



A RETROSPECTIVE COHORT STUDY TO UNDERSTAND THE AGE, GENDER AND RISK FACTORS PATTERN IN PATIENTS ATTENDING FOR CARDIAC REHABILITATION (CR) AFTER CORONARY ARTERY BYPASS GRAFTING (CABG) SURGERY

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ABSTRACT

Introduction: Throughout the world, cardiovascular disease is a leading cause of not only morbidity but also mortality too. Myocardial infarction is the primary reason for admission in cardiac rehabilitation unit, patients of Coronary artery bypass Graft (CABG) surgery along with other cardiac condition like valve surgery, post PTCA (Percutaneous Transluminal Coronary Angioplasty) are also being referred for cardiac rehabilitation. Coronary artery bypass surgery, also known as coronary artery bypass graft (CABG) surgery, is a surgical procedure for partially obstructed coronary artery (the "target vessel"). The purpose is to restore normal blood flow to the partially obstructed coronary artery. Our study is an attempt to understand the age, gender and risk factors pattern in patients attending for cardiac rehabilitation after Coronary Artery Bypass Grafting (CABG) Surgery.

Material And Methods: This Retrospective Cohort Study was conducted in the Department of Physical Medicine and Rehabilitation of Institute of Post Graduate Medical Education and Research (IPGME & R) and SSKM Hospitals, Kolkata after getting Institutional ethical committee clearance and informed consent. Relevant data regarding medical, personal history and demographics collected from the patients attended for cardiac rehabilitation (CR) after coronary artery bypass grafting (CABG) surgery between January, 2014 to June, 2015 (18 months) were being used for analysis.

Results: Data were summarised by routine descriptive statistics. Maximum number of patients are in the age group of 51-60 years. Most of study population are male (90%). Study showed show 42.5 % are smoker, 37.5 % diabetic, 27.5 % are obese, 82.5 % are dyslipidaemic, 57.5 % are hypertensive.

Conclusion: Our study shows most of our patient is male of 5th decade. Minimum age is 46-year, maximum age is 71 years with the mean age 55.4 years. most of study population are male (90%). Among the study population, 42.5 % are smoker, 37.5 % diabetic, 27.5 % are obese, 82.5 % are dyslipidaemic, 57.5 % are hypertensive. Hence male sex is an important risk factor for coronary artery disease. Early and aggressive attention to these risk factors e.g., smoking, diabetes, obesity, dyslipidaemia, hypertension could drastically reduce the need for coronary procedures such as angioplasty, stent, and bypass surgeries.

KEYWORDS : Cardiac Rehabilitation (CR), Coronary Artery Bypass Grafting (CABG) Surgery, Risk factors for Coronary Artery Disease (CAD)

INTRODUCTION: Throughout the world, cardiovascular disease is leading cause of mortality and morbidity. The term cardiac rehabilitation refers to "the sum of activities required to influence favourably the underlying cause of the disease, as well as the best possible, physical, mental and social conditions, so that they (people) may, by their own efforts preserve or resume when lost, as normal a place as possible in the community. Rehabilitation cannot be regarded as an isolated form or stage of therapy but must be integrated within secondary prevention services of which it forms only one facet".¹ Though the myocardial infarction remains the primary reason for admission in cardiac rehabilitation unit, patients of Coronary artery bypass graft (CABG) surgery along with other cardiac condition like valve surgery, post PTCA (Percutaneous Transluminal Coronary Angioplasty) are also being referred for cardiac rehabilitation. Coronary artery bypass surgery, also known as coronary artery bypass graft (CABG) surgery, is a surgical procedure consisting of either diverting the left internal thoracic artery (left internal mammary artery or "LIMA") to the left anterior descending (LAD) branch of the left main coronary artery; or a harvested great saphenous vein of the leg, attaching the proximal end to the aorta or one of its major branches, and the distal end to immediately beyond a partially obstructed coronary artery (the "target vessel"). The purpose is to restore normal blood flow to the partially obstructed coronary artery. It is performed to relieve angina unsatisfactorily controlled by maximum tolerated anti-ischemic medication, prevent or relieve left ventricular dysfunction, and/or reduce the risk of death. It does not prevent heart attacks. India has a large number of patients of coronary artery disease who needs CABG operation.² Over few decades post-operative rehabilitation of CABG patients has become very popular one. Our study is an attempt to understand the age, gender and risk factors pattern in patients attending for cardiac rehabilitation after Coronary Artery Bypass Grafting (CABG) Surgery.

REVIEW OF LITERATURE:

An estimated 47 million Indians had coronary artery disease (CAD) in 2010.² While efforts are being made to contain this epidemic by educating public and applying preventive measures, the ever-

increasing burden of patients with symptomatic and life-threatening manifestations of the disease is posing a major challenge.³

Indian patients undergoing bypass surgeries are often young (average age of 60 yrs.) and yet reveal a high burden of major modifiable CVD risk factors. The prevalence of obesity (BMI>25) is 51%; diabetes 48%; hypertension 71%; smoking 40%; and high LDL-C >100 mg/dl 86%.¹ Early and aggressive attention to these risk factors could drastically reduce the need for coronary procedures such as angioplasty, stent, and bypass surgeries.

There has been a steady 25-30 percent annual increase in the number of coronary procedures over the past several years. The number of bypass surgeries is increasing in India but it is decreasing in the US. About 60,000 coronary bypass surgeries are done annually in India.³

Diabetes mellitus doubles the risk of coronary artery disease.⁴ Angiographic studies comparing diabetic patient with non-diabetic patients have shown greater frequency of major stenosis in intermediate segments of major vessels and more diffuse disease.⁵ Potentially modifiable risk factors for coronary artery disease exists in patients with type 2 diabetes mellitus. These risk factors are increased concentrations of low-density lipoprotein cholesterol, decreased concentrations of high-density lipoprotein cholesterol, raised blood pressure, hyperglycaemia, and smoking.⁶ Atherosclerotic coronary heart disease is a major sequelae of hypertension. In contrast to other cardiovascular sequelae like stroke, renal failure, no convincing evidence exists to show that CHD morbidity and mortality are substantially reduced by pharmacological treatment.⁷ Plasma cholesterol and family of plasma lipoprotein are major risk factor are major factor in pathogenesis of coronary atherosclerosis.⁸ There are ample evidences that lipoprotein play major casual role in in aetiology of atherosclerosis.⁹ Independent association between Triglyceride and coronary artery disease is equivocal according to Gotto Jr AM¹⁰ but according to Austin MA¹¹ there is independent association between triglyceride and coronary artery disease. Smoking is a risk factor for developing coronary artery disease. It accounts for an estimated 30%

death caused by CHD according to Rockville et al.¹² Smoking acts synergistically with other risk factors, substantially increasing the risk of CHD.¹³ John A Ambrose et al. reported that cigarette smoking impacts all phases of atherosclerosis from endothelial dysfunction to acute clinical events. Both active and passive (environmental) proinflammatory cytokines increase leukocyte-endothelial cell interaction, diminishes NO which is vasodilator, increases serum cholesterol and LDL.¹⁴ Numerous prospective investigations have demonstrated a substantial decrease in CHD mortality for former smokers compared with continuing smokers.¹⁵ This diminution in risk occurs relatively soon after cessation of smoking, and increasing intervals since the last cigarette smoked are associated with progressively lower mortality rates from CHD.¹⁶

According to Willem Johan et al. stress is an important risk factor for CAD.¹⁷

Obesity is also a risk factor for developing coronary artery disease. Overweight contributes to hypertension, dyslipidaemia, diabetes and metabolic syndrome. A 10 lb weight gain increases risk for cardiovascular disease¹⁸ and conversely weight loss of 10% reduces risk for coronary artery disease.¹⁹ Obesity is also related to poor quality of life (QOL).^{20,21}

Pharmacological management includes Antiplatelet agents (Aspirin, Clopidogrel); Nitrate (Isosorbide mononitrate or dinitrate, Sublingual nitro-glycerine, Nitro-paste or patch; Beta blocker (Atenolol, Metoprolol, Carvedilol); ACE inhibitor (Enalapril, Lisinopril, Ramipril); ARB (Losartan); Anti-coagulant (Warfarin); Diuretics (Furosemide Hydrochlorothiazide, Spironolactone); Calcium channel blocker (Verapamil, Diltiazem, Nifedipine); Statins (Lovastatin, Pravastatin, Simvastatin, Atorvastatin) as per specific indication and condition of the patient.²²

Coronary artery bypass grafting (CABG) is performed for patients with coronary artery disease (CAD) to improve quality of life and reduce cardiac-related mortality. CAD is the leading cause of mortality in the developed country. CABG was introduced in the 1960s with the aim of offering symptomatic relief, improved quality of life, and increased life expectancy to patients with CAD.²³ By the year 1970, CABG was found to increase survival rates in patients with multivessel disease and left main disease when compared with medical therapy.²⁴ CABG is performed for both symptomatic and prognostic reasons. Indications for CABG have been classified by the American College of Cardiology (ACC) and the American Heart Association (AHA) according to the level of evidence supporting the usefulness and efficacy of the procedure.²⁵

The generally accepted indications for cardiac rehabilitation include: acute myocardial infarction, stable angina pectoris, coronary artery bypass graft surgery, heart valve repair or replacement, percutaneous transluminal coronary angioplasty and heart transplantation or heart-lung transplantation, as reported by Broustet JP, Monpère et al.²⁶ There is no contraindication for risk factor modification or counselling.²⁷ In the past decades cardiac rehabilitation has evolved as a result of evidence-based research, as the understanding of atherosclerosis and the role of risk factors has advanced. Only 25-30% patients are enrolled in institution based cardiac rehabilitation programme after CABG.²⁸ One south Indian study showed favourable change in functional capacity, resting rate pressure double product, fasting blood sugar, total cholesterol, triglyceride and arthrometric indices.²⁹

In an analysis of recent data from 156 hospitals participating in the Get with the Guidelines (GWTG) Program published recently, Brown *et al.* found that 56% of patients hospitalized for Myocardial Infarction (MI), Percutaneous Coronary Intervention (PCI) or Coronary Artery Bypass Graft (CABG) surgery were referred to cardiac rehabilitation at discharge.³⁰

Sex differences are found to impact cardiac rehabilitation participation with women having poorer participation rates than men.³¹ Barriers to women's participation include the lack of financial resources, transportation difficulties, and the lack of social or emotional support.³²

Although cardiac rehabilitation is quite effective and evidence based, the real scenario is different. Underutilization of cardiac rehabilitation is definitely a problem even in developed country. This is true for our country too which is a major challenge.

AIMS AND OBJECTIVES:

To understand the age, gender and risk factors pattern in patients attending for cardiac rehabilitation after coronary artery bypass grafting (CABG) Surgery.

MATERIAL AND METHOD:

Before starting the study, Institutional ethical committee clearance was taken. Informed consent was taken from each patient before including them in this study. Every patient was explained about the study.

Study Design:

A Retrospective Cohort Study

Study Area:

This study was conducted in the Department of Physical Medicine and Rehabilitation of Institute of Post Graduate Medical Education and Research (IPGME & R) and SSKM Hospitals, Kolkata.

Study Population:

Patients attended for cardiac rehabilitation (CR) who undergone CABG Surgery in the Department of Cardiothoracic and vascular surgery (CTVS) at SSKM Hospital, Kolkata.

Study Period:

Patients attended between January, 2014 to June, 2015 (18 months) for cardiac rehabilitation after coronary artery bypass grafting were included for analysis.

Sample Size:

Being an observational study no formal sample size calculation was done. All patients attending for cardiac rehabilitation after coronary artery bypass grafting surgery during the above-mentioned period were considered for statistical calculation.

Inclusion Criteria:

Patient undergoing CABG Surgery in the Department of Cardiothoracic and vascular surgery (CTVS) at SSKM Hospital, Kolkata attended for cardiac rehabilitation between January, 2014 to June, 2015.

Exclusion Criteria:

- 1. Patients not willing to be included in the study
- 2. Patients not willing or otherwise unable to give consent

Parameters to be Studied:

- 1. Age of the patients
- 2. Gender distribution
- 3. Risk factors associated

Study Technique:

Patients under study are those who came for Cardiac rehabilitation (CR) after CABG surgery between January, 2014 to June, 2015 (18 months) and willing to be included with valid consent. Relevant data regarding medical, personal history and demographics were used for the analysis.

RESULT ANALYSIS:

Data were summarised by routine descriptive statistics.

Table 1: Age Distribution

No. of patients	Minimum Age in years	Maximum age in	Mean age in years	Standard Deviation
40 (n=40)	46	71	55.4	6.55

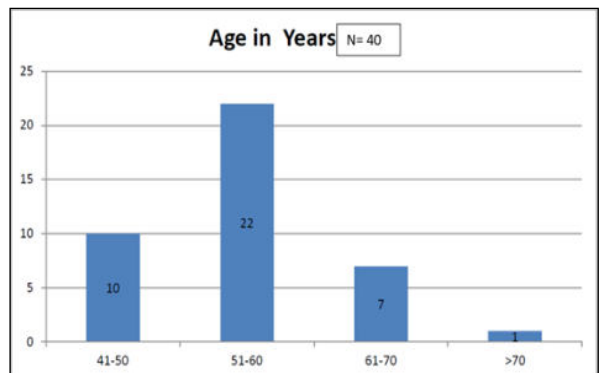


Figure 1: Distribution according to Age

Comments:

Above table and diagram show the age distribution. Maximum number of patients are in the age group of 51-60 years.

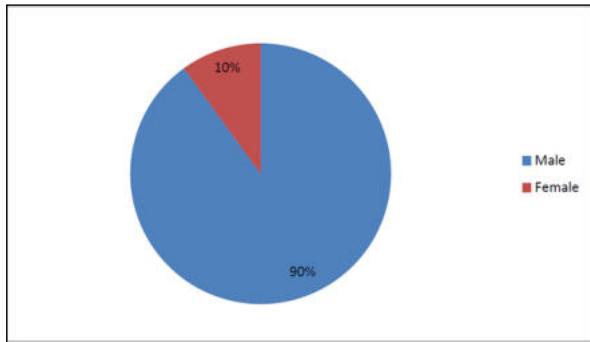


Figure 2: Distribution of Study Population according to Sex (Gender)

Table 2: Descriptive Statistics for Sex (Gender)

No. of patients	Male	Female	Total
40 (n=40)	36(90%)	4(10%)	40

Comment:

The above table and diagram shows most of study population are male (90%).

Table 3: Presence of Risk Factors in Study Population

Sl. No.	Risk factors	Total population	No of patients associated with	Percentage
1	Smoking	40	17	42.50 %
2	Diabetes	40	15	37.50 %
3	Obesity	40	11	27.50 %
5	Dyslipidaemia	40	33	82.50 %
6	Hypertension	40	23	57.50 %

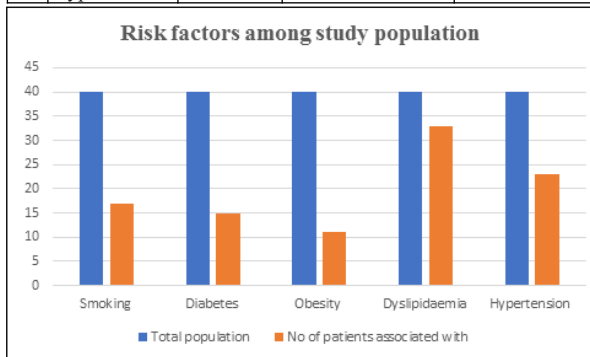


Figure 3: Presence of Risk Factors in Study Population

Comment:

Above diagram show 42.5 % are smoker, 37.5 % diabetic, 27.5 % are obese, 82.5 % are dyslipidaemic, 57.5 % are hypertensive.

DISCUSSION:

This Retrospective Cohort Study conducted in the department of Physical medicine and rehabilitation, IPGME&R and SSKM Hospital, Kolkata to understand the age, gender and risk factors pattern in patients attending for cardiac rehabilitation (CR) after coronary artery bypass grafting (CABG) Surgery. Data collected during the period of 18 months from January 2014 to June 2015, from those patients were considered for statistical calculation. After getting Institutional ethical committee clearance, we considered data from 40 patients in our study. Maximum number of patients are in age group is 51-60 years. Minimum age 46 years, maximum age 71 years with the mean age 55.4 years. Most of the study shows more or less age pattern like our study. In a study by Bilinska M, Kosydar-Piechna M, Gasiorowska A, et al.³³ mean age was 55, whereas a study by Lan C, Chen SY, Hsu CJ, et al.³⁴ found mean age of 56 but Heather M Arthur et al.³⁵ reported mean age group 62.5 and 64.2 in their study population who participated hospital based and home-based rehabilitation. In our study population 42.5% are smoker. There is wide range of variation of smoker population in different study. 82.5% of in our study population are dyslipidaemic which is more or less same also as reported by Herbert F. Jelinek et al.³⁶

57.5% of study population in our study are hypertensive. Similar result is also found by Herbert F. Jelinek.³⁶ In our study 27.5% population are obese. Study by Rajendran AJ, Manoj S et al.²⁹ showed number of obese patient closer to our observation (36%). Our study showed that 37.5 % diabetic. Study done by Kasliwal RR, Kulshreshtha A, et al.⁴ showed that the prevalence of obesity (BMI>25) is 51%; diabetes 48%; hypertension 71%; smoking 40%; and high LDL-C >100 mg/dl 86%.

In our study most of the patients (90%) are male which is corroborating most of the previous study. Similarly study by Abraham Samuel Babu, Manjula Sukumari Noone, et al.³⁷ showed 82.5 % patients are male whereas Fatemeh Esteki Ghashghaei, Masoumeh Sadeghi et al.³⁸ reported 81% of their study population were male.

Hence male sex is an important risk factor for coronary artery disease. Early and aggressive attention to these risk factors could drastically reduce the need for coronary procedures such as angioplasty, stent, and bypass surgeries.

LIMITATION:

Sample size is small. Data from large sample may be used for analysis in future.

CONCLUSION:

Our study shows most of our patient is male of 5th decade. Minimum age is 46-year, maximum age is 71 years with the mean age 55.4 years. most of study population are male (90%). Among the study population, 42.5 % are smoker, 37.5 % diabetic, 27.5 % are obese, 82.5 % are dyslipidaemic, 57.5 % are hypertensive. Hence male sex is an important risk factor for coronary artery disease. Early and aggressive attention to these risk factors e.g., smoking, diabetes, obesity, dyslipidaemia, hypertension could drastically reduce the need for coronary procedures such as angioplasty, stent, and bypass surgeries. This could be important from individual and societal point of view, and also could lessen economic burden of the country so far as medical expenses and loss of working hours are concerned.

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