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AN ANALYTICAL OBSERVATIONAL STUDY ON PREVALENCE OF RISK FACTORS, PHARMACOECONOMICS OF DRUGS IN CARDIOVASCULAR DISEASED PATIENTS

Dr Arul Prakasam K C^{*1}, Dr Preethi T², Dr Jayaprakash U³, Dr Asha M⁴, Dr Kavinkishore S⁵

¹Professor and HOD, JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy,
Komarapalayam, Tamil Nadu, India

[Affiliated to The Tamil Nadu Dr.M.G.R. Medical University, Chennai, Tamil Nadu- 600032]

²PharmD, JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, Komarapalayam, Tamil
Nadu, India

³PharmD, JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, Komarapalayam, Tamil
Nadu, India

⁴PharmD, JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, Komarapalayam, Tamil
Nadu, India

⁵PharmD, JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, Komarapalayam, Tamil
Nadu, India

***Address for Correspondence:** Dr. Arul Prakasam K C, M. Pharm, Ph. D

Professor and Head of the department, JKKMMRF's Annai JKK Sampoorani Ammal College of
Pharmacy, Komarapalayam, Tamil Nadu- 638 183 Phone: +91-9842778531

Email Id: kcarul2000@gmail.com

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Abstract

Background: One of the greatest CVD loads in the world is seen in India. By 2025, there would be 4.77 million annually CVD deaths in India, up from 2.26 million in 1990. Estimates of the prevalence of coronary heart disease in India over the past few decades have varied from 1.6 to 7.4 percent in rural areas and from 1 to 13.2 percent in urban populations. Data on the prevalence of the risk factors for cardiovascular disease are scarce, and the expense of medications for the condition is considerable. **Purpose of study:** The study's primary goal is to assess and determine the prevalence of risk factors and to analyze the cost of various cardiovascular drugs. **Methods:** To obtain risk factors of cardiovascular disease - "Metagenics risk assessment of CVD questionnaire" is used after getting approval from the Metagenics. To obtain cost analysis the data collection form includes patient demographics, diagnosis data, prescribed drug name and dose and duration and cost of the per unit dose and total cost of the drug is measured. **Results:** High prevalence of CVD risk factors where in acute coronary syndrome 42.3% of population are in high risk and in ischemic heart disease 25 % of population are in high risk. The modifiable risk factors such as alcohol consumption, physical inactivity, hypertension, diabetes are the most common risk factors for the present study population. The main burden of financial resource consumption in cardiovascular drugs is found to be 80% **Conclusion:** The rapid increase in cardiovascular morbidity should be mitigated down by reasonable preventative measures. The use of generic medications should be promoted in order to alleviate the detrimental impacts of drug fluctuation in price.

Key Words: Acute coronary syndrome, ischemic heart disease, risk factors, cost analysis, cardiovascular drugs

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in the world incidentally, it remains the most important disease affecting the health of the Indian population. Over the last several decades, estimates of the prevalence of coronary heart disease in India have ranged from 1.6 percent to 7.4 percent in rural regions and from 1 percent to 13.2 percent in urban populations. In comparison to the Global Burden of Disease study, recent reports from three large prospective studies in India suggest that increased proportion of CVD mortality (30–42 percent) and an age-standardized CVD risk of mortality 255–525 per 100 000 population in men and 225–299 per 100 000 population in women. Majority of these CVD related deaths were caused by coronary heart disease (CHD) (68.4%). The Global Burden of Disease study has estimated that CHD has caused highest percentage of deaths 17.8% in India in 2016 and showed an escalating trend with 49.8% increase between 2007 to 2017¹. Coronary artery disease is a multifactorial phenomenon. Classification of coronary artery disease is typically done as under: Ischemic heart disease and Acute coronary syndrome. Etiologic variables can be roughly divided into modifiable and non-modifiable variables. Gender, age, family history, and genetics are all unchangeable variables. Smoking, obesity, cholesterol levels, and psychosocial factors are among the risk factors that can be modified. Compared to the female gender, men are more prone. Hypercholesterolemia continues to be a significant, controllable CAD risk factor. Pharmacoeconomics play a key role in practice of medicine in developing countries.

Compliance with the treatment of disease by the patient is largely influenced by the cost of the drugs. Pharmaceutical industry manufactures many branded formulations of the same drug with large difference in selling price. In India, most of the drugs are available in brands and these are also prescribed by clinician mostly in brand name. This may affect the patient's finance adversely if costly brand is prescribed, especially in cardiovascular diseases which need treatment for prolonged duration². In India, there aren't much research that compare the prices of various medicine brands. Therefore, we made the decision to conduct a study that compares the prices of various medicine brands used to treat cardiovascular ailments.

MATERIALS AND METHODS

Ethical Clearance

This study was approved by Institutional Ethics Committee, Ethics Committee for Research on Human Subjects (ECRHS), JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy with reference number EC/PHARM.D/2021-08.

PREVALENCE OF RISK FACTORS OF CORONARY ARTERY DISEASE

It is a Prospective observational study conducted in Tertiary health care hospital, Erode during the period of 6 months. The designed sample size needed for this study using the following formula $n = t^2 \times p \times (1-p) / m^2$ Where, N=sample size required T= level of confidence at 99.9% (standard value is 3.2905) P= CVD prevalence rate =10.82%=0.1082 M=margin of error at 10% (power of 90%) =0.1 Sample size = $3.29^2 \times 0.1082 \times (1- 0.1082) / 0.1^2$ is equal to 235.59. So, total of 262 patients are enrolled in our study. 17 patients were rejected due to incomplete follow-up. Among them 245 patients were selected. The inclusion criteria are, people who are admitted in cardiology department with diagnosis of ACS and IHD, people of age above 18, and the exclusion criteria are pregnancy and lactating women, people who are not willing to participate in the study.

Study Procedure

The protocol was approved by ethical committee of institution. Data was collected by face-to-face interviews of participants by a standardized questionnaire. The forms were composed of demographic data section including name, age, gender, marital status, educational level, occupation, contact number, social history, past medical and medication history, and allergies if any. To obtain risk factors of cardiovascular disease - "**Metagenics risk assessment of CVD questionnaire**" is used after getting approval from the Metagenics. The first section was composed of questions about cardiovascular history, family history, risk factors for CVD such as physical activity, smoking status, alcohol status, stress and its management, sleep duration and sleep impairments, inflammation and Pain and blood sugar levels, diet factors including fruits, vegetables, starchy foods, fish, and coffee intake and number of servings per day.

The second section was composed of record of the basic biochemical measurements including the participants low density lipoprotein, high density lipoprotein, triglycerides in mmol/dL and C reactive protein level (CRP in mg/L) thyroid function, testing of fasting blood glucose (FBG in mg/dl) was collected using the patient review chart and patient systolic blood pressure (SBP in mm/Hg) measured by using a well-calibrated sphygmomanometer and digital blood pressure machines and patients waist circumference (in cm) is measured

using a measuring tapes. Each category of questions allocated with a score based on the participants answer.

In addition, the last section had a summary of the total score of CVD risk factors as defined by including cardiovascular history, family history, lifestyle, stress, sleep, blood sugar, inflammation pain, diet, lipids, blood pressure, thyroid function, weight management, total of this risk factor score was added and according to their risk score the participants are classified into low risk, moderate risk, high risk and very high risk to the cardiovascular disease.

Statistical analysis

Data collected were tabulated, analysed, and interoperated using standard statistical tools. The statistical procedure was undertaken with the help of the statistical package Instat and prism version 6.0. The association was done by the chi- square test. The p Value less than or equal to 0.05 was fixed as the level of significance.

PHARMACOECONOMIC ANALYSIS OF CARDIOVASCULAR DRUGS

It is a Prospective observational study conducted in Tertiary health care hospital, Erode during the period of 6 months. 245 Prescription were evaluated, and the total cost of prescribed medication were calculated.

Study Procedure

To obtain cost analysis the data collection form includes patient demographics, diagnosis data, prescribed drug name and dose and duration and cost of the per unit dose and total cost of the drug is measured.

RESULT

A total of 262 patients are enrolled in our study. 17 patients were rejected due to incomplete follow-up. Among them 245 patients were selected. They were divided into two diseased groups: Group 1 Acute Coronary Syndrome (ACS) containing 189 subjects and Group 2 Ischemic Heart Disease (IHD) containing 56 subjects.

Gender wise distribution:

According to the gender wise distribution,153 patients (115 acute coronary syndrome and 38 ischemic heart disease) were male, 92 patients (74 acute coronary syndrome and 18 ischemic heart disease) were female. The male patients are more prevalent than female patients.

Age wise distribution:

According to the age wise distribution majority of the patients were at the age of 55-59 years 17.98% in acute coronary syndrome and 19.64% in ischemic heart disease.

Educational status wise distribution:

33.33% of acute coronary syndrome patients are in professional category and 30.35% of ischemic heart disease patients are in graduate category. Illiteracy rate of acute coronary syndrome patient is 4.76% whereas ischemic heart disease patient is 8.92%.

Occupational status wise distribution:

The study subjects according to their occupation status wise distribution was described below. This was followed by professionals 19.57% and 28.57% in both groups, patients who are unemployed in both groups 7.40% and 8.92%.

Marital status wise distribution:

Majority of the patients were under married category 89.41%, 78.57% in acute coronary syndrome and ischemic heart disease group.

Disease duration between the two groups:

Majority of patients have the disease duration of 0-2 years 73.54%, 71.42% in acute coronary syndrome and ischemic heart disease group.

ASSESSMENT OF RISK FACTORS OF CARDIOVASCULAR DISEASE**Lifestyle risk factors****Average outdoor activity for 20 minutes per week**

62.4% ACS patient and 48.21% IHD patient reported that their outdoor activity for 20 minutes per week (brisk walking, jogging, cycling, swimming) was less than a week. The p value is <0.05 .

Smoking and alcohol consumption status of the population

Smoking and alcohol Status of the population, among them only 36.5% of ACD population and 26.78% of IHD population are non-smokers and 31.74% ACD population and 25% IHD population are non-alcoholic. 14.28% of ACD patient and 16.07% IHD patient drinks more alcohol daily.

Environmental status of the population

The environmental status of the population is shown in table 6.9, among them 62.9% of ACS population and 51.7% IHD population lives in the city followed by 25.9% of ACS population and 26.7% IHD population lived in main road. The p value is <0.05 . The rows and columns are significantly associated.

Stress factors**Stressful events experienced in the past six months by the population.**

36.5% of ACS population had stress due to illness in the family and 35.7% of IHD population had stress due to moving to a new city. The p value is <0.05 . The rows and columns are significantly associated.

Stress reduction activities performed by the population.

53.4% of ACS population and 60.7% of IHD population do not participate in any activities to reduce stress. The p value is <0.05 . The rows and columns are significantly associated.

Sleep factors**Sleep duration of the population**

55.5% of ACS population and 80.3% of IHD population sleeps 0-4 hours in a day. The p value is <0.05 . The rows and columns are significantly associated.

Sleep impairments in the population

Both the diseased population of the study 53.4% and 48.2% suffers from insomnia. The p value is <0.05 . The rows and columns are significantly associated.

Diet factors

Dietary consideration in the both the population of the study, where ACS population consume fried food for 1-2 times in a week is 48.1% and in IHD population it is 46.4%. Both the population consume more than 2 serves of starch foods daily (bread, potatoes, rice) is 66.6% and 76.7%. The p value is >0.05 , significantly not associated. Fruit intake 1-3 pieces daily in both the population is 64.5% and 71.4%. consuming fish 1-2 times a week in their diet in ACS population is 29.6% and fish eaters 3-6 times a week in IHD population is 46.4%. The p value is >0.05 , significantly not associated.

Lipid factors

Lipid function among the population

The high-density lipoprotein level is less than 1.1mmol/L in ACD population is 71.9%. And in IHD population is 75%. Low density lipoprotein level is between 2.5-3.33mmol/L in IHD population is 48.2% which is greater than ACS population 33.8%. The p value is > 0.05 . The rows and columns are not significantly associated.

Triglycerides level is between 2.1-3.0 mmol/L in IHD population is 44.6% which is greater than ACS population is 24.3%. The p value is <0.05 . The rows and columns are significantly associated.

Inflammation and pain factor

C-reactive protein marker among the population

C Reactive protein marker for inflammation and pain of the population is shown in table 6.16 it shows that CRP is more than 5.0 mg/L in ACS population is 64% and in IHD population is 50%. The p value is <0.05 . The rows and columns are significantly associated.

Blood pressure

Systolic blood pressure measurement

The systolic blood pressure is 140-160mmHg in ACS population is 35.9% and in IHD population is 55.3%. the p value is <0.05 . the rows and columns are significantly associated.

Thyroid function

Thyroid levels are in normal level in both acute coronary population and ischemic heart disease population that is 58.2% and 53.5%. The p value is 1.780. The rows and columns are not significantly associated.

Weight management factor

The waist measurement 95 -101 cm in male ACS population is 52.1% and in IHD population is 65.7%. Table:7.20 shows the wait measurement 81-87cm in female ACS population is 62.1% and in IHD population is 50%. The rows and columns are significantly associated.

Association between total CVD score with cardiovascular risk factor between acute coronary syndrome and ischemic heart disease.

The association of risk factor such as Family history, lifestyle, blood sugar, blood pressure in responders of both the acute coronary syndrome (74.6%,55%, 112%, 42.8%) and ischemic heart disease patient (58.9%,76.7%, 82.1%,83.9%) are in high-risk category.

The stress factor, thyroid function, diet factors and weight factors are not associated with the risk factors of cardiovascular disease in both the acute coronary and ischemic heart disease population, falls under the low-risk category of cardiovascular disease. The sleep factors such as sleep duration and sleep impairment in ACS population is 57.6% and IHD population is 66% which falls under the medium risk category of cardiovascular disease.

On comparison of acute coronary syndrome and ischemic heart disease inflammation and pain in the IHD population 57.1% falls under high-risk category which is greater while compared to the ACS population 32%, whereas lipid factor of IHD population 66% which falls under high-risk category it is greater than ACS population 45%.

Prevalence of risk factors of acute coronary syndrome and ischemic heart disease.

The prevalence of risk factors among the study population, where ACS population is in high-risk category 42.3% and in IHD population the prevalence of risk factor is in moderate risk category 53.5%. only 1% and 7.1% of ACS and IHD population are in low-risk category.

PHARMACOECONOMICAL ANALYSIS:

245 Prescription were evaluated, and the total cost of prescribed medication were calculated to be rupees 1122770. (Includes the cost of cardiovascular drug and supporting medicines.)

Total cost of cardiovascular drugs in 245 prescriptions

From the analysis of 245 prescription, the total cost of the medication given to treat cardiovascular disease alone was found to be rupees 855264.

Average percentage of cost for medications used to treat cardiovascular disease for each prescription.

Total cost of the prescription is 1122770 and the cost of prescribed cardiovascular drug is 855264.Average cost of cardiovascular drug per prescription is 3490.

Comparison of cost of alternative brands with prescribed brands

The list of prescribed medication replaced with cheaper alternative brands. While comparing the cost of the drugs the alternative brands show a huge difference in the cost with prescribed medication.

Total unit cost of the prescribed medication is calculated to be rupees 43651. The total unit cost of the cheaper alternative brands is calculated to be rupees 24685.

This shows there is difference of 18965 rupees while comparing the unit price of both prescribed and alternative brands.

DISCUSSION

The current study for the prevalence of risk factor of cardiovascular disease shows that male patients are more prevalent than female in both ACS and IHD group. Similar study conducted in Sri Lanka³ reported that acute coronary syndrome was more prevalent in male patients 66.3% than female patients 33.7%, whereas the study conducted in Iran⁴ reports the same as our study that IHD among males was significantly higher than females (19.1% versus 14.2%, $p < 0.046$). The age distribution was 55- 59 years in the current study. The study conducted in Tanzania⁵ reported that more than three-quarter (81%) of the patients with ACS were within the age category of 45 years and above and the study conducted earlier⁴ reported that the patient with IHD mean age of males and females was 57.4 (13.1) and 56.4 (12.0).

Major risk factor is lack of outdoor activities such as walking, cycling, jogging etc. The study conducted in America⁶ reports that patients with ischemic heart failure were most likely to be physically inactive (56.8%) and the study conducted in Brazil⁷ reported the same as our study that 56.3% of ACS patient are physically inactive.

Triglycerides level is between 2.1-3.0 mmol/L in IHD population is 44.6% which is greater than ACS population is 24.3%.

The association of risk factor such as Family history, lifestyle, blood sugar, blood pressure in responders of both the acute coronary syndrome (74.6%, 55%, 112%, 42.8%) and ischemic heart disease patient (58.9%, 76.7%, 82.1%, 83.9%) are in high-risk category.

The prevalence of risk factors among the study population, where ACS population is in high-risk category 42.3% and in IHD population the prevalence of risk factor is in moderate risk category 53.5%.

Cost analysis of the cardiovascular drugs, the list of prescribed medication replaced with cheaper alternative brands. While comparing the cost of the drugs the alternative brands show a huge difference in the cost with prescribed medication. Total unit cost of the prescribed medication is calculated to be rupees 43651. The total unit cost of the cheaper alternative brands is calculated to be rupees 24685. This shows there is difference of 18965 rupees while comparing the unit price of both prescribed and alternative brands.

CONCLUSION

Cardiovascular disease is a major health problem in India and worldwide and it is associated with many risk factors. The present study reports that there is a high prevalence of CVD risk factors where in acute coronary syndrome 42.3% of population are in high risk and in ischemic heart disease 25 % of population are in high risk.

The modifiable risk factors such as physical inactivity, hypertension, diabetes are the most common risk factors for the present study population. It is crucial to make an early and accurate diagnosis of CVD with risk stratification to guide therapy accordingly. 60% of the

study population has more than 5.0 mg/L c reactive protein level in the blood. Plasma biomarker of inflammation can be helpful for diagnosis and predicting the outcome. Optimization of hypertension and DM control implementation is the responsibility of health care providers by monitoring the blood pressure and blood glucose level periodically. Risk of physical inactiveness can be overcome by providing a fitness plan, these interventions are most important and effective way to reduce the prevalence of risk factor of cardiovascular disease.

In this present study the main burden of financial resource consumption in cardiovascular drugs is found to be 80% it can be resolved by trivializing the expensive treatment strategy and switching to cost effective therapy leads to adherent treatment. To reduce the disadvantage of cost variation of drug, the generic prescribing should be encouraged. Cheap and effective generic medication should be prescribed by the practitioner.

Table 1 Gender wise distribution

Gender	ACS (n=189)	IHD (n=56)
Male	115(60.84%)	38(67.85%)
Female	74(39.15%)	18(32.14%)

Table 2 Age wise distribution

Age	ACS (n=189)	IHD (n=56)
Under 30	0(0%)	1(1.78%)
30-34	1(0.52%)	0(0%)
35-39	4(2.11%)	2(3.57%)
40-44	8(4.23%)	3(5.35%)
45-49	24(12.69%)	3(5.35%)
50-54	20(10.58%)	7(12.5%)
55-59	34(17.98%)	11(19.64%)
60-64	23(12.16%)	9(16.07%)
65-69	29(15.34%)	2(3.57%)

70-74	22(11.64%)	9(16.07%)
75 and above	24(12.69%)	9(16.07%)

Table 3 Educational status wise distribution

Educational status	ACS (n=189)	IHD (n=56)
Professional degree	63 (33.33%)	13(23.21%)
Graduate	54(28.57%)	17(30.35%)
Intermediate/Diploma	32(16.93%)	9(16.07%)
High school	11(5.82%)	6(10.71%)
Middle school	13(6.87%)	4(7.14%)
Primary school	7(3.70%)	2(3.57%)
Illiterate	9(4.76%)	5(8.92%)

Table 4 Occupational status wise distribution

Occupation	ACS (n=189)	IHD (n=56)
Professionals	37(19.57%)	16(28.57%)
Semi profession	29(15.34%)	8(14.22%)
Shop/Farm	25(13.22%)	5(8.92%)
Skilled worker	31(16.40%)	12(21.42%)
Semiskilled worker	19(10.05%)	11(19.64%)
Unskilled worker	34(17.98%)	7(12.5%)
Unemployed	14(7.40%)	5(8.92%)

Table 5 Marital status wise distribution

Marital status	ACS (n=189)	IHD (n=56)
Single	5(2.64%)	3(5.35%)
Married	169(89.41%)	44(78.57%)
Divorced	15(7.93%)	9(16.07%)

Table 6 Disease duration between the two groups

Disease duration	ACS (n=189)	IHD (n=56)
Newly diagnosed	2(1.05%)	6(10.71%)
Less than 2 years	139(73.54%)	40(71.42%)
3 to 5 years	37 (19.57%)	8(14.28%)
6 to 8 years	4(2.11%)	1(1.78%)
9 to 11 years	7(3.70%)	1(1.78%)

Table 7 Average outdoor activity for 20 minutes per week

Outdoor activity per week	ACS (n=189)	IHD (n=56)	Chi square	p value
Less than once a week	118(62.4%)	27(48.21%)	10.075	0.0392
Average once per week	34(17.9%)	21(37.5%)		
Average 2-3 times per week	32(16.9%)	6(10.71%)		
Average 4-5 times per week	2(1.05%)	1(1.78%)		
Average 5 or more times per week	3(1.58%)	1(1.78%)		

Table 8 Smoking and alcohol consumption status

Smoking status	ACS (n=189)	IHD (n=56)	Chi square	p value
Never Smoked	69 (36.50%)	15(26.78%)	10.278	0.0163
Ex -Smoker	41(21.69%)	24(42.85%)		
Less Than 20 Cigarettes/Day	53(28.04%)	10(17.85%)		
More Than 20 Cigarettes/Day	26(13.75%)	7(12.5%)		
Alcohol consumption	ACS (n=189)	IHD (n=56)	Chi square	p value
Average 0 Drinks Daily	60(31.74%)	14(25%)	5.895	0.1168
Average 1 Drink Daily	73(38.62%)	19(33.92%)		
Average 2 Drinks Daily	29(15.34%)	17(30.35%)		
Average 3 or More Drinks Daily	27(14.28%)	9(16.07%)		

Table 9 Environmental status

Environment	ACS (n=189)	IHD (n=56)	Chi square	p value
Main Road	49(25.9%)	15(26.7%)	13.260	0.0041
City	119(62.9%)	29(51.7%)		
Gas Emission	2(1.0%)	6(10.7%)		
Chemical Exposure	19(10.0%)	6(10.7%)		

Table 10 Stressful events experienced in the past six months

Stressful events	ACS (n=189)	IHD (n=56)	Chi square	p value
Death Of Family Member	34(17.9%)	7(12.5%)	39.193	<0.0001
Illness In the Family	69(36.5%)	5(8.9%)		
Family Relation Disputes	48(25.3%)	12(21.4%)		

Moving To New City	16(8.4%)	20(35.7%)		
Retirement	6(3.1%)	1(1.7%)		
Son Or Daughter Leaving Home	4(2.1%)	2(3.5%)		
Change In Financial State	12(6.3%)	9(16.0%)		

Table 11 Stress reduction activities

Stress reduction activities	ACS (n=189)	IHD (n=56)	Chi square	p value
Meditation/ Prayer	47(24.8%)	5(8.9%)	15.419	0.2039
Yoga/Stretching/Relaxation Exercise	18(9.5%)	14(25%)		
Sports/Social Activities/ Community Events	9(4.7%)	1(1.7%)		
Play with pets	14(7.4%)	2(3.5%)		
Did not participate in any activities	101(53.4%)	34(60.7%)		

Table 12 Sleep duration

Sleep Duration	ACS (n=189)	IHD (n=56)	Chi square	p value
0-4 Hours	105(55.5%)	45(80.3%)	13.581	0.0035
5-6 Hours	25(13.2%)	6(10.7%)		
7-8 Hours	50(26.4%)	3(5.3%)		
More Than 8 Hours	9(4.7%)	2(3.5%)		

Table 13 Sleep impairments

Sleep impairments	ACS (n=189)	IHD (n=56)	Chi square	p value
Snoring	74(39.1%)	13(23.2%)	23.281	<0.0001
Obstructive Sleep Apnoea	6(3.1%)	9(16.0%)		
Insomnia	101(53.4%)	27(48.2%)		
No difficulties	8(4.2%)	9(16.0%)		

Table 14 Diet factors

Diet	Consuming level	ACS (n=189)	IHD (n=56)	Chi square	p value
Fried food eaters	Less Than Once a Week	61(32.2%)	16(28.5%)	0.8580	0.8355
	1-2 Times a Week	91(48.1%)	26(46.4%)		
	3-6 Times a Week	31(16.4%)	12(21.4%)		
	Everyday	6(3.1%)	2(3.5%)		
Starchyfood eaters	0-1 Serve Daily	44(23.2%)	7(12.5%)	3.072	0.2153
	2 Serves Daily	126(66.6%)	43(76.7%)		
	3 Serves Daily	19(10.0%)	6(10.7%)		
Vegetable intake	Usually None	47(24.8%)	21(37.5%)	8.930	0.0115
	1-2 Serves Daily	137(72.4%)	30(53.5%)		
	3-4 Serves Daily	5(2.6%)	5(8.9%)		
Fruits intake	Usually None	61(32.2%)	13(23.2%)	2.044	0.3600
	1-3 Pieces Daily	122(64.5%)	40(71.4%)		
	4 Or More Pieces Daily	6(3.1%)	3(5.3%)		
Fish eaters	Usually None	29(15.3%)	5(8.9%)	35.193	0.1582
	1-2 times a week	56(29.6%)	20(35.7%)		
	3-6 times a week	55(29.1%)	26(46.4%)		
	Everyday	49(25.9%)	5(8.9%)		
Coffee drinkers	Usually None	53(28.0%)	30(53.5%)	17.095	0.0007
	1-2 Cups daily	106(56.0%)	25(44.6%)		
	3-4 Cups daily	26(13.7%)	0(0%)		
	5 or more cups daily	4(2.1%)	1(1.7%)		

Table 15 Lipid function

Lipids markers	Variables	ACS (n=189)	IHD (n=56)	Chi square	p value
High density lipoprotein	Less Than 1.1mmol/L	136(71.9%)	42(75%)	0.2116	0.8996
	Between1.1-1.5mmol/L	46(24.3%)	12(21.4%)		

	More Than 1.5mmol/L	7(3.7%)	2(3.5%)		
Low density Lipoprotein	Less Than 2.5mmol/L	92(48.6%)	18(32.1%)	7.359	0.1181
	Between 2.5-3.3mmol/L	64(33.8%)	27(48.2%)		
	Between 3.4-4.1mmol/L	18(9.5%)	9(16.0%)		
	Between 4.2-4.9mmol/L	8(4.2%)	1(1.7%)		
	More Than 4.9mmol/L	4(2.1%)	1(1.7%)		
Triglycerides	Less Than 1.0 mmol/L	44(23.2%)	7(12.5%)	20.108	0.0005
	Between 1.0-2.0 mmol/L	89(47.0%)	16(28.5%)		
	Between 2.1-3.0 mmol/L	46(24.3%)	25(44.6%)		
	Between 3.1-5.0 mmol/L	6(3.1%)	6(10.7%)		
	More Than 5.0mmol/L	1(0.5%)	2(3.5%)		

Table 16 C-reactive protein marker

C reactive protein	ACS (n=189)	IHD (n=56)	Chi square	p value
Less Than 1.2mg/L	16(8.4%)	1(1.7%)	10.282	0.0163
Between 1.2-3.3mg/L	18(9.5%)	11(19.6%)		
Between 3.4-5.0mg/L	34(17.9%)	16(28.5%)		
More than 5.0mg/L	121(64.0%)	28(50%)		

Table17 Systolic blood pressure

Systolic blood pressure	ACS (n=189)	IHD (n=56)	Chi square	p value
Less Than 120mm Hg	27(14.2%)	4(7.1%)	19.860	0.0005
120-129mm Hg	26(13.7%)	2(3.5%)		
130-139 mmHg	49(25.9%)	6(10.7%)		

140-160mmHg	68(35.9%)	31(55.3%)		
More Than 160mmHg	19(10.0%)	13(23.2%)		

Table 18 Thyroid function

Thyroid function	ACS (n=189)	IHD (n=56)	Chi square	p value
Normal thyroid function	110(58.2%)	30(53.5%)	1.780	0.4107
Hypothyroidism TSH>4.0	58(30.6%)	16(28.5%)		
Hyperthyroidism TSH <0.4	21(11.1%)	10(17.8%)		

Table 19 Waist measurement in male

Waist measurement (male)	ACS (n=189)	IHD (n=56)	Chi square	p value
Waist≤ 94cm	16(13.9%)	5(13.1%)	2.503	0.2861
Waist 95-101cm	60(52.1%)	25(65.7%)		
Waist ≥102cm	39(33.9%)	8(21.0%)		

Table 20 Waist measurement in female

Waist measurement (female)	ACS (n=189)	IHD (n=56)	Chi square	p value
Waist ≤80cm	12(16.2%)	3(16.6%)	1.190	0.5514
Waist 81-87cm	46(62.1%)	9(50%)		
Waist ≥88cm	16(21.6%)	6(33.3%)		

Table 21 Association between total CVD score with cardiovascular risk factor

Risk factors	ACS (n=189)			IHD (n=56)		
	Low	Medium	High	Low	Medium	High
CVD history	46(24.3%)	2(1.0%)	141(74.6%)	19(33.9%)	4(7.1%)	33(58.9%)
Lifestyle	20(10.5%)	65(34.3%)	104(55.0%)	3(5.3%)	10(17.8%)	43(76.7%)
Stress	73(38.6%)	50(26.4%)	66(34.9%)	54(96.4%)	1(1.7%)	1(1.7%)
Sleep	75(39.6%)	109(57.6%)	5(2.6%)	6(10.7%)	37(66.0%)	13(23.2%)
Blood Sugar	63(33.3%)	14(7.4%)	112(59.2%)	4(7.1%)	6(10.7%)	46(82.1%)
Inflammation	43(22.7%)	85(44.9%)	61(32.2%)	1(1.7%)	23(41.0%)	32(57.1%)
Diet	176(93.1%)	11(5.8%)	3(1.5%)	48(85.7%)	3(5.3%)	5(8.9%)
Lipids	11(5.8%)	92(48.6%)	86(45.5%)	6(10.7%)	13(23.2%)	37(66.0%)
Blood Pressure	58(30.6%)	50(26.4%)	81(42.8%)	2(3.5%)	7(12.5%)	47(83.9%)
Thyroid Function	160(84.6%)	0(0%)	29(15.3%)	52(92.8%)	0(0%)	4(7.1%)
Weight	151(79.8%)	1(0.5%)	37(19.5%)	49(87.5%)	4(7.1%)	3(5.3%)

Table 22

Prevalence of risk factors

Risk	ACD (n=189)	IHD (n=56)
Low risk (-88-100)	2(1.0%)	4(7.1%)
Moderate risk (101-220)	68(35.9%)	30(53.5%)

High risk (221-350)	80(42.3%)	14(25%)
Very high risk (351 and above)	39(20.6%)	8(14.2%)

Table 23 Cost categories of drugs

Cost categories	Cost in rupees
Total cost of prescription	1122770
Cost of supporting prescribed medication Average cost/prescription	4582
Cost of prescribed cardiovascular drugs	855264
Average cost of cardiovascular drugs/prescription	3490
Cost of supporting prescribed medication	267506

Table 24 cost of alternative brands with prescribed brands

Generic name	Prescribed brands	Unit price	Cheaper brands	Unit price	Cost difference
Metoprolol+ Telmisartan	Metosartan	50.88	Prolomet	8.27	42.61
Atorvastatin	Avas	14.43	Atorfit	10.40	4.03
Cilnidipine	Nulong	7.76	Ciliphon	3.80	3.96
Enoxaparin sodium	Parinex	471.14	Lupenox	409.34	61.8
Nicorandil	Nikoran od	20.12	Eorandil	14.31	5.18
Prazosin	Minipress xl	14.67	Prazopress xl	9.40	5.27
Rivaroxaban	Xarelte	112.51	Rivaxa	15.83	96.68
Heparin	Heparin	339	Heparin	104.58	234.42
Retepase	Retifuce	39488	Retefact	23000	16488
Streptokinase	Stk	3009	Cupiflo	1012	1997

Clopidogrel	Clopivas	28.9	Clavix	13.9	15
Spironolactone	Aldactone	10.91	Voltasfe	5.52	5.39
Sacubitril and valsartan	Vymada	84.16	Cidmus	78.32	5.84

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CONFLICT OF INTEREST

The author declares no conflicts of interest.