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A PROSPECTIVE STUDY ON PRESCRIBING PATTERNS OF DRUGS IN CARDIOVASCULAR PATIENTS IN TERTIARY CARE HOSPITALS OF KHAMMAM REGION

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ABSTRACT

Cardiovascular diseases are the most diseases prevalent in India. Cardiovascular diseases are showing an increasing trend due to changes in lifestyle and social habits. Medicines are the basis of the treatment and prevention of cardiovascular diseases. Factors such as low rates of use of evidence-based therapies, high cost of drugs and long duration of therapy make the rational use of cardiovascular drugs difficult. The aim of the study was to evaluate the drug prescription model in cardiovascular disease. Prospective observational study was conducted in a tertiary hospital over a period of 6 months. In the study, 200 patients were enrolled and evaluated with their demographics, medical history, and prescription drugs. In this study, among the 200 cardiovascular disease cases were evaluated, the incidence of cardiovascular disease was common in men (53.5%) and most prevalent in the age group 51 to 60 years. In evaluating the cardiovascular drug prescription pattern, anticoagulants (13.3%), antianginal drugs and statins (6%), antihypertensives (9.6%) were the prescribed drugs. Increasing age, random lifestyle changes, lack of physical activity, increased stress, workload, and smoking-like habits have paved the way for greater morbidity and mortality. Drug-drug interaction creates problems in the treatment of cardiovascular disease, as it requires multiple therapies.

Effective strategies and regular monitoring need to be implemented to improve patient compliance and achieve better outcomes.

Key words: Cardiovascular diseases, Angina, Myocardial infraction, prescribing pattern, Statins

INTRODUCTION

Cardiovascular disease (CVD) is a group of heart and blood vessel disorders. According to the Global Burden of Disease Study in India, coronary heart disease (CAD) is the largest contributor to CVD, accounting for over 35% of the disease burden **[1]**. Cardiovascular disease can also cause a number of complications, such as diabetes and chronic kidney failure **[2]**. Important modifiable risk factors for CVD are an unhealthy diet, physical inactivity, tobacco use, excess of a high-fat diet and the effects suggest an abnormal blood lipid profile and obesity **[3]**. Medicines play a crucial role in promoting human health and well-being, but to achieve this desired effect they must be safe and effective and must be used rationally. Drug interactions create a significant challenge for healthcare professionals and can affect patients' mortality, morbidity and quality of life **[4]**. Polypharmacy may increase the risk of adverse drug reactions, medication errors and patient non-compliance **[5]**. The potential role of the clinical pharmacist in the treatment of patients with ACS includes the prevention of drug-related problems, the treatment of cardiovascular risk factors, and the implementation of measures to preserve the rationale for prescribing **[6, 7]**. Effective strategies for detecting, evaluating and managing CAD are well established in high-income countries, but these strategies have not been fully implemented in India **[8]**. Inadequate prescribing habits lead to ineffective and unsafe treatment, prolongation of illness, distress, and an unnecessary financial burden on the patient **[9-11]**. Therefore, this study attempts to analyze current drug prescription patterns used in the treatment of cardiovascular disease in order to ensure adequate use of drugs to reduce disease morbidity and mortality and reduce unnecessary economic burden on the patient **[12-14]**. The results of this study should provide useful and relevant information to physicians.

METHODOLOGY

This study was a prospective observational study conducted over a 6 months period from November 2020 to April 2021 in several tertiary hospitals. A total of 200 cases that met our inclusion criteria were included in our study. Inclusion criterion includes Patients of both genders and age above 20 years were selected. Patients

suffering with cardiovascular diseases were enrolled in the study. Exclusion criteria includes Patients who were below 20 years and not diagnosed with cardiovascular diseases. Patients records that did not had relevant data and patients not willing to participate in study were excluded. The study protocol was approved by the Institutional Ethics Committee prior to the start of the study. Written informed consent was requested from all patients before requesting data collection. The patients identity was kept confidential. Simple random sampling was done to collect the data. The patients were then classified according to their disease type. Demographic characters, co-morbid conditions, cardiology investigations, drugs prescribed were documented.

RESULTS

In the present study we collected the data of 200 patients with cardio vascular disease. Results indicated that out of 200 participants 107 male individuals (53.5% had a high frequency of cardiovascular incidence as compared to 93 female individuals (46.5%).

Out of 200 participants 11 (5.5%) of patients belongs to age group 20-30 yrs. 30 (15%) of patients belongs to age group belongs to 31-40yrs 45 (22.5%) of patients belongs to the age group belongs to 41-50 yrs, majority of individuals i.e 63 (31.5%) belongs to age group 51-60 yrs. 34 (17%) of patients belongs to age group 61-70 yrs . 17 (8%) of patients belongs to age group 71-90 yrs **(Figure 1)**.

Majority of patients 152 (76%) were uneducated and 48 (24%) of patients were educated. Out of 200 patients majority 88% (176) participants does not have any family history of CVD but 12% (24) participants show positive family history for CVD.

150 (75%) were from urban areas and 50 (25%) were from rural areas. Most of the patients 50 (25%) are alcoholic and (48) 21.5% of patients had habit of smoking.

Majority of 64.5% patients had chief complaint on shortness of breath and 63% of patients had chest pain, followed by 10% of patients with palpitations, 9.5% with chest heaviness and 6% are with sweating, 5% are with pedal edema, 3% with giddiness, least 2% are with chest tightness **(Figure 2)**.

In our study the most frequently reported Comorbidities were diabetes (68) 34%, followed by Hypothyroidism (9) 4.5%, asthma (5) 2.5%, epilepsy and hyperlipidemia (4) 2%, COPD, acute kidney injury, tuberculosis, hypercalcemia (1) 0.5%.

Out of 200 patients majority 35% (70) of patients are diagnosed with coronary artery disease. Followed by 22% (44) with angina and 20.5% (41) with myocardial infarction. 18% (36) are diagnosed with left ventricular dysfunction. 7% (14) with

ischemic heart disease and 4% (8) are with two vessel disease. 3.5% (7) are with three vessel disease 3% (6) are with stroke and cardiomyopathy **(Figure 3)**.

A total of 200 prescriptions were analyzed and it was observed that 1640 drugs were used in the study. The drugs listed in essential drug list were compared with drugs prescribed in our study. Percentage of drugs that matched with WHO EDL is 40.4% (662 drugs). Maximum number of drugs per prescription in our study are 6 with 35% (64). Followed by 7 drugs per prescription in (47) 23.5%, 5 drugs in 21.5% (43), 4 and 8 drugs in 10% (20) of prescriptions each 3and 10 drugs in 1% (2) of prescription each, 9 drugs in 1.5% (9) of prescriptions **(Table 1)**. The average numbers of drugs per prescription are 8.2.

Anticoagulants are the drugs that are useful to prevent clots and reduce their chance of developing serious conditions such as strokes, heart attacks total number of anticoagulants prescribed in our study are 219 (13.3%). Among them most prescribed one is Aspirin 230 (14%) aspirin not only prevent blood clots from forming but it can also prevent heart attacks and strokes. Clopidogrel 57 (3.5%) stops platelet clumping together to form unwanted blood clots this prevent heart attacks and strokes, enoxaparin 35(2.1%), prasugrel 10 (0.6%), heparin 17 (1%) prevent harmful blood clots and reduce the risk of stroke **(Table 2)**.

Statins are the drugs which are effective at lowering cholesterol and protecting against heart attack and stroke. Total of 99 (6%) statins were prescribed in our study among them atorvastatin 71 (4.3%) is most commonly prescribed drug used to lower high blood cholesterol and prevent heart diseases such as heart attack and stroke, followed by rosuastatin 26 (1.6%), simvastatin 2 (0.12%) **[15] (Table 2)**.

Anti anginals are used to provide immediate relief from symptoms and prevent angina attacks. Total of 65 (4%) anti anginals were prescribed in our study they are nitroglycerine 31 (1.9%), glyceryl trinitrate 4 (0.2%), isosorbide di nitrate 9(0.5%), isosorbide mono nitrate 6 (0.3%), nicorandil 13 (0.8%), trimitazidine 2 (0.1%). 72 (4.4%) drugs were prescribed to treat conditions of heart like heart rate and heart failure they are amaidarone 14 (0.8%), and digoxin 8(0.5%), and ticagrelor 33(2%), digoxin 5(0.3%), and ivabradine12(0.7%) **(Table 2)**.

Total of 177(10.8%) of Anti hypertensive drugs were prescribed in our study. Among them most Prescribed one is Ramipril 30 (1.8%), telmisartan 27 (1.6%), metoprolol succinate 30(1.8%) lowers high blood pressure help prevent strokes and heart attacks, metoprolol 9(0.5%), verapamil 5(0.3%), fosinopril sodium 4(0.2%),

enalapril 7 (0.4%) reduce high blood pressure and helps to prevent future heart attacks and strokes, amlodipine 6(0.3%), carvedilol 16(1%), dilteazem 6(0.4%) reduce high blood pressure and helps to prevent future heart attacks and strokes. valsartan 12 (0.7%) lowers blood pressure and make it easier for heart to pump blood around body. Total of 83 (5%) diuretics were prescribed in our study which are used for fluid retension and oedema conditions most prescribed one is torsemide 44 (2.7%), furosemide 37(2.2%), metalazone 2 (0.12%) **(Table 2)**.

Antibiotics are the drugs used to treat or prevent bacterial infections total of 45 (2.7%) drugs are prescribed in our study they are cefpodoxime 21 (1.3%), piperacillin+tazobactum 11(0.7%), ceftrioxone 6 (0.4%), erythromycin 3 (0.2%), benzathine pencillin G , levofloxacin, ofloxacin, doxycycline 1 (0.1%) each **(Table 3)**.

Total of 39 (2.4%) analgesics were prescribed in our study which are used to relieve pain. Total of 6(0.3%) Anti psychotics drugs were prescribed in our study which are used to treat psychosis conditions which includes hallucinations, delusions etc. Drugs include nalaxone 4 (0.2%), olanzepine, escitrapolam 1(0.1%).

Anti epileptic drugs are used to treat condition like seizures. Total of 6 (0.3%) drugs were prescribed they are lacosamide, leviferacefam 1 (0.1%) each, clonazepam 4 (0.2%) used to relieve panic attacks and control certain types of seizures.

Total of 9 (0.5%) Anti Tuberculosis drugs they are Isoniazide 4 (0.2%), rifampacin 4 (0.2%), trimithazidine 1 (0.1%). 13 (0.8%) anti anxiety drugs were prescribed in our study. They are alprazolum 8 (0.5%), atezolum 4(0.2%) (Table5). Vitamin supplements are used to improve overall health and help to manage some health conditions total of 45 (2.7%) vitamin supplements are used those are calcitriol 10 (0.6%), vitamin B 7 (0.4%), multivitamin and folic acid 5 (0.3%) each, ferrous fumarate 8(0.4%), cap A to Z 4(0.2%),thiamine, pyridoxine, potassium chloride, 2(0.12%) each.

Total of 12 (0.7%) drugs which treat respiratory problems are prescribed in our study they are levo solbutamol 3(0.2%), fluticasone 2 (0.1%), aminophylline 2 (0.1%), ipratomium bromide 2(0.2%), budesonide 1(0.1%), triamcelone 1 (0.1%), diphen hydramine 1 (0.1%) **(Table 4)**.

Other common drugs in our study include levocitrizine 1 (0.1%) used to relieve runny nose, sneezing, itching, bisacodyl 3(0.2%)is a laxative, acetyl cystine 1(0.1%) relieve chest congestion due to emphysema, bronchitis etc, domperidone 28 (1.7%) is an anti emetic which is an dopamine antagonist.

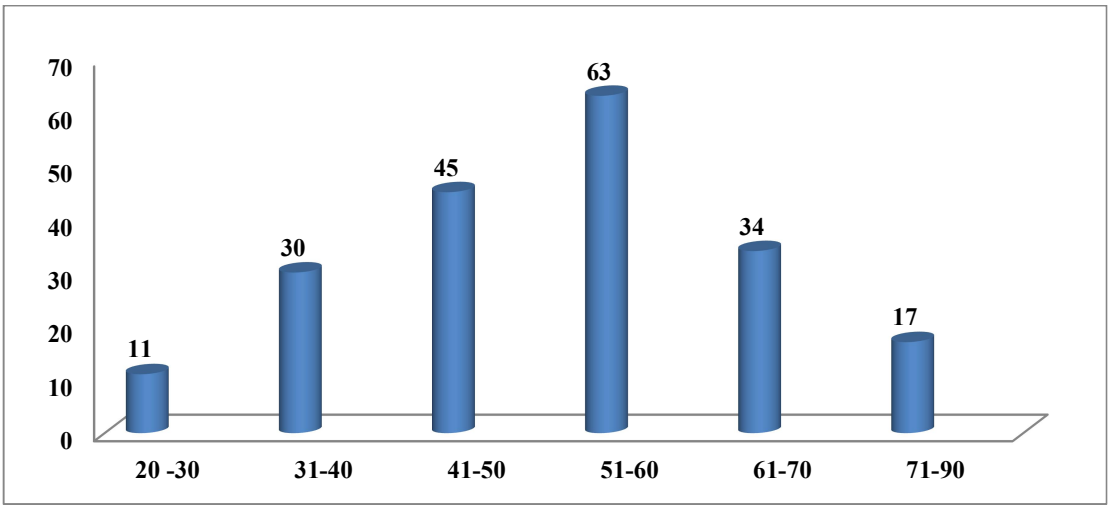

Figure 1: Age wise distribution of patients

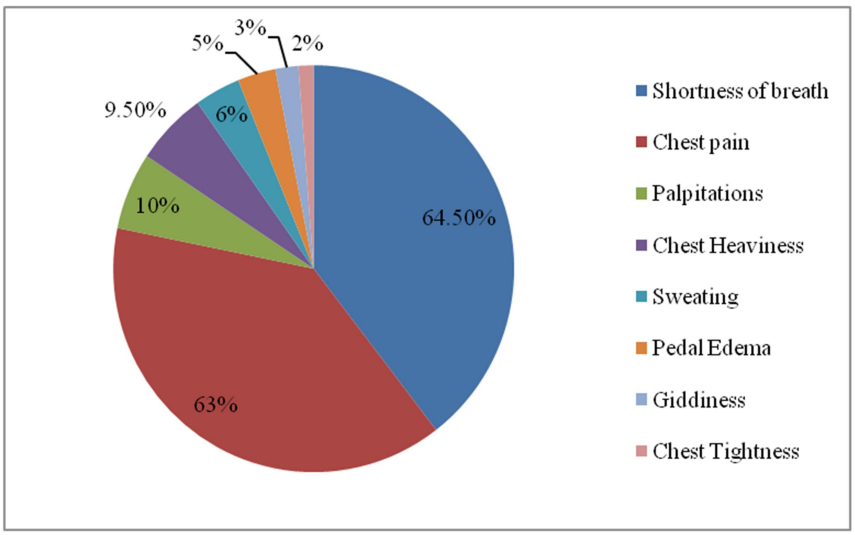

Figure 2: Chief complaints reported by participants

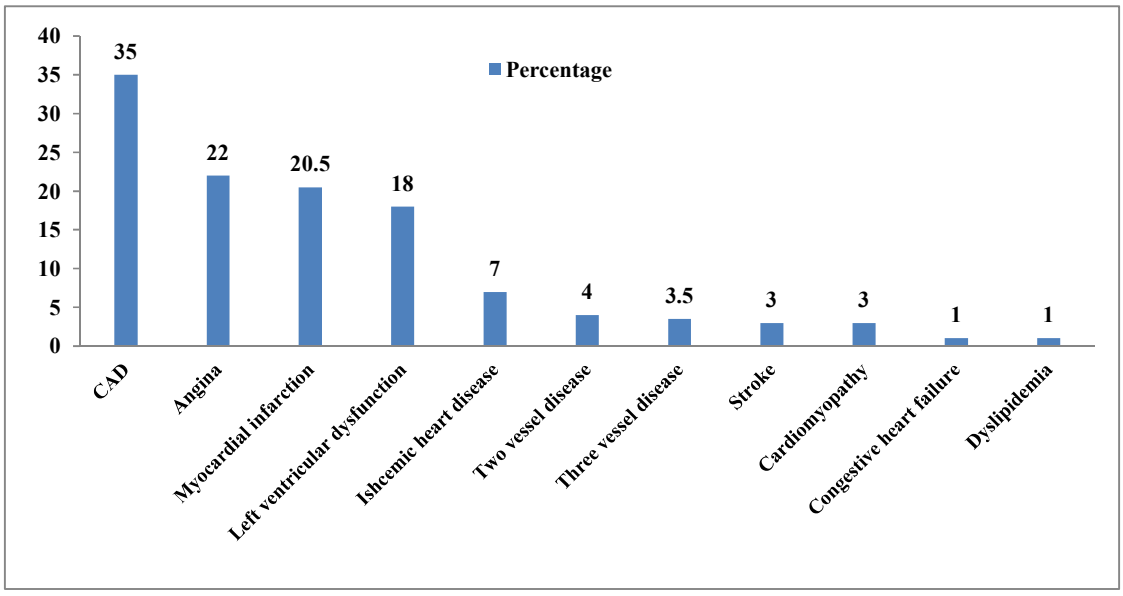

Figure 3: Distribution of Cardiovascular diseases in participants

Table 1: Number of drugs per prescription in participants

No of drugs per prescription	Subjects	Percentage
3	2	1
4	20	10
5	43	21.5
6	64	35
7	47	23.5
8	20	10
9	3	1.5
10	2	1

Table 2: Drugs prescribed for cardiovascular disease

Class of drugs	Drugs	Subjects	Percentage
Beta blockers	Bisoprolol fumarate	2	0.1
	Metoprolol	9	0.5
	Atenolol	1	0.1
	Propronolol	2	0.1
	Metoprolol succinate	30	1.8
	Metoprolol tartarate	4	0.2
	Nebivolol	4	0.2
	Valsartan	12	0.7
	Enalapril	7	0.4
ACE inhibitors	Ramipril	30	1.8
Calicium channel blocker	Fosinopril sodium	4	0.2
	Verapamil	5	(0.3)
	Rosuastatin	26	1.6
Nitrates	Glyceryl trinitrate	4	0.2
	Glyceryl dinitrate	9	0.5
	Nitroglycerine	31	1.9
	Isosorbide dinitrate	6	0.4
HCN channel blokers	Ivabradine	12	0.7
Alpha and beta blockers	Carvedilol	16	1
Digitalis glycosides	Digoxin	8	0.5
Potassium channel opener	Nicorandil	13	0.7
Anti arrythmics	Amaidarone	14	0.8
Mineralo corticoid receptor antagonist	Eplerone	3	0.2
Alpha agonist hypotensive agents	Clonidine	5	0.3
Aldosterone receptor antagonist	Spironolactone	55	3.3
Diuretics	Furosemide	37	2.2
	Metalazone	4	0.2
	Torsemide	44	2.7
	Trimitazidine	2	0.1
Statins	Atrovastastin	68	4.1%
	simvatastin	2	0.12%
	Rosuastatin	26	1.6%

Table 3: Antibiotics prescribed in study

Class of drugs	Drugs	Subjects	Percentage
Antibiotics	Doxycycline	1	0.1
	Azithromycin	3	0.2
	Benzathine pencillin G	1	0.1
	Cefpodoxime	21	1.3
	Ceftriaxone	6	0.4
	Amoxicillin + Clavulanic acid	3	0.2
	Piperacillin tazobactum	11	0.7
	Erythromycin	3	0.2
	Levofloxacin	1	0.1
	Ofloxacin	1	0.1

Table 4: Drugs prescribed for other co morbidities in the study

Class of drugs	Drugs	Subjects	Percentage
Thienodiazepines	Atezolum	4	0.2
Benzodiazepines	Diazepam	5	0.3
	Alprazolum	8	0.5
	Clonazepam	4	0.2
Mucolytics	Acebrophylline +Acetyl cystine	1	0.1
Antitussives	Codein phosphate	3	0.2
Opioid antagonists	Nalaxone	4	0.2
Analgesic	Tramadol	3	0.2
	Morphine	2	0.1
	Paracetamol	11	0.7
	Diclofenac sodium	2	0.2
	Ibuprofen	1	0.1
	Flupirtine	16	1
Anti histamines	Diphenhydramine	1	0.1
	Levocitrizine	1	0.1
Laxative	Bisacodyl	3	
Proton pump inhibitors	Pantoprazole	96	5.8
	Rabeprazole	51	3.1
	Omeprazole	10	0.6
	Esmoprazole	2	0.2
H2 receptor antagonist	Ranitidine	1	0.1
Nasal decongestants	Phenyl ephrine	3	0.2
Anti cholinergic agent	Ipratopium bromide	2	0.1
Bronchodilators	Aminophylline	2	0.1
B2 adenergic receptor agonist	Levosolbutamol	3	0.2
Electrolytes	Potassium chloride	2	0.1
Dopamine antagonist	Domperidone	28	1.7

DISCUSSION

Cardiovascular disease is a leading cause of death in India. Changes in eating habits, sedentary lifestyles and urbanization have contributed to this. In the present study, cardiovascular disease was observed more frequently in men (53.5%) and over the age of 50. CVD is mainly triggered by many risk factors such as hypertension, high cholesterol, obesity or diabetes, which can be controlled by following a healthy diet, regular exercise and avoiding tobacco. This study states that hypertension and diabetes were the most common comorbid conditions associated with coronary heart disease. In the present study, participants between the ages of 40 and 70 are the most affected.

In our study, uneducated people are more likely to be affected by cardiovascular disease, which could be due to inadequate communication skills with their doctor, reading problems, understanding relevant information, and ignorance about their health and blind beliefs.

People living in urban areas are more affected than in rural areas, this could be due to poor eating habits, social habits such as smoking, alcohol, modern lifestyle and stressful environment.

In most cases, family history has no impact on cardiovascular disease today Noncommunicable diseases such as

hypertension and diabetes etc., they are increasing day by day due to the unhealthy lifestyle, eating habits and stressful environment around us.

People with mild physical activity are more affected by cardiovascular disease. Frequent exercise is strongly associated with decreased cardiovascular mortality and the risk of developing cardiovascular disease because physically active people have lower blood pressure, increased insulin sensitivity, and a more favorable plasma lipoprotein profile.

In our study, most patients complained of shortness of breath and chest pain, as a symptom of cardiovascular disease could be due to inflammatory proteins associated with the development of coronary artery disease. respiratory symptom.

Aspirin and clopidogrel were the most prescribed antiplatelet drugs for the therapeutic management of cardiovascular disease. In the present study, the use of atorvastatin (4.1%) was higher among the anti-lipid drugs. Rosuvastatin (1.6%) was found to be the next common drug used in CVD patients. This concludes that atorvastatin is the most commonly prescribed of the lipid-lowering drugs. Among the nitrates, nitroglycerin constitutes about (1.8%) trimetazidine (0.4%) of the antianginal drugs **[16]**.

Most of the participants (6.5%) are prescribed aspirin, which is used as an anticoagulant and prevents the formation of blood clots. Aspirin causes bleeding in the stomach and intestines; To treat this condition, taking aspirin with food can help. To treat heartburn, our study prescribes some simple proton pump inhibitor antacids such as pantoprazole and rabeprazole, so this prescription is considered a rational prescription.

Most of the drugs like NSAIDs, antibiotics used in our study have common side effects like nausea, vomiting, diarrhea and pain, etc. To treat these conditions, antiemetics such as domperidone, for diarrhea, laxatives such as bisacodyl, for pain, analgesics such as tramadol, etc. are prescribed.

5 to 7 prescription drugs are prescribed, over 40.4% (662) of the drugs in our study follow the list of essential drugs according to WHO guidelines to meet the priority health needs of populations.

CONCLUSION

The present study concludes that age, lifestyle changes, lack of physical activity, increased stress, smoking and alcohol were major risk factors for cardiovascular morbidity and mortality. In the present study, the drug prescription pattern in the cardiovascular system was evaluated. Most drugs were rationally prescribed according to current guidelines. In addition to prescribing medications, patients should be

educated on CVD risk factors and how to prevent them.

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