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Trends in Prescribing patterns among Cardiovascular Diseases in a Tertiary care Teaching Hospital

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ABSTRACT: Background: Cardiovascular diseases are the major cause of mortality worldwide, identification and assessment of prescribing patterns is the first step towards improving medication quality and the patient safety in CVD patients. **Aim:** The study is aimed to evaluate the trends in prescribing patterns in Cardiovascular Disease (CVD) patients and to identify the most common cardiovascular diseases. **Methods:** A cross-sectional observational study was conducted on the prescribing pattern of drugs in cardiovascular disease patients, in a tertiary care teaching hospital for a period of 6 months. **Results:** A cohort of 100 patients were enrolled in the study, from which 80 were males and 20 females and the majority of patients belonging to the age group from 41 to 60 years were more prone to CVDs. Among the cardiovascular diseases, Myocardial Infarction (38 %) was the most common type of CVD. The most prescribed class of drug was Antiplatelet (91 %) and most of these classes of drugs were prescribed in brand names only. **Conclusion:** The study was carried out to identify the trends in prescribing patterns in patients with cardiovascular disease and to assess the most common cardiovascular disease. Our study conveys Myocardial infarction (MI) and Ischemic Heart Disease (IHD) was the common cardiovascular disease and Antiplatelet was the most commonly prescribed class of drug.

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INTRODUCTION:

Cardiovascular diseases (CVD) are the number one cause of death worldwide, with more people dying each year, than from any other cause. As per WHO, an expected 17.9 million individuals passed on from CVDs in 2016, addressing 31 % of worldwide deaths. Cardiovascular diseases are a group of disorders of heart and blood vessels which include coronary artery disease, cerebrovascular disease, peripheral artery disease, congenital heart disease, deep vein thrombosis and pulmonary embolism [1].

Prescription writing is a science and an art as it conveys the messages from the prescriber to the patient. The study of prescribing patterns is a component of medical audit that does monitoring and evaluation of prescribers as well as it recommends necessary modifications to achieve effective medical care [2].

Polypharmacy and inappropriate prescribing is a major health problem which can lead to adverse events. The periodic evaluation of prescribing patterns in each hospital setting will be of great help to monitor and supervise the drug use behaviours. Thus prescribing pattern studies provides favorable feedback to the physicians and helps them to modify the treatment strategies [3].

Management of CVDs depends upon reducing the symptoms and reducing the risk of future events. Pharmacological as well as non-pharmacological treatments are equally relevant in the management of CVDs. The possible treatment options for the management of CVDs are lipid-lowering agents, Vasodilators, Beta-blockers, Calcium Channel Blockers, Angiotensin-Converting Enzyme inhibitors (ACEi), Angiotensin 2 Receptor Blockers (ARB), Nitrates, Statins, Antiplatelet, and Anticoagulants. So it is significant to carry out the study and to evaluate the pattern of prescription in patients with cardiovascular disease, to ensure safe and effective therapy [4].

MATERIALS AND METHODS:

The study was conducted in inpatients from the Department of Cardiology and General medicine in a 500 bedded teaching hospital. This was a cross-sectional observational study that was conducted for a 6 month period. The subjects who were 18 years and above, all inpatients having cardiovascular disease and the subjects who was willing to participate in the study with signed informed consent were included. Whereas lactating and pregnant women up to 12 weeks after Partum, subjects with psychiatric disorders, those who was unable to answer the questions and all patients with renal impairment were excluded. Data were collected from the selected subjects with the help of a self-designed data collection form. It was then used to obtain information on prescribing patterns in cardiovascular disease patients.

Study tools:

Patient demographic details, social history and clinical data including duration of hospital stay, radiographic details, laboratory profile, diagnosis, symptoms, etc.

Therapeutic data including the name, route, dose, and frequency of the drug, the duration of therapy and other relevant details were recorded in a suitably-designed individual case record form by reviewing their prescriptions and medical records.

Ethical clearance:

The study was approved by Bapuji Pharmacy College Institutional Ethical Committee on human subjects research with approval number IEC No; BPC/IEC No.58/2019-2020.

RESULTS:

A total of 100 patients were enrolled in the study, out of 80 were Males and 20 were Females (Table 1).

Table 1. Distribution of Cardiovascular Patients based on gender.

Sex	Cardiovascular patient	%
Male	80	80
Female	20	20

Age wise categorization in the Table 2 revealed that 45 % patients belonged to the class of 41 to 60 years, 44 % under the class of 60 to 80 years, and 8 % from the class of 18 to 40 years while only 3 % were aged greater than 80 years old.

Table 2. Distribution of Cardiovascular patients based on Age group.

Age (Years)	Cardiovascular patients	Percentage (%)
18-40	08	8
41-60	45	45
61-80	44	44
>80	03	3

The Table 3 shows the most commonly seen cardiovascular diseases among study subjects were identified as MI (38 %) and IHD (36 %), unstable angina (10 %), CHF (7 %), CAD (3 %), Arrhythmia (3 %), Aneurysm (2 %), and CHD (1 %). The most prescribed class of drugs (Table 4) were Antiplatelets (91 %) , along with Antibiotics (66 %), HMG-COA reductase (61 %) followed by Anticoagulants (50 %) , ACEI (11 %), ARB (17 %), Beta Blocker (21 %), Diuretics (39 %), Antidiabetics (16 %), Anti anginals (5 %). The most commonly prescribed Anti platelet agent was Ecospirin (36 %), in ACE inhibitors Ramistar (4 %) along with

Angiopril (7 %). While in ARBs Telmikind (11 %), Beta Blockers Cardivas (15 %) followed by other drugs, in Diuretics Lasix (21 %).

Table 3. Distribution of Cardiovascular diseases among study population.

Sl. No.	CV diseases	CV patients	Percentage
1	IHD	36	36
2	Unstable Angina	10	10
3	MI	38	38
4	CAD	3	3
5	CHD	1	1
6	Arrhythmia	3	3
7	CHF	7	7
8	Aneurysm	2	2

CV – Cardiovascular.

Table 4. Category of Drugs Prescribed.

Class of drugs	NOP	Percentage
Antiplatelets	91	91
HMG- COA Reductase	61	61
Anticoagulants	50	50
ACE	11	11
ARB	17	17
Beta blocker	21	21
Diuretics	39	39
Antibiotics	66	66
Antidiabetics	16	16
Antianginals	5	5

NOP - No. of patients.

Among Anticoagulants Heparin (44 %) was the most commonly prescribed drug. From the class of HMG-COA reductase inhibitors Atorvas (40 %), in Antibiotics Augmentin (40 %), in Antidiabetics Glycomet Forte (8 %), in Antianginals Angiplat (3 %); were the most prominent classes of drugs (Table 5). As from Table 6 the most commonly prescribed Anti platelet agent was Aspirin (36 %), in ACE inhibitors Ramipril (4 %) along with Captopril (7 %). While in ARBs Telmisartan (11 %), Beta Blockers Carvedilol (15 %) followed by other

drugs. In Diuretics Furosemide (21 %). Among Anticoagulants Heparin (44 %) was the most commonly prescribed drug. From the class of HMG-COA reductase inhibitors Atorvastatin (40 %), in Antibiotics Amoxicillin + Clavulanate potassium (40 %), in Antidiabetics Glimepiride and Metformin (9 %), in Antianginals Nitroglycerin (3 %); were the most prominent classes of drugs.

Table 5. Frequency of drugs prescribed based on brand names.

Class	Brand name	NOD	%
Anti-platelets	Ecosprin	36	36
	Ecosprin av	7	7
	Clopitab	35	35
	Plavix	2	2
	Deplatt-A	11	11
ACE (-)	Ramistar	4	4
	Angiopril	7	7
ARB's	Telmikind	11	11
	Tozaar	6	6
β-Blockers	Cardivas	15	15
	Toprol xl	3	3
	Coreg	3	3
Diuretics	Lasix	21	21
	Dytor plus	11	11
	Aldactone	7	7
Anticoagulant	Heparin	44	44
	Warfarin	6	6
HMG COA Reductase (-)	Atorvas	40	40
	Rozavel	21	21
Antibiotics	Xone	16	16
	Augmentin	40	40
	Vegacef	10	10
Anti Diabetics	Humulin r	4	4
	Humalog	3	3
	Glycomet	9	9
Anti-anginals	Isordil	2	2
	Angiplat	3	3

NOD - No. of drugs, (-) – Inhibitors.

In the pattern of drug prescription (Table 7) 97 % of drugs were prescribed in Brand names, whereas only 3 % in generic names. Table 8 shows the combination therapy from the sample and it depicts that there were 69 combination therapies in the prescriptions out of which 59 % were Amoxicillin + Clavulanate followed by 11%

of Aspirin + Clopidogrel, 11 % of Torsemide + Spironolactone, 7 % of Aspirin + Atorvastatin respectively.

Table 6. Frequency of drugs prescribed based on generic name.

Class	Generic name	NOD	(%)
Anti-platelets	Aspirin Aspirin+Atorvastatin Clopidogrel Clopidogrel Clopidogrel+Aspirin	36 7 35 2 11	36 7 35 2 11
ACE Inhibitors	Ramipril Captopril	4 7	4 7
ARB'S	Telmisartan Losartan	11 6	11 6
Beta Blockers	Carvedilol Propranolol Metoprolol	15 3 3	15 3 3
Diuretics	Furosemide Torsemide+SPNL Spironolactone	21 11 7	21 11 7
Anti-coagulants	Heparin Warfarin	44 6	44 6
HMG COA Red. (-)	Atorvastatin Rosuvastatin	40 21	40 21
Anti-biotics	Ceftriaxone Amoxicillin+Clav.K Ceftriaxone	16 40 10	16 40 10
Anti-diabetics	Human insulin r Insulin Lispro Glim.+Metformin	4 3 9	4 3 9
Anti-anginals	Isosorbide dinitrate Nitroglycerin	2 3	2 3

SPNL – Spironolactone, Clav. K - Clavulanate potassium, Glim. – Glimepiride, Red (-) – Reductase inhibitor.

Table 7. Pattern of drug prescription.

Sl. No.	The pattern of drug Prescription	NOP (N=100)	%
1	Drugs prescribed in brand name	97	97
2	Drugs prescribed in generic name	3	3

NOP - Number of prescription.

Table 8. Drugs prescribed in combination therapy.

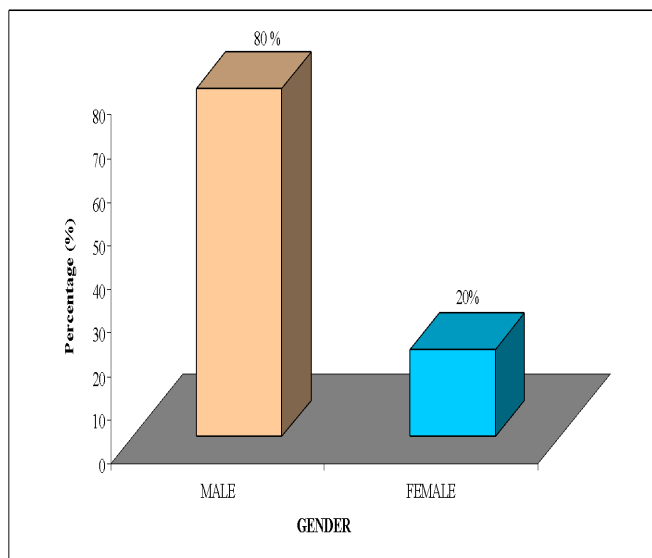| Drug	NOP	%
Aspirin+Clopidogrel	11	11
Aspirin+Atorvastatin	07	7
Torsemide+Spironolactone	11	11
Amoxicillin+Clavulanate	40	40

Fig 1. Distribution of Cardiovascular patients based on gender.
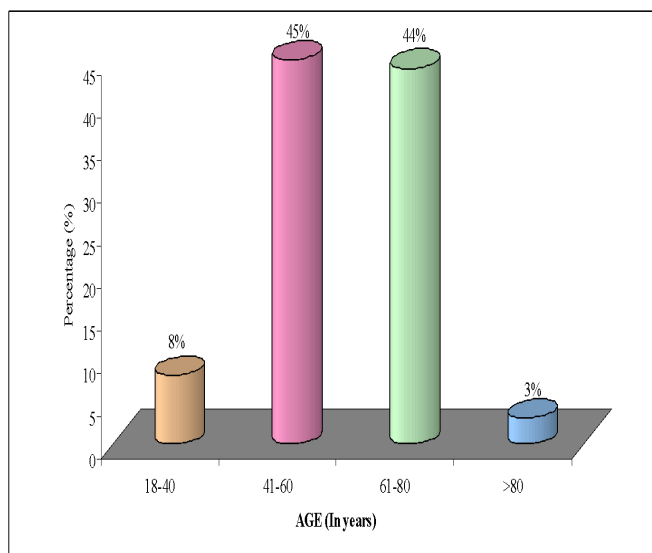

Fig 2. Distribution of Cardiovascular Patients based on age group.

DISCUSSIONS:

Cardiovascular disease (CVD) is the type of disease which is being common among individuals of different age groups, thus it is important to analyze the drugs prescribed in order to avoid more complications and provide safe health care. The study was conducted for a

period of 6 months. A cohort of 100 patients with cardiovascular diseases are assessed for the trends in prescribing patterns of drugs in CVD patients and they were conducted based on the number of drugs and different classes of drugs prescribed with their dose and frequency from admission to discharge of the patient.

Out of 100 patients enrolled in the study, 80 % were Males and 20 % were Females and this reveals the male predominance, which was similar to the study conducted by Blessy Rachel Thomas, *et al*, shows 84 % males and 16 % females [5].
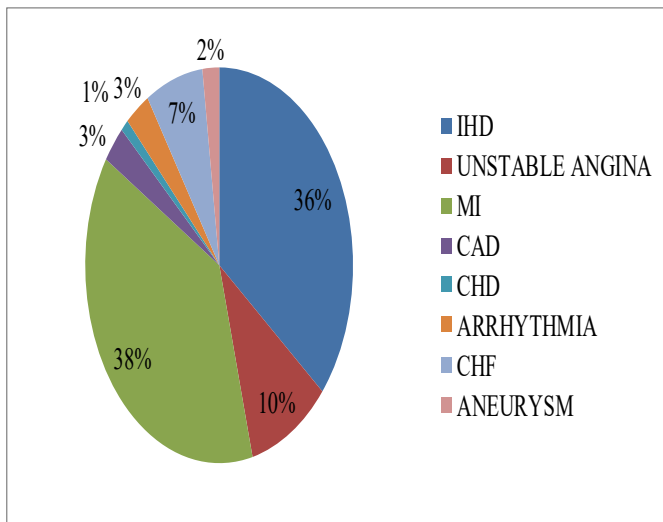
Fig 3. Distribution of Cardiovascular diseases among Study Population.
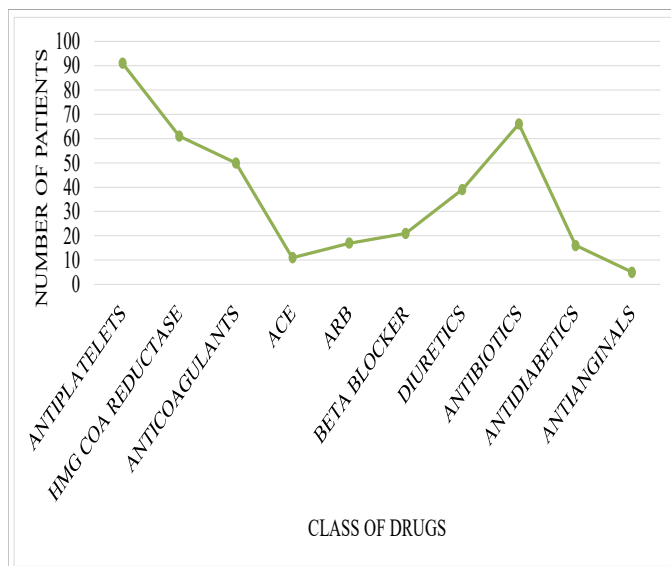
Fig 4. Category of Drugs Prescribed.

While 45 % of the subjects belong to the age group 41 to 60 years, similarly Aishwarya AT, *et al.* conducted a study and their results range from age 61 to 70 [4], this variation may be due to change in the study population. The most commonly seen cardiovascular disease among

study subjects were identified as Myocardial infarction (MI) 38 %, Ischemic heart disease (IHD) 36 % and so on. Abdul Hannan*, et al*. conducted a study and showed that 96.7 % had IHD followed by other cardiac diseases [6].
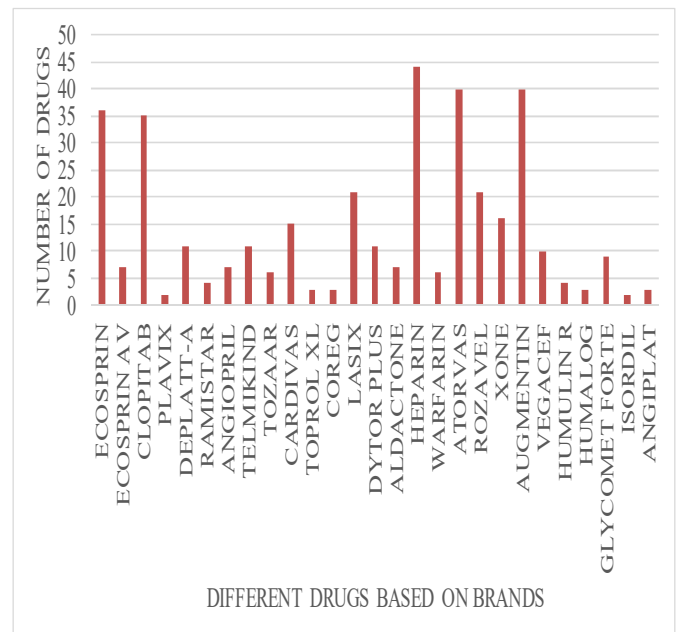

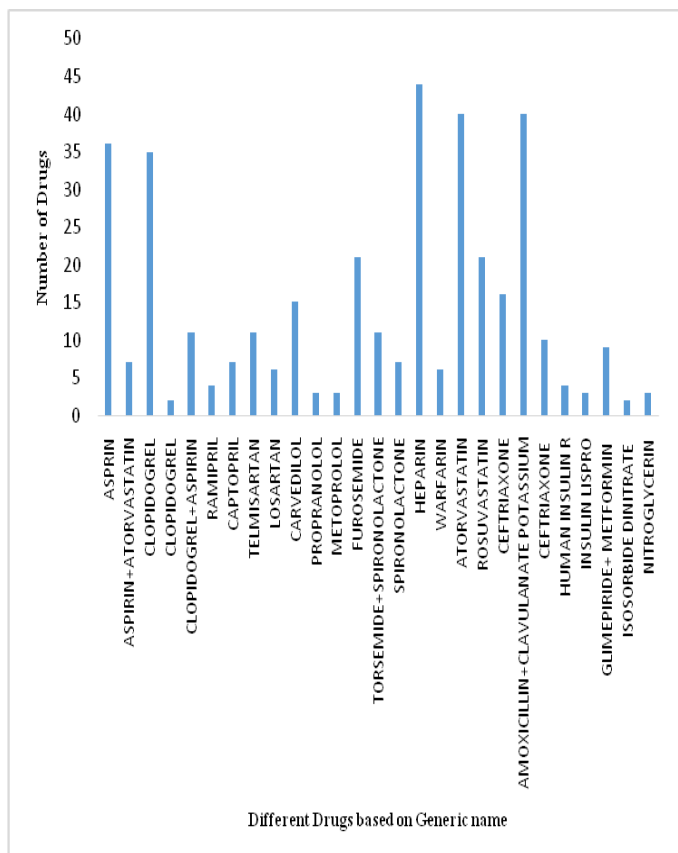**Fig 5. Frequency of Drugs Prescribed based on brand names.**

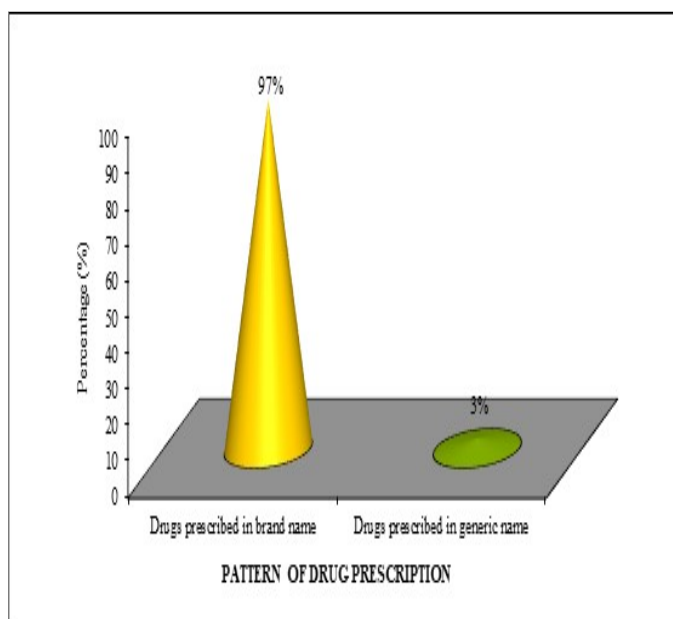**Fig 6. Frequency of Drugs Prescribed based on generic name.**
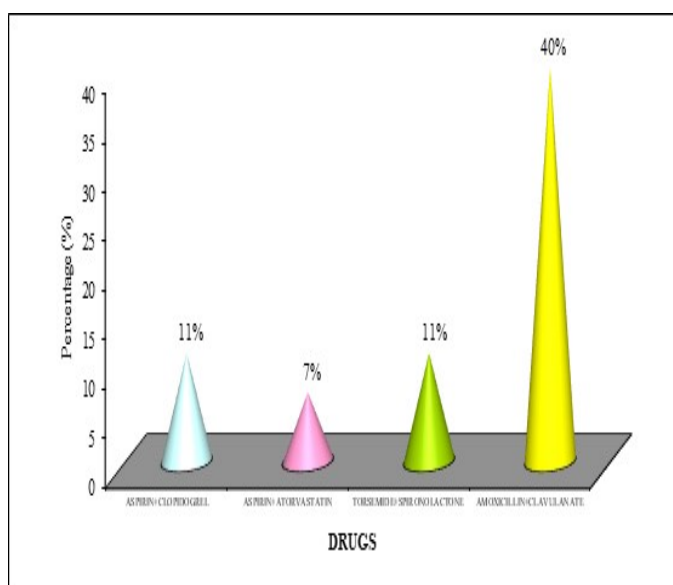
Fig 7. Pattern of Drug Prescriptions.

Fig 8. Drugs Prescribed In Combination Therapy.

A study conducted by Kiran P. Vakade, *et al.* and Blessy Rachel Thomas, *et al.* shows that Antiplatelet (90.24 %) is the most commonly prescribed class of drug [2,5]. Similarly in our study the most prescribed category of drugs were Antiplatelet 91 %, along with Antibiotics 66 %, HMG-COA reductase 61 % and followed by other classes. Apart from that Shantadurga S. Kerkar conducted a study indicating the most commonly prescribed antiplatelet drug was Aspirin + Clopidogrel 68.10 % and followed by other drugs [7]. The pattern of drug prescription shows that 97 % of drugs were prescribed in brand names while only 3 % of drugs were prescribed in generic names. A parallel study conducted by Aishwarya A.T, *et al.* concluded that all the

prescriptions in their study were prescribed in the brand names rather than generic names [4]. In another study conducted by Christain, *et al.* 19.5 % in generic name, 80.5 % in brand name [8] and Choudhary, *et al.* 16.88 % in generic name and 83.12 % in brand name [9]. The study also categorizes the drugs given in combination therapy, among the 100 cases there were 69 combination therapies out of which 40 % were Amoxicillin + Clavulanate. A study conducted by Narender Boggula, *et al.* concluded that the most commonly used combinations were Furosemide + spironolactone 57.8 %, followed by Clopidogrel + Atorvastatin 15.7 %, Etophylline + Theophylline 10.5 % [10]. This variation depends on different study sites.

CONCLUSION:
The study was carried out to identify the trends in prescribing patterns in patients with cardiovascular disease and to assess the most common cardiovascular disease. Our study conveys MI and IHD as the common cardiovascular disease and Antiplatelet as the most commonly prescribed class of drug.

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