6.

7. Biery DW, Berman AN, Singh A, Divakaran S, DeFilippis EM, Collins BL, et al. Association of smoking cessation and survival among young adults with myocardial infarction in the partners YOUNG-MI registry. JAMA Netw Open 2020;3:e209649.

8. Arzamendi D, Benito B, Tizon-Marcos H et al. Increase in sudden death from coronary artery disease in young adults. Am Heart J, 2011; 161: 574–580. doi: 10.1016/j.ahj.2010.10.040.

9. Poloński L, Gąsior M, Gierlotka M et al. Ogólnopolski Rejestr Ostrych Zespołów Wieńcowych (PL-ACS). Charakterystyka kliniczna, leczenie, rokowanie chorych z ostrymi zespołami wieńcowymi w Polsce. Kardiol Pol, 2007; 65: 861–872.

10. Egred M, Viswanathan G, Davis GK. Myocardial infarction in young adults. Postgrad Med J, 2005; 81: 741–745. doi: 10.1136/pgmj.2004.027532.

11. Cannon, C.P., Battler, A., Brindis, R.G., Cox, J.L., Ellias, S.G., Every, N.R., Flaherty, J.T.,Harrington, R.A., Krumholz, H.M., Simoons, M.L.,Weinrraub, W.S., . American College of Cardiology Key Data Elements and Definitions for Measuring the Clinical Management and Outcomes of Patients With Acute Coronary Syndromes. A Report of the American College of Cardiology Task Force on Clinical Data Standards (Acute Coronary Syndromes Writing Committee). *Journal of the American College of Cardiology*, 2001;38(7), pp.2114-30.

12. American Diabetic Association 2013. Standard in Medical of Diabetes-2013 Diabetes care,36, pp4-10.

13. American College of Cardiology/American Heart Association 2013 (ACC/AHA) Cholesterol Guideline advocated several changes from the previous Adult Treatment Panel III (ATP III) Guidelines

14. Pawan Suri,Ashutosh Arora,Kanika Kinra,Vanita Aurora et al. Risk Factors and Angiographic Profile in Young Individuals with Acute ST-Elevation Myocardial Infarction (STEMI). Indian Journal of Clinical Cardiology.2020;p 1–6.

15. Faisal AWK, Habib G, Yasmin S, Latif W, Ahmed S. Angiographic patterns of coronary artery disease in young patients presenting at a tertiary cardiac center. Pak J Med Sci. 2022;38(8):2107-2111. doi: https://doi.org/10.12669/pjms.38.8.6162.

16. Prakash B,Jaiswal A,Shah MMandar et al. Demographic & angiographic profile of young patients aged 40 year & less undergoing coronary angiography in a tier II city of Eastern India.Journal of Family Medicine and Primary care.Oct.2020:vol.09(10);p5183-5187.

17. Ewa M. Maroszynska-Dmoch, Beata Wozakowska-Kaplon et al. Clinical and angiographic characteristics of coronary artery disease in young adults: a single centre study. Kardiologia Polska 2016; 74, 4: 314–321; DOI: 10.5603/KP.a2015.017.

18. Binay Kumar Rauniyar1 , Arun Kadel2 , Kiran Prasad Achary et al. Angiographic profile of young patients (≤ 40 years) in a tertiary care center of Nepal. Asian Journal of Medical Sciences | Nov-Dec 2020 | Vol 11 | Issue 6; p68-71.

19. Waterbury TM, Tarantini G, Vogel B, Mehran R, Gersh BJ, Gulati R. Non-atherosclerotic causes of acute coronary syndromes. Nat Rev Cardiol. 2020; 17:229-241. doi: 10.1038/ s41569-019-0273-3.

20. Tamis-Holland JE, Jneid H, Reynolds HR, Agewall S, Brilakis ES, Brown TM, et al. Contemporary Diagnosis and Management of Patients with Myocardial Infarction in the Absence of Obstructive Coronary Artery Disease: A Scientific Statement From the American Heart Association. Circulation. 2019;139(18): e891-e908. doi: 10.1161/ CIR.0000000000000670.