Prescription Audit of Cardiac Drugs in Cardiac Outpatient: A Prospective Study

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Abstract:- **Cardiovascular disease is one of the largest causes of mortality. Cardiovascular diseases are diseases of heart and blood vessels which include coronary arterial disease; rheumatic heart diseases, congenital heart diseases, deep vein thrombosis and pulmonary embolism. As prescription audit is one of the systematic tools for determining the quality of medical care which also provide the documented evidence to support diagnosis and treatment. The risk factors for cardiovascular diseases are smoking, harmful use of alcohol, hypertension, diabetes etc. The aim was to study the prescription pattern of cardiac drugs in cardiac outpatients in Crimson Hospital. Patient's information was collected by observing the patients medication record with cardiovascular disease diagnosed by a cardiologist. Total 201 patients were included who were clinically diagnosed with cardiovascular diseases. The result of this study shows that most of the cardiac patients were age group from 61-70 years (26.4%) followed by 51-60 year age group (23.4%). Cardiovascular disease was more in male in comparison to female. Brahmin patients (42%) were mostly diagnosed with CVD in comparison to other races It was found that alcohol consumers patient were more in number than smokers and tobacco consumers. In occupation wise distribution most of the CVD patients were housewife (34.82%) followed by farmers (21.89%). During our study, we found most of the classified cardiac drugs were Renin-Angiotensin system. Most of the prescribed cardiovascular drugs were anti-platelet drug (7%) followed by calcium channel blocker (amlodipine 6%) in cardiac patients. Hypertension (47%) shows the highest diagnosis of diseases in patients. Oral route was mostly preferred rather than intravenous routes.**

Keywords:- Cardiovascular drugs, Coronary artery disease, Prescription, Prescription patter

I. INTRODUCTION

Non-Communicable Diseases (NCDs) are dominating worldwide. About 2/3rd (66%) of death occur due to NCDs (NHRC, 2019). In Nepal, NCDs began to be noticed in the second half of the 20th century (Vaidya, 2011). Among NCDs, Cardiovascular diseases (CVDs) are most prevalence (Vaidya, 2011). CVD is regarded as a number one killer in the world (Shakya *et al.*, 2013). CVD is regarded as burden in low and middle income countries like Nepal (LMIC). In LMIC, 3/4th of world's deaths are due to CVD (WHO, 2017). CVD kills 17.7 million in 2015 worldwide or globally (Khanal *et al.*, 2018).

In LMIC, people do not have the benefits of early detection and treatment with risk factors compared to people in high- income countries (WHO, 2017). CVD are a group of disorder of the heart and blood vessels. It includes coronary heart diseases, cerebrovascular diseases, peripheral arterial diseases, rheumatic heart diseases, congenital heart diseases, deep vein thrombosis and pulmonary embolism (WHO, 2017)

Prevalence cardiac problem in Nepal are HTN, Coronary artery diseases, Rheumatic heart diseases, congenital heart diseases (Shakya *et al.*, 2011). CVD is burden in shealth problems in developing countries like Nepal.Some of risk factors for CVDs are smoking, harmful use of alcohol, physical inactivity, unhealthy diets, obesity, hypertension, diabetes, hyperlipidemia (Dhungana *et al.*, 2018) CVD risk profile could be varied by age, sex, race and occupation (Dhungana *et al.,* 2018*)*. Raised Blood pressure is the major risk factor for cardiovascular diseases. Female were at higher risk of CVD as compared to males (Bansal *et al.*, 2016).

In order to reduce the CVD risk, field experts recommend a stepwise robust approach i) Evaluate the way people live, ii) Assess the main CVD risk factor, iii) Sensitize the population and health care providers for this problem (Adrega *et al.*, 2018). Cardiovascular diseases develop over a long time. CVD can be prevented or delayed by effectively managing modifiable risk factors through lifestyle changes, Pharmacologic therapy surgery. Modifiable risk factors include overweight, obesity, tobacco smoking, poor nutrition, insufficient physical activities, and high blood cholesterol.

Cardiovascular medicines are key element in preventing and treating cardiovascular diseases. Blood Pressure lowering medicine and lipid lowering agent reduces the chance of risk at patient developing cardiovascular diseases. Cardiovascular medicines are used to slow the progress of the diseases or treat symptoms in patients who have the diseases.

Appropriate medication can improve the quality of life and increased their life expectancy in patient with CVD. Prescription audit is the systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, and the

resulting outcome and quality of life for the patients and it is a continuous cycle, involving observing practice, setting standards, comparing practice with standards, implementing changes and observing new practice (Nuthan Kumar.*et al*., 2018). Prescription audit helps in assessing the quality of medical care, as prescription provides documented evidence to support diagnosis and treatment. Prescription auditing has the capability to promote the rational usages of drugs and essential medicine. It is necessary to conduct prescription audit periodically to make sure that the quality of health care provided. WHO has recommended core prescribing indicators to investigate the drug use in health facilities. These are average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounter with an injection prescribed, percentage of drugs prescribed from essential drug list. These indicators aim to measure the performance of health care providers in several important areas pertaining to appropriate or rational use of drugs (WHO, 1993).

➤ *Rational of the study*
Nepal is low and middle income countries, battling with communicable and non-communicable diseases (Vaidya, 2011).The incidence of CVD was 40% among NCD in Nepal (Khanal *et al*., 2017). CVD is the leading cause of mortality globally (Khanal et al., 2018).In 2012, death occurs due to CVD was 17.5 million. i.e. 31 % of total death. It has been estimated that 23.3 million people would die by 2030 only due to CVDs (Khanal *et al*., 2017). In Nepal, CVD was first documented in 1970s with MI, Coronary heart diseases (CHD) is most privileges among CVDs. A study done in Dharan found that privilege of C.H.D is 6% in male. In Gangalal National Heart Centre, the number of patient doubled annually between 2001 and 2008. Among 20% of CVDs patient, 8% patient had CHD in Tribhuvan University Teaching Hospital. The most common diseases of CVD after CHD are (Vaidya, 2011).

- RHD (20-28%)
- Hypertensive heart diseases (7-9%)
- Arrhythmia (4-11%)
- Congenital heart diseases (4-7%)
- Endocarditis (0.5-2.5%)

Ischemic Heart Diseases (IHD) are the leading cause of death for last 16 years from 2002-2017 (NHRC, 2019). In 1990, IHD were 3rd cause of death i.e. 67.72 rates per 100,000. About 2.46 % of premature death caused by IHD. Major risk factor contributing to death are high systolic blood pressure i.e. 5.87 % and smoking i.e. 7.19 % (NHRC, 2019)

In 2017, I.H.D is the leading (first) cause of death i.e. 100.45 rate per 100,000. 11.34 % premature deaths caused by IHD. Percentages of risk factor contributing to death are high systolic B.P i.e. 13.52 and smoking i.e. 12.89 (NHRC, 2019)

It has been estimated that tobacco consumption in adults will be double from 12% in 1995 to 25% in 2025 and rise to a staggering 40% by 2025 (Vaidya, 2011).

Management of CVDs in Nepal has been focused on treatment rather than education preventive health care.

II. OBJECTIVE

➤ *General objective*
To study, the prescription audit of cardiac drugs in cardiac outpatient in Crimson College of technology.

➤ *Specific Objective*
- To study the demographic of cardiac patients.
- To study the diagnosis of patients prescribed with cardiac drugs.
- To study about pattern of prescribed cardiac drugs.
- To study the prescribed cardiac drugs as per WHO core indicators.

III. LITERATURE REVIEW

CVDs are diseases of heart and blood vessels. It include coronary arterial diseases, rheumatic heart diseases, congenital heart diseases, deep vein thrombosis and pulmonary embolism (Nooreen *et al*., 2018). CVD increases the burden of diseases across the globe (Nooreen *et al*., 2018). Numbers of drugs have been used to minimize cardiovascular events and mortality(Sharma *et al*, 2013). They are anti-platelets, β-blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blocker (ARB) and cholesterol lowering statins. Second and third generation pharmacological agents show more pharmacological and clinical benefits (Sharma *et al*., 2013). Example: atorvastatin and rosuvastatin have less toxicity over older statin (Sharma *et al.*, 2013). Prescription Audit refers to studying the prescribing pattern in order to monitor, evaluate and if necessary suggest modifications in the prescribing practices of medical practioners (Saha *et al*., 2018).

Prescription auditing has potential to promote the rational usages of drugs and essential medicines. Essential medicines are one of the vital tools needed to improve and maintain health. Potential benefit of prescription audit are (Kandula *et al*., 2017).

- Identify and promote good practice and promote good practices.
- Improve professional practice and quality standard.
- Supports learning and development of staff and organization.
- Identify and eliminate poor or deficient practice.
- Identify and eliminate waste.
- Promote working with multidisciplinary team.
- Allocate resource to provide better patient care.

> *Epidemiology*

CVD is the number one killer in the world. It kills 30 million in 2007 (Mendis *et al.*, 2007) According to WHO, 17.5 million death occurs due to CVD in 2012. Among CVD, 7.4 million death occurs were due to CHD and about 6.7 million were due to stroke (Nooreen *et al.*, 2018)

A study conducted in the United Arab Emirates (UAE) reported 35% with HTN, 34% having dyslipidemia, 14.4% had a coronary artery diseases(CAD) and 29.5%

with Diabetic mellitus (Govender *et al.*,2019). CVD is prevailed in developed and under developed countries. About 75% of death have occurred in underdeveloped and developing countries (Nooreen *et al.*, 2018). 3/4th death occurs in low and middle countries. In 2016, about 13.8% of industrial workers of Nepal were diagnosed with CVD. In Nepal, HTN was the most prevalent risk factor for CVD range from 26% to 38.9 % (Khanal *et al.*, 2018). Heart diseases mortality in men occurs at young age whereas in women occurs around 60 years of age (Calling *et al.*, 2019)

> *Etiology*

Modifiable risk factors	Non-Modifiable risk factors
Tobacco use & exposure to tobacco smoke	Sex
Unhealthy diet	Age
Overweight/obesity	Race
Physical inactivity	Family history
Harmful use of alcohol	
Diabetes & hyperlipidaemia	

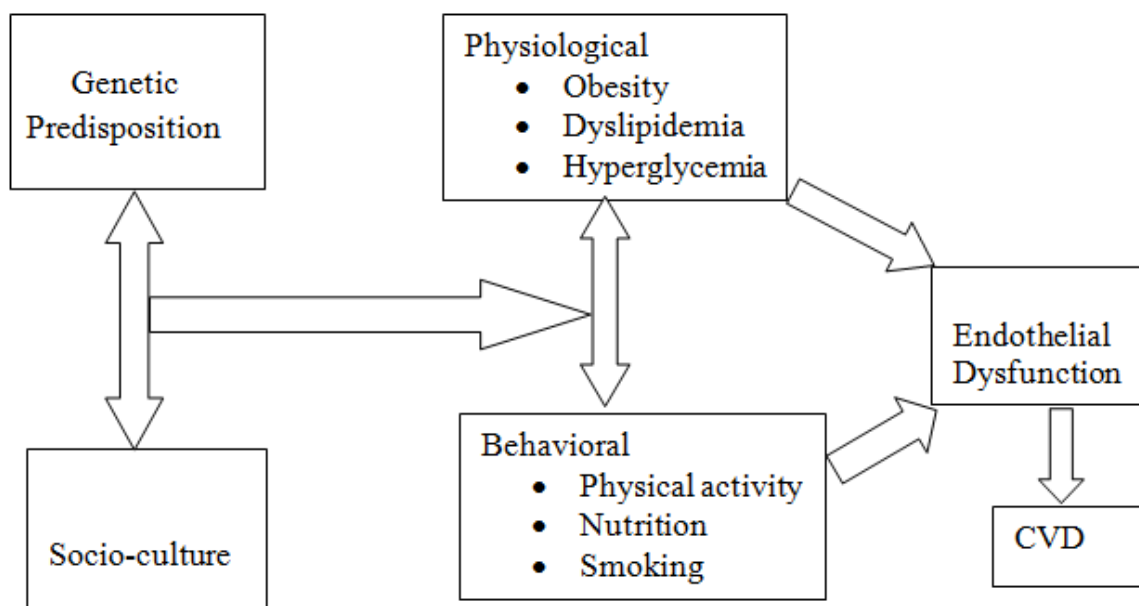Table 1

> *Causation Pathway*

Fig 1

Investigation of cardiovascular diseases (Ralston, Penman, Strachan and Hobson, 2018)
- Electrocardiogram
- Chest X-ray
- Echocardiography
- Electrophysiology
- Cardiac catheterization
- Radionuclide imaging
- Computed tomography
- Magnetic resonance imaging
- Bio-chemical Makers

Symptom of CVD (Ralston, Penman, Strachan and Hobson, 2018)
- Chest pain on exertion
- Severe prolonged chest pain
- Syncope
- Palpitation
- Breathlessness

Treatment of CVD: Medication (Division of non-communicable diseases ministry of health, Kenya, 2018

Class	Example	Usual monotheapy	Maxiumu daily dose	Possible side effect
Long lasting CCB	Amlodipine	5 mg OD	10 mg OD	Oedema Fatigue Headache Palpitation
	Felodipine	5 mg OD	10mg OD	
	Nifedipine	Retard tab: 10-20 mg daily BD LA tab:30mg OD	Retard tab: 30 mg daily BD LA tab:90mg OD	
Thiazide diuretic	Chlorothiazide	25mg OD	50mg OD	Hypokalaemia Hyponatraemia Hyperuric aemia Hypocalciuria Hyperglycemia Rash Dyslipidaemia
	Hydrochlorothiazide	12.5 mg OD	25 mg OD	
Thiazide like diuretic	Indapamide	2.5mg OD	5mg OD	
ACE Inhibitor	Captopril	25-50 BD or TDS	50 mg TDS	Cough (ACEI) Hyperkalaemia Increased serum creatinine Angioedema
	Enalapril	5-20 mg daily in 1 or 2 divided doses	20 mg daily in 1 or 2 divided doses	
	Lisinopril	10 mg OD	40 mg OD	
	Perindopril	4 mg OD or 5 mg OD	8 mg OD or 10 mg OD	
	Ramipril	2.5 mg OD	10 mg OD	
Beta blockers	Atenolol	25 mg OD	100 mg	
	Bisoprolol	2.5 mg OD	20 mg OD	
	Carvedilol	6.25mg	BD 25 mg BD	
	Labetalol	100 mg BD	400 mg BD	
	Metoprolol succinate	25mg OD	100 mg OD	
	Nebivolol	5 mg OD	20 mg OD	
ARB	Candesartan	8 mg OD	32 mg OD	
	Irbesartan	150 mg OD	300 mg OD	
	Losartan	50 mg OD	100 mg OD	
	Telmisartan	40 mg OD	80 mg OD	
	Valsartan	80 mg OD	160 mg OD	

CCB: Calcium channel blocker; ACE: angiotensin converting enzyme; ARB: angiotensin receptor blocker; OD: administer once daily; BD: administer twice daily; TDS: administer 3 times daily
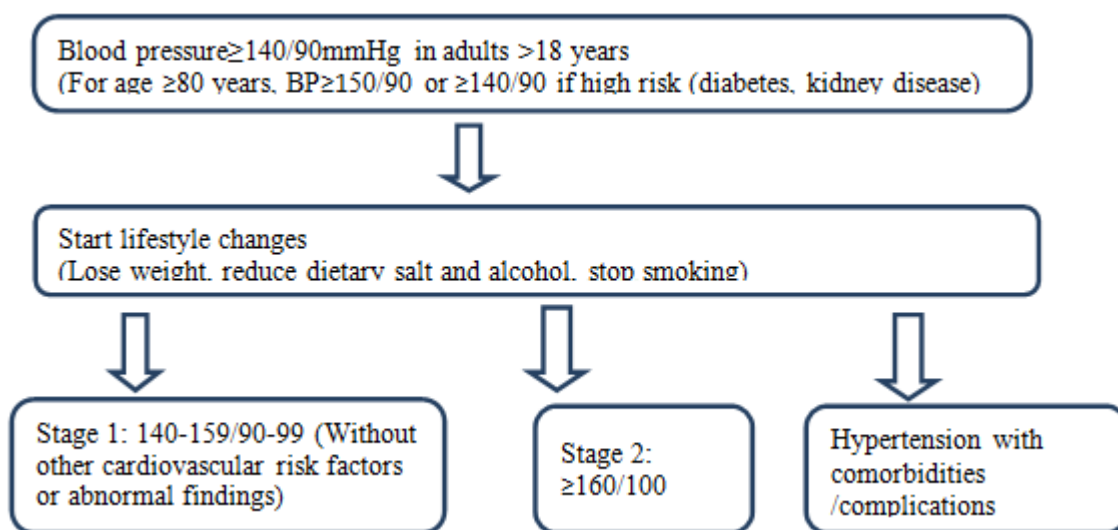
Table 2

Other Anti-hypertensive drugs				
Class	Example	Usual monotheapy	Maxiumu daily dose	Possible side effect
Centrally acting Agents	Methyldopa	250mg BD or TDS	1000mg/day	Angina Orthostatic Hypotension Gynaecomastia Rash
	Clonidine	0.1mg BD	2.4mg/day	
	Phenoxybenzamine	0mg BD	40mg TDS	
Potassium sparing diuretics	Amiloride	5mg OD/ divided	10mg OD or divided dose	Hyperkalaemia Headache
	Triametrene	25mg OD or divided dose	100mg OD or divided dose	
Loop Diuretis	Torasemide	5 mg OD	20 g OD	Hyperuricaemia Hypokalaemia
	Furosemide	20 mg OD	80mg OD or divided dose	
Vasodilators	Hydrallazine	25 mg BD or TDS	150 mg/day	Hypotension Palpitations
Alpha1 ReceptorBlocker	Prazosin	1mg BD-TDS	20mg/day	Hypotension, Diarrhea, Tachycardia
	Terazosin	1mg OD	20mg/day	

Table 3

➤ *Surgical Operation (WHO, 2017)*
• Coronary artery by pass
• Balloon angioplasty
• Valve repair and replacement
• Heart transplantation
• Artificial heart operation

Threshold for treatment initiation (Division of non-communicable diseases ministry of health, Kenya, 2018)
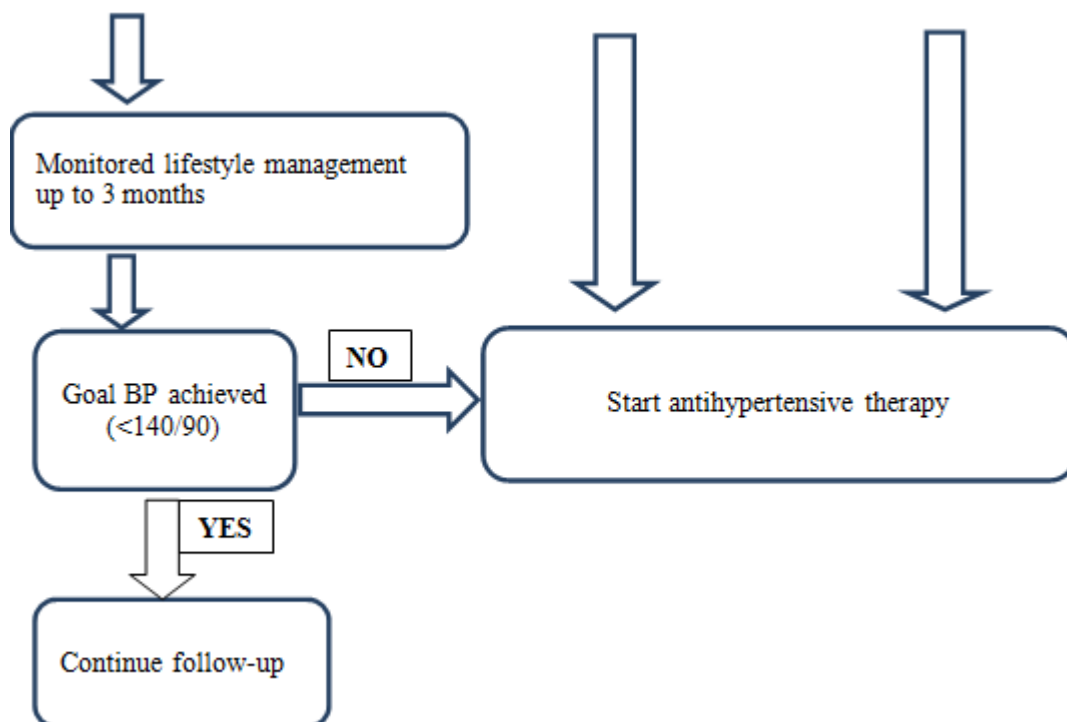
Blood pressure≥140/90mmHg in adults >18 years
(For age ≥80 years, BP≥150/90 or ≥140/90 if high risk (diabetes, kidney disease)

⬇

Start lifestyle changes
(Lose weight, reduce dietary salt and alcohol, stop smoking)

⬇   ⬇   ⬇

Stage 1: 140-159/90-99 (Without other cardiovascular risk factors or abnormal findings)

Stage 2: ≥160/100

Hypertension with comorbidities /complications

Fig 2

Choice of medication for lowering B.P. (Division of non-communicable diseases ministry of health, Kenya, 2018)
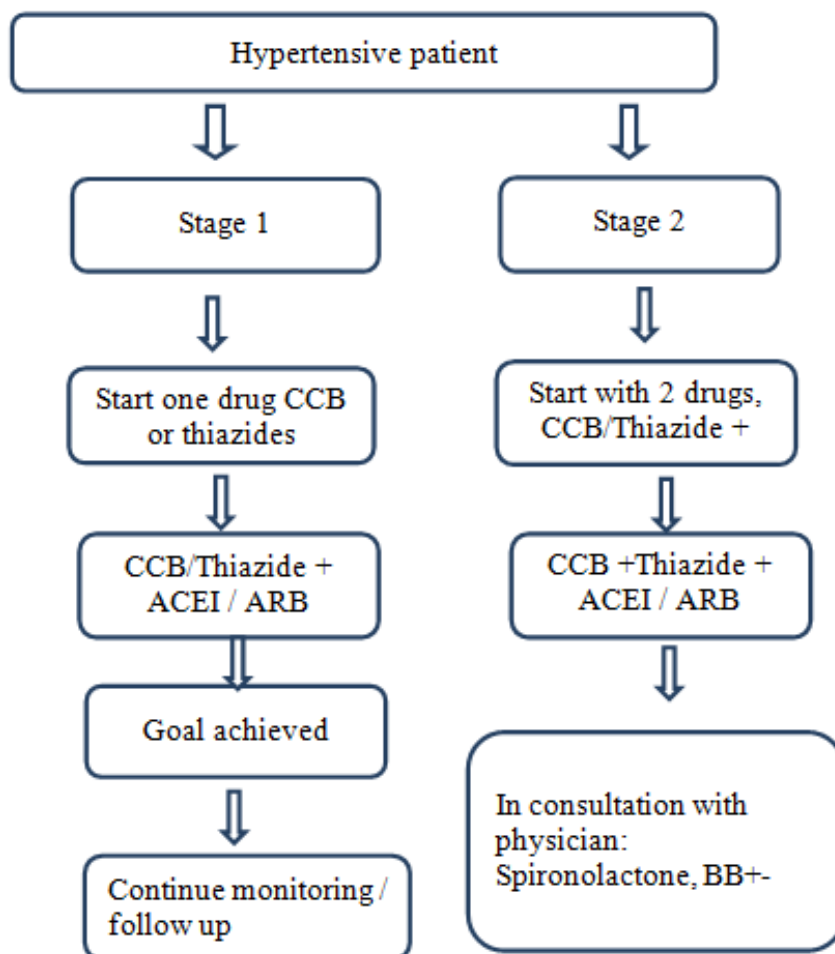

Fig 3

IV.   METHODOLOGY

Study site: The study was conducted at crimson hospital which is located in manigram and provides health services to rupandehi and other surrounding district like gulmi, palpa, kapilvastu, nawalparasi and other districts. This hospital has got various clinical departments like psychiatry department, cardiac department, and dental, orthopedics, dermatological, general and many more other department.

Study type: This is prospective observational study.
Duration of study: The study was conducted for six months.
Population size:
Total 201 patients were enrolled in this study.

➢ *Patient selection*

• *Inclusion Criteria: The inclusion criteria were:*
✓ Patients of age more than 18.
✓ Both the sexes were included in this study.
✓ Patient who attained the cardiac outpatient department at crimson hospital

• *Exclusion criteria: The exclusion criteria were:*
✓ Patient who refused to undergo follow up regular visit.
✓ Patient who were not interested to participate in this study.

Materials: Patient profile form was design manually by the researchers. The dully filled form contains patient demography data like name, address, age, gender, occupation, education, marital status, medication history, medical history, diagnosis, dosage form, dosage and duration.

Method: The method of entire study was carried out in three phases as discussed below:

❖ *PHASE: I*
Pilot and Literature review: A pilot study was carried out within a period of 4 weeks in order to analyze the feasibility and scope of the project then the study proposal was designed and its necessities of the project was submitted to department of pharmacy by considering those feasibilities and scope using final protocol.

Procuring the consent from hospital authority: In order to carry out the proposed project in the hospital, it should be reviewed and approved from the hospital authority by the Dean/Director to precede the study ahead and same as to the respective department along with physicians and health care professionals to utilize the hospital resources over the study period

Literature Survey: An exhaustive literature survey was carried out regarding **"prescription audit of cardiac drugs in cardiac outpatient: A prospective study**." The source includes journals like International journal of research in medical science, Nepalese heart journal, Bulletin of the world health organizations, Biomed central, Journal of clinical and experimental research, etc.

Patients Selection: All the outpatient with cardiac diseases diagnosed by Cardiac Doctor in the Crimson Hospital were included in the study, prescribed with the drugs, patient above the 12 years of age of either sex were included in the study. Designing of Data entry form/Questionnaire a separate Data entry format for incorporating Details was designed incorporating Patient Profile Form which contains details such as name, age, address, gender, past medication History, present medication History, medications, dose/frequency etc.

❖ *PHASE- II*
A plan was carried out to collect the record of patients suffering from cardiac diseases arrived at the OPD of Hospital within a period of three months. All the records were collected including demographic information and different drugs which were prescribed by the Doctors. Altogether 201 patient's record was randomly collected and was analyzed. The drugs prescribed in Brand names by qualified medical Doctors were then decoded into generic names by using Latest version of DIMS.

Assessing the prescription: Prospective data from patient medical cardex records with at least one drug along with supportive medications were obtained with regard to age, and prescribed. A total of 201 prescriptions were collected, observed and recorded.

❖ *PHASE-III*
Data Entry : The record of patient medications of the cardiac diseases were collected from the outpatient department from 25 july 2019- 25th to September 2019 paying attention to inclusion and exclusion criteria and were prospectively evaluated for the presence and fulfillment of following variables.
• Patients details: name, age, sex, address, occupation, marital status etc.
• Date of collection
• Diagnosis
• Medical History
• Medication History
• Dosage form
• Prescribed drugs
• Dose, Frequency and Duration

All of the above information on the record were noted and captured into the personal computer (ms-Excel).Data were coded, checked for completeness and consistency.

➢ *Data Evaluation:*
Patient Medical Record obtained during data collection was evaluated in ms-excel. All the Information collected regarding the Prescription audit of Cardiac Drugs used in Cardiac Diseases in the medication record including the study of demographic characteristic and diagnosis of Patients prescribed with cardiac drugs, study about pattern of prescribed cardiac drugs, essential drug prescribed, and

study of prescribed cardiac drugs as per WHO core indicators.

➤ *Report preparation:*

Information Regarding the drug prescription pattern, use of essential drugs, risks for patients adverse effect, prescribing indicators given by WHO and other factors related were incorporated in the report. For descriptive statistics, results were expressed in terms of percentages and presented using tables according to the types of tool used.

➤ *Report Submission:*

After completing the report entitled "**Prescription Audit of Cardiac Drugs in Cardiac Outpatient: A Prospective Study**" was submitted to the department of pharmacy, Crimson College of Technology and to the Crimson Hospital, Manigram, Rupandehi, Nepal hoping for the proper implementation for expected outcomes to contribute improving the quality of drugs prescription pattern for patients and with the anticipation to appreciate in the future.

V. RESULT

➤ *Age-wise distribution of patient*

Altogether 201 patients were included in this study. The age distribution of the patient is given in table. At present study, most of CVD patient from age group 60-70 years (25.37%) followed by 50-60 year age group (22.39%) . The mean average is 57.2 and standard deviation is ±14.4

Age group	Number of patients (N)	Percentage (%)
Less than 30	8	4.0
31-40	26	12.9
41-50	30	14.9
51-60	47	23.4
61-70	53	26.4
71-80	33	16.4
81-90	4	2.0
Total	201	100.0

Table 4:- Age distribution of the patients (n=201)

Gender-wise distribution of patients. The Gender wise distribution of the patients is given in the fig 4 In our study, the more number of CVD patient were male (56 %) and less number of patient were female (44%)
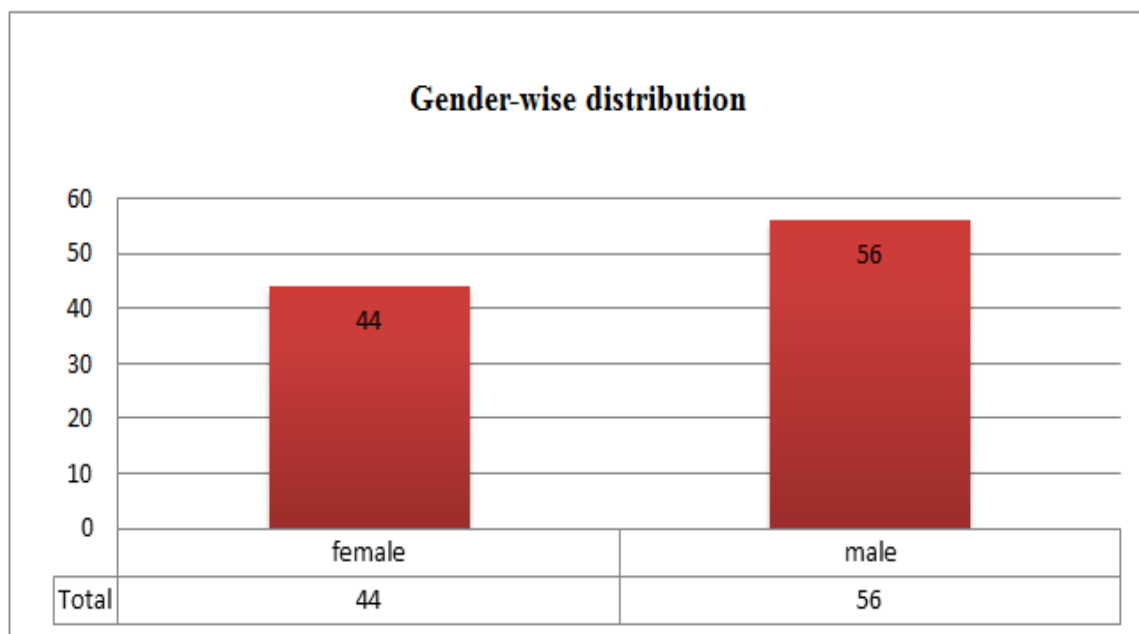

Fig 4:- Gender-wise distribution

➢ *Racial distribution of patients*

The detail of racial distribution study patients are given in the figure 5 In our study we found that 41% were Brahmin followed by chettri (12%), followed by others (27%).
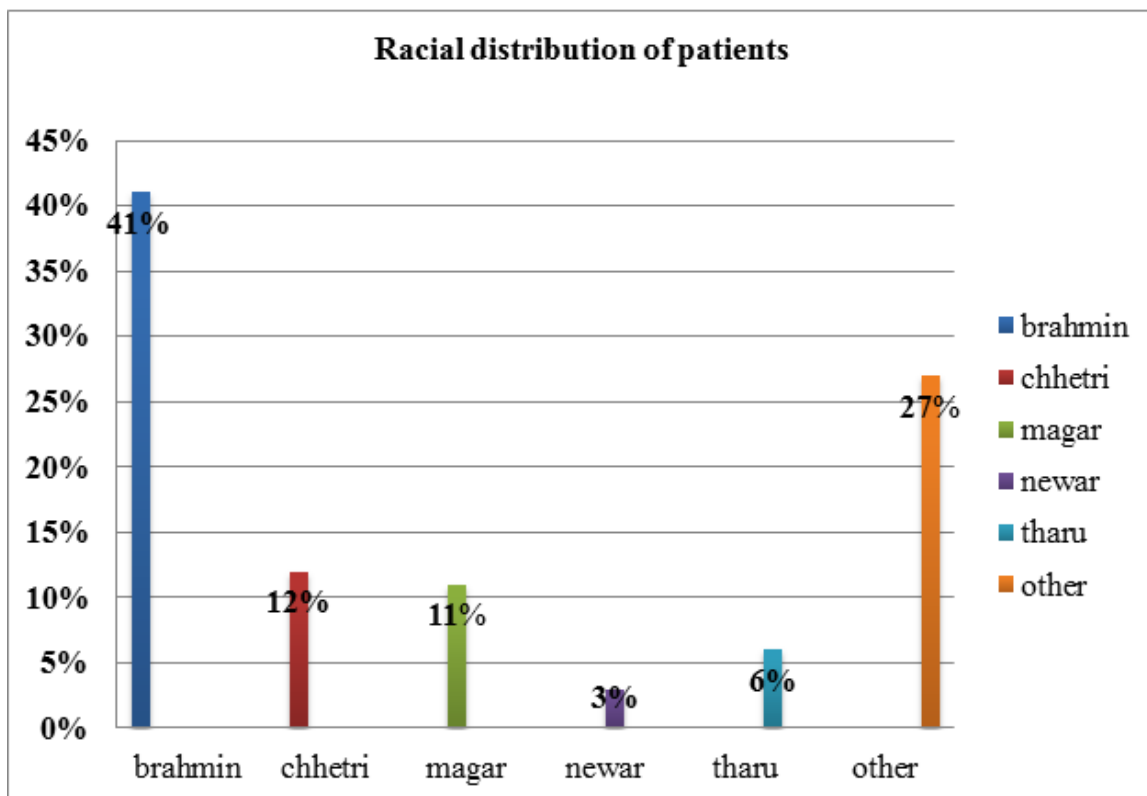

Fig 5:- Racial wise distribution

Social history wise distribution of patient: The social history wise distribution of patients is given in the figure 6 It was found that alcohol consumer's patients were more in numbers (24.05 %) as compared to smoking and tobacco consumer's patients.
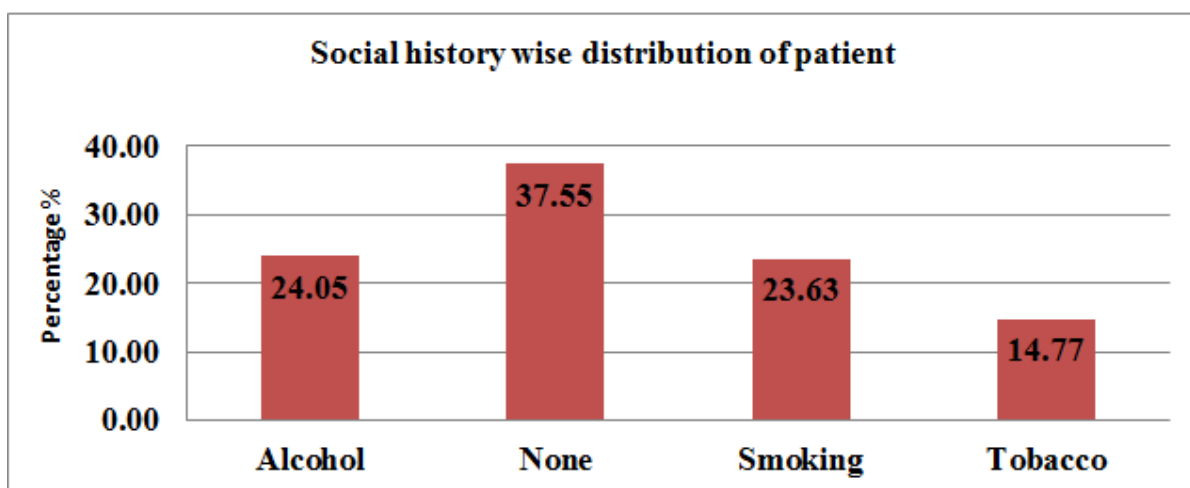

Fig 6:- social history wise distribution

Occupation wise distribution of patient: The occupation wise distribution of patients is given in the table 5 It was found that most of the CVD patients were housewife (34.82%) compared to others.

Medical history wise distribution of patients: The medical history wise distribution of patients is given in figure 7 Medical history was evaluated and is presented in percentage. DM was found to be most prevalent among the patients.

Occupation	No. of patient (N)	Percentage (%)
House wife	70	34.82
Farmer	44	21.89
Service	37	18.4
Business	28	13.93
Others	22	10.94
Total	201	100

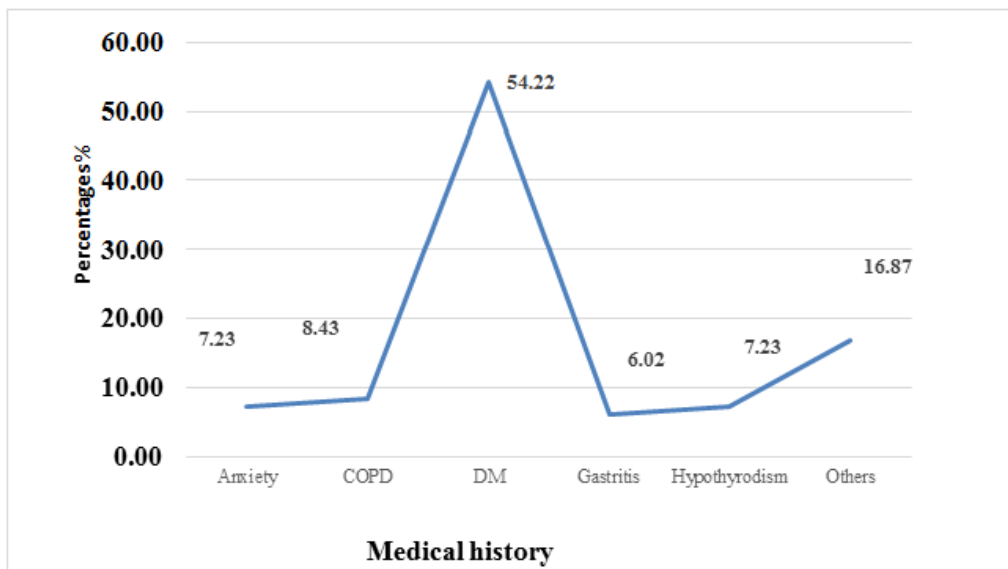Table 5:- occupation wise distribution of patients

Fig 7:- Medical history wise distribution of patients.

Diagnosis in CVD Patients: The details of diagnosis of cardiovascular diseases are given in figure 8 Overall we found that, Hypertension have highest majority (48.28 %) as associated diseases followed by MI (19.40 %).

Gender wise distribution of diseases: The gender wise distribution of disease are given in the figure 9 In our study, HTN is more prevalence in female (24.38 %) than male (23.38 %), likewise for MI male (12.94%) suffered more than female (6.97%).
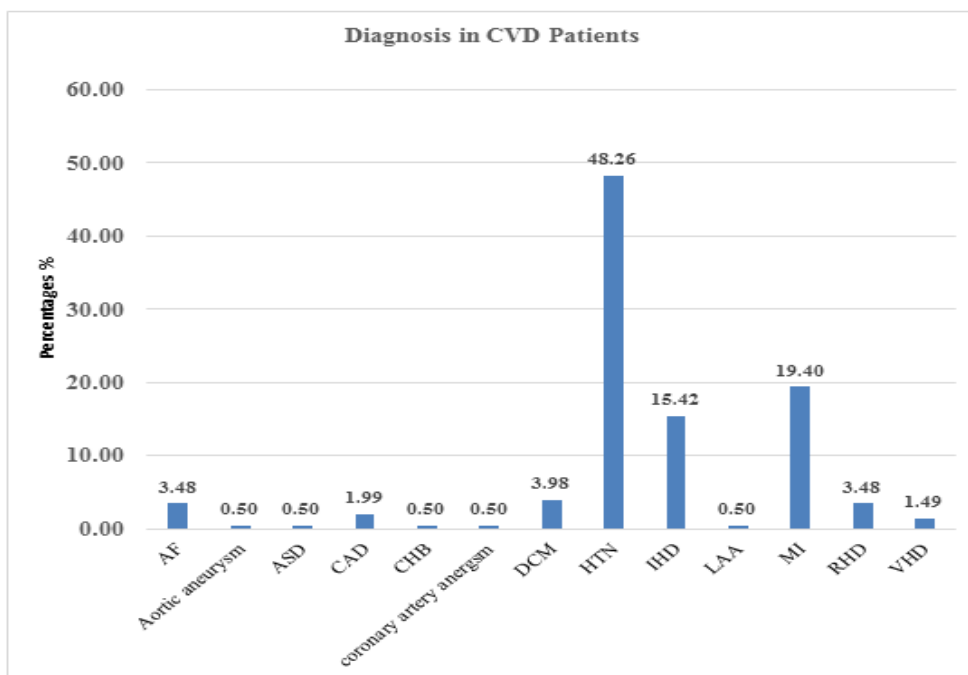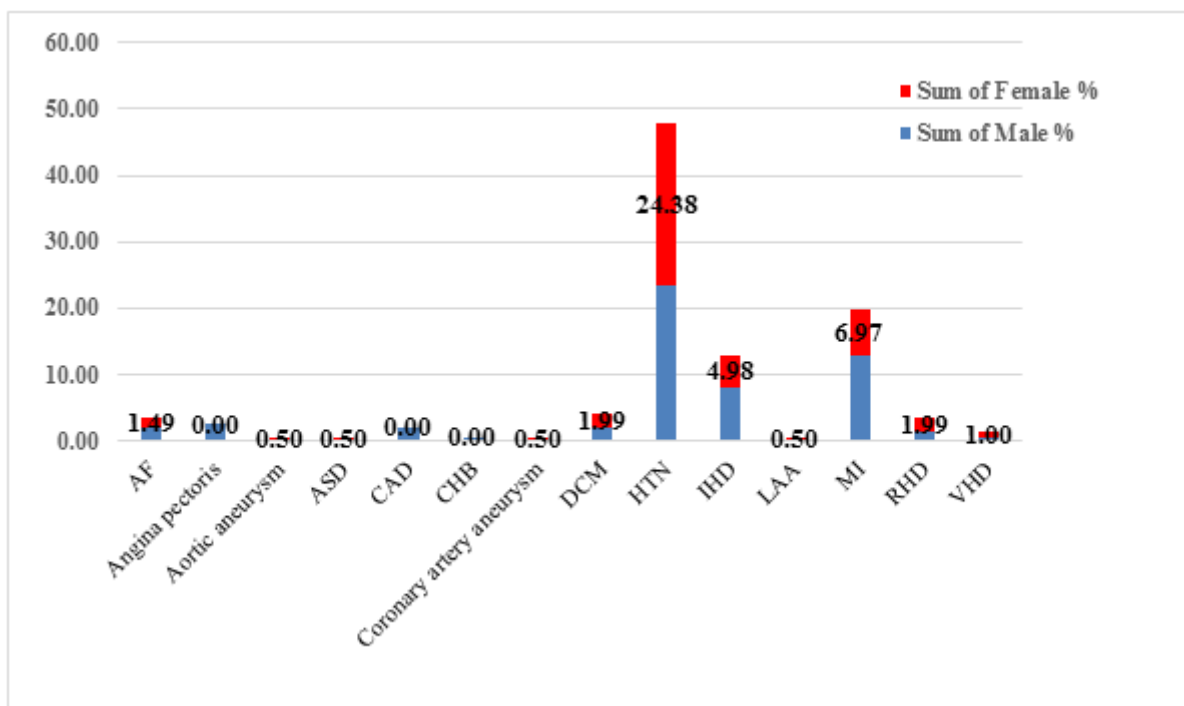

Fig 8:- Diagnoses in CVD

Fig 9:- Gender wise distributions of diseases

Number of Drug per Prescription in CVD Patients: Number of Drug per Prescription in CVD Patients are given in figure 10 the highest number of prescription contains two drugs i.e. 24%and least number of prescriptions contains seven and eight drugs

Most commonly prescribed drugs in CVD: The details of most commonly prescribed drugs in CVD patients are given in figure 11 In our study, we found that losartan (10%), amlodipine (7%) and aspirin (7%) were most commonly prescribed drugs.
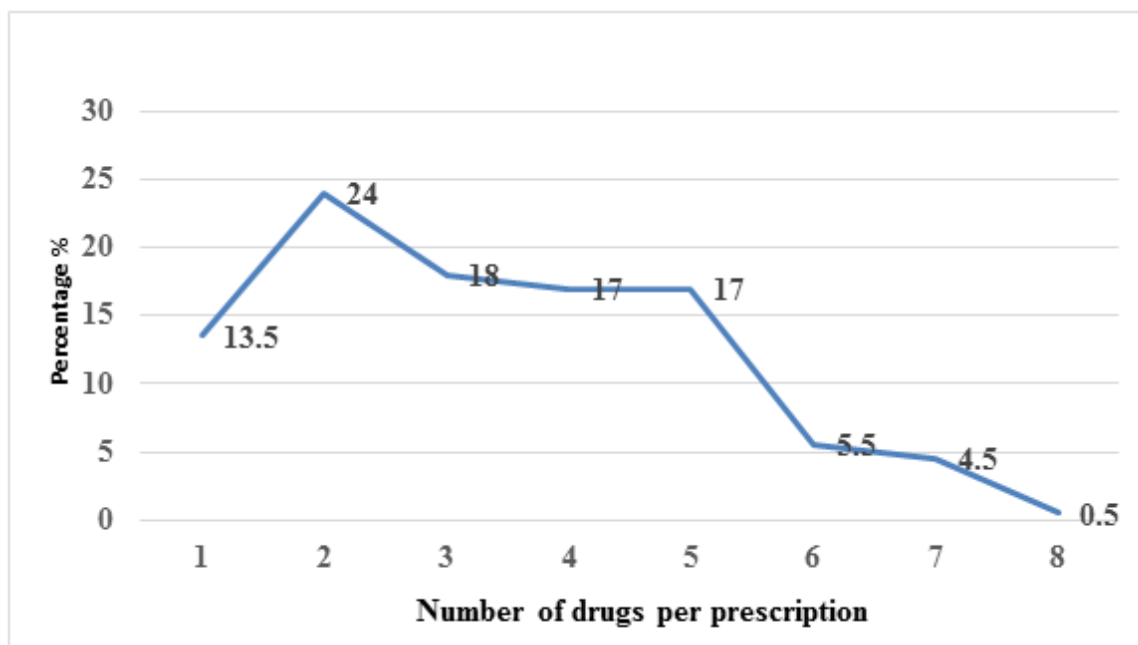

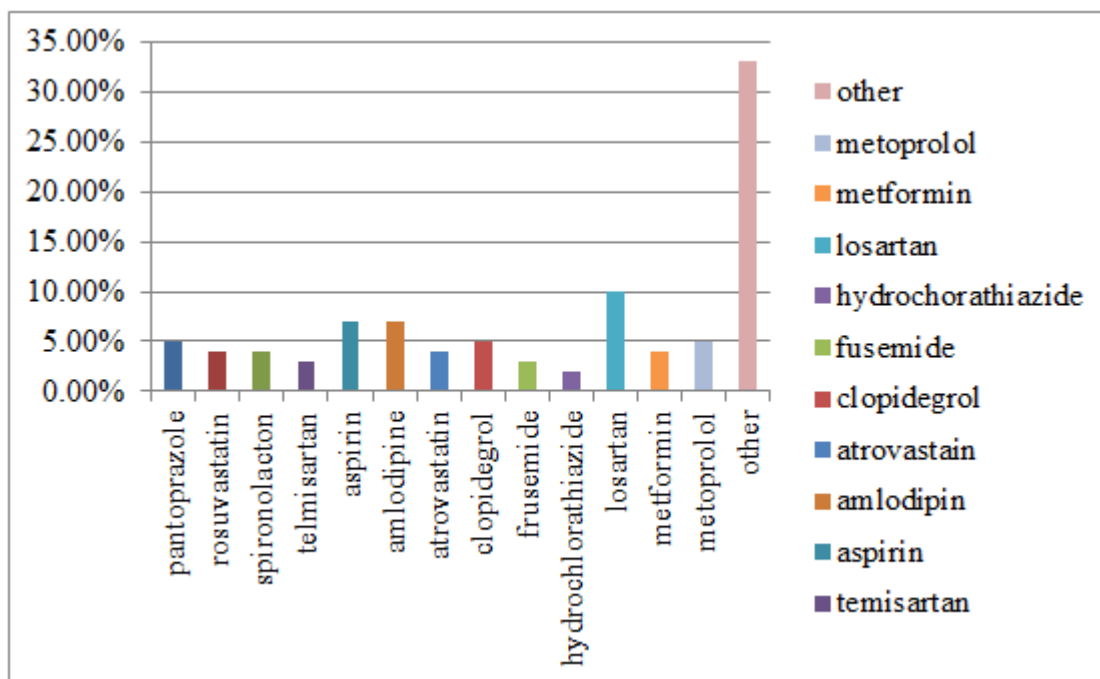Fig 10:- Number of Drug per Prescription in CVD Patients

Fig 11:- Most commonly prescribed drugs used in CVD

Classification of cardiac drugs (AIHW, 2017). The detail of classification of cardiac drugs are given in Table 6 In our study, we found that drugs belonged to the class Renin-Angiotensin System agent were given to about 19.71% followed by Antithrombotic agents (17.37%).

WHO recommended Prescribing indicator: The details of WHO recommended prescribing indicators are given below in Table 7 (WHO, 1993).

ATC code	ATC Classification	Number (N)	Percentage (%)
B01	Antithrombotic agent	119	17.37
C01	Cardiac Therapy	15	2.19
C02	Antihypertensive	14	2.04
C03	Diuretics	124	18.10
C04	Peripheral Vasodilators	2	0.29
C05	Vasoprotectives	0	0.00
C07	Beta Blocking Agents	107	15.62
C08	Calcium Channel Blockers	70	10.22
C09	Renin-Angiotensin system Agents	135	19.71
C10	Lipid modifying Agents	99	14.45
	Total	**685**	**100**

Table 6:- Classification of cardiac drugs.

S.N	WHO recommended prescribing indicators	Result
1	Total number of drug prescribed	992
2	Average number of drug prescribed	4.905
3	Percentage of drugs prescribed by generic name	0.1
4	Percentage of patient encounters with an antibiotics prescribed	0.2
5	Percentage of patient encounters with an injection prescribed	0.3
6	Percentage of drugs prescribed from national EDL	42.33

Table 7:- WHO recommended prescribing indicators.

VI. DISCUSSION

In our study, total 201 number of cardiac patient were analyzed which contain 56% were male and 44% were female, due to availability of more population of male in the hospital locality. The similar type of study was done in Karnataka (India) found that 64.7% male and 35.3% female (Nagabushan *et al*., 2015). At present study, most of cardiovascular disease patient from age group of 61-70 years (26.4%) followed by 51-60 year age group (23.4%).The mean average age is 57.2 and standard deviation is ±14.47. In our study, we Found that Brahmin races were 41.71%, followed by Chhetri (12.06%). The highest percentage of Brahmin patient found because the study was conducted in the Brahmin locality which is in accordance with the study conducted by the RR Dhugana (Dhungana *et al*., 2015)

In our study, 62.45% patients had social history. Among them 24.05% patients were addicted to alcohol, 37.55% patients were to smoking and 14.77% patients were addicted to tobacco. The proportion of alcohol consumers (24.05%) and smokers (23.62%) were higher than tobacco consumer.

In case of occupation wise distribution of patients, the highest number of patient was found to be housewife(34.82%) followed by farmer(21.89%).The percentage of housewife was highest due to lack of exercise, poor education level, fatty food consumption, obesity etc. In a similar study conducted in Kathmandu, Nepal found that 45.2% were housewife followed by self-employed(24.7%) and other (Dhungana *et al*., 2015)

According to the study we found that the more patient were diagnosed with HTN (47.76%), followed by MI (19.90%), IHD (12%). The similar study was conducted in the Karachi, Pakistan found that ,more patient were diagnosed with HTN followed by IHD (20%) and MI(10%) (Ali H, 2015)

The incidence of CVD is higher in male than female. It was found that the incidence of HTN in male (23.38%) and female (24.38%) were similar, whereas MI was diagnosed at higher rate in male (12.94%) than female (6.97%). The incidence of IHD is almost double times in male (7.96%) as compared to female (4.98%).

Mostly CVD patient may suffer from other diseases. We had found that CVD patients suffered from diseases like COPD (8.43%), DM (54.22%), Hypothyroidism (7.23%), Anxiety (7.23%), Gastritis (6.02%) etc. Among them DM patients (54.22%) were diagnosis as highest in CVD patients.

Mostly two numbers of drugs were prescribed to 24 % patients followed by three numbers of drugs, four number of drugs, and five number of drugs. The average of drugs prescribed per prescription is 4.9 whereas in other type of similar studies showed 3.1,6.49 and 8.8 (Darji *et al*., 2015) (Dabhade *et al*., 2013) (H. & S., 2011).

Drugs related to CVD are renin-angiotensin system, lipid modifying agents, beta blocking drugs, anti-diuretics, etc. Among the classification of cardiovascular prescription medicine we found the rennin-angiotensin system agent (19.71%), were more used in cardiac patient followed by diuretics (18.10%) and antithrombotic (17.37%) then other drugs.

Our prescription database includes 95 different drugs. The prescription of CVD preventive drugs in the study was frequent. The most commonly prescribed drugs were losartan (10%) followed by aspirin (7%), amlodipine (7%), clopidogrel (5%), metoprolol (5%), Rosuvastatin (5%) etc. The most commonly prescribed drugs were antihypertensive drugs followed by antiplatelet androsuvastatin drugs.

WHO has recommended core prescribing indicators to investigate the drug use in health facilities that helps to measure the rational use of drugs. As per the prescription of our study only 0.1% of drugs were prescribed in generic names whereas the other studies showed that about 60%, 63.34% and 4.16% (H. & S., 2011) (Darji *et al*.,2015) (Kaur B, Walia R, 2013). Among 992 drugs prescribed to 201 patients, the prescribers prescribed 420 drugs from the national EDL. According to our prescription database, prescribers prescribed 0.3% injection dosages form over CVD patients.

VII. CONCLUSION

In conclusion, the result of this study shows that most of the cardiovascular drugs are used in the treatment of cardiac diseases in cardiac patients. During our study most of the CVD patients were male. It is found that CVD occurs between 60-70 age groups. Patient addicted to alcohol, smoking and tobacco had high incidence to be affected by CVD .We have found that, most of CVD patient were housewife. In our study we found that most of the patients were diagnosed with HTN followed by MI and IHD. HTN diagnosis patient were similar in male and female but MI diagnosed patient were more in male. We have found that prescribers prescribed two numbers of drugs to large number of patients. In our study we found that most of the cardiovascular drugs groups are prescribed among which anti- hypertensive significantly highest percentage of prescription had. Among the cardiovascular drugs losartan were given to large number of patient followed by amlodipine, aspirin and so on.

The study showed that there will be still a high number of branded drug prescribed for cardiovascular patients. By minimizing the prescription of branded drugs, patient's quality care can be obtained and economic burden can be reduce to the patients. By studying more no of cases in different hospitals the result may be more accurate.

LIMITATION

One of the limitations is sample size calculation and sampling method. Sample size was not calculated prior to study and also we follow the purposive sampling rather than randomization. The major limitation is the follow up the patients. Since the study was conducted only in one hospital. By analyzing more no of cases in different hospital the result may be more accurate.

REFERENCES

[1]. Adrega T, Ribeiro J, Santos L, Santos JA (2018), Prevalence of cardiovascular disease risk factor, health behaviours and arterial fibrillation in a Nepalese post-seismic population : A cross-sectional screening during a humanitarian medical mission, *Nepalese heart journal*, **15**(2), 9-13.

[2]. Calling S, Johansson SE, wolff M, Sundquist J, Sundquist K,(2019), The ratio of total cholesterol to high density lipoprotein cholesterol and myocardial infarction in women's health in the lund area: A 17 year follow up cohort study, *BioMed centralcardiovascular disorder*,**19**(239)**,** 1-9.

[3]. Dabhade S, Gaikwad P,(2013)<Comparative evaluation of prescription of MBBS and BAMS doctors using WHO prescribing indicators, *Medical journal of Dr. DY PatilUniversity*,**6**(4), 411.

[4]. Darji NH, Vaniya H,(2015), Prescription audit in the inpatients of a tertiary care hospital attached with medical college, *Journal of Clinical and ExperimentalResearch*, **3**(2),197.

[5]. Dhungana RR, Khanal MK, Pandey AR, Thapa P, Devkota S, Mumu SJ, Shayami A, Ali L (2015). Assessment of short term cardiovascular risk among 40 years and above population in a selected community of Kathmandu, Nepal. *J Nepal Health ResearchCouncil*, **13**(29), 66-72.

[6]. Dhungana RR, Thapa P, Devkota S, Banik PC, et al,(2018), Prevalence of cardiovascular disease risk factor: A community based cross-sectional study in a peri-urban community of Kathmandu Nepal, *Indian heart journal*,**70**, S22-S27.

[7]. Govender RD, Al-Shamsi S, soteriades ES, Regmi D, (2019), Incidence and risk factor for recurrent cardiovascular disease in middle eastern adults : A retrospective study,*BioMed central*,**19**(253), 1-7.

[8]. H Nagabushan, HS Roopadevi, GM Prakash, R Pankaja (2015). A prospective study of drug utilization patterns in cardiac intensive care unit at a tertiary care teaching hospital. International Journal of Basis and Clinical Pharmacology, **4**, 579-583.

[9]. http://www.health.go.ke/wp-content/uploads/2018/06/Hand-book-Cardiovascular-2018_19_5_18_Final.pdf

[10]. http;//apps.who.int>

[11]. https://mohp.gov.np/attachments/article/449/5.%20NBoD%20Report%202019.pdf

[12]. https://www.aihw.gov.au/getmedia/e84e445a-b4f0-4eac-96ee-b4cbf4e5639a/aihw-cvd-80.pdf.aspx?inline=true

[13]. https://www.dwraju.com.np

[14]. https://www.who.int/medicines/publications/essential medicines/en/

[15]. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

[16]. Kandula PK, Rao SB, Sangeeta K, Gudi SK et al, (2017), A study of prescription audit in outpatient department of a tertiary care teaching hospital in India: an observational study, *Journal of drug delivery and therapeutics*, **7**(3), 92-97.

[17]. Khanal MK, Ahamad M, Moniruzzaman M, Banik PC, et al, (2017), Total cardiovascular risk for next ten years among rural population of Nepal using WHO/ISH risk prediction chart, *BioMed central*,**10**(120)**,** 1-7.

[18]. Khanal MK, Ahamad M, Moniruzzaman M, Banik PC, et al, (2018), Prevalence and clustering of cardiovascular disease risk factors in rural population aged 40-80 years, *BioMed central*,**18**(677), 1-13.

[19]. Kumar NUS, Nalini GK, Deepak P, Prema M,et all,(2018),Prescription audit of outpatients in tertiary care governmenthospital, *International Journal of Basic and Clinical Pharmacology*, **7**,636-639.

[20]. Mandis S, fukino K, Cameron A, Laing R, et al, (2007), The availability and affordability of selected essential medicine for chronic disease in six low and middle income countries, *Bulletin of the world health organisation*,**85**(4), 279-288.

[21]. Nooren M, Maryam, Hani H, Fatima S, et al, (2018), A pharmacoepidemiology study of cardiovascular drugs in intensive cardiac care unit patients in a tertiary care hospital, *International journal of medical research and health science*, **7**(4), 88-93.

[22]. Olusesan FJ, Simeon OO, Olatunde OE, Oludare OI, et al, (2017),Prescription audit in a paediatric sickle cell in south west Nigeria :A cross sectional retrospective study, *Malawai medical journal*, **29**(4), 285-289.

[23]. Potharaju HR, Kabra SG,(2011),Prescription audit of outpatient attendees of secondary level government hospitals in Maharastha, *Indian journal ofPharmacology*,**43**(2),150

[24]. Ralston SH, Penman ID, Strachan MWJ and Hobson RP (2018) *Davidson's Principles and Practice of Medicine* (23rd edition) Elsevier ltd Edinburgh London New York, 448-456.

[25]. Saha A, Bhattacharjya H, Sengupta B, Debbarma R, (2018), Prescription audit in outpatient department in teaching hospital of North East India, *International journal of research in medical science*, **6(4)**, 1241-1247.

[26]. Sakya S, Sharma D, Bhatta DY, (2011), Current scenario of heart disease in Nepal: At a glance, *Nepalese heart journal*, **8**, 23-26.

[27]. Sharma KK, Mathur M, Gupta R, Guptha S,et al,(2013), epidemiology of cardio-protective pharmacological agent use in stable coronary heart disease, *Indian heartjournal*, **65**, 252-255.

[28]. Solanki ND, Shah C, (2015), Prescription audit in outpatient department of specialty hospital in western India: an observational study, *International journal of clinical trials*, **2(1),** 14-19.

[29]. Vaidya A, (2011), tackling cardiovascular health and disease in Nepal: epidemiology, strategies and implementation, *British medical journal*, 87-91.

[30]. Zafar F, Ali H, Naveed S, Korai OU, Rizvi M, Naqvi GR and Siddiqui S (2015). Drug utilization pattern in cardiovascular Diseasess: A Descriptive Study in Tertiary care settings in Pakistan. *J Bioequiv Avilab*, **7**(1):026-029.

[31]. Bansal P, Chaudhary A, Wander P, Sajita M, Sarit Sharma, Girdhar S ,et al (2016). Cardiovascular risk assessment using WHO/ISH risk prediction charts in a Rural area of North India, *Journal of Research in Medical and Dental Science*, **4**(2), 127-131.

[32]. Kaur B, Walia R (2013). Prescription audit for evaluation of prescribing pattern of the doctors for rational drug therapy in tertiary care hospital. *Journal of Drug Deliveryand therapeutics*, **3**(5), 77-80.