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Research Article

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Assessment of Drug Therapy Problems Among Patients with Cardiovascular Disease in the Medical Ward and at the Ambulatory Clinic of Hiwot-Fana Specialized University Hospital 2022

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ABSTRACT

Background: Cardiovascular diseases remain the most significant cause of death worldwide. A World Health Organization Report (WHO) (2011) estimated that 17.1 million people die of cardiovascular disease (CVD) each year, representing 30% of all deaths. Of this, about 7.3 million are due to coronary heart disease, and 6.2 million people are dying from CVD, mainly from heart disease and stroke, which are projected to remain the single leading cause of death.

Objective: This Study aimed to assess drug therapy problems among hospitalized and follow-up patients with cardiovascular diseases at Hiwot-Fana Specialized University Hospital.

Methods: The Study was cross-sectional. The study included all patients who met the inclusion criteria, was admitted with cardiovascular disorders to the internal medicine ward between March 1 and March 30, 2022, and had follow-ups at an ambulatory clinic at HFSUH. A systematic questionnaire was used to gather information on sociodemographic factors, family history, working diagnosis, pertinent laboratory data, current drugs, drug therapy issues, compelling agents, vital signs, etc. Data collecting forms were completed by reviewing patient cards and conducting patient interviews. SPSS for Windows version 20 was used to analyze the data. Data analysis and any potential correlation between variables were done using binary logistics, regression, and descriptive statistics.

Results: Of 216 study participants, 131 (60.65%) had DTPs. From the seven classes of DTPs studied, 16 (12.2%) cases related to unnecessary drug therapy, 76 (58%) need additional drug therapy, 9 (6.9%) cases related to ineffective drug products, 14 (10.7%) cases related to inappropriate dose and 16(12.2%) cases related to Noncompliance. Ineffective drug products in 9 (6.9%) cases were the least prevalent DTP. Independent factors that predicted the occurrence of DTPs in the study population were sex, age, family history, and social drug use.

Conclusion: Drug therapy issues were generally prevalent among patients who were followed up at ambulatory clinics and admitted to internal medicine. In approximately 216 individuals, 131 drug therapy issues were found; extra drug therapy is responsible for 58% of all DTPs. The two most prevalent drug therapy issues, Noncompliance and unnecessary drug therapy, accounted for 12.2 and 12.2% of all DTPs, respectively. The overall prevalence of DTPs in this Study was 60.65%, which calls for extra care and collaboration from medical professionals to address this issue.

Keywords: Drug Therapy Problem, Cardiovascular Disease, Unnecessary Drug Therapy, Noncompliance

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List of Abbreviations and Acronyms

ADR	:	Adverse drug reaction
AHA	:	American Heart Association
CVA	:	Cerebrovascular accident
CVD	:	Cardiovascular disease
CCF	:	Congestive cardiac failure
DNOs	:	Drug-related negative outcomes
DRP	:	related problem
DTP	:	Drug therapy problem
HFSUH Hiwot	:	Fana Specialized University Hospital
HF	:	Heart failure
IHD	:	Ischemic heart disease
PPI	:	Proton pump inhibitors
RDNOs	:	Risk for a drug-related negative outcome
WHO	:	World Health Organization

Introduction

Cardiovascular diseases remain the most significant cause of death worldwide. A World Health Organization Report (WHO) [2011] estimated that 17.1 million people die of cardiovascular disease (CVD) each year, representing 30% of all deaths. Of this, about 7.3 million are due to coronary heart disease, and 6.2 million people are dying from CVD, mainly from heart disease and stroke, which are projected to remain the single leading cause of death [1].

compromised by drug therapy problems. All patient problems involving medications can be categorized into one of seven types of drug-related problems. These include unnecessary drug therapy, need for additional drug therapy, ineffective drug, dosage too low, adverse drug reaction, dosage too high and Noncompliance [2].

Drug therapy problems are the dominant reasons for admission. A retrospective cross-sectional

A study in Singapore showed that 71.9% of DTP resulted in admission [3]. In contrast, from a prospective survey by lender AJ et al., among 1300 unplanned admissions, 714(5.6%) were medication-related, but 46.5% of these admissions were potentially preventable [4]. A review of the literature concerning drug therapy problems (DTPs) has shown that 28 % of all emergency department visits were medication-related, including adverse events, of which 70%-90% were preventable [5].

Both physicians and pharmacists are responsible for medication errors in irrational drug use, while patients' adherence is also essential in terms of accurately maintaining treatment. One of the other significant reasons for DRP is the tendency of patients to use OTC medication without consulting pharmacists. The pharmacist is a substantial health professional in the identification of DRP, in correcting the implementation of rational drug use principles by giving drug-related consultancy service and improving pharmaceutical care service by observing patients during the treatment process [6].

In Western countries, the number of heart failure (HF) patients is rising, mainly owing to aging. Because of the improvement in pharmacologic and nonpharmacologic treatment for heart failure, the heart failure-related therapeutic regimen is becoming more complicated. Noncompliance with this regimen can result in worsening HF symptoms, sometimes leading to hospitalization.

Noncompliance with this medication and other lifestyle recommendations was a significant problem in HF patients. Evidence-based interventions to improve compliance in patients with HF are scarce. According to European guidelines of the European Society of Cardiology [ESC] and the American Heart Association/American College of Cardiology [AHA/ACC], multiple medications [ACEI, diuretics, B-blocker, spironolactone, digoxin] are beneficial for heart HF patients, Nonpharmacological lifestyle modification such as fluid and sodium restriction daily weighing, adjustment of activity, smoking cessation, and limitation of the amount of alcohol are requested [7].

According to research conducted in Germany and Bangladesh, 182 cardiac patients (72%) were males, which is in line with the fact that males are more prone to heart disease compared to women of a similar age, but according to a study conducted in India, 112 patients' chart with CVD were reviewed during the study period, out of these 53 drug-related problems were identified from 44 patients. The most common drug-related problem was found to be drug Interactions (49.05%), followed by Adverse Drug Reactions (18.86%) and failure to receive drugs (9.43%) [8,9].

Cardiovascular diseases account for 7-10% of all adult medical admissions in African hospitals, with heart failure contributing to 3-7%. Drug therapy problems among cardiovascular diseases will lead healthcare professionals to optimize drug therapy, which may influence health expenses, save lives, improve health, reduce morbidity, and increase quality of life [10,11]. A study conducted in Felegehiwot referral hospital among cardiovascular patients in Ethiopia indicates that 105 DTPs were identified. From this, most of the patients had drug therapy problems, of which indication-related problems constituted the highest part [12].

Statement of the Problem

Although medications play an essential role in the cure, palliation and prevention of disease, they also expose patients to drug-related problems [13].

Drug therapy problems (DTPs) are a significant safety issue for hospitalised patients and may lead to reduced quality of life, increased hospital stay, increased overall healthcare cost and even increased risk of morbidity and mortality [14,15].

Cardiovascular diseases are the number one cause of death globally; more people die annually from CVDs than any other causes. This is due to the complexity of medication use, which exacerbates cardiac problems. Omeprazole + Digoxin interactions are also found in cardiac patients. During the co-administration of this medication, the digoxin level increased by PPI, especially omeprazole. The interaction may cause a spike in the concentration of heart medication, which could lead to complications. So, the concomitant use of clopidogrel + aspirin or clopidogrel +proton pump inhibitor (PPI) is still in dilemma.

Therefore, assessing patients' gastrointestinal risk and selectively choosing is necessary, lowest as the reaction with clopidogrel [8].

According to a study conducted in India, 112 patient case charts were reviewed during the study period, out of which 53 drug-related problems were identified from 44 patients. The most common drug-related problem was found to be drug Interactions (49.05%), followed by Adverse Drug Reactions (18.86%) and failure to receive drugs (9.43% [9].

The Study in public and private hospitals in Addis Ababa showed that more than half of the deaths were due to cardiovascular diseases [12].

In one of the studies conducted at Jimma University Specialized Hospital in Ethiopia, drug therapy problems were identified in 73.5 % of study subjects, but according to a study conducted in Adamas among 192 hypertensive patients showed that about 452 DTPs were identified in 155 patients [16,17].

Significance of the Study

Early identification of the types and patterns of DTPs and their associated factors may enhance the prevention and management of DTPs. These also enable the practitioner to collaborate with the patients to construct a better care plan. It would be much better to prevent drug therapy problems than to correct them.

Therefore, this Study is significant in several perspectives. Firstly, in Ethiopia, particularly in the study area, little is known about the DTP status among the target population, as studies are scarce in this regard. Therefore, this Study will generate essential data that could fill this gap. Secondly, having data regarding the burden of DTP among CVD patients will help policymakers effectively plan to prevent risks caused by these problems. Thirdly, identifying risk factors of DTP is essential in that it creates opportunities for designing effective interventions to mitigate issues related to drug therapy, thereby maximizing patient care.

This research identified a unique predictor of potential medication-related problems, facilitating systematic medication screening and treatment planning. Early identification of types and patterns of drug therapy problems and factors associated with them may enhance the prevention and management of drug therapy problems. Category and identifying DTP will also enable the practitioner to construct a better care plan in collaboration with the patient. Lastly, the findings from this Study are used as a baseline for future researchers who want to undertake similar Studies in the country.

Literature Review

According to an observational study of home visits on chronic HF by a pharmacist that was made after a referral from a multidisciplinary chronic HF service in India in Dandenoge Hospital to assess barriers to medication adherence in 66 chronic heart failure patients during home visits, the main reason for medication no adherence was duplication of drugs (71%) and running out of medication [33%] and ADR (20%) [1]

According to a study conducted in India, 112 patient case charts were reviewed during the study period, out of which 53 drug-related problems were identified from 44 patients. The most common drug-related problem was found to be drug Interactions (49.05%), followed by Adverse Drug Reactions (18.86%) and failure to receive drugs (9.43%) [9].

According to a study conducted in the general medicine and cardiology department of 640 bedded multidisciplinary tertiary care hospital at Coimbatore on 80 patients, the significant diagnoses included systemic Hypertension (SHT) 47.5%, ischemic heart disease (IHD) 16.25%, congestive cardiac failure (CCF) 10%, and Cerebrovascular accident (CVA) 7.5%. In patients with SHT, a total of 112 DTPs (28.43%) were identified in these patients. In patients with CCF, 47 (11.93%) DTPs were observed. In patients with CVA, 33 (8.38%) DTPs were identified. In patients with SHT and IHD, the most frequently identified DTPs were drug interactions (54.46% & 57.75%), Drug overdosage (12.5% & 11.27%) and drug duplication (8.93% & 8.45%), respectively [18].

According to a study conducted at the Karachi National Institute of Health in Australia, of 267 heart failure patients, 73(27.3%) were compliant. In contrast, 197(72.7%) were noncompliant due to regimen complexity (20.2%), financial reasons (15.5%), the need not to take the medication (15.5%), miscommunication (15%), side effects (13.5%), nonavailability or the nonavailability of the mediation (11.4%) [19].

The Study conducted at Grenoble University Hospital, France, reported that 429 drugs were associated with DTPs. Cardiovascular drugs were the most frequently implicated agents (22.2%) [20].

According to research conducted on patients with cardiovascular disease who were in intensive care units (ICU) of tertiary care hospitals in India, A total of 174 drug therapy problems were identified during the study period, which was classified into drug interactions 86%, untreated indications 23%, adverse drug reactions 22%, improper drug selection18%, therapeutic duplication 15%, patient in need of therapeutic Drug monitoring 6% and Drug without indication 4% [21].

According to research conducted in both Saud Arabia and the United Kingdom, Drug and dose selection accounted for70% of the causes of medication-related problems (MRPs) in SA, while ADRs were the leading cause of MRPs in the UK [22].

According to a cross-sectional study conducted in Adama Hospital Medical College on 192 hypertensive patients, 452 DTPs were identified in 155 patients, accounting for 80.7%. The most common DTP identified was drug interaction in 64.4% of patients, and nonadherence was recorded in 86 patients (44.8%) [17].

According to a study conducted in Jimma, Ethiopia, 73.5% of patients in the internal medicine wards of Jimma University Specialized Hospital had one or more DTPs. Among 257 patients involved in the Study, 316 DRPs were identified in 189, making the average number of DRPs 1.2 per patient. A single DRP was identified in 97 (37.7%) patients, while 92 patients had two or more DRPs. From the six classes of DRPs addressed by the Study, 103 (32.6%) cases were related to an untreated indication or need for additional drug therapy, and 49 (15.5%) cases were

related to high medication dosage. Unnecessary drug therapy in 49 (15.5%) cases, low medication dosage in 44 (13.9%) cases, and ineffective drug therapy in 42 (13.3%) cases were the other classes of problems identified. Noncompliance in 31 (9.8%) cases was the least prevalent DRP. Again, according to a study conducted in FELEGEHIWOT REFERAL HOSPITAL and JSUH, 164 DTPs were identified, with a mean of 1.69 + 0.99 DTP per patient. The Study in Jimma Specialized University Hospital in the internal medicine ward showed that there were 149 DTPs with 3.014 DTP per patient, and this variation can be due to the Involvement of clinical pharmacy service since then. The most common CVD encountered were hypertensive heart disease (27, 27.84%), rheumatic heart diseases (24, 24.74%) and functional heart failure and corpulmonalae (24, 24.74%) [16].

Objective

General Objective

- To assess drug therapy problems among patients with cardiovascular disease in the medical ward and those who had follow-ups at the ambulatory clinic of HFSUH from March 1 to March 30, 2022

Specific Objectives

- To identify the types of drug therapy problems
- To determine the magnitude of each type of drug therapy problems
- To assess the degree of severity of drug therapy problems in patients with CVDS
- To determine the number of drug therapy problems per patient
- To evaluate factors associated with drug therapy problems

Methodology

Study Area and Period

The study was conducted among patients admitted with CVD at the medical ward and ambulatory clinics of HFSUH from March 1 to March 30, 2022, GC. HFSUH is located in Harar town, Harar region, east of Ethiopia, 526Km far away from Addis Ababa. The area is divided into nine woredas. The estimated total population is 183,344(ECSA, 2007). There are six hospitals: Four governmental (two public, two militaries), two private hospitals, &eight Health centers. HiwotFana Specialized University Hospital is one of four governmental hospitals. This hospital provides internal medicine, surgery, pediatrics, emergency, maternity, family planning, gynecologic, ambulatory clinics, dental, psychiatric, physiotherapy, delivery TB and HIV service centres to the people of east Ethiopia, especially those from Hararge-zone and Harar-region. The medical ward of this hospital is divided into ICU, critical rooms, and cold rooms.

Study Design: A Cross-sectional study was used.

Population

Population Source

All patients were admitted to the medical ward and had follow-up visits to ambulatory clinics of HFSUH during the study period.

Study Population

All patients with CVD who were admitted to the medical ward and had follow up at ambulatory clinics of HFSUH in the study period.

Eligibility Criteria

Inclusion Criteria

Patients who were admitted with CVD and who had taken cardiovascular drug therapy. Patients with CVD who had follow up at an ambulatory clinic in HFSUH

Exclusion Criteria

- Patient charts with incomplete information and patients who had not taken medication
- Patients discharged before cross-checking the collected data

Sample Size and Sampling Technique

The sample size depended on the number of patients admitted during the study period. A convenient sampling technique was used per the data collection period and inclusion criteria.

Sample Size Determination

The sample size was determined using the statistical formula. It suspected that a 95% confidence interval was desired to estimate the proportion within 5%, and the sample size drawn was

$$n= Z^2pq/d^2= \frac{(1.96)^2 \text{ x } 0.5 \text{ x } 0.5}{(0.05)^2} = 384,$$

where,
q= 1-p = 0.5

The above sample was taken from a relatively small population (<10,000), then the sample size was adjusted as;

NF= n/ (1+ (n/N)),
=384/ (1+ (384/400))
T =196

Then I took 10% of 196 as a contingency value because the data was not filled correctly.

Finally, a total no of 216 patient cards was calculated as the sample size of the Study

Sampling Technique

Convenient sampling was employed following the inclusion criteria and data collection period. To choose population representatives, the Study used essential random sampling. The first steps in the sampling process were interviews with patients admitted with cardiovascular disease and followed up with ambulatory clinics during the study period (March 1–March 30, 2022).

Variables

Dependent Variables

- Presence of DTP

Independent VARIABLE

- **patient-related factors**
- Age
- sex
- marital status
- Educational status
- medication history
- length of hospitalization
- **Drug-related factors**
- number of drugs

Data Collection Instrument
During the Study, patients' chart review guided questionnaire and data collection tool were used for data collection. The DTPs evaluation tool was prepared based on the categories and reasons for DTP.

Data Collection Process
Data collection was undertaken from 03-29 March 2022 in HFSUH. Data were collected through medical record reviews of patients using a prepared standard checklist and structured questionnaire. The structured questionnaire was translated into their local language. The content of the checklist includes patient details, investigations, procedures, current and past medication, and disease conditions. Other results, such as those from biochemistry and hematology, were also found. The contents of the standard questionnaire include social history, Drug and disease-related questions, and allergies. Two pharmacists, who took clinical pharmacy in-service training, and one Nurse with a bachelor's degree were involved in collecting the data.

Data Entry and Analysis
The data was cleaned, coded, entered and analyzed in SPSS 20. , Frequencies and percentages described categorical variables and continuous variables were characterized by means and standard deviations.

Data Quality Assurance
To ensure its quality, data was collected by graduating medical student students with a basic knowledge of pharmaceutical care services; the focal advisor supervised the data collection process and reviewed all filled DTP registration formats.

Ethical Consideration
The process started after getting permission from HFSUH. A legal letter was written for the medical ward head from the school of medicine and was submitted to the concerned bodies of HFSUH. Ethical conduct was maintained during data collection and the patient's chart review period. Patient chart privacy and confidentiality were ensured during the patient chart review period. Thus, the full name and address of the patient were not recorded in the DTP data collection tool.

Dissemination of Results
The findings of this study were presented and disseminated to the School of Medicine, the College of Medical and Health Science of Haramaya University, other Ethiopian universities having medical or health science faculty, different levels of health facilities, governmental and non-governmental organizations and other concerned bodies.

Definitions of Terms and Operational Definitions
Adverse Drug Event: Any injury related to the use of a drug, even if the causality of this relationship is not proven [2].

Adverse Drug Reaction any noxious, unintended, and undesired effect of a drug, which occurs at doses used in humans for prophylaxis, diagnosis or therapy (2).

Drug Therapy Problem This is a circumstance or event that actually or potentially interferes with the desired effects of health outcomes.

Hospital Stay the time the patient spent in the hospital from admission to the date the data was taken.

Adherence is a patient's drug-taking behavior measured with the Morisky scale. Patients who say no to at least one question are noncompliant [2].

Hypertensive Patient: is a patient with high blood pressure and has already started anti-hypertensive medication [13].

Contra-Indication is medical condition in which specific drugs are not indicated because they are associated with severe medical complication

Co-Morbidity is the presence of one or more additional diseases or disorders co-occurring with a primary disease.

Dosage Includes the dose given, the administration frequency and the therapy duration.

Dosage Too High the drug dosage is too high, which may result in undesirable effects.

Dosage Low: the drug dosage is too low to produce the desired response

Effectiveness-Related Problems, low dosage, or ineffective drug therapy

Indication-Related Problems Unnecessary drug therapy or need additional drug therapy

Inappropriate Dosage: too high or too low dosage

Ineffective Drug Therapy, the Drug or the dosage form is not recommended for the condition to produce the most effective desired response.

Need Additional Drug Therapy: Additional drug therapy is required to treat or prevent a medical condition or illness.

Noncompliance: the patient is not able or willing to take the drug therapy as intended and tends to take prescribed drugs.

Unnecessary Drug Therapy: Drug therapy when the patient does not have a clinical indication to start medication

Result
Sociodemographic Status of Patients
Among the total patients involved in the Study, 93(43%) were male, and 123(57%) were females. Most of the patients were married, which was 164 (75.9%) of the total study participants. Those who complete secondary school account for 83(38.4%), followed by those who cannot write and read 80 (37%). A large number of study participants were of older age (>58). From total females of 123, 10 were pregnant (8.1%) and 9 were breastfeeding (7.3%) [Table1]

Table 1: Shows the Sociodemographic Characteristics of Study Patients in The Internal Medicine Ward and At Ambulatory Clinics in Hiwot Fana Specialized University Hospital, March 2022 (N=216)

Sociodemographic Variable			Frequency	Percent (%)
Sex	Male		93	43
	Female	pregnant	10	4.7
		Non pregnant	113	52.3
		Total	123	57
		breastfeeding	9	4.2
		Nonbreastfeeding	114	52.8
		Total	123	57
Age	15-25		41	19
	26-36		42	19.4
	37-47		30	13.9
	48-58		38	17.6
	>58		65	30.1
Marital status	Single		47	21.8
	Married		164	75.9
	Widowed		-	-
	Divorced		5	2.3
	Orthodox		83	38.4
	protestants		41	19
	Muslims		91	42.1
	Others		1	0.5
Educational status	illiterate		80	37
	Primary		35	16.2
	Secondary		83	38.4
	Tertiary		18	8.3
Ethnicity	Amhara		57	26.4
	Oromo		135	62.5
	Gurage		9	4.2
	Tigre		10	4.6
	Others		5	2.3

Most commonly used social drugs were other drugs, followed by caffeine, and the least was alcohol consumers [figure 1]

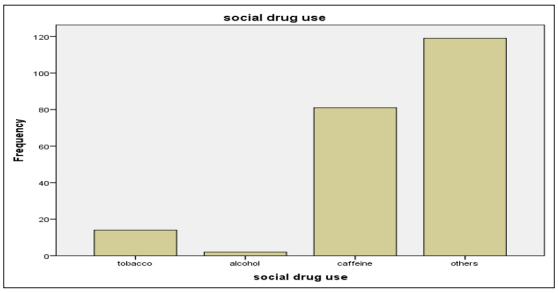

Figure 1: Bargraph of patients' social drug use in the internal medicine ward and at ambulatory clinics in Hiwot Fana Specialized University Hospital, March 2022

The most common medical problems associated with a family history of patients with CVD were medical problems other than CVD and DM [Table]

Table 2: Shows the Family History of Patients with CVD in The Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Medical Problems	Frequency	Percent
CVD	10	4.6
DM	6	2.8
Others	200	92.6
Total	216	100

Among cardiovascular diseases, the most common was CHF, which accounted for 96(44.4%), followed by Hypertension, which was 93(43.1%), respectively. However, acute coronary syndrome and atrial fibrillation were the least common, which was in the same range of 1 (0.5%) [Table 3].

Table 3: Shows the Working Diagnosis of The Patients with CVD In the Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Working diagnosis	Frequency	per cent
CHF	96	44.4
HTN	93	43.1
IHD	9	4.2
STROKE	6	2.8
VTE	10	4.6
ACS	1	0.5
AF	1	0.5
TOTAL	216	100

The relevant laboratory and vital signs were taken for 100 and 144 patients, respectively, from the total number of patients who participated in the study [Table 4].

Table 4: Showing Relevant Laboratory Values of Patients With CVD in the Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Variable		Frequency	Percent
Laboratory value	yes	100	46.3
	No	116	53.7
Vital signs	Yes	144	66.7
	No	72	33.3
Total		216	100

As explained in the following pie chart, of the total drugs prescribed for patients with cardiovascular disease, the most prescribed drugs were combinations of drugs like ACEIS, diuretics, CCB, BB, statins, aspirin, anticoagulants and others: 106(49.1%), followed by diuretics 57(26.4%).

Among the total number of patients with CVD who participated in the Study, 127 patients (58.8%) were associated with compelling medical conditions. Of these compelling agents, the most common was DM, which ranged from 38(29.9%) to 33 (26%), followed by pneumonia, 33(26%), but dyspepsia was the least common, 13(10.2%) [Table 5].

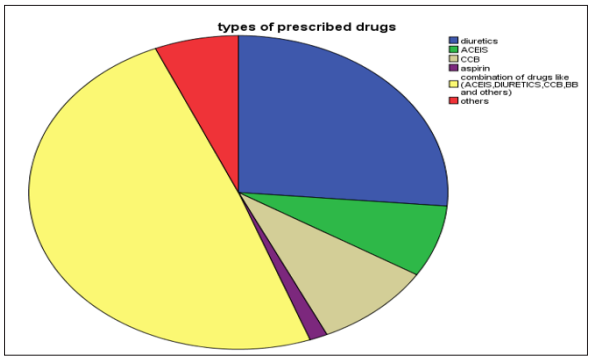

Figure 2: Pie-chart of prescribed drugs for patients with CVD in the internal medicine ward and at ambulatory clinics in Hiwot Fana Specialized University Hospital, March 2

Table 5: showing the co-morbidity status of patients with CVD in the medical ward and ambulatory clinics, HFSUH, March 2022

Comorbid agents	Frequency	Percent
DM	38	29.9
Anemia	18	14.2
Dyspepsia	13	10.2
Pneumonia	33	26
Others	25	19.7
Total	127	100

Of the total patients who participated in the Study, 131(60.65%) patients were associated with drug therapy problems, which means drug therapy problems per patient was 0.6. The most common drug therapy problem was a need for additional drug therapy, which was 76(58%), followed by unnecessary drug therapy and Noncompliance, which was in the same range of 16(12.2%), respectively. In terms of the degree of severity, almost all Drug-related problems share a similar range. Still, in this Study, the need for additional drug therapy was both severe and most common drug therapy problems, followed by unnecessary drug therapy problems [Table 6].

Table 6: Showing Drug Therapy Problems in Patients with CVD In the Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Types of DTP	Frequency	Percent
Unnecessary drug therapy	16	12.2
Need for additional drug therapy	76	58
Ineffective drugs products	9	6.9
Inappropriate dose	14	10.7
ADS	-	-
DI	-	-
Noncompliance	16	12.2
Total	131	100

This Study found drug therapy problems in patients with cardiovascular disease and identified drug therapy problems with compelling agents. Among the total patients who participated in the Study, 18 (8.3%) were associated with both drug therapy problems with CVD and co-morbidity. The most common drug therapy problem associated with co-morbidity was a need for additional drug therapy in 16 (7.4%) patients, but ineffective drug products were the most minor 2(0.9%) [Table 7].

Table 7: Showing Drug Therapy Problems with Co-Morbidities in Patients with CVD In the Medical Wards and Ambulatory Clinics, HFSUH, March 2022

DTP with co-morbidity	Frequency	Percent
Unnecessary drug therapy	-	-
Need for additional drug therapy	16	7.4
Ineffective drugs products	2	0.9
Inappropriate dose	-	-
ADS	-	-
DI	-	-
Noncompliance	-	-
Missing	198	91.7
Total	216	100

In this study, no association was found between drug therapy problems and associated factors. Perceived associated factors, found to be significant by binary regression, were introduced to binary logistic regression. All covariates were not associated with drug therapy problems [Table 8].

The number of drugs per patient was typical, especially three and above drugs, which accounted for 63.5%, and the least was one Drug per patient, which accounted for 11% [Table 9].

Discussion

The occurrence of DTPs among hospitalized and follow-up patients was associated with different reasons and risk factors. Identifying these factors is crucial for preventing and controlling DTPs in an individual patient.

Indication-related problems, which include the need for additional drug therapy and unnecessary drug therapy, were the leading DTPs identified. Effectiveness-related problems, which include ineffective drug therapy and inappropriate doses, were the second most prevalent group of DTPs. Safety-related problems in this Study only indicated that the dose was too high. Ineffective drug products were the most minor drug therapy problems in this Study. Still, a Study conducted in Felegehiwot referral hospital among cardiovascular patients in Ethiopia indicates a total of 105 DTPs were identified. From this, most of the patients had drug therapy problems, of which indication-related problems constituted the highest part [12]. There was no significant difference in indication-related drug therapy problems. Still, the effective communication between health professionals on the selection of drugs led to a low prevalence of ineffective drug product DTP in this Study.

In this study, female sex, age, family history and the clinically significant potential need for drug therapy were found to be independent predictors, which increase the chance of having DTP.

However, sex, family history, marital status and age were not significantly associated with DTPs in these studies. This Study's findings differ from those of other studies because of the sample size.

Table 8: Showing Drug Therapy Problems Associated with A Respective Sociodemographic Character (Associated Factors) In Patients with CVD in The Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Sociodemographic character		Df	P-value	COR	95% CI	
Sex	Sex(1)	1	.48	1.229	.693	2.180
Age	Age(1)	1	.664	1.212	.508	2.89
	Age(2)	1	.204	.593	.264	1.328
	Age (3)	1	.684	1.222	.465	3.210
	Age(4)	1	.245	.611	.266	1.404
Pregnancy	Pregnancy(1)	1	.709	1.307	.321	5.311
Breastfeeding	5.168	1	.891	1.105	.263	4.647
Social drug use	Social drug(1)	1	.629	1.154	.645	2.065
	Social dug(2)	1	.463	.653	.209	2.039
	Social drug(3)	1	.999	105500	.00	-
Family HX	Family HX(1)	1	1.000	.000	.00	-
	Family HX(2)	1	1.000	.000	.00	-
	Family HX(3)	1	1.000	.000	.00	-
Marital status	Marital(1)	1	.854	1.186	.393	7.3
	Marital (2)	1	.494	1.944	.289	13.073
	Marital (3)	1	.63	1.432	.5045	2.735
Types of prescribed drugs	Drug (1)	1	.590	1.394	.437	4.661
	Drug (2)	1	.678	.733	.170	3.169
	Drug (3)	1	.760	.667	.049	9.032

*p-value < 0.25 considered as statistically significant or associated as per crude odds ratio

Table 9: Shows the Number of Drugs Per Patient in Patients with CVD in the Medical Ward and Ambulatory Clinics, HFSUH, March 2022

Number of drugs	Frequency	Percent
One Drug	24	11
Two drugs	55	25.5
Three and above	137	63.5
Total	216	100

This Study showed that 131 (60.65%) of patients admitted to the internal medicine ward and had follow-up at ambulatory clinics associated with DTP, which was lower than the Study conducted in India On patients with cardiovascular disease who were in intensive care unit (ICU) of tertiary care hospitals, 174 drug therapy problems were identified during the study period, which were classified into drug interactions 86%, untreated indications 23%, adverse drug reactions 22%, improper drug selection18%, therapeutic duplication 15%, patient in need of therapeutic Drug monitoring 6% and Drug without indication 4% [21]. This variation might be due to the variation in the specification of the service unit and sample size.

In this Study, heart diseases were more common in females than in males of similar age, but according to research conducted in Germany and Bangladesh, 182 cardiac patients (72%) were males. This is in line with the fact that men are more prone to heart disease than women of a similar age [8,9]. This difference might be due to social life, sample size and environmental conditions.

In this Study, 60.65% DTP was identified from 216 patients, and drug therapy problem per patient was 0.6, which was inconsistent with a Study conducted in Jimma, Ethiopia, which found that 73.5% of patients in the internal medicine wards of Jimma University Specialized Hospital had one or more DTPs. Among 257 patients involved in the Study, 316 DRPs were identified in 189 patients, making the average number of DRPs 1.2 per patient [16]. This might be due to the collaboration of health providers like medical interns, residents and pharmacists to avoid drug-related problems in this Study.

According to this survey, the most common CVD was CHF, which accounted for 96(44.4%), followed by Hypertension, 93(43.1%). However, according to a study conducted in Jimma Specialized University Hospital, the most common CVDs encountered were hypertensive heart disease (27, 27.84%), rheumatic heart diseases (24, 24.74%), functional heart failure and cor-pulmonaria (24, 24.74%) [16]. This variation might be due to environmental conditions and social life.

In this Study, from 216 patients, 131 DTP was identified. The most common DTP identified was needed for additional drug therapy 58% followed by Noncompliance and unnecessary drug therapy, which account for 12.2% in a similar range respectively, but according to a cross-sectional study conducted in Adama Hospital Medical College on 192 hypertensive patients, a total of 452 DTPs were identified in 155 patients in which it accounts for 80.7% of total patients. The most common DTP identified was drug interaction in 64.4% of patients, and no adherence was recorded in 86 patients (44.8%) [17]. The variation might be due to a knowledge gap during medication selection and categorizing CVD into specific diseases (HTN).

According to this survey, the primary working diagnoses include CHF (44.4%), HTN (43.1%), VTE (4.6%) and stroke (2.8%), which was inconsistent with a study conducted in the general medicine and cardiology department of 640 bedded multidisciplinary tertiary care hospital at Coimbatore, India, on 80 patients, the significant diagnoses included systemic Hypertension (SHT) 47.5%, ischemic heart disease (IHD) 16.25%, congestive cardiac failure (CCF) 10%, and Cerebrovascular accident (CVA) 7.5%,[18]. This difference might be due to the sample size.

According to this study, 131 drug therapy problems were identified in 216 patients. At the same time, the most common DTP was the need for additional drug therapy (58%), followed by unnecessary drug therapy and Noncompliance, which had the same range (12.2%), which was inconsistent with a study conducted in India 112 patient case charts were reviewed during the study period, out of which 53 drug-related problems were identified from 44 patients. The most common drug-related problem was found to be drug Interactions (49.05%), followed by Adverse Drug Reactions (18.86%) and failure to receive drugs (9.43%) [9]. This variation may be due to the knowledge gap of the physicians towards the selection of medication and sample size variation, as well as due to medication use culture [23-26].

Conclusion and Recommendation

Conclusion

In general, patients who were admitted to internal medicine and received follow-up care at ambulatory clinics frequently experienced drug therapy issues. About 216 individuals had 131 drug treatment issues in total, with extra drug therapy accounting for 58% of all DTPs. With 12.2 and 12.2% of all DTPs, respectively, Noncompliance and needless drug therapy issues were the second most prevalent drug therapy issues. Drug additions, drug discontinuations, monitoring for possible Noncompliance, and varying the frequency of delivery were common forms of treatments performed for the DTPs. CHF was the most common cardiovascular condition, and hypertension came in second.

Recommendation

Based on the findings of this Study, the following recommendations are made:

- The HFSUH health policymakers should continue to include clinical pharmacists in the hospital. Clinical pharmacists should also be geared to identifying, solving, and preventing DTPs rather than overlapping on the already existing dispensing druggists, and healthcare providers should provide the necessary facilities for patients until discharge and essential care for patients come for a refill.
- Hospital administrators should work to introduce computerized physician order entry (CPOE) system software to decrease medication errors.
- Consider age-related changes in pharmacokinetics or pharmacodynamics and their effect on dosing requirements.
- Check for potential drug-disease,drug-food interaction and drug-drug interactions before starting a new drug.
- MOH and FMHACA: To establish nationwide specific and comprehensive cardiovascular disease management guideline
- MOH and FMHACA: To effectively establish and develop pharmaceutical care services

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