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Prescription Pattern of Coronary Artery Disease in a Tertiary Care Hospital: A Retrospective Observational Study

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ABSTRACT

The study's major goal is to look at the current prescribing patterns for medications used in the treatment of coronary heart disease at the research location. The goal of this study's drug use research was to make it easier for a specialised set of people to utilise medications rationally. In the Medicine ward, an observational retrospective study was done over a six-month period. Patients who consult a cardiologist for heart abnormalities are checked, diagnosed, and recommended appropriate treatment. The most common lipid-lowering medication was rosuvastatin (53.84 percent), followed by atorvastatin (46.15 percent). Antihypertensive medications are commonly used by patients. Beta blockers, ACE inhibitors, and diuretics were the most popular options. Adrenergic receptor blockers are used to treat hypertension patients. Metoprolol and bisoprolol were prescribed by the majority of doctors (57.7%) (8.8 percent). Carvedilol, on the other hand, is rarely given (31.1 percent). ACE inhibitors stood a good chance of being prescribed. Enalapril was given to the majority of the patients (66.6 percent). Eplerenone (38.2%) and furosemide (38.2%) were the doctors' second and third choices, respectively (32.3 percent). The majority of patients were men, which could be due to smoking and drinking tendencies. When compared to other types of cardiovascular drugs, statins and anti-atherogenic therapies are the most common. Beta-blockers, ACE inhibitors, and diuretics are commonly used by hypertension patients.



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INTRODUCTION

Coronary artery disease is a disorder in which atheroma, thrombosis, or spasm of coronary arteries obstructs the circulatory supply to the heart [1-3]. CVDs are the world's most common noncommu-

nicable diseases, as well as the major cause of mortality and disability. CVDs kill more people each year than any other cause [4]. The following are some modifiable risk factors:

Hypertension

Hypertension can be cured, but only if it is detected and treated according to the doctor's instructions [5].

Cholesterol

High total cholesterol, elevated triglyceride levels, high levels of low-density lipoprotein (LDL) cholesterol, and low levels of high density lipoprotein (HDL) cholesterol all increased the risk of heart disease and stroke [5].

Diabetes

Developing cardiovascular disease at a younger age

than others is more common, diabetes is uncontrolled, and the consequences are more severe [5].

Tobacco

Passive smoking, on the other hand, is a risk factor for cardiovascular disease. Tobacco abstinence may reduce the risk of cardiovascular disease [5].

Diet

Low consumption of fruits, vegetables, and seafood, as well as high consumption of salt, saturated fat, and trans-fats, has been related to an increased risk of cardiovascular disease. Trans-fat consumption has a negative impact on blood lipids and circulating inflammatory markers [6, 7]. Processed meat consumption is connected to an increased risk of cardiovascular disease, possibly due to increased dietary salt consumption [8].

Alcohol Consumption

Moderate drinking without a history of binge drinking has been associated to a lower risk of cardiovascular disease [9, 10].

Medicines like contraceptive pills and hormone replacement treatment can potentially increase the risk of heart disease. The following are some non-modifiable risk factors:

Genetics

Having a parent with cardiovascular disease increases a person's risk by three times [11].

Age

It is estimated that 82 percent of persons 65 and older die of coronary heart disease [12]. Meanwhile, the risk of stroke doubles every decade after the age of 55 [13]. The rise in women lasts until they are 60 to 65 years old [14].

Sex

Males are more likely than premenopausal women to get heart disease [15]. When a woman reaches menopause, it has been believed that her risk is similar to that of a man.

However, current evidence from the WHO and the United Nations contradicts this [16]. Middle-aged males are two to five times more likely than women to suffer from coronary heart disease [17].

Treatment

Both caregivers and patients with heart disease must be able to comprehend the prescribed drug, follow the instructions for use, and be aware of any potential side effects.

The following are the most commonly recommended medications for cardiac disease [18]:

Angiotensin Converting Enzyme (ACE)

Angiotensin II is a hormone that causes blood vessels to constrict or shrink [19]. Benazepril is an example of a regularly prescribed medicine. Captopril, Enalapril, Fosinopril, Lisinopril, Moexipril, Perindopril, Quinapril, Ramipril, Trandolapril are the examples of ACE inhibitors.

Angiotensin II Receptor Blockers (ARB)

Angiotensin receptor blockers, unlike angiotensin converting enzyme inhibitors, totally block the action of Angiotensin II on the heart [20]. Candesartan, Eprosartan, Irbesartan, Losartan, Telmisartan, Valsartan are the examples.

Anti-Coagulants

Anticoagulants (blood thinners) can prevent blood clots from developing but do not dissolve existing blood clots [21]. Rivaroxaban, Dabigatran, Apixaban, Heparin, and Warfarin are some of the most commonly prescribed medications [22].

Antiplatelets

These are given to people who have had a cardiac event, such as a heart attack [23]. The following are some examples of frequently prescribed drugs: Ticagrelor, Aspirin, Clopidogrel, Dipyridamole, Prasugrel, Dipyridamole, Prasugrel are the examples [24].

Beta Blockers

They reduce the generation of toxic compounds produced by the body in reaction to heart failure by blocking the effects of adrenaline (epinephrine).

This improves the heart's ability to work. - Acebutolol, Atenolol, Bisoprolol, Betaxolol, Metoprolol, Nadolol, Propranolol, Sotalol are the examples [25].

Calcium Channel Blockers (CCB)

Calcium channel blockers can be used in different parts of the body for different purposes depending on the individual's health condition or disorders [26].

Amlodipine, Diltiazem, Felodipine, Nifedipine, Nimodipine, Nisoldipine, and Verapamil are some of the most commonly given medicines [27].

Anti-Hyperlipidemics

Cholesterol deposits in blood vessels can lead to plaque formation, constricting blood vessels. If a blood clot forms around the plaque rupture, it might break off and obstruct the blood vessel.

The following are some examples of cholesterol-lowering medications:

Atorvastatin, Pravastatin sodium, and Simvastatin are statins.

Vasodilators

Calcium channel blockers can be used in different parts of the body for different purposes depending on the individual’s health condition or disorders [26]. Amlodipine, Diltiazem, Felodipine-Nifedipine, Nimodipine, Nisoldipine, and Verapamil are some of the most commonly given medicines [27].

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Potassium Channel Activators

A potassium channel opener is a medication that makes it easier for ions to pass through potassium channels.

1. Diazoxide, a vasodilator used to treat hypertension; smooth muscle relaxing action.
2. Minoxidil is a vasodilator used to treat hypertension and hair loss.
3. Nicorandil is a vasodilator that is used to treat angina pectoris.

Drug Prescription Pattern

The ability of health professionals to discriminate between many pharmacological options and identify which ones will assist their patients is reflected in their prescribing pattern. Prescription writing is both an art and a science, as it conveys the physician’s message to the patient. It is an order for a member to receive scientific medication at a specific time. The study of prescribing patterns is a type of medical review that aims to monitor, assess, and, if required, propose changes to prescribing practises in order to make medical care more reasonable and cost effective. Contrary drug use studies are important tools for determining whether medications are used appropriately in terms of sufficiency, safety, convenience, and cost at all stages of the pharmaceutical process.

Drug Utilization

National drug policy, illiteracy, poverty, the use of multiple health-care systems, drug marketing and promotion, the sale of prescription drugs without a prescription, competition in the medical and pharmaceutical markets, and the limited availability

of independent, unbiased drug information are all examples of these issues in India. Unwise drug use can lead to an increase in medical problems, antimicrobial resistance, side effects, and patient mortality. As a result, recent studies on drug consumption have evolved into a possible criterion for evaluating health systems. Because of increased marketing of new pharmaceuticals, deep differences in the pattern of drug prescribing and utilisation, rising concern about delayed adverse effects, and mounting concern about drug charges, the importance has grown since then.

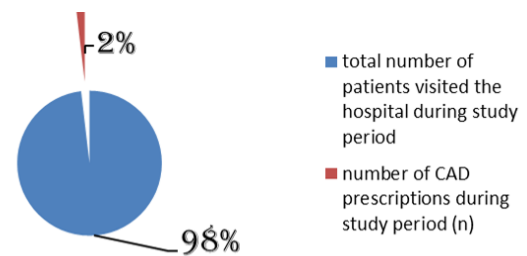


Figure 1: Prevalence of Coronary Artery Disease in the Given Population

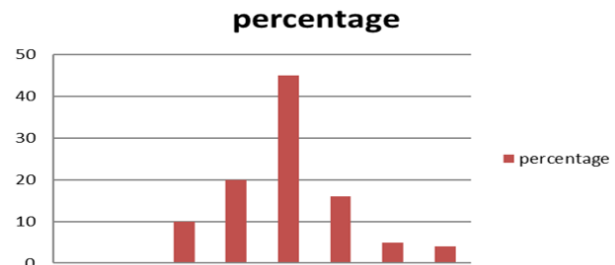


Figure 2: Column Chart on Age Wise Distribution Among CAD patients

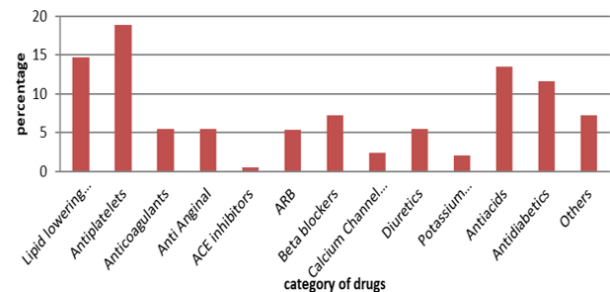


Figure 3: Bar Chart on the Prescribing Patterns of Physician

Types of Drug Utilization Studies

In addition, drug utilisation studies can be qualitative or quantitative. Qualitative drug utilisation studies are a multidisciplinary process that gathers, organises, analyses, and reports data on actual drug usage. The collection, organising, and demonstration of estimates or measurements of drug usage are

Table 1: Gender Wise Distribution of CAD Patients

S. No.	Sex	Number of Patients (n=100)	Percentage (%)
1.	Male	60	60%
2.	Female	40	40%

Table 2: Surgical Procedures Observed in the Study Population

Sl.no.	Name of the surgical procedure	Number of patients(n=124)	Percentage (%)
1.	Coronary angiogram	86	69.3%
2.	Percutaneous transluminal coronary Angioplasty.	36	29.03%
3.	Coronary artery bypass grafting	02	1.61%

Table 3: Cross Tabulation on Medical Condition and No. of Patients

Sl.no.	Medical Condition	Number of Patients (n=100)	Percentage (%)
1	Diabetes mellitus	38	38%
2	Obesity	1	1%
3	Renal disorders	3	3%
4	Metabolic acidosis	1	1%
5	Hypothyroidism	3	3%
6	Anemia	1	1%
7	Osteoarthritis	1	1%
8	COPD	2	2%
9	Others	10	10%
10	NONE	39	39%

all part of quantitative drug utilisation research.

Sources of Data on Drug Utilization

Data about drug usage can be found in the following places:

1. Data from drug regulatory bodies.
2. Data from suppliers (distribution)
3. Data on practise settings
4. Data on prescribing and dispensing
5. Drug usage assessment

METHODOLOGY

Study Design

This is a 6-month retrospective and prospective observational study that took place at the inpatient cardiology department of a tertiary care hospital, Aware Gleneagles Global Hospital.

Collection of Data

Relevant details of every in-patient with coronary artery disease were collected in a specially constructed Performa to analyze prescribing patterns.

The demographic data), as well as the diagnostic data, were gathered from each patient's in-patient case records.

Also highlighted in the medical records were linked co-morbid diseases and risk factors for developing coronary artery disease.

The drug information was recorded, including the substances, dosage form, dose, mode of administration, and frequency.

Inclusion Criteria

The study comprised all in-patients diagnosed with coronary artery disease in the cardiology unit by a consultant cardiologist.

Exclusion Criteria

1. Patients who were managed in a day care facility.
2. Women who are pregnant or nursing.
3. Patients who have been diagnosed with additional heart conditions.
4. All of our patients are in the emergency rooms.

Table 4: Cross Tabulation Prescribed Drugs and No. of Drugs Given

S.No.	Prescribed Drugs	No. of Drugs	Percentage (%)
1.	Lipid lowering agents	91	
	Rosuvastatin	49	53.84%
	Atorvastatin	42	46.15%
2.	Anti-platelets	117	
	Aspirin	56	57.8%
	Clopidogrel	44	37.6%
	Ticagrelor	14	11.9%
	Tirofiban	3	2.56%
3.	Anticoagulants	34	
	Heparin	22	64.7%
	Enoxaparin	10	29.4%
	Rivaroxaban	1	2.9%
4.	ACE Inhibitors	3	
	Enalapril	2	66.6%
	Lisinopril	1	33.3%
5.	ARB	33	
	Telmisartan	20	60.6%
	Olmесartan	7	21.21%
	Valsartan	3	9.09%
	Losartan	3	9.09%
6.	Anti-Anginal Drugs	34	
	Nitroglycerin	17	50%
	Trimetazidine	13	38.2%
	Isosorbate Dinitrate	14	41.1%
7.	Beta Blockers	45	
	Metoprolol	26	57.7%
	Bisprolol	4	8.8%
	Carvidilol	14	31.1%
	Nebivolol	1	2.2%
8.	Calcium Channel Blockers	15	
	Amlodipine	9	60%
	Diltiazem	2	13.3%
	Cilnidipine	3	20%
	Nifidipine	1	6.6%
9.	Diuretics	34	
	Eplirinone	13	38.2%
	Furosemide	11	32.3%
	Torseamide	9	26.4%
	Metolazone	1	2.9%

5. Patients who are mentally unwell.
6. Pediatrics.

Duration of the Study

The study will take place over the course of six months (i.e. October 2018 to March 2019).

RESULTS AND DISCUSSION

Patients diagnosed with any type of coronary artery disease other than those listed above are included in the study. The study focused on patient data such as age, sex, previous and present medical profiles, and various therapy classes. The information came from the medical records of patients who had a profile. Approximately 5275 patients visited the hospital throughout the study period. Because 500 of them were confirmed to have coronary artery disease, the prevalence of coronary artery disease was determined to be 9.478 percent. The inclusion and exclusion criteria in this study resulted in the selection of 100 patients.

Figure 1 depicts the prevalence of coronary artery disease in the given population. In Table 1, the gender distribution of CAD patients was tabulated. Figure 2 shows a column chart depicting the age distribution of CAD patients. Table 2 lists the surgical procedures that were observed in the study population. Table 3 shows a cross-tabulation of medical conditions and patient numbers. Figure 3 shows a bar chart depicting physician prescribing patterns. Table 4 shows a cross-tabulation of prescribed medicines and the number of drugs administered.

Coronary artery disease can strike anyone at any age, however the risk of developing the condition rises with age. The majority of patients in this study are between the ages of 51 and 60, followed by those between the ages of 61 and 70. This is in line with a prior analysis on CAD drug utilisation review, which found that the most common age group with CAD was 40-60 years old.

The doctors' extensive diagnosis indicated that the individuals had a variety of clinical problems. Diabetes was found in 38 percent of patients, while metabolic acidosis was diagnosed in 1% of patients. Obesity was found in nearly one percent of CVD patients. Three percent of patients had hyperthyroidism, three percent had renal diseases, one percent of patients had anaemia, and ten percent of patients had other diagnoses.

Coronary artery disease is more common in older people than in younger patients, as are related conditions such as diabetes, renal disorders, thyroid

disorders, anaemia, asthma, COPD, and gastrointestinal disorders. Diabetes mellitus was the disease with the most related diseases reported in this investigation. Diabetes, anaemia, and asthma were the co-morbidities related with CAD, according to CAD prevalence and drug consumption patterns. Physicians prescribed a variety of pharmacological therapeutic medication groups. These medications have been classified and prescribed to patients in various groups. Antiplatelets were prescribed to the majority of patients (18.84%), followed by cholesterol lowering medicines (14.65%), anti-anginal medications (5.47%), and anticoagulants (5.47%). (5.47 percent). Beta adreno receptor blockers (7.24 percent), ACE inhibitors (0.48 percent), Angiotensin-converting enzyme inhibitors (0.48 percent), calcium channel blockers (2.41 percent), and diuretics were all recommended to the patients (5.47 percent). Anti-ulcer medications were prescribed in 13.52 percent of the cases, whether the patients had ulcers or not. The most common lipid-lowering medication was rosuvastatin (53.84 percent), followed by atorvastatin (46.15 percent).

CONCLUSION

The majority of the participants in the research had coronary artery disease, according to the findings. This could be as a result of their eating habits, smoking, lack of exercise, and poor health hygiene. Because the prescribing pattern was sensible and followed established treatment guidelines, the treatment was effective, as evidenced by the patient's return to normal life. The majority of the patients were men. When compared to other cardiovascular medicines, statins and anti-atherogenic treatments are the most common. The anti-hypertensive group is dominated by beta blockers, ACE inhibitors, and diuretics. The study has some limitations, leading to the conclusion that it cannot be considered a standard study because it was conducted at a single tertiary level hospital and may not be comparable to data from other generalist institutions. The prescribing practise of calcium channel blockers and angiotensin receptor blockers should be modified by implementing educational interventions.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Issues

We obtained the informed consent from the patients enrolled.

REFERENCES

- [1] S Mendis, P Puska, and B Norrving. Global atlas on cardiovascular disease prevention and control. World Health Organization, ISBN: 9789241564373.
- [2] M Naghavi, H Wang, R Lozano, A Davis, X Liang, M Zhou, S E Vollset, A Abbasoglu Ozgoren, S Abdalla, F Abd-Allah, M I Abdel Aziz, S F Abera, V Aboyans, B Abraham, J P Abraham, K E Abuabara, I Abubakar, L J Abu-Raddad, N M E Abu-Rmeileh, and A M Temesgen. Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, 385(9963):117–171, 2015.
- [3] B B Kelly and V Fuster. Promoting cardiovascular health in the developing world: a critical challenge to achieve global health. 2010. ISBN: 9780309147743.
- [4] Bhim Ram, Naresh Kumar, Faiyaz Ahmad Ansari, Arshad Ahmad, Manoj Kumar Chaudhary, and Md. Jawed Akhtar. Prevalence and Drug Utilization Patterns of Cardiovascular Disease in a Tertiary Care Hospital of Bihar - A Prospective and Observational Study. *Journal of Medical Science and Clinical Research*, 6(4):1082–1087, 2018.
- [5] WHF. Cardiovascular disease risk factor, 2011. World Heart Federation, Accessed on: 20 Jul 2021.
- [6] C. S. Booker and J. I. Mann. Trans fatty acids and cardiovascular health: Translation of the evidence base. *Nutrition, Metabolism and Cardiovascular Diseases*, 18(6):448–456, 2008.
- [7] Valentina Remig, Barry Franklin, Simeon Margolis, Georgia Kostas, Theresa Nece, and James C. Street. Trans Fats in America: A Review of Their Use, Consumption, Health Implications, and Regulation. *Journal of the American Dietetic Association*, 110(4):585–592, 2010.
- [8] Kenneth J. Mukamal, Chiung M. Chen, Sowmya R. Rao, and Rosalind A. Breslow. Alcohol Consumption and Cardiovascular Mortality Among U.S. Adults, 1987 to 2002. *Journal of the American College of Cardiology*, 55(13):1328–1335, 2010.
- [9] World Health Organization. Global Status Report on Alcohol and Health, 2011. ISBN: 9789241564151, Accessed on: 20 Jul 2021.
- [10] Prevention of Cardiovascular Disease. page 3, 2007. World Health Organization, UNAIDS, ISBN: 9789241547260.
- [11] Sekar Kathiresan and Deepak Srivastava. Genetics of Human Cardiovascular Disease. *Cell*, 148(6):1242–1257, 2012.
- [12] Heart.org. Understand Your Risks to Prevent a Heart Attack. 2016. American Heart Association, Accessed on: 20 Jul 2021.
- [13] Pekka Jousilahti, Erkki Vartiainen, Jaakko Tuomilehto, and Pekka Puska. Sex, Age, Cardiovascular Risk Factors, and Coronary Heart Disease. *Circulation*, 99(9):1165–1172, 1999.
- [14] B Jani and C Rajkumar. Ageing and vascular ageing. *Postgraduate Medical Journal*, 82(968):357–362, 2006.
- [15] npr.org. Diabetes Raises Women’s Risk Of Heart Disease More Than For Men, 2014. Accessed on: 20 Jul 2021.
- [16] R Jackson, L Chambles, M Higgins, K Kuulasmaa, L Wijnberg, and D Williams. Sex difference in ischaemic heart disease mortality and risk factors in 46 communities: an ecologic analysis, 1999. Cardiovascular Risk Factors. WHO MONICA Project and ARIC Study, 7:43–54.
- [17] Heart.org. Cardiac Medications. National Heart Lung and Blood Institute: Your Guide to Living Well With Heart Disease, Accessed on: 20 Jul 2021.
- [18] Texas Heart Institute. Angiotensin converting enzyme (ACE) inhibitors, 2013. Accessed on: 20 Jul 2021.
- [19] Heart.org. American Heart Association: Cardiac Medication, 2016. Accessed on: 20 Jul 2021.
- [20] Medscape.org. Angiotensin receptor blockers: benefits beyond blood pressure lowering? ARBs vs. ACE inhibitors, 2007. Accessed on: 20 Jul 2021.
- [21] D Robin and R H Kenneth. Drugs to Treat Heart Disease, 2014. Health line, Accessed on: 20 Jul 2021.
- [22] Anita B. Crockett. Use of Prescription Drugs: Rising or Declining? *Nursing Clinics of North America*, 40(1):33–49, 2005.
- [23] R S Gaud, D K Jain, S G Kaskhedikar, and S C Chaturvedi. Critical evaluation of present prescribing pattern. *Indian J Hosp Pharm*, 26:70–72, 1989.

- [24] M V Srishyla, K Mahesh, M A Nagarani, C Andrade, and B V Venkataraman. Prescription audit in an Indian hospital setting using the DDD (defined daily dose) concept. *Indian Journal of Pharmacology*, 26(1):23, 1994.
- [25] M N G Dukes. Drug utilization studies: methods and uses. 1993. World Health Organization. Regional Office for Europe. ISBN: 9789289013086.
- [26] J R Laporte, M Porta, and D Capella. Drug utilization studies: a tool for determining the effectiveness of drug use. *British Journal of Clinical Pharmacology*, 16(3):301-304, 1983.
- [27] Morten Andersen. Is it Possible to Measure Prescribing Quality using only Prescription Data? *Basic Clinical Pharmacology and Toxicology*, 98(3):314-319, 2006.

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