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Study of Prescribing Pattern, Identification of Drug Related Problems and Therapeutic Intervention in Cardio Vascular Diseases (CVD) Patients

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ABSTRACT

Cardiovascular disease (CVD) is a disorder of heart and blood vessels. CVD is one of the major causes of deaths in India, which contributed around 30 to 40%. The aim of the study was to study the prescribing pattern of drugs, identification of drug related problems and therapeutic intervention in CVD patients. A hospital based prospective and observational study was carried out for a period of nine months in a south Indian tertiary care hospital. Among 120 selected patients, 79 were male (65.83%) and 41 were female (34.16%), more number of patients (35) were between the age group of 55-64 (29.16%) of which 27 were males & 8 were females, and very less number of patients (6) were between the age group 85-94 (5%) of which all the 6 were male. Hypertension is the most commonest and dominant disorder, which affected 47(39.16%) patients, in which 30 were male (25%) and 17 were female (14.16%). Most common risk factor is HTN followed with smoking and diabetes of 45 patients (37.5%). The most often prescribed pattern adopted in CVD is Dual therapy, it is most frequently used therapy 50 (41.66%) and quadruple therapy is less frequently 6(6.5%) used. The diuretics and calcium channel blocker combination were maximally prescribed class of drugs as a dual therapy. A total of 47 drug-drug interactions were found, among 12 were major, 15 were moderate and 20 were minor interactions. Clinical pharmacist has intervened with the help of other health care professionals in order to reduce the risk factor and minimise the drug-drug interactions. The study provides the benefits of presence of clinical pharmacist in a hospital setting, in order to prevent the medication related errors and provide the expertise pharmacotherapy opinion in CVD patients, which improves the patient compliance. Hence study justifies a need of active collaboration between clinical pharmacist, physician and other health care professionals for the better management of CVD patients.

Keywords: Prescribing Pattern; Cardio Vascular Diseases; Drug Related Problems; Therapeutic Intervention.

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INTRODUCTION

CVD is a class of diseases which affect the heart, blood vessels and circulatory system, the commonest form of CVD are, coronary heart disease (CHD), congestive heart failure (CHF), stroke, hypertension, peripheral artery disease, and rheumatic heart disease.[1] Cardiovascular disease is one of the major causes of deaths. The percentage of deaths in India due to cardiovascular disorders was estimated to be 30-40%.[2] Typical symptoms of an underlying CVD includes pain or pressure in the chest, shortness of breath, irregular heart beat pain or discomfort in the arms ,left shoulder, elbows, jaw or back, nausea and fatigue, light headed or faint ,cold sweat.[3] The CVD is caused by two types of risk factors i.e. Modifiable and Non modifiable risk factors like hypertension, diabetes, smoking, physical inactivity, unhealthy diet, cholesterol/lipids, over weight and obesity, lack of sleep, age, family history.[4] A number of different tests are used to diagnose the heart-related problems including, blood tests, coronary angiography, Electrocardiogram (ECG), exercise stress tests, X-rays, Echocardiogram ,Radionuclide tests, Magnetic Resonance imaging (MRI) scans, Computerised Tomography (CT) scans. CVD can be effectively treated with a combination of lifestyle changes, medicines and in some cases surgery. There are various medications used for the treatment of CVD that may either aim to widen the arteries or to lower the blood pressure.[5] Most common classes of drugs prescribed in CVD patients includes Anti-

platelets that inhibit platelet function by blocking cyclooxygenase and subsequent aggregation.eg :low dose aspirin, prasugrel, clopidogrel.[6] Statins act by blocking cholesterol formation and increasing the number of low density lipoprotein (LDL) receptors in the liver.eg : Atorvastatin, rosuvastatin.[7] Beta blockers- they work by blocking the effect of specific harmone in the body that slows down heart beat which helps to increase blood flow.eg: atenolol, metoprolol.[8] Nitrates are used for vasodilation. Eg: ISMN, ISDN.[9]ACE inhibitors are used to treat high blood pressure. Eg: Ramipril, esinopril. Angiotensin II receptor antagonist works similar to ACE inhibitors by blocking angiotensin II receptors.[10] Calcium channel blockers works to widen the arteries and reduction of blood pressure.eg: Amlodipine, diltiazem.[11] Diuretics works by removing excess water and salt from the body via urine.eg: Spirinolactone.[12] Surgical methods include coronary angioplasty, coronary artery bypass graft(CABG), Heart transplant.[13]Clinical pharmacist plays an important role in reducing the risk factors, drug-drugs interactions and drug related problems. The study provides the benefits of the presence of clinical pharmacist in a hospital setting, in order to prevention of medication errors; provide the expertise pharmacotherapy and better management of drug therapy based on patients specific factors. All together influence the improvement in patient compliance, safety, level of care, better control of risk factor and health care cost and ultimately results in overall development of patients quality of life.

MATERIALS AND METHODS

Study design and settings: A prospective and observational study was conducted for aperiod of nine months in the department of Medicine, at BLDEA'S Shri B. M. Patil Medical College Hospital and Research Centre, Vijayapur, after obtaining the institutional ethical committee clearance. The patients admitted to medicine wards were screened according to inclusion and exclusion criteria and 120 patients were finally selected for the study.

Inclusion criteria

- Inpatients in general medicine wards.
- Patients of age above 18 years.
- Patients admitted to CCU and ICU.
- Patients who are willing to participate in the study.

Exclusion Criteria:

- Outpatients.
- Inpatients other than general medicine wards, ICU, CCU.
- Patients of OBG and Pediatrics.
- Patients who are not willing to participate in the study.

Data collection:

Data extracted from the case files by using data collection form (includes demographic data, chief complaints , social history , side effects, past medical history and past medication history, laboratory details, diagnosis and treatment chart). And DRP'S were documented in a structured patient data collection form design according to the study objectives.

Statistical analysis:

The data were expressed in simple mathematics and multiple responses were reported in terms of percentages.

The graphs and Table were generated using the Microsoft excel sheet.

RESULTS

Among the 120 selected patients, 79 were male patients (65.83%) and 41 were female patients (34.16%), more number of patients (35) were between the age group of 55-64 (29.16%) of which 27 were males & 8 were females, and very less number of patients (6) were between the age group 85-94 (5%) of which all the 6 were male.

Hypertension is the most commonest and dominant disorder, which affected 47 patients among 120 patients, in which 30 were male (25%) and 17 were female (14.16%), it constitutes 39.16% of the total study population.

Most common risk factor is HTN followed with smoking and diabetes, which is predominant in 30 males (25%), 15 females (12.5%) and totally 45 patients (37.5%) of the study.

Diuretics were the most often prescribed drugs in the study in which furosemide(69) was pescribed frequently followed by toresemide(32) and spiranolactone(17). Oral anti-coagulants were the second most prescribed drugs in which asprin(57), clopidogrel9(27) was more frequently prescribed. Ramipril was the frequently prescribed drug in ACE inhibitors. Amlodipine(34) was frequently prescribed in CCBs and propronolol(17) in BBs

The most often prescribed pattern adopted in CVD is Dual therapy, it is most frequently (50) used therapy (41.66%) and quadruple therapy is less frequently (6) used (6.5%). The diuretics and calcium channel blocker combination were maximally prescribed class of drugs as a dual therapy.

A total of 47 drug-drug interactions were found, among 12 were major, 15 were moderate and 20 were minor interactions. 3 interacting pairs of DDIs were predominantly seen in the study of which clopidogrel+rabeprazole was the mostly encountered interacting pair.

Management of the DDIs was done in the study in which one of the drug in the two interacting pairs has been replaced with the other alternative drug

Clinical pharmacist has intervened with the help of other health care professionals in order to reduce the risk factor and drug-drug interactions for the betterment of the patient.

DISCUSSION

A Prospective observational study was conducted on prescribing pattern of drugs and pharmacist/medical intervention in cardiovascular diseases in medicine department for a period of nine months. Total 120 study subjects were included in the study, out of which 79 were male patients constituting 65.83% and 41 were female patients constituting 34.16%. Males are more in number when compared to females (Table 1)

According to the study more number of patients (35) were between the age group of 55-64 constituting 29.16% of which 27 were males & 8 were females, and less number of patients (6) were between the age group 85-94 constituting 5% of which all the 6 were male.(Table 2).

Hypertension is the most dominant disease, which affected 47 patients in which 30 were male constituting 25% and 17 were female constituting 14.16% which is similar to the

study conducted by the Md. Abdul Muhit et.al, on Cardiovascular disease prevalence and prescription patterns at a tertiary level hospital in Bangladesh.[1]IHD patients (23) & ACS patients(19) were the second

predominantly observed diseases and a very rare cases of SVT(1),CVA(1),and DCM(1) were observed in the study. (Table 3).

Table 1: Gender distribution

SI. No.	Gender	No. of Patients	Percentage
1	Male	79	65.83
2	Female	41	34.16
	Total	120	100%

Table 2: Age distribution

SI. No.	Age group (in years)	Male		Female		Total	
		N	%	N	%	N	%
1	35-44	13	10.83	2	1.66	15	12.49
2	45-54	14	11.66	7	5.83	21	17.49
3	55-64	27	22.5	8	6.66	35	29.16
4	65-74	14	11.66	14	11.66	28	23.32
5	75-84	5	4.16	10	8.33	15	12.49
6	85-94	6	5	0	0	6	5
Total		79		41		120	

Table 3: Different types of CVD In male and female

SI. No.	Disease	Male	%	Female	%	Total	%
1	Hypertension	30	25	17	14.16	47	39.16
2	Angina	8	6.66	3	2.5	11	9.16
3	MI	6	5	6	5	12	10
4	ACS	15	12.5	4	3.33	19	15.83
5	IHD	12	10	11	9.16	23	19.16
6	Stroke	5	4.16	0	0	5	4.16
7	Dialated Cardiomyopathy	1	0.83	0	0	1	0.83
8	Supra ventricular tachycardia	1	0.83	0	0	1	0.83
9	Cerebrovascular accident	1	0.83	0	0	1	0.83
Total		79	65.83	41	34.16	120	99.99

The most commonly found risk factor in the study is HTN, which is predominant in 30 males constituting 25%, 15 females constituting 12.5% and totally 45 patients constituting 37.5% of the study which is contradicting with the study conducted by Peter Tanuseputro et.al, on Risk factors for cardiovascular disease in Canada.[14] The second common risk factor was smoking that was observed in 25 malesubjects and diabetes is also the other risk factor that was observed in 35 study subjects. The least observed risk factor is the family history (hereditary) that was observed in 5 study subjects.(Table 4)

Diuretics were the most often prescribed drugs in the study in which furosemide(69) was pescribed frequently

followed by toresemide(32) and spiranolactone(17). Oral anti-coagulants were the second most prescribed drugs in which asprin(57), clopidogrel9(27) was more frequently prescribed. Ramipril was the frequently prescribed drug in ACE inhibitors. Amlodipine(34) was frequently prescribed in CCBs and propronolol(17) in BBs.(Table 5)

Subjects in the study were treated with 4 different types of therapy(based on no. of drugs prescribed) like mono, dual, triple and quadruple therapy in which more patients(50) received dual therapy constituting 41.66% followed by triple therapy (39) and mono therapy (25). Quadruple therapy was given in very less study subjects(6) as show in the (Table 6).

Table 4: Common risk factors in CVD

SI. No	Risk Factors	Male	%	Female	%	Total	%
1	HTN	30	25	15	12.5	45	37.5
2	Smoking	25	20.83	0	0	25	20.83
3	Diabetes	17	14.16	18	15	35	29.6
4	Age	6	5	4	3.33	10	8.33
5	Family history	3	2.5	2	1.66	5	4.16
	Total	81		39		120	

Table 5: Class of drugs prescribed with respect to their individual drugs

SI. No.	Drug Class	Individual Class	No. of Subjects
1	Diuretics	Furosemide,	69
		Toresemide	32
		Spiranolactone	17
2	ACE inhibitors	Captopril,	12
		Ramipril	46
3	Beta blockers	Metprolol,	13
		Propranolol	15
4	ARBs	Losartan,	7
		Telimisartan	3
5	Oral anti-coagulants	Asprin,	57
		Clopidogrel,	27
		Warfarin	16
		Heparin,	2
		Enoxaparin.	2
6	Nitrates	ISMN	10
		ISDN	5
7	CCBs	Amlodipine,	34
		Nifedipine	13

Table 6: Type of prescribing pattern in CVD

SI. No	Type of Therapy	No. of patients	%
1	Mono	25	20.83
2	Dual	50	41.66
3	Triple	39	32.5
4	Quadruple	6	6.5
	Total	120	100

According to the study the most commonly prescribed dual drug combination is diuretics with CCBs(20) followed by ACE-I with diuretics (15) which is similar to the study conducted by OlusegunAdesola Busari1et. al, on Prescribing pattern and utilization of antihypertensive drugs and blood pressure control in adult patients with systemic hypertension in a rural tertiary hospital in Nigeria.[15](Table 7)

The present study identified the DDIs among patients admitted to cardiac unit of general medicine ward, a total of 47 DDIs were identified among 120 study subjects. Major DDIs were encountered for 12 times, moderate DDIs were encountered for 15 times and minor DDIs for 20 times.(Table 8)

Out of 12 major DDIs Clopidogrel +rabeprazole(6) is the most common inetracting pair followed by Furosemide +gentamycin (4) &Metronidazole+warfarin(2) of this study. Management of the DDIs was done in the study in which one of the drug in the two interacting pairs has been replaced with the other alternative drug (Table 9)

Table 7: Dual therapy

SI. No.	Name of the Drug Class	No. of Times Prescribed	%
1	Diuretics+CCB	20	40%
2	ACE-I+Diuretics	15	30%
3	AC+BB	2	4%
4	ACE-I+Nitrates	5	10%
5	CCB+ACE-I	8	16%
	Total	50	100

Table 8: Drug-drug interactions

SI. No.	DDI	No. of Times Encountered	%
1	Major	12	25.31
2	Moderate	15	31.91
3	Minor	20	42.55
	Total	47	

Table 9: Pharmacist intervention in management of major DDIs

SI. No.	Interacting pair	Effect	Management	No. of Patients Recovered
1.	Clopidogrel+Rabeprazole	Decreased action of Clopidogrel	PPIs were replaced with H2 antihistamines(Ranitidine)	6
2.	Furosemide+Gentamicin	Addittive drug effects Ototoxicity, Nephrotoxicity	Alternate medication is given(Amoxicillin)	4
3.	Metronidazole+Warfarin	Increased bleeding	Alternate antibiotic is used(Tinidazole)	2

CONCLUSION

The present study explores the common risk factors involved in CVD and prevalence of CVD with age and sex. The study reveals the prescribing pattern (dual therapy) drugs and common class of drugs prescribed for the management of CVD. Clinical pharmacist role play an important role in reducing the risk factors, drug-drugs interactions and drug related problems. The study provides the benefits of the presence of clinical pharmacist in a hospital setting, in order to prevention of medication errors; provide the expertise pharmacotherapy and better management of drug therapy based on patients specific factors. All together influence the improvement in patient compliance, safety, level of care, better control of risk factor and health care cost, thus the present study justify the need for active collaboration between clinical pharmacist, physician and other health care professionals in the better management of CVDs.

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CONFLICT OF INTEREST

Authors do not have any conflict of interest

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